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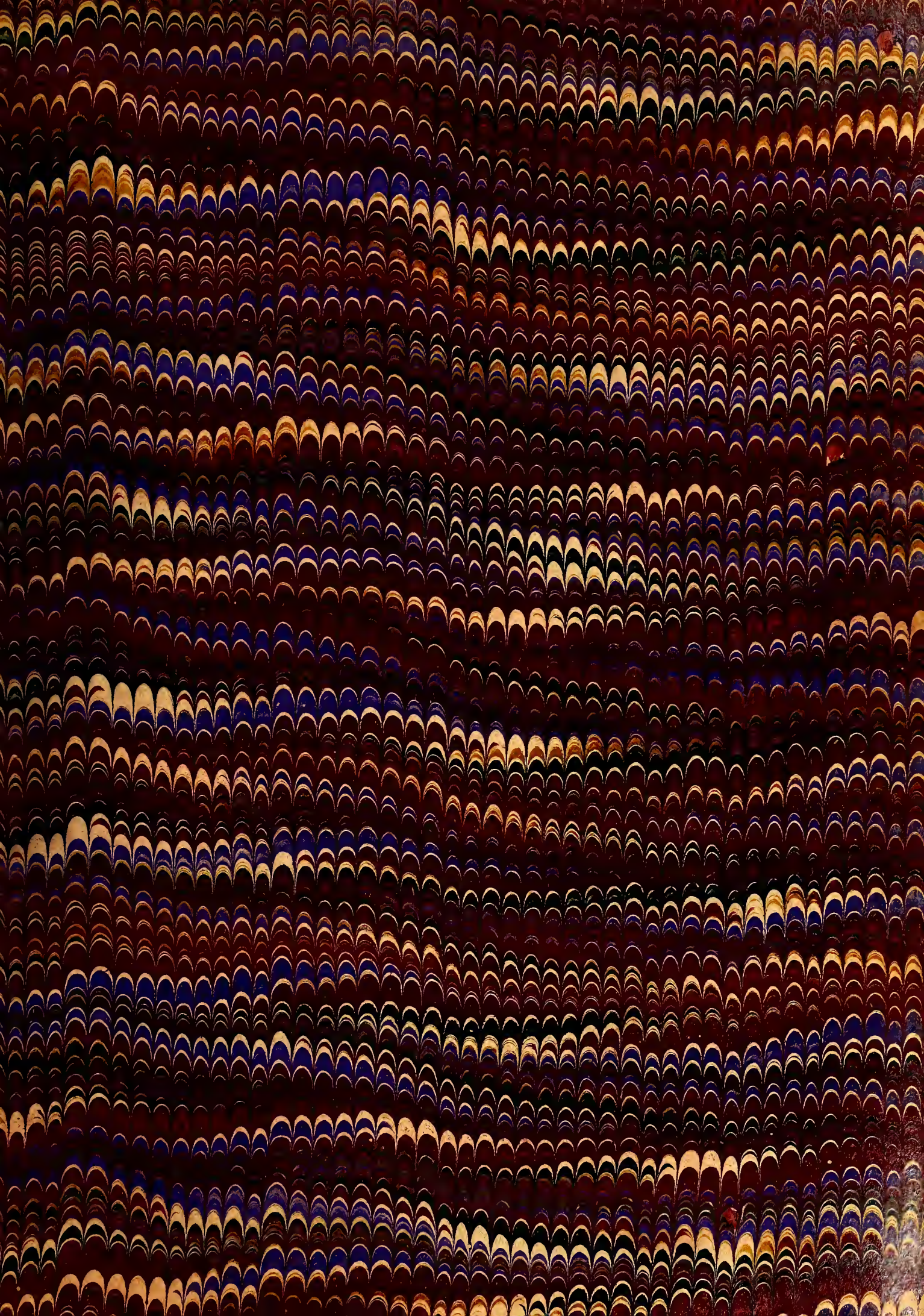


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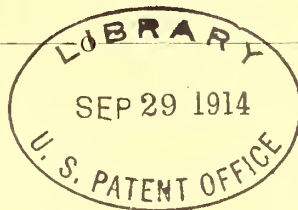
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INDEX TO VOLUME XXXVII

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PAGES BY WEEKS

Jan. 7.....	pages	1 to	58
Jan. 14.....	"	59 to	100
Jan. 21.....	"	101 to	144
Jan. 28.....	"	145 to	190
Feb. 4.....	"	191 to	246
Feb. 11.....	"	247 to	288
Feb. 18.....	"	289 to	324
Feb. 25.....	"	325 to	358
Mar. 4.....	"	359 to	404
Mar. 11.....	"	405 to	444
Mar. 18.....	"	445 to	486
Mar. 25.....	"	487 to	544
April 1.....	"	545 to	622
April 8.....	"	623 to	656
April 15.....	"	657 to	696
April 22.....	"	697 to	734
April 29.....	"	735 to	774
May 6.....	"	775 to	826
May 13.....	"	827 to	862
May 20.....	"	863 to	902
May 27.....	"	903 to	940
June 3.....	"	941 to	1000
June 10.....	"	1001 to	1044
June 17.....	"	1045 to	1094
June 24.....	"	1095 to	1136

A

- Accelerometer and gradient meter combined (Trotter), 429
- Accident claim department:
 - Campaigns against accidents:
 - Cleveland, Southwestern & Columbus Ry.
 - Reduction in costs, 122
 - School children, 138
 - "Southwestern creed," 94
 - Talks to employees [Schneider], 379; Comment, 361
 - Indianapolis & Louisville Traction Co., 137
 - Kansas City, Metropolitan Street Ry., 1129
 - Lehigh Valley Transit Co., 351
 - Portland, Ore., 264, 538, 1087
 - Tacoma Railway & Power Co., Safety league, 282
 - Cause and prevention of accidents [Kellogg], 790; Discussion, 798; Comment, 776
 - Cleveland, Southwestern & Columbus Ry., Reduction in costs, 192
 - Comments on safe operation of railways [Dye], 265
 - Committees of employees on safety, 290
 - Free transportation of employees, Legal status, 779
 - Freight claims, Method of accounting [Davis], 463
 - Human element [Kellogg], 791
 - Index information bureau [Odell], 1022
 - Liability of employees [Peck], 159; Discussion, 156
 - Medical department [Cole], 1024
 - Prevention of accidents by claim agents [Carson], 1022
 - Prevention, Portland, Ore., Advertising, 538
 - Prize article on "How to avoid accidents," Portland, Ore., 264
 - Reducing boarding and alighting accidents [Hone], 1023
 - Safety league, Tacoma Railway & Power Co., 282
 - Settling physicians' bills, 1024
- Accidents:
 - Collisions on interurban roads and their causes [Peck], 159; Discussion, 156
 - Comparison of accidents on pay-within and other cars, 1065
 - Conference on. (See New York State Public Service Commission)
 - First aid to the injured [Moorhead], 419
 - Indiana, for three months, 352
 - New York City, 73, 615, 819, 1038
 - New York State, Report of Public Service Commission, 301
 - Open cars vs. closed cars, Texas experience [Kellogg, Jr.], 790; Comment, 776
 - Staunton, Ill., Crew indicted, 352
 - Texas street railways [Kellogg], 790; Discussion, 798; Comment, 776
- Accountants' Association:
 - Committee on standard classification of accounts, Meeting of, 169
 - Committees, List of, 210
 - Executive committee meeting, 210

- Accountants' Association: (Continued)
 - Joint committee on freight and express accounting, 501
 - Joint committee on shop accounting, Meetings, 215, 795, 1111; Comment, 776
 - Progress of [Forse], 28
- Accounting:
 - Auditor, The traveling [White], 467; Discussion, 502
 - Depreciation [Edwards], 972
 - Depreciation account proposed in Nebraska, 919
 - Depreciation in New York. (See New York City, Metropolitan Street Ry., Reorganization.)
 - Depreciation appropriation in St. Louis, 315; Comment, 247
 - Engineering, Sub-committee meeting of joint committee, 795; Comment, 776
 - Freight claims [Davis], 463
 - General accounting of public utility corporations [Tharp], 842
 - Interline accounting [Hixson], 503
 - Maintenance, in Chicago, 547
 - New York Public Service Commission, Report on uniform accounts, 301
 - Renewals as defined by Chicago Board of Supervising Engineers, 374; Comment, 547
 - Shop, Inter-department charges, 193
 - Shop, Meeting of joint committee of Engineering and Accountants' Association, 215
 - Standard classifications adopted by New Jersey Commission, 273
- Accounting Conference. (See Central Electric Accounting Conference)
- Advertising:
 - Illinois Traction System, Signal equipment, 719
 - New York, Westchester & Boston Ry., 138
 - Summer traffic [Smith], 514; Comment, 487; Discussion, 521
- Aerial monorailway (Fawkes), *1028
- Aeroplanes at street railway parks, *980
- Air-brakes. (See Brakes, Air.)
- Akron, Ohio:
 - Brick paving with pitch filler, *718
 - Northern Ohio Traction & Light Co.:
 - Annual report, 1127
 - Cars, One-side convertible, *1074
 - Improvements, 304, 396, 648
 - Officers, 239
- Alabama, Legislation, 313
- Alaska-Northern R. R., Gasoline motor car, *984
- Albany Southern R. R. (See Hudson, N. Y.)
- Albany, N. Y., United Traction Co.
 - A conscience letter, 757
 - Improvements planned, 1114
 - Rensselaer fare case, Court decision, 479, 767, 895
 - Reply to Report of Commission on cars, 183
- Allentown, Pa., Lehigh Valley Transit Co.:
 - Accident prevention campaign, 351
 - Accident record, 689
 - Annual report, 435
 - Improvements during 1910, *250
- Alliance, Ohio, Stark Electric R. R., Telephone train dispatching, *428
- Alternating-versus direct-current for railway operation, 7
- Alton, Jacksonville & Peoria Ry. (See Jerseyville, Ill.)
- American Cities Railway & Light Co. (See New York City)
- American Electric Railway Accountants' Association. (See Accountants' Association)
- American Electric Railway Association:
 - Banquet at Hotel Astor, New York, 223
 - Circular on associate membership and affiliated associations, 72
 - Committee on education, Meeting, 759
 - Committee on Electric Railway Dictionary, Meeting, 215
 - Committees, List of, 219
 - Committees on various subjects, Meetings, 214
 - Condition and work of [Brady], 26; Comment, 12
 - Convention:
 - Exhibit arrangements, *1118
 - Location, Announcement of committee, 803; Comment, 775
 - Location, Meetings of committee, 604, 623, 419
 - Morning sessions, 1003
 - Development and work of [Brady], 216
 - Executive committee meeting, 214
 - Insurance expert appointed, 1073
 - Mid-year meeting, 191, 214, 223
- American Electric Railway Engineering Association:
 - Committee on buildings and structures, Meeting, 917

- American Electric Railway Engineering Association: (Continued)
 - Committee for conference with American Society for Testing Materials, Meeting, 468
 - Committee on engineering apprentices, Meeting, 1117
 - Committee on equipment, Meetings, 218, 800
 - Committee on power distribution, Meetings, 414, 453, 880
 - Committee on power generation, Meeting, 508
 - Committees, List of, 118
 - Joint committee on block signals, Meetings, 169, 501, 599, 1114; Comment, 360, 624
 - Joint committee on shop accounting, Meetings, 215, 795, 1111; Comment, 776
 - Letter ballot on standards, 1028
 - Progress of [Harvie], 28
 - Question Box, Discontinuance proposed, 13
- American Electric Railway Manufacturers' Association:
 - Banquet announcement, 127
 - Executive committee meetings, 210, 1072, 1119
- American Electric Railway Transportation and Traffic Association:
 - Committee on city rules:
 - Meeting, 713
 - Recommendations, 963
 - Committee on freight and express traffic, 340
 - Committee on interurban rules:
 - Meetings, 170, 493, 675, 716; Comment, 445, 698
 - Organization, 82
 - Committee on passenger traffic, Meeting, 635
 - Committee on schedules and time-tables, Meetings, 169, 639, 758
 - Committee on transfers and transfer information, Meeting of, 169
 - Committees, List of, 167
 - Executive committee meetings, 209
 - Joint committee on block signals, Meetings, 169, 599, 1114; Comment, 366, 624
 - Joint committee on freight and express accounting, Meeting, 501
 - Transfer law suggested, 635
 - Work of association [Page], 29
- American Institute of Electrical Engineers:
 - Annual meeting in New York, 879
 - Meeting at Toronto, 676
 - San Francisco Section entertained by Southern Pacific Co., *978
- American Railway Engineering & Maintenance of Way Association:
 - Annual convention, 497, 524
 - Committee on electricity, 783
- American Railway Master Mechanics' Association, Convention, 1001, 1031, 1111, 1115
- Ampere-hour meter for car service (Chamberlain & Hookham), *308
- Anderson, Ind., Indiana Union Traction Co., Annual report, 536
- Anderson, S. C., Greenville, Spartanburg & Anderson Ry.:
 - Merger, 281
 - Stock issue, 766
- Angola (Ind.) Railway & Power Co., Receiver-ship, 853
- Anti-climbing devices. (See Rumpers)
- Appraisal of railway property:
 - "Going value," Diagram showing method of computing, 165
 - Logical basis for valuations of interurban street railways [Young], 115; Discussion, 162
- Metropolitan Street Ry., New York, 123, 422, 708, 756, 798, 828, 876, 916, 976
- Principles established by Wisconsin Railroad Commission, 164
- Apprentice courses, Value of, in electric railway shops, 363
- Arbitration in industrial disputes, 103
- Argentina, S. A., Rosario Electric Tramway Co., Extension, 221
- Arkansas Association of Public Utility Operations, Convention, *839
- Armature guard, *925
- Armature winding, Long Island R. R., 1007
- Arnold, Bion J., Honorary degree conferred upon, by University of Nebraska, 168
- Ash-handling system, "Geco" pneumatic (Green Engineering Co.), *341
- Ash hoist and dump, Syracuse shops, *560
- Asphaltic oils as economical wood preservatives [Cherrington], 504
- Atchison (Kan.) Railway, Light & Power Co., Notes, 687
- Athol (Mass.) & Orange Street Ry., Control of, and officers, 817
- Atlanta, Ga., Georgia Railway & Electric Co.:
 - Cars, Pay-as-you-enter, *416
 - Redemption of bonds, 239

(Abbreviations: * Illustrated. c Correspondence.)

Atlanta, Ga., Georgia Railway & Electric Co.:
(Continued)
—Service conditions, 396, 537
—Shop notes, *383
—Track construction standards, *78
Atlantic City. (See American Electric Rail-
way Association, Convention)
Auditor, The traveling [White], 467; Discus-
sion, 502
Augusta-Aiken (Ga.) Railway & Electric Cor.,
Sale of bonds, 817
Austin (Tex.) Street Ry., Bonds, 181
Austria, Single-phase railway developments,
308
Austrian Street Railway Association, Operat-
ing and maintenance rules adopted by,
40
Automobile 'bus line of Indianapolis, New
Castle & Toledo Ry., 369

B

Babylon (N. Y.) R. R., Receivership, 181
Baggage handling, Recommendations of In-
diana Railroad Commission, 225
Baggage rules on Western Ohio R. R., 538
Baltimore:
—Storage-battery plant. Largest of its
kind in the world, 387
—United Railways & Electric Co.:
Annual report, 767, 851
Block signal system on North Street
viaduct, *41
Booming Baltimore, 894
Bulletin to motormen on care of spe-
cial work, *841; Comment, 828
Cars, Pay-as-you-enter, *626
Instruction prints, *760
Power contract, 345
Baltimore & Ohio Southwestern R. R., De-
cision on joint rates with electric
roads, 637
Bearings. (See Roller bearings)
Beaumont (Tex.) Traction Co., Issue of re-
ceiver's certificates, 435
Bell pull, Double signal, Boston prepayment
car, *580
Belton (Tex.) & Temple Traction Co., Sale,
687
Berkshire Street Ry. (See Pittsfield, Mass.)
Berlin, Germany:
—Grosse-Berliner Strassenbahn, Annual
report, 639
—Instruction room for motormen, *799
—Schöneberg Electric Underground Rail-
way opened to public, 19
Birmingham (Eng.) Tramways, Report, 915
Blanks and forms:
—Car failure record, Richmond, Va., *81
—Car overhauling in shops, Syracuse, N.
Y., 553
—Inspection forms, Scranton, Pa., 603
—Long Island R. R., 1005
—Manager's loose-leaf pocket record, 172
—Ohmer register, 510
—Philadelphia instruction system, 830
—Piece-work records, Boston, 370
—Shop practice
Savannah, Ga., 299
Syracuse, N. Y., 562
—Wheel records, Shops of Chicago Rys.,
567
Block signals. (See Signals)
Bloomsburg, Pa., Columbia Power, Light &
Railways Co., Merger, 1086
Boards of trade, Interest of railway compa-
nies in, Discussion, 635
Boiler economy and the application of flue-
gas analysis [Hibbard] 794; Discus-
sion, 797
Boise (Idaho) & Interurban Railway, Double-
truck city cars, *1029
Boring mill for motor frames, Metropolitan
Street Ry., New York, *589
Boring tool, Expansion (Davis), *429
Boston:
—Electrification of terminals:
Boston Society of Civil Engineers,
Discussion by, 501
Hearing before Massachusetts Joint
Board, 466
Report of Massachusetts Joint Board,
225; Comment, 192; Discussion,
[Crocker], [Swain], 672
—Elevated Ry.:
Acquisition of stocks and bonds of
other railway companies, 279
Annual report, 47; Comment, 145
Cable order, 1028
Cars, Pay-within, *579
Efficiency Club and Efficiency Com-
mittee, Work of, 597; Comment,
548
Piece-work records in armature shop,
370
Railings at elevated stations, 1072
Relations with employees, 51
Signs for cars, New, *1119
Stations of Riverbank subway, 235
Transfers, Hearing on petition for ad-
ditional, 666
—Joint commission on transit matters, Spe-
cial reports by, 153
—Public Service Investment Co., Issue of
stock, 350

Boston: (Continued)
—Subways:
Joint Commission recommends new
plan, 812
Riverbank subway, Location of sta-
tions, 235
Boston & Northern & Old Colony Street Rys.:
—Bond issue, 238, 435
—Express cars, *872
—Fare petition of West Newbury, 1120
—Issue of stock, 50, 648
Boston & Western Electric R. R., Proposed,
927
Boston Society of Civil Engineers Electrifica-
tion of railroads discussed at March
meeting, 501
Boston & Worcester Electric Companies, An-
nual report, 92
Boston & Worcester Street Ry., Stock issue,
280, 435, 478
Bow collector, London, Brighton & South
Coast Ry., *786
Bowling Green, Ohio, Lake Erie, Bowling
Green & Napoleon Ry., Receivership,
853
Bradford (Eng.) Tramways:
—Annual report, 980
—Increased pay for employees, 124
—Parcel business, 458
Brake rigging, Shop instruction prints and
jigs for gaging, Philadelphia, *454
Brake setting and energy consumption, Ex-
perience of Third Avenue R. R., 488
Brake shoe practice, Lehigh Valley Transit
Co., 252
Brake slack adjuster, Automatic ratchet-type
(Duffy), *307
Brake troubles, Hudson & Manhattan R. R.,
1102
Brakes, Air:
—Inspection, Need of, 545
—Repair department, Brooklyn Rapid
Transit, *586
—Repair work, Chicago Rys., 567
—Standardization, Central Electric Rail-
way Association, 70, *633; Comment,
102
Brakes, Hand, Maintenance of, 147
Brakes, Indiana law, 462
Bridge standards discussed by New Jersey
Commission, 750
Bridges:
—Concrete, Indianapolis, New Castle &
Toledo Electric Ry., *366
—Reinforced concrete [Denman], 962
Brill Co., J. G., Report, 316
Bristol (Conn.) & Plainville Tramway Co.,
Supply of sand on cars, 676
British Columbia Electric Ry. (See Van-
couver, B. C.)
Brooklyn:
—Coney Island & Brooklyn R. R.:
Bond issue, 350
Fare case, Decision of Public Service
Commission, 459
Issue of notes, 49
—Rapid Transit Co.:
Advertisements on subway question,
977
Air brake and compressor depart-
ments, *586
Cable crossing, Temporary high-ten-
sion overhead, *336
Car defects, Tabulation of, 838
Car maintenance, Specializing on con-
centration of, 446
Heater maintenance, *305
Officers and directors, 135, 238, 280
Oil cups, Integral, *83, *168
Overhead construction on Brooklyn
Bridge loops, *789
Physical examination of employees, 95
Proposal to build subway and elevated
lines, 430, 722, 762, 811, 977;
Comment, 736
Publicity campaign, *719, 977
Resistances, Improving, 306
Seating and curtain departments,
*629
Snow-fighting equipment, *255
Transit; a monthly publication, 768
Wheel handling carriage, *371
Wheels, Solid rolled-steel, *414, 979
Windows, Order for reconstruction,
137
Brooklyn Bridge terminal, Iron-bar overhead
construction, *789
Brushes, Carbon. (See Carbon brushes)
Buffalo, N. Y.:
—Buffalo & Lake Erie Traction Co., Train
dispatching, [Wade], 158
—Buffalo, Rochester & Pittsburg Ry., Gas-
electric car, *807
—International Traction Co.:
Bondholders' plan, 181
Near-side single platform car, *1112;
Comment, 1095
—Investigation of surface railway condi-
tions by B. J. Arnold, 333
Buffalo, Lockport & Rochester Ry. (See
Rochester, N. Y.)
Bumpers, Anti-climbing devices discussed by
Central Electric Railway Association
Committee, *70
Burlington, N. C., Piedmont Railway & Elec-
tric Co., 992

Burn-off work, Gasoline and compressed air
outfit, Syracuse shops, *560
Bus lines of Havana Electric Ry., 949
Bushing armature leads, Chicago Rys., 841
Byllesby & Co., Convention in Chicago, 150

C

Cable laying, Submarine:
—New London & East Lyme Street Ry.,
under Connecticut River, *418
—Union Railway Co., New York, across
Harlem River, *328
Cables, Large order for, Boston Elevated Ry.,
1028
California, Legislation, 236, 313, 392, 533, 610
Canagacy (Cuba) Co., Annual report, 535
Canada, Development of electric railways in.
[Payne], 37
Canadian Street Railway Association, Annual
meeting, 1045, 1062
Capitalization, Report by New York Public
Service Commission, 302
Car cleaner, Need of modern, 1095
Car design:
—Business car, Michigan United Rys., *739
—Dimensions and other data of represen-
tative types of cars, 21 (Table);
Comment, 2
—Discussion by committee of Engineering
Association, 218
—Express car, Old Colony Street Ry., *873
—Framing developments, 25
—Light-weight cars [Sullivan], 790
—Light-weight cars, Discussion by commit-
tee of Engineering Association, 801
—Near-side single-platform car, Buffalo, 1113
—Parabolic front, Indianapolis, New Castle
& Toledo Electric Ry., *368
—Pay-as-you-enter cars:
Atlanta, Ga., *417
Baltimore, *626
Quincy, Ill., 387
—Pay-within cars, Boston Elevated Ry.,
*579
—Pennsylvania Commission report on, 1016
—Semi-convertible cars, Boston Elevated
Ry., *579
—Single-track pay-as-you-enter car, Quincy,
Ill., 387
—Steel cars:
Long Island R. R., 1056
Southern Pacific Ry., *1049
—Weight of steel cars, 248
Car doors, Report of Pennsylvania Commis-
sion, 1018
Car framing:
—Pay-as-you-enter car, Atlanta, Ga., *417
—Shore Line Electric Ry., *870
Car houses:
—Construction details discussed by commit-
tee of Engineering Association, 918
—Corsicana, Tex., Concrete, *331
—Denver City Tramway Co. [Evans],
*660
—Havana Electric Ry. [Hild], *946, 947
—Newark, N. J., Public Service Ry., 758
—Ogden, Utah, *700
—San Diego, Cal., Reinforced concrete, 717
—Saybrook, Conn., *867
—South Bend, Ind., Murdock lines, *575
Car loads, Report of Ford, Bacon & Davis on
Philadelphia service and equipment,
456, 1066; Comment, 446
Car maintenance records in Philadelphia, 1065
Car maintenance, Specializing in concentration
of, Brooklyn Rapid Transit Co., 446
Car painting. (See Painting cars)
Car pilot, Home-made, *915
Car platforms:
—Arrangements of, 25
—Platform bars in Chattanooga, Tenn.,
*717
—Size of, Report of Pennsylvania Commis-
sion, 1017
—Turn-in device (Ohmer), Dayton, Ohio,
388
Car run-ins:
—Brooklyn Rapid Transit System, 838
—New York City, 674
—Philadelphia Rapid Transit, 1065
Car seats:
—Arrangements of seats, 24
—Report of Pennsylvania Commission, 1018
Car steps, Height of:
—Connecticut Co., 397
—Report of Pennsylvania Commission, 1017
Car weights:
—Shore Line Electric Ry., *869
—Steel cars, 248, 1047
—Unit weights of cars on various railways,
25; Comment, 2
Car wiring:
—Baltimore, *628
—Denver City Tramway methods, 952
—London, Brighton & South Coast Ry.,
*787
—Long Island R. R., 1056
—Specifications for, 697
Cars:
—Business and office, Michigan United
Rys., *738

Cars: (Continued)

—Closed:

- Boise, Idaho, *1029
- Galveston-Houston Ry., *413
- Georgia Railway & Electric Co., 383
- Salt Lake & Ogden R. R., *705

—Combination:

- Express-passenger, Illinois Traction System, *275
- Indianapolis, New Castle & Toledo Electric Ry., *368
- Long Island R. R., Passenger and baggage, *1057
- Shore Line Electric Ry., *369
- Sweeper and baggage car, Michigan United Rys., *718

—Convertible:

- Lehigh Valley Transit Co., *250
- One-side convertible, Northern Ohio Traction & Light Co., *1074

- Decorated, Manila, *594
- Derrick, Third Avenue R. R., 1075
- Dump, Montreal, *175
- Excursion, Washington, Baltimore & Annapolis Ry., *914
- Express, Old Colony Street Ry., *872
- Havana Electric Ry. [Wild], 946
- Instruction, Philadelphia Rapid Transit Co., *835
- Life of, Report of Pennsylvania Commission, 1016
- Near-side single-platform, Buffalo, *1112; Comment, 1095
- Observation, Havana Electric Ry., *949
- Outing, Detroit United Ry., *1030
- Pay-as-you-enter:

- Atlanta, Ga., *416
- Baltimore, United Railways & Electric Co., *626
- Chattanooga, Tenn., *523
- Kansas City, Arch-roof cars, *175
- Milwaukee Electric Railway & Light Co., *642
- Origin and progress, 384
- Quincy, Ill., *387
- San Francisco, United Rys., *679

—Pay-within:

- Boston Elevated Ry., *579
- Contracts for, Electric Service Supplies Co., 231
- History, 385
- Philadelphia, Criticism of, 457

—Prepayment:

- New Orleans, La., *84
- One-man cars, Missoula, Mont., *924
- Turn-in device (Ohmer), Dayton, Ohio, 388, *718

- Private, Washington, Baltimore & Annapolis R. R., *754

—Semi-convertible:

- Boston Elevated Ry., *579
- Coffeyville, Kan., *885

- Semi-steel, Milwaukee Electric Railway & Light Co., *642

- Side entrance, Shore Line Electric Ry., *869
- Single-truck, in large cities, 1016
- Single vs. double-truck cars, Experience of Havana Electric Ry. [Hild], *907; Comment, 905

—Steel:

- Long Island R. R., *1054; Comment, 1046
- Painting, Hudson & Manhattan R. R., 1102
- Southern Pacific Ry., 1048; Comment, 1046

—Summer cars, 1045

- Trailers, Operation of, in Philadelphia, 1067

—Turn-in, Dayton, Ohio, *718

Cars ordered in 1910, 14; Comment, 3

Carbon brushes:

- Atlanta, Ga., 383
- Life of, on Long Island R. R., 1008

Catenary construction:

- Galveston-Houston Ry., *409
- Hoosac tunnel [Murray], *669
- Proposed, with wood poles [Sekell], *455
- Shore Line, with looped hangers, 870
- Catskill (N. Y.) Traction Co., Control, 648

- Cedar Rapids & Iowa City Railway & Light Co., Sale of power [Young], 746
- Cedarburg, Wis., Milwaukee Northern Ry., Bond issue, 478, 688

- Central California Traction Co. (See Stockton, Cal.)

Central Electric Accounting Conference:

- Affiliation with Central Electric Railway Association proposed, 503, 602
- Alphabetical list of items of expense, 228, 950
- Meeting in March, 502

Central Electric Railway Association:

- Affiliation with Accounting Conference proposed, 506, 602
- Annual meeting, 162
- Brown book, 267
- Committee on standardization, Report of, 70, *633; Comment, 102
- Committees, Lists of, 262, 1072
- Consolidation with Illinois Electric Railways Association proposed, 307, 337, 360
- Meeting in March, *595
- Report of the secretary and treasurer, 114

Central Electric Railway Association: (Continued)

- Standardization Committee meeting, 70, 663; Comment, 102

Central Electric Traffic Association:

- Annual meeting, 113, 158
- Committees, List of, 263
- Consolidation with Illinois Electric Railways Association proposed, 307, 337
- Meeting in April, 707
- Meeting on rate checking, March, 522
- Report of the Chairman [Neereamer], 113

Central Pennsylvania Traction Co. (See Harrisburg, Pa.)

Central States, Interurban construction in 1910, *20

Chambersburg, Greencastle & Waynesboro Street Ry. (See Waynesboro, Pa.)

Charleston, S. C., Transportation facilities, 339

Charleston (S. C.) Consolidated Railway, Gas & Electric Co., Stock issue, 436

Charlotte, N. C.:

- Manager's loose-leaf pocket record, 172
- Stop sign set in street pavement, *170

Chattanooga (Tenn.) Railway & Light Co.:

- Advertising campaign, 609
- Pay-as-you-enter cars, *523
- Platform bars, *717
- Transfer changes, 537

Chester, Pa., Southern Pennsylvania Traction Co., Fare increase, 94

Chicago, Ill.:

- Aurora, Elgin & Chicago R. R., Sale of bonds, 1085
- Board of Supervising Engineers Renewals defined, 374; Comment, 547

- Calumet & South Chicago Ry., Renewals as defined by Board of Supervising Engineers, 374; Comment, 547

—Chicago City Ry.:

- Annual meeting and report, 535, 612
- Renewals as defined by Board of Supervising Engineers, 374; Comment, 547
- Suit to set aside settlement ordinance, 90

- Trolley-adjusting device, 306

- Chicago City & Connecting Rys., Bond issue, 181

- Chicago Consolidated Traction Co.: Bondholders to receive securities and cash, 318

- Receivers discharged, 766

- Chicago Elevated Rys., Issue of notes, 1085

- Chicago & Northwestern Ry. Committees of employees on safety, 290

—Chicago Rys.:

- Annual report, 688
- Bond sale, 238, 280
- Brushing armature leads, 841
- Car building and repair shops, *490, *565

- Consolidation of, with Chicago Consolidated Traction Co., 49, 93, 135, 436
- Fare recorder (Dayton), *426
- Gear-washing machine, *590
- Jig for truck assembly, *740
- La Salle Street tunnel, 636
- Organization of car shops, *565
- Press for armature bearings, *587
- Purchase of Chicago Southern Traction Co., 1128

- Reheater for speed roll insulator, *1028

- Renewals as defined by Board of Supervising Engineers, 374; Comment, 547

- Sand blast for cleaning steel cars, *578

- Screen-cleaning machine, *804
- Segregation of county traction lines, 345

- Trolley wheels, Rapid finishing, *804
- Varnish handled by air pressure, *760
- Waste cans, Safety, 578

- Consolidation of elevated railways proposed, 350, 648, 893, 931, 992, 942, 1035

- Electric Club meeting, 108
- Electrification Committee, 530, 724
- Electrification, Plans of Chicago Association of Commerce, 635

- Locomotive smoke problem [Bird], 305; Comment, 327

- Metropolitan West Side Elevated Ry.: Annual report, 394
- Merger rumors denied, 239

- South Side Elevated: Annual report, 348
- Dividend, 436

- Southern Street Ry., Renewals as defined by Board of Supervising Engineers, 374; Comment, 547

—Subways:

- Legal questions to be settled, 887
- Plans by Arnold and by Jackson, 988
- Policy, 325
- Public hearings, 927
- Report [Arnold], 272, 797
- Robinson plan, 1117
- St. John plan, 922; Comment, 904
- Shuttle system proposed by A. S. Robinson, 257

Chicago, Ill.: (Continued)

- Ticket office, Joint interurban, proposed, 594
- Traffic commission advocated by C. V. Weston, 391

Chicago & Milwaukee Electric R. R.:

- Consolidation with Northwestern Elevated, Rumors, 238
- Court urges adjustment of affairs, 317
- Record of 13 years without fatal accident, 353

- Reorganization plans, 395, 436, 1085
- Snow plow, *298

Chicago, South Bend & Northern Indiana Ry. (See South Bend, Ind.)

Chico, Cal., Northern Electric Ry.:

- Locomotive, 82-ton [Edwards], *1011
- Note issue, 932

Chippewa Valley Railway, Light & Power Co. (See Eau Claire, Wis.)

Choke coils, Air-cooled (Westinghouse), *93

Cincinnati, Ohio:

- Cincinnati & Columbus Traction Co., Decision on joint rates with steam roads, 637

—Ohio Electric Ry.:

- Financial matters, 182
- Terminal improvements at Dayton, Ohio, *628

—Ohio Traction Co., Bond issue, 394

Circuit breakers, Maintenance of car equipment, 60

Citizens' Railway & Light Co. (See Fort Worth, Texas)

City planning and transportation, Arnold report, 262

City & Suburban Ry. (See Washington, D. C.)

Claim Agents' Association:

- Joint meeting of executive committee and index bureau committee, 169
- Work of [Drown], 31

Claim department. (See Accident claim department)

Cleaning cars, Lackawanna & Wyoming Valley R. R., 416

Cleveland, Ohio:

- Cleveland, Painesville & Ashtabula R. R., Annual report, 535

—Cleveland Ry.:

- Bond issue, Letter to City Council, 276
- Chamber of Commerce inquiry into operating conditions, 431, 644, 845

Earnings, 177

- Fare question, 44, 90, 131, 235, 987, 1032, 1082

Ordinance, Proposed changes:

- Chamber of Commerce committee meetings, 464, 607
- Dahl amendment to ordinance, 682, 1124
- Discussion by President Stanley, 266; Comment, 291
- Goff's opinions, in "Plain Dealer," 311
- Suggestions of company, 531, 813

- Report to stockholders by President Stanley, 266; Comment, 291

- Ticket counterfeiters arrested, 1123

—Cleveland, Southwestern & Columbus Ry.:

- Campaign to reduce accidents: Reduction in costs of accidents, 192
- School children, Work with, 138
- "Southwestern creed," 94
- Talks to employees [Schneider], 379; Comment, 361

- Cleveland, Youngstown & Eastern Ry., Sale, 726

- Depot, Proposed interurban, 650
- Johnson, Tom L., Death of, 658

- Lake Shore Electric Ry. Annual report, 612

Cleveland, Painesville & Eastern R. R. (See Willoughby, Ohio)

CO₂ recorders. (See Flue-gas analysis)

Coal:

- Lignite deposits in United States, 881
- Purchasing, on a b. t. u. basis, Cleveland, 508
- Storage pits, Illinois Traction System, *591

Coasting recorders:

- Milwaukee Electric Railway & Light Co., 385
- Third Avenue R. R., New York, 129
- Coffeyville, Kan., Flat-arch, semi-convertible car, *885

Colorado Railway, Light & Power Co. (See Trinidad, Col.)

Columbia (S. C.) Electric Street Railway, Light & Power Co., Stock increase, 766, 992

Columbia Power, Light & Railways Co. (See Bloomsburg, Pa.)

Columbus (Ohio), Delaware & Marion Ry.:

- Interest paid, 318, 612, 853
- Receivership, 931
- Voluntary Relief Association, 729

Columbus (Ohio), Marion & Bucyrus R. R. (See Delaware, Ohio)

Columbus (Ohio), Mount Vernon & Mansfield Traction Co., Bond issue, 726

Columbus (Ohio), New Albany & Johnstown Traction Co., Sale, 238

Columbus (Ohio) Railway & Light Co.
 —Stock increase, 992
 —Strike, History of, 461
 Commutator grinder (Phillips), *604
 Commutator slotting:
 —Long Island R. R., 1008
 —Syracuse shops, *556
 Commutator slotting tools (Westinghouse), *677
 Concrete in railway service, 1096
 Concrete mixer, Havana Electric Ry. [Hild], *909
 Condensers with aluminum tubes in station of Havana Electric Ry. [Hild], *910
 Cones, Charcoal, for grounding (Paragon), 1030
 Coney Island & Brooklyn R. R. (See Brooklyn)
 Congestion problem in Philadelphia, Committees to investigate, 121
 Connecticut, Legislation, 179, 278, 313, 433, 533, 929, 1034, 1083, 1126
 Connecticut Co. (See New Haven, Conn.)
 Connecticut Valley Street Ry. (See Greenfield, Mass.)
 Controllers:
 —Braking, effective in backward running (Thomson-Houston), *982
 —Circuit, for railroad signaling (Union), *524
 Converters:
 —Commutating pole rotary (G. E.), *1122
 —Regulating pole rotary (G. E.), Rochester, N. Y., *884
 —Regulating pole rotary (G. E.), Potomac Power Co., Washington, D. C., 605
 —3000-kw rotary, in New York, *83
 Corsicana (Tex.) Gas & Electric Co., Improvements, *331
 Cottage City, Mass., Martha's Vineyard Street Ry., Proposed lease of Oak Bluffs Street Ry., 818
 Counting attachment for band saw, *676
 Couplers:
 —Discussion by committee of Engineering Association, 800
 —M. C. B. (Tomlinson), *677
 —(See also Draft rigging)
 Cranes:
 —Jib, in Syracuse repair shops, *555
 —Portable, for ornamenting iron poles, San Francisco [Foster], *109
 —Wrecking (Browning), Illinois Traction System, *874
 Criticisms of the service, 904
 Cross-arm statistics. (See Poles, Statistics)
 Cross arms, Recommendations of National Electric Light Association, 964
 Crossings, Railroad:
 —Indiana, Red lights at crossings, 480
 —Steam railroad crossings discussed by New Jersey Commission, 751
 Crossings, Transmission line:
 —Committee meeting of Engineering Association, 414, 880
 —Maintenance of Way Association, Report by sub-committee, 500
 —Shore Line Electric Ry., *872
 Crossover, Sliding portable, Detroit United Ry., *584
 Culverts, Concrete box, Oklahoma City [Haller], *449
 Cumberland, Md., South Penn Railways & Light Co., Merger, 182
 Curtain department, Brooklyn Rapid Transit System, *629
 Cut-out cocks, Safety, in train line, Discussion by Central Electric Railway Association committee, 71

D

Dallas, Tex., Texas Traction Co., Dividend, 1086
 Danville (Va.) Railway & Electric Co., 1128
 Date stamp, "Cosmo," for railway use (Joslin), *128
 Dayton, Ohio:
 —City Ry., Dividend, 817
 —Dayton Street Ry., Increase of capital stock, 436
 —People's Ry., Turn-in-car, *718
 —Terminal improvement of Ohio Electric Ry., *628
 "Deceleration" or "retardation," 247
 Definitions, Signal, 1108
 Delaware, Legislation, 278, 533, 929
 Delaware & Hudson Co. (See New York City)
 Delaware, Ohio, Columbus, Marion & Bucyrus Ry., Increase in capital stock, 93, 135
 Denver (Colo.) City Tramway Co.:
 —Bond issue, 181
 —Office building and car house [Evans], *660
 —Redemption of gold bonds, 49
 —Steel tower and cable installation, *173
 Depreciation. (See Accounting.)
 Derrick cars:
 —Illinois Traction System, *874
 —Third Avenue R. R., New York, *1075
 Derrick for stringing feeder lines and setting poles, Salt Lake & Ogden R. R., *701

Des Moines (Ia.) City Ry.:
 —Council of city rejects proposal for sale, 472
 —Franchise matters, 345
 —Reasons for sale, 608
 —Report by city on value of property, 46
 Detention of trains, Washington, Baltimore & Annapolis Ry., 913
 Detroit, Mich.:
 —Detroit United Ry.
 Annual report, 349
 Bond issue, 93, 135, 395
 Crossover, Sliding portable, *584
 Dividend, 318
 Extensions, Granted the right to make, 683
 Listed bonds, 726
 Newspaper handling, 1073
 Notes, 90, 130, 277, 238
 Outing car, *1030
 Power station improvements, 422
 Rental suit, Answer filed, 345; Armistice, 645; Trial, 888, 928, 1081
 Through service to Kalamazoo, 615
 Traffic contract with Michigan United Ry., Proposed, 283, 320
 Yards at Harper Avenue, *494
 —Municipal ownership measures, 391, 609
 Detroit River tunnel, Electrical equipment, *62, *104
 Development charges, Chart of [Ford, Bacon & Davis], 710
 —(See also New York City, Metropolitan Street Railway, Reorganization)
 Direct-current railways. (See High-tension direct-current railways)
 Dispatching trains:
 —Buffalo & Lake Erie Traction Co. [Wade], 158
 —Dispatcher's control of power circuits; Discussion, Syracuse, 154
 —Dispatcher-controlled train-order signal system (U. S. Electric Co.), *882
 —Forgetfulness of conductor, Suggestions for correcting [Dye], 265
 —Interurban roads [Lewis], 114
 —Register stations, Discussion, Syracuse, 155
 —Telephone, Stark Electric R. R., *428
 —Training of dispatchers in New York, 156
 —(See also New York State Public Service Commission, Conference)
 Doors. (See Car doors)
 Draft rigging, Hudson & Manhattan R. R., *1100
 Drawbar, Seamless steel tubing, Boston prepayment car, *582
 —(See also Couplers)
 Drill, Portable electrically driven radial, for a.c. or d.c. circuits (Lamb), *605
 Duluth-Superior Traction Co., Annual report, 687
 Dumping car, Havana Electric Ry., *950

E

East Liverpool, Ohio, Tri-State Railway & Electric Co., Organization, 725
 Eastern Wisconsin Railway & Light Co. (See Fond du Lac)
 Eau Claire, Wis., Chippewa Valley Railway, Light & Power Co., Issue of securities, 181
 Edison Medal awarded to Frank J. Sprague, 864, 879
 Efficiency engineering and piece work, 549
 Electric light and electric railway business, Difference in financial status, 1002
 Electric Railway Journal:
 —Purpose of, 1
 —Statistical number, Scope of, 1
 Electrical code, Revision of National, 640
 Elevated railways and subway systems, Relative advantages, 249
 Elizabeth & Trenton R. R. (See Trenton, N. J.)
 Elmira (N. Y.) Water, Light & Railroad Co., Bond issue, 238
 Emergency repair wagons, Third Avenue R. R., New York, *844
 —(See also Tower wagon)
 Eminent domain in Massachusetts, 325
 Employees:
 —Apprentices. (See Apprentice courses)
 —Bonus paid motormen and conductors, Newark, N. J., 138
 —Bonus question, 736
 —Bulletin to motormen on care of special work, Baltimore, *841; Comment, 828
 —Committees on safety, 290
 —Educational plan of the Transportation and Traffic Association, 759
 —Efficiency. Piece work and lost motion, 549
 —Employment, instruction and discipline of, on interurban lines [Choate], 120
 —Employment of, Recommendations of Indiana Railroad Commission, 224
 —Examination, Written, for trainmen on Cleveland, Painesville & Eastern R. R., 677
 —Forgetfulness, Suggestions for correcting [Dye], 265
 —Hours of labor, the "nine-hour in eleven" bill in Massachusetts, 602

Employees: (Continued)
 —Instruction, Philadelphia Rapid Transit Co., Motormen and conductors, *830; Comment, 829
 —Instruction room for motormen, Berlin, Germany, *799
 —Interurban service, Men to employ for, and their training, 79
 —Lectures by officials, Kansas City, 636
 —Liability of, for accidents [Peck], 159; Discussion, 156
 —Loan fund, Metropolitan Street Ry., New York, 993
 —Merit system in Sheboygan, Wis., 240
 —Motormen, Accurate judgment of running speeds, 406
 —Pensions:
 American Railways Co., 894
 Lehigh Valley Transit Co., Pension and sick benefit, 254
 Michigan United Rys., 728
 Public Service Corporation of New Jersey, 51
 —Physical examination, Brooklyn, 95
 —Prizes for motormen, Interborough Rapid Transit Co., New York, 283
 —Prizes for suggestions from, Lehigh Valley Transit Co., 253
 —Relations of company with, Boston Elevated Ry., 51
 —Relief Association of Columbus, Delaware & Marion Rys., 729
 —Scientific management of [Webster], 1027
 —Stay-at-home master mechanic should visit other shops, 445
 —Stockholders, Portland, Ore., 283
 —Training of electric railway engineers, 943
 —Training of employees, Practice in New York State, 156
 —Trainging interurban trainmen, Need for, 60
 —Transfer talks, Toronto Ry., 335
 —Transportation free, Legal status, in West Virginia, 779
 —Wages:
 Bradford (Eng.) Corporation Tramways, Increase, 124
 Prague Electric Ry., 369
 Syracuse, Increase, 993
 Employers' liability law of New Jersey, 763, 1129
 Engineers:
 —Efficiency, Criticisms of, 735
 —Training of electric railway, 943
 Escanaba (Mich.) Traction Co., Bond issue, 1128
 Europe:
 —Rush-hour conditions, 275
 —Single-phase railways, Statistics, 382
 Evansville (Ind.) Electric Ry., Bond issue, 612
 Express. (See Freight and express)

F

Fairmont (W. Va.) & Clarksburg Traction Co.:
 —Note sale, 395
 —Purchase, 280
 Fare registers:
 —Dayton, on Chicago Rys., *426
 —(Onmer), Operation of, in city service [Duffy], *510; Discussion, 521
 —Rhode Island decision authorizing use of Rooke registers, 102
 Fares:
 —Adjustment of rates to the expansion of city areas [Davis], 211
 —Basis of [Young], 118
 —Cleveland Ry., 1082
 —Coney Island & Brooklyn R. R., Decision of Commission, 459
 —Division of five-cent fare in New York State, 1027
 —Germany, 37
 —Increase:
 Galesburg & Kewanee Electric Ry., 437
 Toledo & Chicago Interurban Ry., 319
 —Interchangeable mileage, Discussion by Illinois Electric Railways Association, 919
 —Massachusetts commutation rates, Report on, 151
 —Maximum tender, Amount of, Various cases cited, 796
 —Milwaukee:
 Insufficiency of present fares, 94
 Low-fare case, Brief of company, 1025
 —No-seat-no-fare:
 Portland, Ore., 1037
 San Francisco, 856, 933
 Trenton, N. J., 439, 479
 —Overages, shortages and unregistered fares in Syracuse [Duffy], 512
 —Pennsylvania fare act unconstitutional, 988
 —Reduction:
 Albany, United Traction Co., 479, 767, 895
 Attleboro, Mass., Hearing, 115
 Central Pennsylvania Traction Co., 895

Fares:

- Reduction; (Continued)
- Cleveland Ry., 987
- Milford & Uxbridge Street Ry., Hearing, 634
- Washington, Alexandria & Mount Vernon Ry., 614
- West Newbury, Mass., petition, 1120
- School fares:
- New Jersey, 856, 994
- Shreveport, La., 933
- Standees, Washington, D. C., Adverse report on bill to fix fares, 184
- Three-cent, Cleveland, 1032
- Washington, D. C.:
- City & Suburban Ry., Hearing, 151
- Complaint against railways, 855
- (See also Through routes and joint rates)
- Farmer, Relation of, to the transportation companies [Spring], 319
- Farmington, Mo., St. Francois County Ry., Officers, 50
- Farmington Street Ry. (See Hartford, Conn.)
- Federal Light & Traction Co. (See New York City)
- Fenders and wheel guards:
- New York City equipment, 352
- Philadelphia, 1020
- Portland, Ore., Supreme Court ruling, 849
- Report on, in Baltimore, 875
- Tests in St. Louis, Rules, 460; Entries, 640; Tests, 662, 764, 1029
- Financial:
- Comparison of returns from different cities [Arnold], 261
- Cost of interurban road with 6600-volt a.c. system, 1200-volt d.c. system and 600-volt d.c. system [Parker], 167
- Cost of Toronto municipal railway, 927
- Costs, Hudson & Manhattan R. R., 1099
- Earnings of Cleveland Ry., 177
- Earnings of New York State Railways, 435
- Electric railway situation in 1910, 9
- Investment per capita for different classes of railways [Arnold], 261
- Maintenance costs of electrical equipment, Third Avenue R. R., 878
- Mileage and capital investment of electric and steam roads, 776
- Receiverships and foreclosure sales in 1910, 19
- Stability of earnings, 736
- Street railway bonds and Massachusetts savings banks, 49
- Ties, Steel, and concrete foundation, Costs, 603
- Track construction costs:
- Atlanta, Ga., 78
- Concrete without ties, Cost of, 384
- Oklahoma City [Haller], 452
- Wood preservation with asphaltic oils, Cost table [Cherrington], 504
- Fire hose specifications, 978
- Fire insurance:
- Expert appointed by American Electric Railway Association, 1073
- Milwaukee Electric Railway & Light Co. [Duffy], 166
- Fire protection in Syracuse maintenance shops, *552
- Fire risk from adjacent structures, 864
- Firemen, Free transportation of, in Massachusetts, 827
- Fishkill (N. Y.) Electric Ry., Sand hopper, Removable, 760
- Flange wear. (See Wheels)
- Floors, Car, Composition, "Monolith," (A. M. Co.), *310, 388
- Flue-gas analysis and boiler economy [Hibbard], 794; Discussion, 797
- Fond du Lac, Wis., Eastern Wisconsin Railway & Light Co.:
- Bond issue, 726
- Repair shop practice [Kelsh], 122; Discussion, 165
- Fonda, Johnstown & Gloversville R. R. (See Gloversville, N. Y.)
- Fort Dodge (Ia.), Des Moines & Southern R. R.:
- Operation of line between Newton and Des Moines Junction, 318
- Receivers' certificates issued, 688
- Twelve hundred-volt equipment, 81
- Fort Smith (Ark.) Light & Traction Co.:
- Redemption of notes, 726
- Stock and bond issue, 350, 688
- Fort Wayne (Ind.) & Northern Indiana Traction Co.:
- Organization, 613
- Sale, 350.
- Fort Worth, Tex.:
- Citizens' Railway & Light Co., Receivership, 931
- Northern Texas Traction Co.:
- Increase of capital stock, 182
- Sale of notes, 853
- Fountains, Drinking, in shops of Chicago Rys., *572
- France:
- Electric railway conditions, 373
- Single-phase electrification in Southern part, 962
- Franchises:
- Freight and express, Massachusetts, 333
- Valuation [Young], 117; Discussion, 162
- Frederick (Md.) Ry., Stock issue, 135

- Free transportation of employees, Legal status, 779
- Free transportation of firemen in Massachusetts, 827; in New Jersey, 1026
- Free transportation of letter carriers unconstitutional, 819, 827
- Freight claims, Method of accounting for [Davis], 463
- Freight and express:
- Bradford, Eng., Parcel business, 458
- Coal delivery, Huddersfield, England, 333
- Lackawanna & Wyoming Valley R. R., 415
- Lehigh Valley Transit Co., 253
- Massachusetts, Express development in, 332
- Salt Lake & Ogden R. R., 707
- South Bend, Ind., Interurban-steam agreement, 728
- Fresno (Cal.), Hanford & Summit Lake Interurban Ry., Bond issue, 1128
- Fuses, Long Island R. R., *1009

G

- Galesburg & Kewanee Electric Ry. (See Kewanee, Ill.)
- Galveston causeway, 408, *413
- Galveston-Houston. (Tex.) Electric Co., Stock increase, 817
- Galveston-Houston. (Tex.) Interurban Ry., System, *408
- Gas-heating outfit for applying steel-tired wheels, Hudson & Manhattan R. R., *1101
- Gasoline cars:
- Alaska-Northern R. R., *984
- Inspection car (Fairbanks-Morse), *385
- (May) direct-drive, *641
- Tulsa, Okla., *926
- Gasoline-electric cars:
- Buffalo, Rochester & Pittsburg Ry., *807
- Repair car, London, Brighton & South Coast Ry., *787
- Gear-case design, Discussion by committee of Engineering Association, 803
- Gear-washing machine, Chicago Rys., *590
- Gears, Life and cost of, Records of Nuttall Co., 310
- General Electric Co., Annual report, 766
- Generators, Direct-current interpole, ratings 25 kw to 1000 kw (Westinghouse), *761
- Georgia Railway & Electric Co. (See Atlanta, Ga.)
- Germany:
- Development of electric railways in 1910, 36
- Electrification of trunk lines, 912
- Storage battery cars, Tests, 21
- Giovi Ry., Italy, Three-phase locomotives, *631
- Glass, Sanding and frosting, Syracuse shops, *558, 559
- Gloversville, N. Y., Fonda, Johnstown & Gloversville R. R.:
- Annual report, 477
- Bond issue, 182, 535
- Governor adjusting attachment, Electric pump (Westinghouse), *254
- Governors' messages, Abstracts of, 75, 125, 229, 273; Comment, 101
- Grade crossings. (See Crossings, Railroad)
- Grain elevator, Illinois Traction System, at Glover, Ill., *453
- Great Britain:
- Electric railway development, 33
- Tramway statistics, 454
- Greenfield, Mass., Connecticut Valley Street Ry., Strike of employees, 396
- Greenville, Spartanburg & Anderson Ry. (See Anderson, S. C.)
- Grip locking device (Western Electric), *1074
- Ground, Charcoal cone (Paragon), 1030

H

- Halifax (N. S.) Electric Tramway, Dividend, 436
- Handling materials and supplies economically, 698
- Harrisburg, Pa.:
- Central Pennsylvania Traction Co.:
- Dividend, 280
- Reduction of fare, 895
- Valley Traction Co., Increase of stock, 854
- Hartford, Conn., Farmington Street Ry., Payment on bonds, 238
- Havana (Cuba) Electric Ry.:
- Bonds listed, 726
- Organization, track and power generating system [Hild], *906; Comment, 905
- Redemption of bonds 478
- Shops, rolling stock, and operating practice [Hild], *946
- Headlight rules discussed by New Jersey Commission, 750
- Headlights, Arc, for cars (G. E.), *982
- Heater switch on cars, Location of, 775
- Heaters, Electric:
- Maintenance, Brooklyn Rapid Transit Co., *305

Heaters, Electric: (Continued)

- Wiring scheme of Consolidated 146 X Heater, *305
- Heating of car house, shops and waiting rooms, Discussion by committee of Engineering Association, 918
- Heating of cars:
- Discussion by committee of Engineering Association, 218, 802
- Report of Pennsylvania Commission, 1020
- Specialized maintenance of electric heaters, 192
- Heavy electric traction:
- Austria Single-phase developments, 308
- Boston Society of Civil Engineers, Discussion by, 501
- Boston terminals:
- Hearing before Massachusetts Joint Board, 466
- Report of Massachusetts Joint Board, 225; Comment, 192; Discussion [Crocker], [Swain], 672
- Central stations for [Darlinton], 967; Comment, 942
- Costs of electrification [Murray], 670
- Germany, 37, 912
- Giovi Ry., Italy, *631
- Great Britain, 35
- London conditions, 362
- London, Brighton & South Coast Ry., *784
- Long Island R. R., Car inspection and maintenance, *1004; Comment, 1002; steel motor cars, *1054
- Maintenance of Way Association, Report by committee 499
- New England Street Railway Club, Discussion, 166
- N. Y., N. H. & H. R. R. experience [Murray], 667; Comment, 658; [Graftio], c979
- New York Railroad Club, Discussion by, at March meeting, 495; Comment, 488
- Paris, Present and proposed lines, 374
- Salt Lake & Ogden R. R., *700
- Single-phase for trunk line railroads [Murray], 667; Comment, 658
- Single-phase vs. other systems on trunk lines [Graftio], c979
- Southern Pacific R. R., Power station, *196; Rolling stock and shops, *1048
- Sweden, Kiruna-Riksgransen line, *788
- Tiga-tension condenser-type terminals (Westinghouse), *233
- High-tension direct-current railways:
- Lugano & Tesserete Ry., Single track, 1000-volt 715
- Piedmont & Northern Ry., 885
- Warren & Jamestown Street Ry., 133
- Washington, Baltimore & Annapolis Ry., Results, 913
- Hocking-Sunday Creek Traction Co. (See Nelsonville, Ohio)
- Hoist, Air, in Syracuse repair shops, *554
- Honolulu (Hawaii) Rapid Transit & Land Co., Dividend 726
- Hoosac tunnel catenary construction [Murray], *669
- Hudson, N. Y., Albany Southern R. R.:
- Annual report, 997
- Bond issue, 135
- Hudson & Manhattan R. R. (See New York City)
- Huntington, W. Va., Ohio Valley Electric Ry., taken over by American Railways Co., 992
- Hydro-aeroplane (Curtiss), *980

I

- Illinois, Legislation, 346, 474, 533, 724, 850
- Illinois Central R. R., Scrap reclaimed and removed, 625, c757
- Illinois Electric Railways Association:
- Block signal committee 724
- Constitution and by-laws, 337
- Meeting, First regular, 337
- Meeting in March, 594
- Meeting in May, 919
- Proposed consolidation with Central Electric Railway Association, 307, 337
- Temporary organization of, 161
- Illinois Electric Railway Traffic Association proposed, 267
- Illinois Mileage Bureau 919
- Illinois Traction System. (See Peoria, Ill.)
- Indiana:
- Accidents for three months, 352
- Electric railways [Brady], 132
- Laws relating to brakes and block signals, 462
- Legislation, 133, 179, 236, 278, 346, 392, 474
- Indiana Railroad Commission:
- Block signal committee, Report of, 377
- Circular on employees issued to interurban companies, 224
- Conference with officials of interurban railways, 75, 224, 506, 840
- Report on signals delayed, 1028
- Indiana Union Traction Co. (See Anderson, Ind.)

Indianapolis, Ind.:
 —Indianapolis & Cincinnati Traction Co.; Mortgage, 281
 Selector signals, 84
 —Indianapolis, Crawfordsville & Western Traction Co., Receivership, 239
 —Indianapolis Interurban Ticket Agency, Development of long-distance travel [Gore], 507; Discussion, 595
 —Indianapolis & Louisville Traction Co. (See Louisville, Ky.)
 —Indianapolis, New Castle & Toledo Electric Ry.:
 Sale of property, 613, 648, 818
 System [White], *364
 Inspection car, Gasoline (Fairbanks, Morse & Co.), *385
 Inspection costs, Hudson & Manhattan R. R., 1098, 1100
 Inspection of high-tension oil switches 789
 Inspection of railway material discussed by New England Street Railway Club, 378
 Inspection of rolling stock:
 —Long Island R. R., 1005
 —Possible improvements, 737
 Inspectors of ventilation, Connecticut Co., 95
 Instruction of employees. (See Employees, Instruction)
 Insulating tape, Flexible asbestos (D. & W. Fuse Co.), 1122
 Insulation of high-tension lines, 195; [Murray], 668; Comment, 659
 Insulator pin statistics. (See Poles, Statistics)
 Insulators:
 —Porcelain strain (Westinghouse), *983
 —Third-rail porcelain, *415
 —Trolley line section (Westinghouse), *174, *1030
 Insurance (See Fire insurance)
 Interborough Bulletin, New York, 240
 Interborough Rapid Transit Co. (See New York City)
 International Electrical Congress at Turin, Italy, 420
 International Traction Co. (See Buffalo, N. Y.)
 International Transit Co. (See Sault Ste. Marie, Mich.)
 Interstate Commerce Commission:
 —Decision on through routes and joint roads between electric and steam roads, 360, 637
 —Fare reduction ordered, Washington, Alexandria & Mount Vernon Ry., 614
 —Hearing on rates on Washington, D. C., suburban line, 151
 —Inspection of Illinois Traction System, 319
 Interstate Rys. (See Philadelphia, Pa.)
 Interurban railways:
 —Building up of a territory [Smith], 513; Comment, 487; Discussion, 521
 —Central States, Construction during 1910, *20
 —Cost of stopping cars, 359
 —Costs, with 660-volt a. c. system, 1200-volt d. c. system and 600-volt d. c. system, 167
 —Dispatching of trains. (See Dispatching trains)
 —Valuations, Logical basis for [Young], 115; Discussion, 162
 Invention. (See Patents)
 Investment:
 —Fair rate of return on [Young], 116; Discussion, 162; [McCarter], 221
 —Proportionate, in supplies on hand, Philadelphia Rapid Transit Co., 420, 699
 Iowa, Legislation, 313, 433, 684
 Iowa Street & Interurban Railway Association Convention, 741
 Italian State Rys., Use of electricity on, 879

J

Jack, Wrecking, applied at an angle (Barrett), *642
 Jackson, Mich., Michigan United Rys.:
 —Cars:
 Business and office, *738
 Combination baggage and snow sweeper, *718
 —Development plans, 763
 —Organization chart, 738
 —Pensions for employees, 728
 Jacksonville (Fla.) Electric Co., Service and improvements, 531
 Jacksonville (Fla.) Traction Co., 648, 818, 1128
 Janesville (Wis.) Traction Co., Bond issue, 1086
 Jersey City, N. J., Yards and shops of Hudson & Manhattan R. R. [Hazelton], *780, *Sup.
 Jerseyville, Ill., Alton, Jacksonville & Peoria Ry., Bond issue, 49
 Jigs for gaging brake rigging, Philadelphia, *454
 Jigs for truck assembly, *740
 Johnson, Tom L., of Cleveland, 658
 Johnstown (Pa.) Traction Co., Dividend, 182
 Joint rates. (See Through routes and joint rates)

Joliet (Ill.) & Southern Traction Co.:
 —Bondholders' committee, 1086
 —Receivership, 281, 1036
 Jones' Sons Co., J. M., Incorporation of, 605
 Journal boxes:
 —Packing, Preparation and care (Galena), *469
 —Rub irons for, Lackawanna & Wyoming Valley R. R., *415

K

Kansas:
 —Legislation, 179, 474
 —Public Utilities Commission, 683
 Kansas City, Mo.:
 —Kansas City Railway & Light Co.:
 Dividend, 931, 992
 Transfer table, Flush, *148
 —Metropolitan Street Ry.:
 Accident prevention campaign, 1129
 Bond sale, 395
 Conference on proposed improvements, 530
 Lectures to employees, 636
 Mayor's letter on proposed improvements, 472
 Office and substation at Walnut Street, *297
 Receivers, 1024, 1080
 Smoking prohibited, 1130
 Transfer talks, 767
 Turtle-back cars, *175
 —Missouri & Kansas Interurban Ry., Negotiations with McKinley interests, 281
 Kendallville, Ind., Toledo & Chicago Interurban Ry.:
 —Fare increase, 319
 —Receivers' certificates, 818
 Kennett Square, Pa., West Chester, Kennett & Wilmington Electric Ry., Reorganization, 50
 Kewanee, Ill., Galesburg & Kewanee Electric Ry., Fare increase, 437
 Key Route. (See Oakland, Cal.)
 Kokomo (Ind.), Marion & Western Traction Co., Annual report, 613

L

Lackawanna & Wyoming Valley R. R. (See Scranton, Pa.)
 Lake Erie, Bowling Green & Napoleon Ry. (See Bowling Green, Ohio)
 Lake Shore Electric Ry. (See Cleveland, Ohio)
 Lake Shore Interurban Traffic Association, Meeting, 728
 Lancaster, Pa.:
 —Lancaster County Railway & Light Co., Purchase, 688
 —Lancaster & Southern Street Ry., Merger, 182
 —Susquehanna Railway, Light & Power Co.:
 Dividend, 1128
 Lease of properties in Reading, 93
 Las Vegas (N. M.) Light & Power Co., Sale, 726
 Lawton (Okla.) & Fort Sill Electric Ry., Receivership, 395
 Leeds (Eng.) Municipal Tramways, Annual report, 980
 Legal:
 —Eminent domain for transmission lines in Massachusetts, 325
 —Fare collection by Rooke registers, Rhode Island Co., 102
 —London decision in underground railways arbitration, 218
 —Maximum tender, Amount of, Various cases, 796
 —Transportation of employees, Legal status of free, in West Virginia, 779
 Legal notes:
 —Assaults—ejectments, 809
 —Charters, ordinances and franchises, 85, 342, 527, 720, 808, 1076
 —Negligence, Liability for, 86, 343, 528, 720, 1076
 Legislation affecting electric railways, 91, 133, 179, 236, 278, 313, 346, 392, 433, 474, 533, 610, 646, 684, 724, 764, 814, 850, 890, 929, 989, 1034, 1083, 1126
 Legislation affecting electric railways in 1910, 8
 —(See also Governors' messages, 75)
 Lehigh Valley Transit Co. (See Allentown, Pa.)
 Letter carriers, Free transportation of unconstitutional, 819, 227
 Lewiston (Me.), Augusta & Waterville Street Ry., Purchase, 478, 931
 Lexington, Ky.:
 —Kentucky Securities Corporation, Stock and officers, 281
 —Lexington & Interurban Rys., Sale of securities, 536
 —Reorganization of companies, 1036
 Lighting of cars:
 —Economies, 904
 —Needed improvements, 778

Lighting of cars: (Continued)
 —Report of Pennsylvania Commission, 1020
 —Switch for emergency lighting (Consolidated), *806
 Lightning arresters:
 —Air-cooled choke coils for (Westinghouse), *983
 —Electrolytic (Westinghouse), *884
 Lightning protection, 865
 —Report of committee of National Electric Light Association, 973
 Lignite. (See Coal)
 Lima, Ohio, Western Ohio R. R.:
 —Baggage rules, 538
 —Bond agreement, 932
 Linemen's tools (Oshkosh), *844
 Little Rock Railway & Electric Co.:
 —Changes in personnel, 874
 —Track construction, 843
 Loan fund for employees, Metropolitan Street Ry., New York, 993
 Loan shark evil in New York, 976
 Locomotives, Electric:
 —Capacity [Murray], 667
 —Detroit River tunnel, *67
 —Flange wear, St. Clair Tunnel locomotives [Hall], 707
 —Flat car, Oklahoma Ry. [Haller], *451
 —Havana Electric Ry., 946, *950
 —Northern Electric Ry., 82-ton [Edwards], *1011
 —Pennsylvania R. R., *338; Tests, 960
 —Progress in design, 4
 —Slow-speed, direct-current, for colliery service, South Shields, England, *925
 —Swedish polar zone railway, *788
 —Switching, N. Y., N. H. & H. R. R., *668
 —Three-phase, Giovi Ry., Italy, *631
 Locomotives, Steam, Failures of, and electric trains in 1910, Long Island R. R., 1010
 London:
 —British Westinghouse Co. versus the Underground Electric Railway Co., decision, 218
 —County Council Tramways:
 Annual report, 1053
 Statistics for 1910, 380
 —Electric railway development, 35
 —Letters from, 43, 234, 389, 606, 810, 986
 —Transit problems, 362
 —Underground Electric Rys., Redemption of bonds, 436
 London, Brighton & South Coast Ry.:
 —Electricification, Single-phase, 636 *784
 —Extension, 582
 —Increase of passenger traffic, 362
 Long Island City, N. Y., New York & Queens County Ry., New transfer system, *632
 Long Island R. R.:
 —Car equipment, inspection and maintenance, *1004; Comment, 1002
 —Cars, Steel motor, *1054; Comment, 1046
 —Electrical operations for 1910, 892
 —Electric operation [McCrea], 495
 —Organization for car equipment, inspection and maintenance, *1004
 —Scaffold in shop, *784
 —Storage battery car, 978
 Los Angeles, Cal.:
 —City Ry., Bond issue, 49
 —Los Angeles Railway:
 Bond issue, 182
 Reinforced concrete tie, *679
 —Pacific Electric Ry.:
 Developments, 1080
 Merger, 177, 182
 Scrap utilization, 625
 Louisville, Ky.:
 —Indianapolis & Louisville Traction Co.:
 Accident campaign, 137
 Reorganization, 853, 893
 —Louisville & Eastern R. R., Sale, 50, 93, 182
 —Louisville & Interurban R. R., Mail rate too low to be attractive, 241
 Lubrication:
 —Cost, Hudson & Manhattan R. R., 1102
 —Filtering oil, 625
 —Mileage basis, Lackawanna & Wyoming Valley R. R., System, 416
 —Motors, Atlanta, Ga., 383
 —Motors, Pamphlet by Galena-Signal Oil Co., 924
 —Philadelphia Rapid Transit Co., Methods, 923
 —Scientific lubricating methods (Galena), *469
 Lynchburg (Va.) Traction & Light Co., Redemption of bonds, 853, 1086

M

McKinley lines. (See Peoria, Ill., Illinois Traction System)
 Mahoning & Shenango Railway & Light Co. (See Youngstown, Ohio)
 Mail service on electric railways:
 —Annual report, 334
 —Jeffersonton, Ky., Rate too low to be attractive, 241

Maine, Legislation 278, 433, 684
 Maintenance costs of electrical equipment:
 —Long Island R. R., 1012
 —Third Avenue R. R., 878; Comment, 865
 Manila, P. I., Decorated car, *594
 Manistee (Mich.) Light & Traction Co., Sale, 50, 436, 536, 853
 Maps:
 —Galveston-Houston Ry., 408
 —Havana Electric Ry., 906
 —Hudson & Manhattan R. R., 1098
 —Lehigh Valley Transit Co., 250
 —London, Brighton & South Coast Ry., 784
 —New York City, Division of rapid transit routes, 1070
 —New York City, Sprague proposed subway, 229
 —New York & Queens County Ry., 632
 —Northern Electric Street Ry., Penn., 334
 —Paris and suburbs, 374
 —Salt Lake & Ogden Ry., 700
 —Shore Line Electric Ry., 866
 Martha's Vineyard Street Ry. (See Cottage City, Mass.)
 Maryland Public Service Commission:
 —Inquiry into physical condition of railway properties, 609
 —Report of, 875
 Masonry, Report by Maintenance of Way Association, 497
 Massachusetts:
 —Eminent domain for transmission lines recommended, 325
 —Legislation, 91, 133, 179, 236, 313, 346, 474, 534, 610, 646, 685, 814, 850, 929, 989, 1034, 1083, 1126
 —Nine-hour in eleven bill, Pamphlet of Street Railway Association, 602
 Massachusetts Joint Board on Metropolitan Improvements (See Boston, Electrification of terminals)
 Massachusetts Railroad Commission:
 —Annual report, 150
 —Hearing on additional transfers, Boston Elevated Ry., 666
 —Hearing on Attleboro fares, 115
 —Hearing on reduction of fares on Milford & Uxbridge Street Ry., 634
 —Hearing on West Newbury fare petition, 1120
 Massachusetts savings banks and street railway bonds, 49
 Master Car Builders' Association Convention, 1001, 1031, 1111, 1115
 Maysville (Ky.) Public Service Corporation, 536
 Meadville, Pa.:
 —Meadville & Conneaut Lake Traction Co., Sale, 135, 281, 436, 478
 —Northwestern Rys., Purchases, 478, 1036
 Meridian (Miss.) Light & Railway Co., Bond sale, 932
 Merit system in Sheboygan, Wis., 240
 Meters:
 —Long scale switchboard (Westinghouse), *230
 —Shunted graphic recording (Sangamo), *232, *806
 —Steam now (G. E. FS-2), *1074
 —Water-flow (G. E.), 885
 —(See also Ampere-hour meter; Coasting registers; Watt-hour meters)
 Metropolitan Street Ry. (See Kansas City; New York City)
 Michigan, Legislation, 475, 724
 Michigan Central R. R., Detroit River Tunnel, *62, *104
 Michigan United Rys. (See Jackson, Mich.)
 Milford (Mass.), & Uxbridge Street Ry., Hearing on fare reduction, 634
 Milwaukee (Wis.) Electric Railway & Light Co.:
 —Accident record, 480
 —Beggs, President, Resignation, 405
 —Cars, Semi-steel pay-as-you-enter, *642
 —Coasting recorders, 385
 —Fares, Insufficiency of, 94
 —Fares, Lower, Brief of Company, 1025
 —Insurance experience and policy [Duffy], 166
 —Power station at Commerce Street, Additions, *292
 —Shops at Cold Springs, *204
 Milwaukee Northern Ry. (See Cedarburg, Wis.)
 Minneapolis, Minn., Twin City Rapid Transit Co.:
 —Annual report, 705; Comparative results, 765; Comment, 779
 —Increase in capital stock of Minneapolis & St. Paul Suburban Ry., 239
 —Right of city to order extensions, 236, 311, 643
 —Strap-hanger ordinance, 768
 Minnesota, Legislation, 534
 Missoula (Mont.) Street Ry., One-man prepayment cars, *924
 Missouri, Legislation, 237, 685
 Missouri Electric, Gas, Street Railway and Water-Works Association, 712
 Missouri & Kansas Interurban Ry. (See Kansas City)
 Mobile, Ala., Track construction, Reinforced-concrete beams, *296
 Monorailway, Aerial (Fawkes), *1028

Montreal Street Ry.:
 —Dump cars, *175
 —Merger proposed, 395
 —Progress of negotiations with city, 532, 607
 —Reply to demands made by Board of Commissioners, 390
 Morgantown, W. Va., Union Utilities Co., Dividend, 818
 Motor bearings, Method of boring, Long Island R. R., *1005
 Motor brushes used staggered, Philadelphia, 923
 Motormen. (See Employees)
 Motors, Electric:
 —Axle-bearing sleeves and axle collars, Atlanta, Ga., *383
 —Cleaning, Chicago Rys., 566
 —Design, Discussion by committee of Engineering Association 803
 —Detroit River tunnel (GE-209A), *69
 —Lubrication, Atlanta, Ga., 383
 —Rehabilitating, Metropolitan Street Ry., New York, *589
 —Snow covers, Long Island R. R., 1009
 —Testing interpole shop motors, 777
 —Troubles and remedies, Lackawanna & Wyoming Valley R. R., 416
 —Ventilation of Long Island R. R., *1058
 Mount Vernon (Ohio) Electric Co., Stock increase, 436
 Municipal Congress, 174
 Murdock lines. (See South Bend, Ind.)

N

National Civic Federation:
 —Discussion of arbitration in labor disputes, 103
 —Meeting, 127
 National Electric Light Association:
 —Central station investments in U. S., 1013
 —Committee on lightning protection, Report, 973
 —Committee on prime motive powers, Report, 969
 —Committee on overhead construction, Report, 964
 —Committee on underground construction, Report, 975
 —Committee report on wood preservation, 974
 —Convention in New York, 592, 980, 1002, 1027
 Nebraska State Railway Commission, Hearing on proposed depreciation account, 919
 Nelsonville, Ohio, Hocking-Sunday Creek Traction Co., Bond issue, 50
 New Castle, Ind., Power station, *365
 New Castle, Pa., Wilmington, New Castle & Southern Ry., Sale, 50, 183, 281
 New England Street Railway Club:
 —Annual meeting, 593
 —Electrification discussed, 166
 —Inspection of railway material discussed, 378
 —Meeting in May, 962
 New Hampshire, Legislation, 534
 New Hampshire public service commission created, 849
 New Hampshire public service commission law, Provisions of, 921
 New Haven, Connecticut Co.:
 —Extensions, 264
 —Shore Line Electric Ry. (See Saybrook, Conn.)
 —Steps, Height of, 397
 —Ventilation inspectors, 95
 New Jersey, Legislation, 91, 134, 314, 346, 434, 475, 534, 646, 724, 764
 New Jersey employers' liability law, 763, 1129
 New Jersey Public Utilities Commission:
 —Annual report, 74
 —Conference with railway men, 750
 —Hearing on service in Trenton, 127
 —Passes, Decision, 136
 —Powers increased, 752
 —Standard classification of accounts adopted, 273
 New Jersey public utilities law:
 —Criticism of, by Frank Bergen, 881
 —Hearing in regard to interpretation of, 1026
 New London (Conn.) & East Lyme Street Ry., Laying cable under Connecticut River, *418
 New Orleans, La.:
 —New Orleans Railway & Light Co.:
 —Annual report, 725
 —Bond issue, 50, 727
 —Cars, Single-truck prepayment, *84
 —Dividend, 613
 —Proposed merger with American Cities Railway & Light Co., 930, 1036
 —United Public Utilities Co., Incorporation, 858, 894
 New York Central R. R.:
 —Commutation rates, Increase, Hearing by Commission, 69
 —Hearing to require electrification of West Side freight line, 840
 —Report on the elimination of freight surface tracks in New York City, 630
 —Titanium rail order, 215

New York City:
 —Accidents in January, 615; February, 819; March, 1038
 —Accidents, 1908-1910, 73
 —American Cities Railway & Light Co., Annual report, 852
 —Car pull-ins, Monthly reports by Public Service Commission, 674; Comment, 657, 697
 —Central Park, North & East River R. R.:
 —Foreclosure and sale, 395, 648
 —Joint rate order, 137
 —Transfer order, 52
 —Commutation rates increased on steam roads, Hearing by Commission, 69
 —Delaware & Hudson Co., Annual report, 688
 —Federal Light & Traction Co., Sale of notes, 350
 —Federal Utilities, Incorporated, 1127
 —Fenders and wheel guards, equipment, 352
 —Forty-second Street, Manhattanville & St. Nicholas Avenue R. R., Sale, 93, 478
 —Franchise tax assessments, 349
 —Growth of travel, 1898-1910, 73
 —Hudson Companies, Sale of notes, 853
 —Hudson & Manhattan R. R.:
 —Annual report, 815
 —Detention records, 1098
 —Note extensions, 318, 613
 —Operating practices, *1098; Comment, 1097
 —Operating record, February and March, 672
 —Signals in Hudson tunnels, Performance of, 298
 —Yards and shops at Jersey City [Hazelton], *780, *Sup. *1098
 —Hudson River water front, Report on elimination of New York Central's freight tracks, 630
 —Interborough-Metropolitan Co.:
 —Annual report, 180
 —Extension of voting trust, 350
 —Interborough Rapid Transit Co.:
 —Advertisements on subway question, 977
 —Converter, 3000-kw rotary, *83
 —Earnings for six months, 238
 —Interborough Bulletin, 240
 —Physical condition of employees, 137
 —Prizes for subway and elevated motormen, 283
 —Proposal to build new subway, Amendment to, 848
 —Rails, Specifications, 82
 —Sale of notes, 818
 —Subway:
 —Automatic train stop, New [Waldron], 1104
 —Automatic trips on local tracks, 353
 —"Neck of the bottle," 248
 —Service order, 51, 184
 —(See also below, Subways, New)
 —Voluntary Relief Department, Report of, 856
 —Manhattan Bridge Three-Cent Line, 1086
 —Metropolitan Street Ry.:
 —Joint rate transfer with other companies, *80
 —Loan fund for employees, 993
 —Motor rehabilitation, *589
 —Reorganization plans, 48, 61, 123, 422, 708, 756, 796, 828, 876, 916, 976, 1086
 —Sale, 93, 436, 766, 1128
 —Sale of receivers' certificates, 536
 —Sand-drying plant, *753
 —Signs, Aluminum, in cars, *588
 —Tax payment certificates, 478
 —Transfer order, 52
 —North American Co., Annual report, 647
 —Operations of railways, 1908-1910, 73
 —Public Service Commission:
 —Decision on Coney Island fare case, 459
 —Decision concerning Third Avenue R. R. reorganization reversed, 1082
 —Hearing on reorganization plan of Metropolitan Street Railway, 48, 61, 123, 422, 708, 756, 796, 828, 876, 916, 976
 —Investigation of, 345, 636, 532, 987
 —Joint rate order, 137
 —Report for 1910, 73
 —Reports on defective car service, 674; Comment, 657, 697
 —Rules governing applications for approval of securities, 1124
 —Subway service order protested, 51
 —Volume of business in 1910, 46
 —Wheelguard case of Union Ry., 888
 —Whitridge, F. W., comments on, 171
 —Rapid transit conditions, 45, 89, 131, 178, 235, 276, 889, 1001, 1033, 1081
 —Second Avenue R. R.:
 —Connections in 59th Street, 766
 —Receiver's certificates, 239
 —South Shore Traction Co., Joint rate order, 137
 —Subways, New:
 —Advertising in connection with campaigns, *922, 977

O

New York City:

—Subways, New: (Continued)

- Proposal of Brooklyn Rapid Transit Co., 430, 722, 762, 811; Comment, 736
- Proposal of Caccavajo and Brown, 345
- Proposal of Interborough Rapid Transit Co., Amended, 848
- Proposal of Sprague and Crosby, *288, 516
- Report of special committee of Board of Estimate and Public Service Commission, *1070; Comment, 1047

—Third Avenue R. R.:

- Claims of American Surety Co., 649
- Coasting registers ordered, 129
- Derrick car, *1075
- Emergency repair wagons, *844
- Maintenance costs of electrical equipment, 878; Comment, 865
- Receivers' compensation, 818
- Reorganization, 50, 93, 317, 1082, 1123
- Report of F. W. Whitridge to bondholders, 170

—Storage battery cars, 944, *981

—Traffic across East River, Statistics, 320

—Union Ry.:

- Cable laying across Harlem River, *328
- Motor tower wagons, *984
- Wheelguard case, 888

New York, New Haven & Hartford R. R.:

- Coasting of locomotives [Gilliam], 496
- Commutation rates, Increase, Hearing by Commission, 69
- Electrification, Results [Murray], 667; Comment, 658
- Electrification of Revere Beach & Lynn R. R., 276
- Electrification of Springfield-Tariffville branch, 684
- Reliability of locomotives [Murray], 497
- Report on assets, 92
- Train delays of 1908 and 1909, 667

New York & Queens County Ry. (See Long Island City, N. Y.)

New York Railroad Club, Electrical night, 495; Comment, 488

New York State:

- Earnings of railways, 435
- Fares, Division of five-cent, 1027
- Legislation, 91, 237, 278, 314, 434, 475, 646, 850, 890, 1083
- New York State Public Service Commission: Albany car service, Reply of United Traction Co., 183
- Conference with railway officers on accidents: Comments, 59, 145, 146
- Official call; resolutions, 88
- Proceedings, 154
- Hearing on commutation rates, 69
- Recommendation to Syracuse Rapid Transit Co., 1082
- Rensselaer fare case, 479, 767
- Report, Fourth annual, 300

New York State Street Railway Association:

- Conference on accidents. (See New York State Public Service Commission)
- Meeting at Syracuse, in March, 516
- Report of committee on joint use of poles, 515; Discussion, 519

New York, Westchester & Boston Ry., Advertising, 138

Newark, N. J., Public Service Ry.:

- Annual report, 648, 686
- Bond sale, 536, 818
- Bonus paid motormen and conductors, 138
- Car house, station and shops combined, 758
- Earnings for 1910, 316
- Employe's Liability Act, 1129
- Notice to holders of stock, 350
- Pensions for employees, 51
- Relief for traffic congestion, Plan of R. F. Danforth, *1068
- School tickets, 856, 994

Newburg, N. Y., Orange County Traction Co., Bond issue, 1086

Newspaper handling on Detroit United lines, 1073

Newspapers:

- Criticisms by, 405
- "Popular finance" in, 289
- Nomenclature: "Deceleration" or "retardation," 247
- No-seat. (See Fares.)

Norfolk (Va.) & Portsmouth Traction Co., Consolidation with Virginia Railway & Power Co., 766, 930

Norfolk (Va.) & Western Ry., Decision on joint rates with electric roads, 637

North American Co., Annual report, 647

North Jersey Rapid Transit Co. (See Paterson, N. J.)

Northern Electric Ry. (See Chico, Cal.)

Northern Electric Street Ry. (See Scranton, Pa.)

Northern Ohio Traction & Light Co. (See Akron, Ohio)

Northern Texas Traction Co. (See Fort Worth, Texas)

Northwestern Railways Co. (See Meadville, Pa.)

Norway, Private companies in Christiania, 1024

Norwich (Conn.) & Westerly Ry., Foreclosure of mortgage, 893

Oakland, Cal.:

—Oakland & Antioch Electric Ry., Stock and bond issues, 436, 688

—Oakland Traction Co.:

- Automobile line trucks, *671
- Bond issue, 135

—San Francisco, Oakland & San José Consolidated Ry., Automatic block signals [Brown], *663

—Southern Pacific R. R.:

- Electrification at Oakland, Fruitvale power station and substation, *196, 813, *978

—Reception to American Institute of Electrical Engineers in station, *978

—Rolling stock and repair shops, *1048

—Trucks, Cast steel (Baldwin), *470

—Ocean Shore Ry. (See San Francisco)

—Office and substation building, Kansas City, at Walnut Street, *297

—Office building and car house, Denver City

—Tramway Co. [Evans], *660

Ohio, Legislation, 134, 278, 347, 393, 434, 475, 534, 611, 685, 724, 814, 850, 890, 929, 1126

Ohio Electric Ry. (See Cincinnati, Ohio)

Ohio Valley Electric Ry. (See Huntington, W. Va.)

Oil burner, Portable (Hauck), *883

Oil cups, Integral Brooklyn Rapid Transit Co., *83, *168

Oil fuel for steam boilers [Wagner], 1027

Oil reclaiming tank, Washington, Baltimore & Annapolis Ry., *915

Oil settling tank, Brooklyn air brake department, *587

Oil storage in Syracuse shops, 562

Oklahoma, Legislation, 347

Oklahoma Ry.:

- Concrete pole construction, *841
- Increase of stock and bonds, 281, 688, 727
- Track construction [Haller], *448

Old Colony Street Ry. (See Boston & North-ern)

Oneida (N. Y.) Ry., Shops at Syracuse, N. Y., *550; Comment, 546

Oneonta, N. Y., Otsego & Herkimer Ry.:

- Employment, instruction and discipline of employees [Choate], 120
- Notes on condition of road, 893, 932

Orange County Traction Co. (See Newburg, N. Y.)

Oregon Electric Ry. (See Portland, Ore.)

Organization for car equipment, inspection and maintenance, Long Island R. R., *1004

Organization of car shops, Chicago Rys., *565

Organization chart, Michigan United Rys., *738

Oshkosh, Wis., Wisconsin Electric Ry.:

- Bond issue, 818
- Repair shop practice [Kelsh], 122; Discussion, 165

Otsego & Herkimer R. R. (See Oneonta, N. Y.)

Ottawa, Ill., Repair shop, 418

Ottawa (Ont.) Electric Ry., Annual report, 436

Oven, Galvanized iron, Syracuse shops, *559

Overhead construction:

- Denver City Tramway Co., Steel towers, *173
- Galveston-Houston Ry., *409
- Havana Electric Ry., 911
- [Heydon], 1110
- Indianapolis, New Castle & Toledo Electric Ry. [White], *364
- Iron-bar construction on Brooklyn Bridge loops, *789
- London, Brighton & South Coast Ry., *785
- Oklahoma City [Haller], *449
- Parma, Italy, *951
- Report by committee of National Electric Light Association, 964
- Salt Lake & Ogden R. R., *704
- Section insulators, Automatic (Westinghouse), *174, *1039
- Shore Line Electric Ry., *870
- Temporary high-tension, Brooklyn Rapid Transit Co., *336
- (See also Catenary construction)

P

Pacific Claim Agents' Association, Annual convention, 967, 1022, 1047

Pacific Electric Ry. (See Los Angeles, Cal.)

Packing for journal boxes, Preparation and care of (Galena), *469

Paint shop practice, Chicago Rys., *571

Painting cars:

- Abbreviating methods [French], 583
- Costs, Hudson & Manhattan R. R., 1099
- Oshkosh, Wis. [Kelsh], 122
- Progress in [Elmqvist], 303
- Weight of materials required [Elmqvist], 304

Painting schedule, Syracuse shops, 560

Paris, Electric railway conditions, 374

Parked streets, Track construction, Oklahoma City [Haller], *450

Parkersburg (W. Va.) & Ohio Valley Electric Ry., Receivership, 932, 1086

Parks and pleasure resorts:

- Aeroplanes, as attractions, *980
- Promotion of traffic [Smith], 514; Comment, 487; Discussion, 521
- Revival of the park idea, 545

Parma (Italy) Provincial Ry., Single-phase, *951

Passes:

- Decision in New Jersey, 136, 820
- Trenton & Mercer Traction Co., Passes abolished, 95

Patchogue, N. Y., South Shore Traction Co., Receivership, 50, 93

Patents—what they are, and how to read and how to understand them [Darby], 110

Paterson, N. J., North Jersey Rapid Transit Co., Bond and stock issue, 436

Paving:

- Germany 36
- Pitch filler Akron, Ohio, *718
- Specifications for, with T-rail track construction [Simmons], 452
- With T-rail, Atlanta, Ga., *78

Pay-As-You-Enter Car Corporation, Merger of interests with Pay-Within Company, 384; Comment, 359

Peak load. (See Power station practice)

Pennsylvania, Legislation, 134, 179, 237, 314, 393, 475, 534, 611, 646, 685, 764, 814, 850, 890, 989

Pennsylvania R. R.:

- Congestion at Broad Street Station, Philadelphia, Committee to consider, 121
- Locomotives, Electric, *388

—New York tunnel extension:

- Electrical features [Gibbs], *955; Comment, 945
- Report on electrification work, 431

—Pole lines across Hacksack Meadows [Gibbs], *1014

Pennsylvania State Railroad Commission, Report of Ford, Bacon & Davis on Philadelphia service and equipment, 455, 1016, 1063; Comment, 446

Pennsylvania Tunnel and Terminal R. R., Renewal agreement with Pennsylvania R. R., 818

Pensions. (See Employees)

Peoria, Ill., Illinois Traction System:

- Accident near Staunton, Ill., Crew indicted, 352
- Annual report, 990
- Block signals of, *719, 804, [Leisenring], *1105
- Bond sale, 239
- Cars:

- Express-passenger motor, *275
- Single-truck pay-as-you-enter, *387

—Coal storage pits, under water, *591

—Developments of 1910, *381

—Grain elevator at Glover, Ill., *453

—Inspection by Interstate Commerce Commission, 319

—Operating engineering department, New, 113

—Parlor car service between Peoria and St. Louis, 728

—President Taft's trip, Decatur to Springfield, Ill., 306, *333

—Repair shop at Ottawa, Ill., 418

—Stock sale, 613

—Waiting station at St. Louis, *837

—Wrecking crane, *874

Philadelphia:

- American Rys. Co., Pensions for employees, 894
- Car maintenance records, 1065
- Congestion at Broad Street station, Committees to investigate, 121
- Interstate Rys.:

- Dividend, 1128
- Leases of properties controlled by, 281
- Payment of interest, 436
- Stock issue, 688, 726

—Philadelphia Rys., Incorporation, 932

—Rapid Transit Co.:

- Bond issue, 1086
- Control of Chester & Philadelphia Ry., 853, 893
- Elevated-Subway division, Rolling stock maintenance, 923
- Instruction system for motormen and conductors, *830; Comment, 829
- Loan for rehabilitation, 711, 762, 847, 889
- Refinancing plans, 281, 318, 349, 394, 420, 436, 682, 762, 1031
- Rehabilitation, Suggestion by T. E. Mitten, 682, 711
- Report of Pennsylvania Commission on service and equipment, 455, 1016, 1063; Comment, 446
- Report on reconstruction of accounts, 420; Comment, 406, 699
- Seat, Motorman's, *761
- Shop instruction prints and jigs for gaging brake rigging, *454
- Suit to compel annulment of agreement with city, 89, 390
- Traffic and service stations, 1066

—Southwestern Street Ry., Sale, 613, 649, 766

Piece work. (See Repair shop practice)
 Piedmont (N. C.) & Northern Ry., 1500-volt equipment, 885
 Piedmont (N. C.) Railway & Electric Co. (See Burlington, N. C.)
 Piedmont (N. C.) Traction Co., Stock increase, 727
 Pinions, Life and cost of Records of Nuttall Co., 310
 Pipes, Painting of, for identification, 1010
 Pit, Coal storage. (See Coal storage pits)
 Pit construction:
 —Milwaukee, *204
 —[Prather], 589; Comment, 546
 —Trestle tracks [Prather], 589; Comment, 546
 Pits used for storage, 60
 Pittsburgh, Pa.:
 —Car service [Arnold], c39
 —Philadelphia Co.:
 —Annual report, 893
 —Note issue, 688
 —Stock increase, 436
 —Pittsburgh Rys., Fare question, 988
 —Report on surface transportation [Arnold], 257
 —West Penn Traction Co.:
 —Annual report, 854
 —Bond issue, 437
 Pittsfield, Mass., Berkshire Street Ry., Officers and directors, 853
 Platforms. (See Car platforms)
 Poles:
 —Concrete, galvanized, tubular and latticed poles, 881
 —Joint use of recommended, National Electric Light Association, 964
 —Joint use of, Report of Street Railway Association of State of New York, 515; Discussion, 519
 —Portable erector for ornamenting iron poles in San Francisco [Foster], *109
 —Reinforced concrete:
 —Disadvantages of, 941
 —Oklahoma Ry., *841
 —Pennsylvania R. R. [Gibbs], *1014
 —Statistics for 1909, Bureau of the Census, 522
 Policemen, Free transportation of, in Massachusetts, 827; in New Jersey, 1026
 Portland, Ore.:
 —Fenders, Ruling by Supreme Court, 849
 —No-seat-no-fare ordinance, 1037
 —Oregon Electric Ry., automatic block signals [Coolidge], *c423
 —Portland Railway, Light & Power Co.:
 —Accident prevention, 538, 1087
 —Dividend, 318
 —Employees as stockholders, 283
 —Prize article on "How to avoid accidents," 264
 Postal Department, Report on mail service, 334
 Postal rates, Proposed increase in second-class, 289
 Pottsville, Pa., Schuylkill & Dauphin Traction Co., 1128
 Power station investments in the United States, 1013
 Power station practice:
 —Abolition of dark corners, 903
 —Auxiliary load, Development of [Young], 746; Discussion, 742
 —Motion study in power stations [Webster], 1027
 —Oil fuel, Use of [Wagner], 1027
 —Painting pipes for identification, 1010
 —Peak load and auxiliary power, 407
 —Progress in design, 6
 —Savannah, Ga., 299
 Power stations:
 —Galveston-Houston Ry., *409
 —Generation on a large scale for groups of railways, 290
 —Havana Electric Ry. [Hild], 909
 —Milwaukee, Commerce Street, Additions to plant, *292
 —New Castle, Ind., *365
 —Salt Lake & Ogden R. R., *701
 —Saybrook, Conn., *866
 —Southern Pacific R. R., Fruitvale, Cal., *196
 Power stations and electricity supply for trunk line railroads [Darlington], 967; Comment, 942
 Power transmission, Progress of, 864
 Prague Electric Ry., Annual report, 369
 Prepayment Car Sales Co., 384; Comment, 359
 Press for armature bearings, Chicago Rys., *587
 Press, Hydraulic, for forcing bearings (Watson-Stillman), *885
 Prime motive powers, Report on, by committee of National Electric Light Association, 969
 Problems of the day in electric railroading [Mathes], 749
 Promotion charges, Chart of [Ford, Bacon & Davis], 710
 Providence, R. I.:
 —Investigation of surface railway conditions by B. J. Arnold, 333; Report, 1069
 —Providence & Fall River Street Ry. (See Swansea Center, Mass.)

Providence, R. I.: (Continued)
 —Rhode Island Co.:
 —Leases, 1036
 —Legal decision permitting use of Rooke registers, 102
 Public service commissions:
 —Discussion on, by Electric Club of Chicago, 671
 —[Josselyn], 312
 —Messages of the Governors, Abstracts of, 75, 125, 229, 273
 —New Jersey law, 921
 —Responsibilities and salaries of commissioners, 101
 Public service corporations:
 —Messages of the Governors, Abstracts of, 75, 125, 229, 273; Comment, 101
 —Relations with the public [Huntington], 282
 Public Service Corporation of New Jersey. (See Newark, N. J.)
 Publicity campaigns:
 —Brooklyn, *719
 —[Gonzenbach], 164
 Pueblo (Col.) & Suburban Traction & Lighting Co., Control, 1128
 Puget Sound Electric Ry. (See Tacoma, Wash.)
 Pull-ins. (See Car run-ins)

Q

Quakertown (Pa.) Traction Co., Bond issue, 239, 436, 536, 649
 Quebec Railway, Light, Heat & Power Co., Dividend, 649
 Question Box of the Engineering Association, 13
 Quincy, Ill., Pay-as-you-enter cars, *387

R

Racks for sash, in Syracuse shops, *559
 Rail bonding:
 —Hints on applying bonds [Nelson], 793
 —Reactance bonds, Illinois Traction System, *1107
 —Thermo (Ohio Brass Co.), *985
 Rail joints:
 —Developments of 1910, 5
 —Welding process, Germany, 36
 Rail registering device under load, *961
 Rail specifications:
 —Interborough Rapid Transit R. R., New York, Rails, 82
 —Progress of 1910, 8
 Railings at elevated stations, Boston, 1072
 Railroad Securities Commission:
 —Hearings in New York, 422
 —Testimony received in Chicago, 265
 Rails:
 —Corrugations [Sieber], *372
 —Corrugations, Tests by International Street & Interurban Railway Association, 5
 —Maintenance of Way Association, Report by committee, 497
 —Progress of 1910, 8
 —T-rail:
 —Specification for ideal construction [Simmons], 452
 —Use of, in streets [Simmons], 452
 —Titanium Pessmer rails, Order of New York Central R. R., 215
 Railway Signal Association, Convention in Chicago, 508, 524
 Rate decision of Interstate Commerce Commission, 360
 Rates. (See Fares)
 Receiverships and foreclosure sales in 1910, 19
 Record systems. (See Blanks and forms)
 Reheater for speed-roll insulator, Chicago Rys., *1028
 Repair cars:
 —Gasoline [Otto], *983
 —Gasoline-electric, London, Brighton & South Coast Ry., *787
 Repair shop practice:
 —Atlanta, Ga., *383
 —Boring tool, Expansion (Davis), *429
 —Brake rigging, Instruction prints and jigs for gaging, *454
 —Brooklyn Rapid Transit, Air brake and compressor departments, *586
 —Car failure records, Richmond, Va., *81
 —Chicago Rys., *565
 —Compressed air for various uses, Lackawanna & Wyoming Valley R. R., 416
 —Eastern Wisconsin system [Kelsh], 122; Discussion, 165
 —Economizing supplies and working time, 326
 —Foreman, Qualifications of, 146
 —Handling materials and supplies economically, 698
 —Heater maintenance, Brooklyn, *305
 —Hudson & Manhattan R. R., *1099, 1102
 —Improving old shops, 248
 —Inspection of car equipment, Needed improvements in 737
 —Instruction prints, Baltimore, *760
 —Lackawanna & Wyoming Valley R. R., 416
 —Long Island R. R., *1007
 —Lubricating methods, Scientific [Galena], *469

Repair shop practice: (Continued)
 —Piece work and lost motion, 549
 —Piece-work rate, One way to fix, 405
 —Piece-work records, Boston, 370
 —Piece-work system, rates, Hudson & Manhattan R. R., 1099
 —Reheater for speed roll insulator, *1028
 —South Bend, Ind., Murdock lines, *574
 —Specializing on concentration of car maintenance, Brooklyn, 446
 —Syracuse, N. Y., *552
 —Things worth while [Gerke], 745; Discussion, 743
 —Transfer table, Flush, Kansas City, *148
 Repair shops:
 —Chicago Rys., *490, *565
 —Havana Electric Ry. [Hild], *946
 —Hudson & Manhattan R. R., Jersey City [Hazelton], *780, *Sup., *1098
 —Long Island R. R., *1007
 —Milwaukee Electric Railway & Light Co., *204
 —Ottawa, Ill., Illinois Traction, 418
 —San Francisco, United Rys., *588
 —South Bend, Ind., Murdock lines, *574
 —Southern Pacific Ry., *1052
 —Syracuse, N. Y., of Syracuse Rapid Transit Co. and Oneida Ry., *550; Comment, 546
 Repair wagons. (See Emergency repair wagons; Tower wagons)
 Resistances, Rearrangement, in Brooklyn, 306
 Return railway circuits:
 —Investigation and care of [Nelson], 793; Discussion, 797
 —Problem of [Steinmetz], 1073
 Rheostats, Removable grid (G. E.), *641
 Rhode Island, Legislation, 91, 347
 Rhode Island Co. (See Providence, R. I.)
 Richmond, Va., Virginia Railway & Power Co.:
 —Bond issues, 436, 854
 —Car failure record, *81
 —Consolidation with Norfolk & Portsmouth Traction Co., 766, 930, 1128
 —Stock listed, 727
 Rio de Janeiro (Brazil) Tramway, Light & Power Co., Annual report, 727
 River, Laying cables under:
 —Connecticut River, *418
 —Harlem River, *328
 Rochester, N. Y.:
 —Buffalo, Lockport & Rochester Ry.:
 —Officers, 181
 —Pit and trestle construction [Prather], 589; Comment, 546
 —Rochester Railway & Light Co., Bond issue, 182, 318, 436
 Rock Hill (S. C.) Water Supply, Electric Light & Street Railway Co., Municipal operation, 396
 Roller bearings with rigid axle wheel (R. R. B. Co.), *309
 Rolling stock ordered in 1910, 14; Comment, 3
 Routes, Shortening, in proportion to traffic density, 488
 Rules for city railways:
 —Austrian Street Railway Association, 40
 —Meeting of committee of Transportation & Traffic Association, 713
 —Recommendations by Committee of Transportation & Traffic Association, 963
 —Revision of desirable, 945
 Rules for interurban railways:
 —Change of crews, Indiana, 855
 —New York State Street Railway Association, Discussion by, 520
 —Signaling rules, Illinois Traction System, 1105
 —Situation at end of 1910, 10
 —Transportation & Traffic Association Committee meetings, 170, 493, 675, 716; Comment, 445, 698
 Run-ins. (See Car run-ins)
 Rush-hour conditions:
 —Europe, Report on, 275
 —Philadelphia, Report on, 455

S

St. Clair Tunnel locomotives, Flange wear, 707
 St. Francois County Ry. (See Farmington, Mo.)
 St. Joseph (Mo.) Railway, Light & Power Co., New Year's transfer, 52
 St. Louis, Mo.:
 —Fender and wheelguard tests, Rules, 460; Entries, 640; Tests, 662, 764
 —Freight and express terminal of Illinois Traction System, *381
 —Terminal Electric Ry., Increase of capital stock, 50
 —United Railways:
 —Annual report, 315; Comment, 247
 —Bond issue, 1086
 —Sand-drying plant, *953
 —Settlement ordinance, 471; Comment, 487; Report of Commission, 644
 —Waiting station of Illinois Traction System, *837
 St. Louis Car Co., Officers and reorganization, 307
 Salary-loan problem, Discussion in New York, 976

Sale of power [Young], 746
 Salisbury (N. C.) & Spencer Ry., Control, 688
 Salt Lake City, Utah Light & Railway Co., Bond issue, 436
 Salt Lake & Ogden R. R., Electrification, *700
 San Diego (Cal.) Electric Ry., Car house, Reinforced concrete, 717
 San Francisco, Cal.:
 —Development of interurban railways near, 312
 —Geary Street municipal project, 391
 —No-seat-no-fare ordinance, 856, 933
 —Ocean Shore Ry., Sale, 182, 281, 318, 932, 1086
 —United Properties Co. organized, 92, 182
 —United R. R.:
 Cars, Pay-as-you-enter, *679
 Erector for ornamenting iron poles, Portable [Foster], *109
 Shops, *588
 —United Railways Investment Co.:
 Annual report, 1035
 Maturity of notes, 281
 San Francisco, Oakland & San José Consolidated Ry. (See Oakland, Cal.)
 San Jose (Cal.) & Santa Clara County R. R., Sale, 727
 Sand on cars:
 —Bristol & Plainville Tramway Co., 676
 —Use of, on interurban cars [Evans], 506; Comment, 546; Discussion, 597
 Sand blast for cleaning steel cars:
 —Chicago Rys., *578
 —Hudson & Manhattan R. R., *1102
 Sand-blasting glass in Syracuse repair shops, *558
 Sand-drying plant:
 —Metropolitan Street Ry., New York, *753
 —St. Louis, *953
 Sand hopper under car seats, Fishkill (N. Y.) Electric Ry., 760
 Sault Ste. Marie, Mich., International Transit Co., Bond sale, 239
 Savannah (Ga.) Electric Co., Improvements in track and power departments, 299
 Saws:
 —Band rip (Fay & Egan), *985
 —Counting attachments for, *676
 Saybrook, Conn., Shore Line Electric Ry., 1200-volt equipment, *866
 Scaffolds:
 —Adjustable, in paint shops, South Bend, Ind., *578
 —Car repair shop, Long Island R. R., *748
 Schedules:
 —Adjusting, Need of a joint traffic association, 447
 —Experimental changes in schedule, 326
 —Possible economies on interurban roads, 828
 —Posting schedules, Desirability of, 863
 —Public knowledge of city, 735
 —Transportation and Traffic Association committee meeting, 758
 Schenectady (N. Y.) Ry., Fare complaint dismissed, 768
 School fares:
 —New Jersey, 856, 994
 —Shreveport, La., 933
 Schuylkill & Dauphin Traction Co. (See Pottsville, Pa.)
 Scranton, Pa.:
 —Lackawanna & Wyoming Valley Ry., Notes, *415
 —Northern Electric Street Ry., Notes, 40
 —Scranton & Binghamton R. R.:
 Bond sale, 854
 System, *334
 —Scranton Ry., Track and rolling stock changes, *603
 Scrap, Reclaiming and reworking, 625, c757
 Screen-cleaning machine, Motor-driven, Chicago Rys., *804
 Seating department, Brooklyn Rapid Transit System, *629
 Seats:
 —Motorman's, Folding, Southern Pacific Ry., *1050
 —Motorman's, Philadelphia Rapid Transit Co., *761
 —(See also Car seats)
 Seattle (Wash.) Electric Co.:
 —Bond issue, 182, 854
 —Dividends, 613
 Securities Commission. (See Railroad Securities Commission)
 Shaper, Double spindle (Fay & Egan), *176
 Sheboygan (Wis.) Railway & Electric Co.:
 —Merit system for employees, 240
 —Publication of "Sparks from the Wire," 306
 Shelburne Falls (Mass.) & Colerain Street Ry., Payment of mortgage bonds, 239
 Shop accounting. (See Accounting)
 Shopwork. (See Repair shop practice)
 Shore Line Electric Ry. (See Saybrook, Conn.)
 Signals:
 —Block system:
 Automatic block signals for electric railways [Howe], *268; [Sachs], c640

Signals:

—Block system: (Continued)
 Baltimore viaduct, United Railways & Electric Co., *41
 Block signal committee of Engineering and Transportation and Traffic Associations, Work of 360; Meeting, 599; Comment, 624
 Clearance diagram, *1106
 Definitions, 1108
 Hudson tunnels, Performance of, 298
 Illinois Traction System, *719 [Leisenring], *1105
 Indiana conference, 340
 Indiana law, 462
 (Kinsman), Terre Haute, Indianapolis & Eastern Traction Co., *886
 Milage, in the United States, 783
 New Jersey Commission, Discussion by, 750
 Pennsylvania R. R., New York tunnel, 961
 Report to Indiana Railroad Commission, 377
 San Francisco, Oakland & San José Consolidated Ry. [Brown], *663
 Single-track lines, Oregon Electric Ry. [Coolidge], c*423
 Stub-end sidings on single-track roads, *425
 —Conductor's control pipe, Discussion by Central Electric Railway Association Committee, 71
 —Dispatcher-controlled train-order signals for interurban railways (U. S. Electric Co.), *882
 —Selector signals for Indianapolis & Cincinnati Traction Co., 84
 —Train stops, Automatic, *665 [Waldron], 1104
 Signs:
 —Aluminum car signs, New York, *588
 —Boston Elevated Ry., new car signs, *1119
 —Destruction of, Discussion by Central Electric Railway Association Committee, 71
 —Report of Pennsylvania Commission on car signs, 1017
 —Stop signs set in street pavement, *170
 Single-phase railways:
 —Europe, Lists, 382
 —France, Southern, 962
 —Parma, Italy, *951
 —Single-phase for trunk-line railroads, Experience of New Haven road [Murray], 667; Comment, 658
 Sleet cutter, Trolley (Bonney-Vehslage), *129
 Smoke from locomotives, Chicago [Bird], 305; Comment, 327
 Smoking prohibited on Metropolitan Street Ry., Kansas City, 1130.
 Snow-fighting equipment, Brooklyn Rapid Transit Co., *255
 Snow plow, Chicago & Milwaukee Electric R. R., *298
 Snowstorms, Effective methods of handling [Cummins], 747; Discussion, 743
 Social results of electric railways [Giddings], 879
 Soldering process for bonds (O. B.), *985
 Somerset (Ky.) Water, Light & Traction Co., Sale, 93, 182, 351, 396, 649
 South Bend, Ind., Shops of Chicago, South Bend & Northern Indiana Ry. and Southern Michigan Ry., *574
 South Penn Railways & Light Co. (See Cumberland, Md.)
 South Shore Traction Co. (See Patchogue, N. Y.)
 Southern Car Co., Reorganization, 749
 Southern Michigan Ry. (See South Bend, Ind.)
 Southern Pacific Co. (See Oakland, Cal.)
 Southern Pennsylvania Traction Co. (See Chester, Pa.)
 Southwestern Electrical & Gas Association; Annual convention, 797
 Special work, Motormen's care of, Baltimore bulletin, *841; Comment, 828
 Specifications. (See Rail specifications)
 Speed of cars:
 —Accurate judgment of, by motormen, 406
 —Maximum speeds discussed by New Jersey Commission, 751
 Spikes, Registering device under load, *961
 Spokane (Wash.) & Inland Empire R. R., Annual report, 816
 Spokane, Wash., Washington Water Power Co.:
 —Dividend, 239
 —Operating results for year, 1127
 Sprague, Frank J., Award of Edison Medal, 864, 879
 Springfield (Mass.) Street Ry., Sale, 688, 818
 Springfield (Mo.) Railway & Light Co., 854, 1128
 Springfield (Ohio) & Xenia Ry., Dividend, 135
 Stage lines of Havana Electric Ry., 949
 Stand for headlight resistance coils (Crouse Hinds), *761
 Standing in cars:
 —Germany, 37
 —Report of Pennsylvania Commission, 1019
 —Washington, D. C., Fares of standees, Adverse report on bill, 184

Standardization:

—Central Electric Railway Association Committee, Discussion by, 70, 633, Comment, 102
 —Discussion by Engineering Association, 219
 Stands, Revolving, for sash and door work, Syracuse shops, *559
 Stark Electric R. R. (See Alliance, Ohio)
 Staten Island, Transfer decision, 353
 Statistics:
 —Accident, Texas railways [Kellogg], 790
 —Accidents on pay-with-in and other cars, 1065
 —Berlin (Ger.) system, 639
 —Block signal mileage in United States, 783
 —Canadian electric railways [Payne], 37
 —Car performance in 1910, electric divisions of Long Island R. R., 1010
 —Car run-ins, Brooklyn, 838
 —Car service, Defective, in New York City, 674; Comment, 657, 697
 —Cars ordered in 1910, 14; Comment, 3
 —City areas, populations, car miles, earnings, longest ride, etc., for 16 cities [Davis], 212
 —City railway systems, Graphical comparison of, 260
 —Earnings, expenses and track mileage of large urban railway properties, Comparison of, on a car-mileage basis, 259
 —Electrical industry, 38
 —Great Britain, 33, 454
 —Growth of street railway travel in New York City, 1898-1910, 73
 —Hours of street railway employees in Massachusetts, 602
 —London traffic, 362, 380
 —Mail service on electric railways, 334
 —New York City railway operation, 1908-1910, 73
 —Operating statistics of New York, Boston, Chicago and Philadelphia, 1064
 —Poles and pole accessories in 1909, 522
 —Population increase and traction earnings, Relation between, Pittsburgh report, 258
 —Ties purchased in 1909, 340
 —Track construction in 1910, 17; Comment, 5
 —Traffic across East River, New York, 320
 —Traffic and service, Philadelphia, 1066
 —Train detentions, Washington, Baltimore & Annapolis Ry., 913
 —Transfers in the census report, 624
 —Valuation of Metropolitan Street Ry. property, 123, 422, 708, 756
 Steam railways:
 —Electrification of terminals [Parker], 166
 —Joint rates with electric lines. (See Through routes and joint rates)
 —Smoke problem is Chicago [Bird], 305; Comment, 327
 —(See also Heavy electric traction)
 Stockton, Cal., Central California Traction Co., Stock increase, 688
 Stopping interurban cars, Cost of, 359; [Sachs], c640
 Storage battery cars:
 —Halle, Germany, Tests, 21
 —Long Island R. R., 978
 —Third Avenue R. R., 944, *981
 Storage batteries:
 —Baltimore, Largest plant of its kind in the world, 387
 —Power stations, Detroit Tunnel, *106
 —Trunk line electrifications, Not economical for, 668
 Storerooms:
 —Chicago Rys. shops, *567
 —Movable bins and shelves, 406, *557, *558, *567, *577
 —South Bend, Ind., shops, *577
 —Syracuse repair shops, *557
 Strap-hanger ordinance defined in Minneapolis, 768
 Street Railway Association of State of New York (See New York State Street Railway Association)
 Strikes:
 —Arbitration of disputes, Discussion by National Civic Federation, 103
 —Columbus, History, 461
 —Connecticut Valley Street Ry., 396
 —Winnipeg, Man., 46, 95
 Submarine cables, Laying:
 —Connecticut River, New London, *418
 —Harlem River, *328
 Substations:
 —Detroit River tunnel, *64
 —Galveston-Houston Ry., *411
 —Havana Electric Ry., *911
 —Indianapolis, New Castle & Toledo Electric Ry., *367
 —Kansas City, Office and substation building, *297
 —Pennsylvania R. R., New York tunnel extension, *958
 —Portable, Havana, *911
 —Salt Lake & Ogden R. R., *702, 703
 —Shore Line Electric Ry., *867
 Subways. (See names of cities)
 Sunday Creek-Hocking Traction Co. (See Nelsonville, Ohio)
 Supplies:
 —Handling economically, 698

Supplies: (Continued)

- Proportionate investment in supplies on hand, Philadelphia Rapid Transit Co., 420, 699
- Susquehanna Railway, Light & Power Co. (See Lancaster, Pa.)
- Sweden, Kiruna-Riksgränsen line, Electrification, *788
- Swiss Federal Railways, Electrification, 952
- Switch box, Universal (G. R. S. Co.), *429
- Switchboards:
 - Long Island steel car, *1060
 - Milwaukee power station, *295
- Switches:
 - Emergency car lighting (Consolidated), *806
 - Inspection of high-tension oil, 789
 - Oil, Non-automatic (Allis-Chalmers), *176
 - Oil-break pole-line (G. E.), *233
- Switzerland, Lugano and Tesserte 1000-volt direct-current railway, 715
- Syracuse, N. Y.:
 - Ohmer fare register practice [Duffy], *510
 - Rapid Transit Ry.:
 - Issue of capital stock, 135
 - Recommendation of Public Service Commission, 1082
 - Shops at Syracuse, *550; Comment, 546
 - Wage increase, 993
- Syracuse conference. (See New York State Public Service Commission)
- Swansea Center, Mass., Providence & Fall River Street Ry., Failure to pay interest on bonds, 135

T

- Tacoma, Wash.:
 - Puget Sound Electric Ry, Refunding of notes, 182
 - Tacoma Railway & Power Co., Safety league of accident claim department, 282
- Tap cover and stud (Dossert), *84
- Tariff (See Fares)
- Taxes:
 - Corporation tax decision, 462; Comments, 447, 489
 - Payments under corporation tax law, 32
 - Reduction of taxes is a feasible means of relief, 147
- Telephone, Portable railway (Kellogg), *176
- Telephone cards, moisture-proof (Western Electric), 470
- Telephone train dispatching (See Dispatching trains)
- Tennessee, Legislation, 347, 724
- Terminals:
 - Dayton Ohio, Ohio Electric Ry., Improvements, *628
 - Electrification of [Parker], 166
 - St. Louis, Freight and express, *381
- Terre Haute (Ind.), Indianapolis & Eastern Traction Co.:
 - Sale of bonds, 932
 - Signal system (Kinsman), *886
 - Testing of materials, Suggestion for, 1096
 - Testing of return railway circuits [Nelson], 793; Discussion, 797
- Texas, Legislation, 347
- Texas Traction Co. (See Dallas, Tex.)
- Third rail:
 - Detroit River tunnel, *66
 - Lackawanna & Wyoming Valley R. R., *415
 - New York tunnel of Pennsylvania R. R. [Gibbs], *959
- Third-rail cle rings, Data regarding, Report by Committee of Maintenance of Way Association, 499
- Third-rail shoe fuse Long Island R. R., *1006
- Third-rail shoe te'l-tale, Hudson & Manhattan R. R., *1101
- Third-rail shoes, Improved, Philadelphia, 923
- Through routes and joint rates:
 - Decision by Interstate Commerce Commission on traffic between electric and steam roads, 637
 - First joint tariff ever published by interurban lines [Gore], 507
 - Indianapolis Interurban Joint Ticket Agency, Development of long-distance travel [Gore], 507; Discussion, 595
 - Massachusetts, Report, 151
 - New York, 52
- Ticket counterfeiters, Cleveland, 1123
- Tickets:
 - Interurban local (Poole), *428
 - Joint rate transfer tickets in New York between Metropolitan Street Railway and other lines, *80
 - Proposed duplex transfer, *128
- Ties:
 - Life of, treated [Winslow], 1110
 - Maintenance of Way Association, Report by Committee, 498
 - Purchase of, in 1909, Statistics, 340
 - Reinforced concrete, Los Angeles, Cal., *679
- Steel:
 - Oklahoma City [Haller], *448
 - Progress of 1910, 6
 - Scranton, Pa., *603

- Timber, Report on white cedar [McKinney], 1025
- Timber preservation:
 - Advantages of treated timber to electric railways [Winslow], 1110
 - Asphaltic oils as economical wood preservatives [Cherrington], 504
 - Maintenance of Way Association, Report by sub-committee, 498
 - Progress of 1910, 6
 - Report of committee of National Electric Light Association, 974
 - [Rhoades], 741
 - [Winslow], 920
- Timetables, Transportation and Traffic Association committee meeting, 758
- Titusville (Pa.) Electric Traction Co., Bond issue, 1128
- Toledo, Ohio:
 - Toledo & Chicago Interurban Ry. (See Kendallville, Ind.)
 - Toledo & Indiana Ry. Bond issue, 894
 - Toledo Railways & Light Co.:
 - Annual report, 396, 991
 - Appraisal, 988
 - Franchise, Tentative, 130
 - Franchise extension, Mayor Whitlock on, 529
 - Franchise negotiations, 607, 645, 681, 722, 763, 812, 848, 863
 - Transfer talks, 51
 - Traction situation, 45, 178, 391
 - Tool box for track construction, Oklahoma City [Haller], *450
 - Tool wagon, Metal, Oklahoma Ry. [Haller], *451
- Toronto Ry.:
 - Annual report, 891
 - Suspension of pay-as-you-enter system, 185
 - Transfer talks, 335
- Toronto Suburban Street Ry., Sale, 1128
- Tower wagons, Electric, Havana Electric Ry., *949
- Tower wagons, Gasoline:
 - Oakland, Cal., *671
 - Union Ry., New York, *984
- Towers, Steel, Denver City Tramway Co., *173
- Track construction:
 - Atlanta, Ga., *78
 - Concrete and steel ties, Oklahoma City [Haller], *448
 - Construction in 1910, 17; Comment, 5
 - Costs, Oklahoma City [Haller], 452
 - Creosoted wood cushions for steel ties [Haller], *451
 - Galveston-Houston Ry., *408
 - Havana Electric Ry. [Hild], 908
 - Indianapolis, New Castle & Toledo Electric Ry. [White], *364
 - Little Rock, Ark., 843
 - Maintenance of Way Association, Report by committee, 498
 - Mobile, Ala., Reinforced concrete beams, *296
 - Oklahoma City [Haller], *448
 - Pennsylvania R. R., New York tunnel extension, 956
 - Salt Lake & Ogden R. R., 701, *705
 - Savannah, Ga., 299
 - Scranton, Pa., Steel tie and concrete construction, *603
 - T-rail, Atlanta, Ga., *78
 - Tieless concrete and paved construction, [Haller], *384
- Track handling apparatus, Oklahoma City [Haller], *451
- Track movement under locomotives, Tests, Pennsylvania R. R., *961
- Trackless trolleys proposed in Great Britain, 26
- Traffic department of Lehigh Valley Transit Co., 252
- Tram in London, 362
- Traffic promotion:
 - Automobile feeder line, Indianapolis, New Castle & Toledo Electric Ry., 369
 - Building up of interurban territory [Smith], 513; Comment, 487; Discussion, 521
 - Joint rates as a means of developing long-distance travel [Gore], 507; Discussion, 595
 - Summer traffic, Methods of stimulating [Smith], 513; Comment, 487; Discussion, 521
- Train dispatching. (See Dispatching trains)
- Train shed, London, Brighton & South Coast Ry., *785
- Transfer tables:
 - Air-operated, South Bend, Ind., shops, *577
 - Chicago Rys., *493
 - Flush, Kansas City, *148
 - Milwaukee shops, 207
- Transfers:
 - Census report, 624
 - Joint, Metropolitan Street Ry., New York, *80
 - Law suggested by Transportation and Traffic Association, 635
 - New Year's transfer, St. Joseph, Mo., 52
 - New York & Queens County Ry., Transfer with coupons, *632
 - Staten Island, Transfer decision, 353
 - Talks to conductors, Toronto Ry., 335

Transfers: (Continued)

- Toledo transfer talks, 51
- Transformers:
 - Baltimore substation, 10,000-kva, *805
 - Lighting (Allis-Chalmers), *1029
- Transmission lines:
 - Eminent domain for, in Massachusetts, 325
 - Pennsylvania R. R., across Hackensack Meadows [Gibbs], *1014
 - Progress in construction, 7
 - Recommendations of National Electric Light Association, 964
- Transportation, Discussions in "Annals of the American Academy of Political and Social Science," 126; Comment, 194
- Transportation of letter carriers. (See Free transportation)
- Trenton, N. J.:
 - Elizabeth & Trenton R. R., Bond issue, 350
 - Leases approved by Board of Commissioners, 477
 - No-seat-no-fare ordinance, 439, 479
 - Trenton & Mercer Traction Co., Passes abolished, 95
- Trenton Street Ry.:
 - Hearing on service, 127
 - Recommendations of Board of Commissioners, 537
- Tri-State Railway & Electric Co. (See East Liverpool, Ohio)
- Trinidad, Col., Colorado Railway, Light & Power Co., Receivership, 350
- Trolley cars, Extruded (Ohio), *231
- Trolley frog, "Detroit" (Dunne), *129
- Trolley pole, Adjusting device, Chicago City Ry., 306
- Trolley switch, "Rymco" high-speed automatic (A. M. Co.), 605
- Trolley wheels:
 - Finishing process, Chicago Rys., *804
 - Georgia Railway & Electric Co., 383
 - Ideal (Lumen), *84
 - Oshkosh, Trolley wheel practice [Kelsh], 122
- Trolley wire, Wear of, N. Y., N. H. & H. R. R., 669
- Trolley wire splicer (Westinghouse), *640
- Trucks:
 - (Baldwin) cast-steel, Southern Pacific R. R., *470
 - (Baldwin) Winnipeg Electric Ry., *807
 - Design of, with reference to light weight, Discussion by committee of Engineering Association, 218, 802
 - London, Brighton & South Coast Ry., *786
 - Long Island R. R., steel cars, *1057
 - Rebuilding, Chicago Ry., 565
 - Tulsa, Okla., Gasoline motor car, *926
 - Tungsten lamps, Wire-type (Westinghouse), 310, 382
- Turbines, Steam:
 - Developments and efficiencies [Dreyfus], *386
 - Low-pressure [Dreyfus], *805
 - Mixed pressure, Havana Electric Ry., *910
 - Moderate speed (De Laval), *678
 - Report of committee of National Electric Light Association, 969
- Turbo-alternator sets, Mixed-pressure (Dick, Kerr), *231
- Turbo-generators, Ventilation of [Williamson], 974; Comment, 942
- Turnstile and register, "Turn-in" (Ohmer), Dayton, Ohio, 388
- Twin City Rapid Transit Co. (See Minneapolis)

U

- Underground construction, Report of committee of National Electric Light Association, 975
- Union Utilities Co. (See Morgantown, W. Va.)
- United Properties Company of California. (See San Francisco)
- United Public Utilities Co. (See New Orleans, La.)
- United Railroads of San Francisco. (See San Francisco)
- United Rys. (See St. Louis)
- United Railways & Electric Co. (See Baltimore)
- United Railways Investment Co. (See San Francisco)
- United Traction Co. (See Albany, N. Y.)
- Utah, Legislation, 237, 534
- Utah Light & Railway Co. (See Salt Lake City)

V

- Valley Traction Co. (See Harrisburg, Pa.)
- Valuations. (See Appraisals)
- Valves, Air brake, Conductor's emergency, Louisville & Northern Ry., 70
- Vancouver, B. C., British Columbia Electric Ry., Annual report, 726
- Vancouver, Wash., Washington-Oregon Corporation, Merger, 183
- Varnish handled by air pressure, Chicago Rys., *760

Varnishing cars [French], 583
 Ventilation of cars:
 —Discussion by committee of Engineering Association, 802
 —Express cars of Old Colony Street Ry., *873
 —Report of Pennsylvania Commission, 1019
 Ventilation inspectors of Connecticut Co., 95
 Ventilation of New York tunnel extension of Pennsylvania R. R. [Gibbs], 955
 Ventilation for turbo-generators, Report on National Electric Light Association, 970 [Williamson], 974
 Ventilator, Cleveland (Nichols-Lintern), 383
 Viaduct, Concrete, Shore Line Electric Ry., *871
 Vienna, Waiting stations, *592
 Virginia Railway & Power Co. (See Richmond, Va.)

W

Waco, Tex., Citizens Ry., 1085
 Wages (See Employees)
 Waiting stations:
 —Illinois Traction System, *381
 —Lehigh Valley Transit Co., *251
 —St. Louis, Illinois Traction System, *837
 —Vienna, *592
 Warren (Pa.) & Jamestown Street Ry., Direct current replaces alternating current, 133
 Washington, Legislation, 611, 724
 Washington, D. C.:
 —City and Suburban Ry., Hearing on rates before Interstate Commerce Commission, 151
 —Fare complaint against railways, 855
 —Fares of standees, Adverse report on bill, 184
 Washington, Alexandria & Mount Vernon Ry., Fare reduction 614
 Washington, Baltimore & Annapolis Electric R. R.:
 —Car, Private, President Taft visits Annapolis in, *754
 —Reorganization, 135, 351, 437, 536, 688
 —Results of 1200-volt direct-current operation, 913
 Washington, Berwyn & Laurel Electric Ry., Hearing on rates before Interstate Commerce Commission, 151
 Washington-Oregon Corporation. (See Vancouver, Wash.)
 Washington Public Service Commission, creation of, 755

Washington Railway & Electric Co., Annual report, 476
 Washington & Rockville R. R., Receivership, 649, 689
 Washington Water Power Co. (See Spokane, Wash.)
 Waste cans, Safety, Chicago Rys., 578
 Water-power conservation and utilization, Conference on, in New York, 524, 674; Comment, 657
 Watsonville (Cal.) Transportation Co., Sale, 536, 818
 Watt-hour meters for car service (Sangamo), *340
 Waynesboro, Pa., Chambersburg, Greencastle & Waynesboro Street Ry., Dividend, 181
 West Chester, Kennett & Wilmington Electric Ry. (See Kennett Square, Pa.)
 West Penn Traction Co. (See Pittsburgh, Pa.)
 Western Ohio R. R. (See Lima, Ohio)
 Westinghouse Electric & Mfg. Co., Annual report, 1084
 Wheel handling carriage, Brooklyn, *371
 Wheelguards (See Fenders and wheelguards)
 Wheel lathe, Long Island R. R., *1008
 Wheel practice:
 —Hudson & Manhattan R. R., 1102
 —Oshkosh [Kelsh], 122
 Wheel tires, Gas-heating outfit for applying, *1101
 Wheel turning:
 —Chicago Rys., 566
 —Costs, Hudson & Manhattan R. R., 1099
 —[Williams], *505; Discussion, 596
 Wheels:
 —Cast-iron [Feist], 743
 —Chilled-iron, and their relation to service conditions [Hale], 962
 —Economical limits, for flange wear on steel-tired and rolled-steel wheels [Sibbald], *509; Discussion, 516
 —Flange wear on St. Clair Tunnel locomotives [Hall], 707
 —Grinding out flat spot by spinning wheel against emery block, Syracuse, *554
 —Hardness of, 903
 —"Rollway" rigid axle (R. R. B. Co.), *309
 —Steel:
 —Pony, Brooklyn, *414
 —Possible improvements in the mileage of, 659
 —Results obtained with, Brooklyn Rapid Transit System, 979
 —Solid steel [Holding], 744
 —Spoke type [Lobdell], 1029
 —Steel-tired, Lackawanna & Wyoming Valley R. R., 416

White, J. G., & Co., Annual report, 1036
 Wickford, R. I., Sea View R. R., Control, 396
 Willoughby, Ohio, Cleveland, Painesville & Eastern R. R.:
 —Increase in capital stock, 280
 —Timber from replaced bridge, Use of, 839
 —Written examination for trainmen, 677
 Wilmington, New Castle & Southern Ry. (See New Castle, Pa.)
 Windows in Brooklyn Elevated cars, Order for reconstruction, 137
 Winnipeg (Man.) Electric Ry.:
 —Annual report, 892
 —Dividend, *32
 —Motor trucks (Baldwin), *807
 —Strike, 46, 95
 Wire:
 —Aluminum, for field coils, Practice in Europe, 796
 —Grooved trolley wire, 880
 —Specifications for hard-drawn copper wire, 880
 Wiring, Car, Specifications for, 697
 Wisconsin, Legislation, 685
 Wisconsin Electric Ry. (See Oshkosh, Wis.)
 Wisconsin Electrical Association, Convention at Milwaukee, 45, 164
 Wisconsin Railroad Commission:
 —Principles of valuation established by [Mack], 164
 —Report for year ending June 30, 1910, 423
 Wood Preservers' Association, Annual meeting, 160
 Worcester (Mass.) Consolidated Street Ry., Proposed purchases, 478, 854

X

Xenia, Ohio, Springfield & Xenia Ry., Earnings, 649

Y

Yards:
 —Detroit United Ry., Harper Avenue, *494
 —Hudson & Manhattan R. R., Jersey City [Hazelton], *780, *Sup.
 Yonkers (N. Y.) R. R., Receivers' certificates, 818, 854, 1036
 York (Pa.) Rys., Note issue, 318, 613
 Youngstown, Ohio, Mahoning & Shenango Railway & Light Co., Bond sale, 436
 Youngstown (Ohio) & Ohio River R. R., Annual report, 727
 Youngstown (Ohio) & Sharon Railway & Light Co., Denial of charge, 437

AUTHOR INDEX

A
 Arnold, B. J. Pittsburgh car service, c39

B
 Brady, A. W. American Electric Railway Association, 26, 216
 Brown, J. O. New installation of automatic block signals on the San Francisco, Oakland & San José Consolidated Ry., *663

C
 Cherrington, F. W. Asphaltic oils as economical wood preservatives, 504
 Choate, J. K. Methods of employment, instruction and discipline of motormen and conductors on interurban lines, 120
 Coleman, G. H. Adjusting Westinghouse electric pump governor, *254
 Coolidge, C. A. Block signals for single-track lines, c*423
 Cummins, F. S. Effective methods of handling snowstorms, 747

D
 Darby, S. E. Patents—what they are, and how to read and understand them, 110
 Darlington, Fred. Central power plants and electricity supply for trunk line railroads, 967
 Davis, G. H. The adjustment of American street railway rates to the expansion of city areas, 211
 Davis, O. I. Method of accounting of freight claims, 463
 Drown, H. V. American Electric Railway Claim Agents' Association, 31

Duffy, J. E. Operation of Ohmer fare registers in city service, *510
 Dye, A. G. Comments on the safety of operation of electric roads, 265

E
 Edwards, H. M. Accounting for depreciation, 972
 Edwards, J. P. New 82-ton electric locomotive of the Northern Electric Railway, *1011
 Elmquist, F. A. Recent progress in car painting, 303
 Evans, John. Office building and car house of the Denver City Tramway Co., *660
 Evans, W. H. Use of sand on interurban cars, 506

F
 Forse, W. H., Jr. American Electric Railway Accountants' Association, 28
 Foster, S. L. Portable erector for ornamenting iron poles in San Francisco, *109
 French, H. A. Abbreviating car painting methods, 583

G
 Gerke, Jacob. Things worth while in shop practice, 745
 Gibbs, George. Electrical features of the New York tunnel extension of the Pennsylvania Railroad, *955, *1014
 Gore, T. J. Development of long-distance travel, 507
 Graftio, Henry. Trunk line electrification, c979

H
 Haller, W. A. Track construction in Oklahoma City, *448
 Harvie, W. J. American Electric Railway Engineering Association, 28

(Abbreviations: * Illustrated. c Correspondence.)

Hazelton, Hugh. Jersey City yards and shops of the Hudson & Manhattan R. R., *780
 Heydon, Edward. Overhead construction, 1110
 Hibbard, M. L. Boiler economy and the application of flue-gas analysis, 794
 Hild, F. W. System of the Havana Electric Railway Company, *906, *946
 Hixson, L. T. Interline accounting, 503
 Howe, W. K. Automatic block signals for electric railways, *268

K
 Kellogg, C. W., Jr. Cause and prevention of accidents, 790
 Kelsh, W. J. Electric railway repair shop practice, 122

L
 Leisenring, John. Automatic block signals on the Illinois Traction System, *1105
 Lewis, C. E. Train dispatching on interurban roads, 114

M
 McCarter, T. N. The rate of return, 221
 Mathes, L. D. Electric railway problems of the day, 749

N
 Nelson, G. G. Investigation and care of return railway circuits, 793

P
 Page, H. C. American Electric Railway Transportation and Traffic Association, 29
 Parker, L. H. Electrification of railroad terminals, 166

Payne, J. L. Electric railways in Canada, 37
 Peck, E. F. Collisions on interurban roads
 and their causes, 159
 Prather, H. C. Pit and trestle construction for
 car maintenance, 589

S

Sachs, P. Cost of stopping an interurban car,
 c640
 Sibbald, John. Economical limits for flange
 wear on steel-tired and rolled-steel
 wheels, *509
 Sieber, K. Rail corrugations, *372

Smith, R. H. Building up of interurban terri-
 tory, and methods of stimulating sum-
 mer traffic, 513
 Sullivan, R. T. Light weight cars, their con-
 struction and operation, 790

T

Tharp, W. J. General accounting of public
 utility corporations, 842

W

Wade, E. H. Train dispatching on the Buffalo
 & Lake Erie Traction Company's line,
 158

Y

Young, C. G. Logical basis for valuations of
 interurban street railways, 115
 Young, J. C. Development of the auxiliary
 load for power plants, 746

(Abbreviations: * Illustrated. c Correspondence.)

PERSONAL

Abercrombie, D. P., Jr., 820
 Acker, Walter H., 96
 Adams, A. C., 481, 651
 Adams, Prof. Henry C., 934
 Adams, Julian, 439
 Albreger, W. R., 821
 Anderson, Alfred, 284
 Andrews, C. H., 995
 Annabel, F. I., 857
 Archibald, W. M., 354
 Argabrite, N. M., 540
 Arnold, Frank, 96, 139
 Arthur, R. G., 284

Bacon, F. W., *54, 729
 Bachman, David S., 1131
 Barber, G. E., 691
 Barbour, F. F., 539
 Bardo, Clinton L., 691
 Barnitz, Edwin A., 186
 Bassett, Edw. M., 1039
 Beggs, John L., 320, *399, 770
 Bell, Edward, 354
 Bell, J. C., 96
 Bellamy, George W., 354
 Benedict, H. A., 96
 Bennington, J. H., *285
 Berry, V. W., 320
 Bewsey, Lewis C., 354
 Blake, J. L., 96, 140
 Bock, E. J., 539
 Boggs, Edward M., 820
 Boyd, John Y., 96
 Brecht, Prof. Milton J., 285
 Bridge, C. M., 242
 Bronson, Miles, 691
 Brooks, F. E., 481
 Brown, J. Q., 820
 Brown, J. W., 691
 Buckley, Michael C., 896
 Buggy, John A., 1089
 Burnett, C. H., 439
 Burr, James E., 857
 Burt, Horace G., 729
 Bushong, A. T., 96
 Butler, L., 769
 Butler, W. W. S., 242

Cahill, C. A., 896, 934
 Camden, S. D., 1131
 Campbell, James, 769
 Campbell, J. J., 1089
 Candee, De Forest, 1131
 Caulfield, J. J., 1131
 Carpenter, M. C., 139
 Case, W. M., 284
 Chaffee, Earle W., 896
 Chapman, C. T., 857
 Chitty, A. H., 284
 Chubbuck, H. E., *187
 Clark, J. P., 539
 Clarke, I. B., 320
 Clements, Judson C., 139
 Cobe, Ira M., 539
 Cochran, Richard E., 284
 Coldwell, O. B., 616
 Coleman, J. S., 729
 Colgate, George L., 53
 Collins, C. C., 897

Conway, G. R. G., 398
 Cook, Walter W., 53
 Cooke, F. H., 242
 Cooper, C. P., 1089
 Cowen, Herman C., 651
 Cox, Geo. M., *995
 Crabbe, W. H., 539
 Cram, J. Sergeant, 1039
 Crane, C. F., 139
 Crooks, C. H., 439
 Cross, Thomas A., 857
 Cummins, Frank S., 897
 Cutshall, F. H., 857
 Damon, George A., 821
 Daniels, Prof. Winthrop Moore, 769,
 821
 Darrow, Richard, 934
 Davidson, Charles J., 857
 Deal, E. C., 617
 Dean, S. Z., 284
 de Hasseth, G. A., 857
 Delany, Geo. W., 691
 De Lisle, F. J., 934
 DeWitt, W. H., 242, 354
 Dill, Samuel J., 53
 Doane, J. A., 539
 Dodge, G. H., 769
 Downs, E. E., 481
 Doyle, J., 1089
 Dozier, Melville, Jr., 897
 Duke, J. B., 481
 Dunham, R. J., 1039
 Dunlap, A. A., 995
 Dunlap, Elton G., 139
 Dunwoody, H. F., 1089
 Durham, J. A., 934
 Dysterod, E., 1089

Elkins, A. F., *617
 Ellicott, H. W., 96
 Emmons, C. D., 53, 821
 Evans, W. G., 651

Fennimore, John, 186
 Fetter, I. C., 692
 Fish, R. H., 691
 Fisher, Walter L., 439
 Fiske, H. A., 242
 Flowers, Herbert B., 769
 Flynn, Harry, 398
 Fohr, Lewis J., 242
 Foshay, Wilbur B., 186
 Fruehauf, N. M., 284

Gannon, Frank S., 1039
 Gibson, Austin E., 139
 Gilhoul, J. R., 139
 Gillner, Walter J., 354
 Giltner, J. W., 439
 Glenn, W. H., 399
 Glynn, A. J., 354
 Gonzenbach, Ernest, 439
 Graham, C. C., 284
 Graves, Clyde M., 284
 Gray, Carl Raymond, 651
 Greenland, S. W., 934
 Greenland, S. W., 1131
 Guiteau, H. C., 769

Haas, E. M., 354
 Hailman, G. Frank, 995
 Haller, W. A., 320
 Ham, William F., 481
 Hammond, J. B., 186
 Hardy, F. I., 1089
 Harlowe, David, 139
 Harman, R. A., 242, 285
 Harper, M. C., 284
 Harrigan, J. R., 540, 651
 Harrington, Lester A., 820
 Harris, A. W., 651
 Harris, John W., 284
 Harlan, G. W., 616
 Hart, George H., 186
 Harvey, A. E., 729
 Harvey, Ford, 1039
 Hendricks, Wayne P., 539
 Henry, George F., 242
 Harry, Geo. S., 896
 Hepburn, F. T., 995
 Hild, Frederic W., 539
 Hobart, H. M., 284
 Hobein, Charles A., 821
 Hoffman, F. D., 539
 Hood, John M., Jr., 481
 Hood, Smith, 284
 Howland, Stanley, 729
 Hudson, Horace R., 53
 Hughes, E. S., 1089
 Hume, Fred., 539
 Hunt, A. M., 857
 Huppuch, Winfield A., 284
 Hurley, Peter E., 53
 Hutchins, R. G., 242
 Hutchinson, Wm., 616
 Hyde, H. S., 539

Irwin, W. G., 186

Jack, Arthur G., 934
 Jacques, L. W., 995
 Jenson, A. G. H., 96
 Johnson, E. E., 729
 Johnson, Rankin, 995
 Johnson, W. O., 398
 Johnston, F. M., 242, 285
 Jones, Charles J., 821
 Jones, Tudor, 651, 729

Kehoe, M. J., 1089
 Keiser, W. N., 691
 Kellett, Wm. P., 186
 Kelley, Thos. A., 617
 Kelly, Frank J., 1089
 Kelly, W. F., 821
 Kelly, W. F., 1131
 Kemmish, N. A., 691
 Kessler, H. G., 897
 Kester, E. E., 242
 Kidd, George, 691
 Kineon, James P., 320, 354
 Koch, William A., 398

Lahrmer, J. H., 539, 1089
 Lake, E. N., 96
 Landis, Lee, 896

Lash, Morrison R., 729
 Lathrop, L. H., 320
 Lee, W. S., 540
 Leisenring, John, 1039
 Lemmon, G. W., 139
 Lenhart, C. E., 1131
 Levering, R. W., 691
 Levinson, L. M., 691
 Lewis, A. P., 934
 Lively, Oscar, 897
 Loomis, L. E., 284
 Lott, F. M., 820
 Ludlum, M. C., 730

MacAfee, John Blair, 995
 MacDonald, Sibbald, 896
 Maddox, W. T., 769, 897
 Main, Edwin, 857
 Maish, A. G., 896
 Manahan, A. N., 821
 Martin, L. B., 354
 Matson, J. L., 539
 Matthews, C. H., 284
 May, A. S., 857
 MacAndrew A. S., 616
 McCaffrey, Thos., 617, 769
 McCarthy, John, 617
 McCaskey, M. E., 398
 McClellan, Wm., 769
 McCloud, Charles, 284
 McCormack, Ira A., 284
 McCray, L. H., 186
 McCrosky, J. W., 398
 McGuire, D. J., 53
 McKnight, W. F., 354
 McMahon, C. L., 354
 McMichael, D. H., 53
 McPherson, J. C., 539, 769, 897
 Mellen, C. S., 857
 Menecely, C. D., 284
 Metcalfe, Charles B., 242
 Millar, Archibald B., 139
 Missner, Edward, 320
 Mitchell, Frank, 398
 Mitchell, I. S., Jr., 398
 Mitten, T. E., 539
 Moe, L. E., 691
 Moore, Alva E., 651
 Moore, C. R., 617
 Moffat, George E., 398
 Mortimer, James D., 769
 Moyer, C. C., 1089
 Mullett, H. A., *897
 Munton, Charles J., 769
 Murray, Charles, 481
 Murray, C. L., 540
 Murray, F. H., 284

Nelson, W. R., 284
 Norton, Wm. D., 691

O'Connell, John, 616
 Olds, E. W., 399, 651
 O'Neil, Hugh, 139
 Ososki, Sidney, 481
 Otto, John, 53
 Owens, W. G., 896

- Pallister, I. H., 729
 Pardee, J. H., 539, 857
 Parker, B. E., 186
 Parker, Ray, 896
 Parshall, Horace Field, 995
 Paxon, L., 769
 Payne, R. L., 284
 Pearson, C. J., 691
 Peck, E. B., *186
 Peters, A. E., 320, 399
 Pierce, F. E., 820
 Pleming, Charles F., 1131
 Plunkett, Martin, 616
 Potter, J. P., 820
 Potvin, F. C., 896
 Powley, Ralph S., 96
 Price, A. W., 691
 Prior, H. E., 1131
 Propst, Charles F., 96
 Puppe, Dr. Johannes, 481
 Putnam, W. R., 139, 398, 729

 Raver, Edward M., 769
 Read, Norman, 651
 Reardon, J. F., 139
 Reed, E. O., 439
 Reed, Wm. B., Jr., 896
 Remelius, Charles, 96
 Rice, Ralph H., 53
 Richards, F. L., 140
 Richmond, C. O., 857
 Rickert, Van Dusen, 96
 Roberts, John, 354
 Robertson, C. H., 96
 Robinson, O. E., 820

 Rockwell, J. C., 481
 Rockwell, Robert W., 540
 Rogers, S. C., 140
 Rolston, Wm. E., 691, 896
 Roosevelt, Col. Theodore, 284
 Ross, W. G., 186
 Rowray, J. B., 616, 769, 1039
 Roycraft, Thomas, 242
 Rushton, W. H., 53
 Rust, T. E., 320
 Ryder, S. J., 691

 Salber, W. E., 820
 Schneider, E. F., 53
 Scott, Charles R., 186
 Scott, Charles F., 1131
 Shackelford, John A., 539, 857
 Shannahan, J. N., 934
 Shaw, James F., 186
 Sheppard, F. L., 820
 Sherman, D. F., 439
 Sherman, D. F., 1131
 Shoup, Paul, 96
 Shuff, Frank K., 539
 Siebert, W. Sumner, 354
 Sigsbee, W. A., 186
 Skelly, F. V., 857
 Smith, E. D., 53
 Smith, Franklin A., 439
 Smith, J. W., 53
 Smith, John H., 539
 Smith, William F., 439
 Soules, Eugene E., 242
 Sommer, Frank H., 1039

 Spring, Col. E. C., 769
 Staats, Henry N., *1089
 Starkey, J. F., 616
 Stees, M. G., 186
 Stephens, B. R., 53
 Stevens, John F., 651
 Stewart, D. J., 820
 Stobart, E. A., 729
 Stocum, C. H., 820
 Stott, H. G., 539
 Stowe, Fred A., 857
 Strong, E. E., 242
 Strout, Edw. E., 617
 Sucese, J. B., 53
 Sullivan, C. O., 897
 Sullivan, John H., 934
 Sullivan, John L., 481
 Sweeney, Mrs. Lena Irwin, 186
 Squires, W. E., 285
 Sylvester, Carl A., 821, 995

 Tabler, B. E., 53
 Taft, C. P., 354
 Taylor, F. W., 398
 Taylor, R. C., 139
 Taylor, Z. V., 242
 Taylor, Samuel J., 1131
 Thomas, E. T., 284
 Thomas, Edward C., 651
 Thomas, J. M., 53
 Thornton, Henry W., 481
 Torner, J. V. H., 616
 Towne, W. F., 398
 Trawick, J. A., 769

 Trawick, J. A., 1131
 Tucker, Wm. H., 616
 Tweedy, Arthur E., 53

 Van Vranken, F., 616
 Vivian, E. H., 481, 539

 Waddell, S. H., 691
 Wallace, H. W., 139, 439
 Wallerstedt, H., 897
 Wallis, J. T., 820
 Walmsley, J. T., 729
 Warfel, C. O., 896
 Warner, J. B., 651
 Watson, R. W., 820
 Weber, H. L., 539
 Westman, A. W., 1089
 Wheeler, George B., *186
 White, W. C., 616
 Whiteley, Calvin, Jr., 439
 Wilgus, Wm. J., 821
 Williams, Col. Timothy S., 285, *354
 Wilson, Chester P., 139
 Winship, Joseph, 284
 Winter, Charles, 857
 Winter, E. W., *242
 Winter, H. M., 481
 Wyatt, R. H., 896
 Woodman, F., *617
 Woodsome, J. C., 769
 Wyman, L. F., 284
 Wynne, Leroy F., 284

 Yates, Richard, 616

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CONTENTS.

Electric Railway Journal in 1911.....	1
Our Statistical Number.....	1
Motor Design and Car Weights.....	2
Car Building in 1910.....	3
Electric Locomotive Design.....	4
Track Progress in the Year 1910.....	5
Power Station and Distribution Systems.....	6
Rail Sections and Specifications.....	8
Regulation Legislation in 1910.....	8
The Electric Railway Situation in 1910.....	9
The Interurban Rules Situation.....	10
Association Work.....	12
The Engineering Association "Question Box".....	13
Electric Railway Rolling Stock Ordered in 1910.....	14
New Electric Railway Track Construction in 1910.....	17
Receiverships and Foreclosure Sales During 1910.....	19
Interurban Construction in the Central States During 1910.....	20
Recent Electric Railway Car Design.....	21
The American Electric Railway Association.....	26
American Electric Railway Engineering Association.....	28
The American Electric Railway Accountants' Association.....	28
The American Electric Railway Transportation & Traffic Association.....	29
American Electric Railway Claim Agents' Association.....	31
Electric Traction in Great Britain.....	33
The Electric Railways of Germany During the Year 1910.....	36
Electric Railways in Canada.....	37
Pittsburgh Car Service.....	39
London Letter.....	43
News of Electric Railways.....	44
Financial and Corporate.....	46
Traffic and Transportation.....	51
Personal Mention.....	53
Construction News.....	54
Manufactures and Supplies.....	57
Table of Traction Earnings.....	58

Electric Railway Journal in 1911

Each year in the electric railway industry has brought its own problems. Sometimes they have been largely electrical or mechanical, in other years they have been legislative, in others financial. The proper time to analyze the conditions confronted by an industry during any period is of course at its close, but at present it seems as if in all phases of the work there was no time when a medium for collecting, disseminating and discussing the news of the field was more necessary. Acquaintance with the methods by which companies in other States and parts of the world are solving their problems should prove of more interest and value than ever before to every one engaged in electric railway work and should enable him either to apply those methods to his own particular problems or to improve upon them. It is the duty of the technical journal in any field to assist in this work by dealing in "ideas" as well as in "news." The purpose of the ELECTRIC RAILWAY JOURNAL is not only to give facts decisively, concisely and in an orderly manner but to present these facts in such a way as to stimulate the thought of the readers of the paper. This is the service which the ELECTRIC RAILWAY JOURNAL will aim to render to its readers during the coming year to a greater extent than ever before.

Our Statistical Number

For the past two years the ELECTRIC RAILWAY JOURNAL has published on the first Saturday of January carefully compiled statistics of the development of the electric railway industry during the preceding year. In doing so it has followed a custom inaugurated in 1907 by the ELECTRIC RAILWAY REVIEW, one of its constituent papers. The statistics this year, as in several previous years, include the miles of track built during the year, the number of cars ordered from independent manufacturers or built in companies' shops, a statement of the foreclosures and receiverships during the year, a review of the interurban railway construction in the Central States and other facts of general interest to the industry. This year these include a discussion of the trend of practice in car design, three important contributed articles on the electric railway development in Canada, Great Britain and Germany, and a series of signed articles on the work of the various electric railway associations contributed by the presidents of those associations. Our statistics show an addition of 5481 cars and about 1397 miles of track added by the electric railway companies during the year. We also print this year 10 editorial articles discussing the technical and financial status of the industry and a review of the business of the year. We take this occasion to express our sincere thanks to the companies which have assisted us in compiling the several tables published in this issue, and to the authors of the contributed articles for their illuminating discussions of the subjects treated by them.

MOTOR DESIGN AND CAR WEIGHTS

In the campaign to reduce the weight of cars, particularly those used in city service, attention was naturally directed first to the economies possible in the car body and its parts. Comparatively little thought was given to the question of the weight of the motor equipments except for the saving made through lightening the car body and thus lessening the size of the motors or the number required. But such a large factor in the total weight of a car as the motors could not long escape consideration, and manufacturers and users, both at home and abroad, have recently been applying their best efforts to a study of this subject.

Probably two-thirds of the total amount of work done by the motor equipment of a city car on level track is performed in accelerating the car, and the energy required for acceleration is directly proportional to the weight of the loaded car. The rest of the work done by the motors, or about one-third, is expended in overcoming the rolling friction of the car and the bearing and gear friction of the car and its equipment. From this it follows that a reduction in the total weight of a car effects a nearly proportional reduction in both maximum and average current demand, and also that it reduces, in the same approximate ratio, the capacity and consequently the interest charges on the entire electrical equipment of the road, from the motor, through the distribution system, to the power station itself. The total investment in the equipment thus affected is several times greater per car operated than the investment in the car bodies and trucks. Hence considerably more expense in car maintenance is permissible in a light car than in a heavy car before the sum of the interest account and the maintenance account of the road using a light equipment is equal to that of the same accounts of the road using a heavy equipment.

The most important change in railway motor design during the past decade has been the introduction of the commutating-pole motor. This change has not been accompanied by any direct reduction in weight or cost of motor, but it has resulted in an elimination of commutator troubles, so that heating is now practically the only consideration in the selection of a motor for a specified service. This fact has a relation to the problem we are considering in two ways. In the first place, the excellent commutation of the commutating-pole motor not only insures a long life of commutator and brushes, but its general cleanliness reduces insulation failures. Consequently the use of the commutating-pole motor has largely reduced the motor maintenance expense account, which has already been shown to be very closely, although indirectly, associated with the question of motor weight.

In the second place, with heating as the determining factor in motor selection, it was inevitable that more attention should be given to the subject of ventilation. Experiments with forced ventilation have demonstrated its advantages and have led to its application in locomotive service. It has even been found that the removal of the hand-hole covers on car motors is followed by a marked decrease in their temperature rise over that experienced when the motors are sealed. Here, then, is an important direct means of reducing motor weight, made possible by the introduction of the commutating-pole motor.

The forced ventilation of car motors has not yet been commercially developed, and there are undoubtedly difficulties in

the way of conveying clean outside air free from brake-shoe dust and wheel-wash to the motor. But some practicable method will undoubtedly be found. Probably the complication and expense of separate motor-driven blowers are hardly justified with small city equipments, but their use on interurban equipments is among the early possibilities. Considerable benefit might even be secured with armature-driven fans if proper provision could be made for a clean air supply.

Another direction in which we can look for improvements in motor design within the near future is in the way of improved insulation. If a motor is continually operated at a temperature much exceeding the boiling point of water, the fabric insulation generally used in the armature and field coils rapidly deteriorates. Of course more latitude can be allowed in the deterioration of insulation in railway motors operated at low voltage than in high-voltage apparatus. Nevertheless, the heat limits of insulation have to be considered very seriously even in the design of railway motors. The need of the hour, therefore, so far as this matter is concerned, is for some improved form of insulation, having, perhaps, a better heat-conducting ability, but certainly better able to withstand higher temperatures than the insulations now usually used in apparatus of this kind. A commutating-pole motor whose windings were thus insulated and which was provided with some method of artificial ventilation would be materially lighter than motors now in general use.

A third possible means of weight reduction involves a somewhat more radical change in practice. In previous issues of this paper we have referred to the use in Germany of aluminum instead of copper for field windings. The Hamburg Street Railway, one of the largest roads in Germany, was the pioneer among the large roads abroad in the use of aluminum field coils and now has some 500 cars equipped with this type of coil. With its use the weight of a 40-hp motor has been reduced about 100 lb. without developing apparently any electrical or mechanical objections. With motors of larger capacity the saving in weight would be considerably more.

A fourth means of weight reduction lies in an increase of armature speed. This in a sense seems like a step backward. The early motors ran at high speed and practically all of those built before 1890 were equipped with double-reduction gearing because of this reason. The modern slow-speed motor was made possible by an increase in the number of poles and was a radical improvement over the earlier type. But the weight of a motor, other things being equal, varies in almost inverse proportion with its speed, so that there is a great inducement from a weight standpoint toward increasing the speed. The principal objections to a high-speed motor are the danger of bursting the binding bands and danger of trouble with the armature bearings. The latter consideration is the more important. It is doubtful whether there is much opportunity for improvement in the way of higher speeds, although there may be some in the case of motors used exclusively in frequent-stop city service. In such motors the armature reaches its maximum speed for short periods only and the average armature speed is usually moderate. A moderate increase in speed also would probably not give rise to any serious problems as regards either gears or brushes. Both of these motor parts have been materially improved within recent years, especially gears, which now are made of very high-grade steel when an exceptionally good article is required.

The comments which we have made on the present status and possibilities for future improvement of railway motors apply principally to motors used in city service, because the improvements discussed have been suggested largely by the desire to reduce car weights, which is particularly a city railway problem. The duty of motors in interurban service, where the stops are infrequent and where the question of acceleration is not so important, consists principally in overcoming wind, journal and track resistance. Here the weight of the cars is a secondary consideration. The use of commutating-pole motors and of artificial ventilation, however, is equally advantageous for this class of service, as they offer the means of obtaining an equipment of higher efficiency than that given by many motors in operation. The qualifications of motors for interurban service should be perfect commutation, low armature speed, low core loss and moderate cost.

CAR BUILDING IN 1910

The statistics of cars ordered during 1910, which are printed elsewhere in this issue, indicate that the electric railway car-building industry enjoyed a prosperous year. The total number of cars ordered was only slightly less than in 1907 and was more than twice the number ordered in 1908. The figures for 1909 were exceeded by 735 cars, the increase being represented principally in cars for city service. Some exceptionally large single orders for cars were placed. Among them may be mentioned 300 cars for the Los Angeles Railway and 150 cars for the Capital Traction Company of Washington, D. C. Nearly all of the Pacific Coast roads made large additions to their rolling stock equipment, the orders of six companies aggregating 745 passenger cars. The Canadian car builders also received some large orders.

Closed cars are still being built in the largest numbers for city service, although the semi-convertible car is coming more and more into use as a general service car for both summer and winter service. A few years ago street railways operated nearly as many open cars as closed cars, changing the trucks and electrical equipment every spring and fall. The cost of doing this work and the extra storage space required for the cars out of service outweigh any advantage of the open car from a traffic standpoint and the practice is being discontinued by many companies. Only 326 open cars were ordered this year, as against 3245 closed, semi-convertible and convertible cars.

The prepayment method of fare collection was introduced in the United States only three years ago, but its many advantages have led to its rapid adoption in small as well as large cities in all parts of the country. Last year 1096 out of 2537 city cars ordered were of the prepayment type, while this year 1878 prepayment cars were ordered out of a total of 3571 city cars. Large numbers of old cars have been remodeled for prepayment operation. Boston and San Francisco are the latest cities of large size to adopt this system for new cars. An interesting development of the year was the one-man pay-as-you-enter car for small roads. Several cars of this type were built for use in Southern cities. Passengers enter and leave by the front platform under the inspection of the motorman. No difficulty has been experienced in adapting the prepayment method in the South to "Jim Crow" cars, in which the white and colored passengers are segregated.

The growth of heavy freight traffic on the interurban roads in the Western States has made necessary the purchase of a large number of new and second-hand box, flat and gondola cars of standard steam railroad types. As the number of these cars placed in service increases it will become more imperative to standardize the couplers and draft gear of all cars so that mixed trains can be operated. For train operation it is equally important to standardize the location of brake hose and train line jumper sockets. Last fall two disastrous head-on collisions between interurban cars demonstrated the necessity of building and maintaining all passenger car bodies at the same height above the rails so as to prevent as far as possible over-riding of one car on the other.

A few self-propelled gas-motor and storage-battery cars were designed and built during 1910. For new interurban roads with light traffic the gas-motor car enables operation to be begun before the earnings would pay the interest on the investment in overhead line and a power house. These cars are being constructed in sizes up to 70 ft. long. Marked improvements in storage batteries for vehicular service have again called attention to this type of self-propelled car for lines of light traffic. The high rate of acceleration required in a street car making frequent stops heretofore has been the principal cause of the failure of storage-battery cars owing to the deterioration of the batteries when discharged too rapidly. To reduce the load on the battery during the acceleration period as much as possible the storage-battery cars which have been tried in New York City and elsewhere have been built with bodies and trucks of exceptionally low weight and they have been fitted throughout with anti-friction bearings. As a result, the power consumption has been reduced to approximately 45 watt-hours per ton-mile as compared with about 140 watt-hours per ton-mile for an ordinary trolley car.

The storage-battery cars now in service and many of the detail improvements which have contributed to their successful operation are still in the experimental stage, but they have pointed the way toward possible methods for reducing the weight and power consumption of all types of cars for city service. The tests made in Philadelphia with anti-friction motor and journal bearings demonstrated the saving in power consumption made by using these devices, and it only remains to determine their life in actual service under the usual conditions of inspection and maintenance.

The demand for better ventilation and heating of city cars has been met by a number of new systems and devices which are being widely used. In addition to improvements in automatic deck sash ventilators, forced-draft and exhaust-fan systems have been perfected which create a positive movement of fresh air through the car at all times. The Chicago Health Department, through its comprehensive experiments with car ventilation systems, has contributed many valuable experimental data on the requirements of heating and ventilating apparatus and has given a new impetus to improvements in this direction. Briefly, the ordinances in Chicago now require that not less than 400 cu. ft. of fresh air per passenger per hour should be introduced over heaters near the floor line and exhausted near the ceiling.

For high-speed service the M. C. B. equalized type of truck has been found superior to any other, and the slight modifications of the different truck builders consist chiefly in details of frame construction, brake rigging and other parts which do

not affect the riding qualities. In the most recent designs of trucks particular attention has been paid to maintaining the alignment of the frames and provision for wear of the moving parts, such as the pedestal jaws and bolsters. It is worthy of note that the standard axle and journal boxes of the American Electric Railway Engineering Association are being used on nearly all new cars. Solid steel wheels have come into favor rapidly, and many of the largest city and interurban railways are using them exclusively. Much better cast-iron wheels can now be bought than ever before at a price based on mileage which compares favorably with that of steel wheels. Cast-steel wheels also are being sold in competition with cast-iron and rolled-steel wheels, and their mileage records are said to be excellent.

ELECTRIC LOCOMOTIVE DESIGN

One of the most important as well as the most generally heralded advantages of electricity over steam as a motive power for railway service is the economy with which the power can be subdivided. This permits the economical operation of a large number of single car units and allows a large number of the axles of a train to be made driving axles. Nevertheless, it is noteworthy that the two principal installations made during the past year in this country of heavy electric traction equipment, that of the Pennsylvania Tunnel & Terminal Company and that of the Detroit River Tunnel, are exclusively locomotive, and that the most important installation of this character now under construction in this country, that of the Hoosac Tunnel, is also exclusively locomotive. In these instances it was what might be called a subsidiary advantage of electricity that led to its adoption, but this condition emphasizes the fact that electric locomotive design will continue for some time at least to constitute an important part of electric railway engineering.

When the subject is more closely considered it will be found that the limitations of space and weight on an electric locomotive have given rise to a wide variety of principles of design. Indeed, in the five principal heavy electric traction installations recently made the locomotives represent as many different types. Thus we have the New York Central d.c. gearless, the New Haven a.c. quill-mounted gearless, the Pennsylvania d.c. side-rod gearless, the Detroit Tunnel d.c. horizontally supported motor type with twin gearing, represented also by the latest B. & O. locomotives, and the Hoosac Tunnel locomotive with geared and vertically supported motors. While successful operation is obtained with all five designs, it would be most interesting to compare the cost of upkeep of five such dissimilar constructions. The two gearless locomotives have now been in successful operation for such length of time as to make such figures of value.

The small locomotives first built naturally used the general type of motors and methods of suspension employed in street railway service. About 1893 and 1894, following the efforts made to design a gearless motor for street railways, several gearless electric locomotives were built, notably for the Baltimore & Ohio Belt Line and for the Central London Underground Railroad. But there was a reaction in favor of the geared and horizontally suspended motor for slow-speed work until the motor capacity required exceeded the permissible duty which could be placed upon a single pinion. This introduced the twin-gear construction of the Great Northern Railroad and

subsequently those of the Detroit Tunnel and latest B. & O. locomotives. In these machines the limit of standard axle motor design with horizontal suspension seems to be reached. These locomotives, however, provide about all the capacity which is required by a single-unit freight locomotive, operating at speeds of from 15 m.p.h. to 20 m.p.h., and two such units can supply a drawbar pull in excess of the strength of the usual draft gear. Where such locomotives are used exclusively for freight service this type of construction is fairly satisfactory in first cost, operation and maintenance.

For high-speed passenger service a departure from the street railway, or horizontal, geared type of motor appears necessary. This is partly because the space available is not sufficient for the very much larger capacity of motors required and partly because of the necessity of providing better running qualities than those afforded by an ordinary heavy bogie truck. In this connection experience seems to indicate that a leading guiding truck is desirable for high-speed locomotives, four wheels being preferable to two. There is a wide divergence, however, in the designs of the motors used on high-speed electric locomotives and in the method of transmitting their torque to the driving wheels.

Omitting from consideration the early gearless motors of 15 years ago, which were supported directly on the axle, the first attempt to solve this problem of high speed and large capacity was the direct-current locomotive of the New York Central Railroad. These locomotives have proved reliable and highly efficient in operation and capable of much higher voltages than the 650 volts used on the New York Central road. The lower speed limit of this type of construction has not yet been fully determined, but the simplicity of the design makes it particularly attractive for direct-current freight or passenger service, provided the speed is not so low as to make the first cost prohibitive.

Side-rod locomotives have found considerable favor abroad, but will be an untried venture in this country until the operation of the Pennsylvania locomotives shall have established their status. With the entire weight of motors spring-supported and equipped with guiding trucks, the side-rod construction provides for easy riding qualities, but the dual relations of efficiency and weight of locomotives of this type, as compared with the efficiency and weight of the high-speed gearless locomotives of either the New York Central or the New Haven types, are not yet known. The high center of gravity and the inside journals of the side-rod locomotive are patterned after steam engine practice, and it is expected that track inequalities will cause a rolling movement in this locomotive, rather than undesirable nosing. Finally, even when full advantage is taken of the better ventilation of the more open construction, made possible in the Pennsylvania locomotive by housing the motor in the superstructure and fully protecting it from climatic conditions, it would still seem that the direct side-rod construction is necessarily heavy and expensive, owing to the low rotative speed of the armature. Still a further step would be the introduction of gearing as well as side rods. While this might appear an undesirable added complication, it undoubtedly would result in producing a lighter structure by reason of the higher armature speed thus afforded, and it is probable that the combination of gear and side-rod drive will become a factor in future electric locomotive design, both for high-speed passenger

and lower-speed freight service. Locomotives of this type, built abroad, have been described in the pages of the *ELECTRIC RAILWAY JOURNAL* during the past year.

The design of electric locomotives in which a geared motor is supported directly above the axle had its origin in the desire to retain the high-speed advantages of the ordinary geared motor but to be free of the space limitations which exist when a geared motor is carried horizontally between the axles. The equipment of the Hoosac Tunnel with this type of locomotives, and their operation, will add very much to our knowledge of the practical advantages of this plan.

From the standpoint of service, electric locomotives can be divided into three general classes: high-speed passenger, low-speed freight and switching locomotives. The multiple-unit control is valuable in all three as it provides for double heading, as required by service conditions. In many instances it would be a great operating advantage if a locomotive could be so designed as to be used interchangeably for both passenger and freight service. In the case of electric locomotives designed to operate exclusively on heavy mountain grades interchangeability can possibly be secured without too great a penalty in weight and first cost of the all-around unit. For level track operation, however, it is probable that two distinct types of locomotives will better serve the dissimilar requirements mentioned.

The experience gained with steam engines should, of course, count for much in the design of electric locomotives. A distinction should be made, however, between the features employed in the steam locomotive because of the requirements of the steam equipment and those dictated by the hauling and riding qualities of the locomotive. Experience based on the latter considerations is limited, owing to the ruling necessity of making proper provision for the boiler and firebox. A removal of the handicap in a locomotive of providing a coal-burning plant means the opening up of new possibilities in design which may eventually cause a wide dissimilarity between steam and electric locomotive running gear.

In whatever direction the present development stage of electric locomotive design may lead, it has been demonstrated beyond question that the electric locomotive as such has set a standard for reliability and low cost of operation hitherto unapproached by the steam engine. Last winter's accident on the Great Northern Railway, in which all four locomotives were swept off the track by a snow slide but later were raised and repaired for service at an expenditure of but a few hundred dollars each, has done much to establish confidence in this type of motive power. Meanwhile, daily evidence of reliability is being offered by the electric locomotives handling the entire traffic of the three railroads entering New York City. While reliability is only one of the assets of the electric locomotive, it is perhaps lack of confidence in this respect that has hitherto held back its extension to trunk line service. It is, therefore, gratifying to have any fears of this nature dispelled by the daily records of the electric locomotives in operation.

It is difficult to tell the direction in which there will be the greatest development in electric locomotive operation during the coming few years. Up to this time electric locomotives have been used almost exclusively on trunk lines for tunnel service and on elevated and interurban railways for switching service. Their application to pusher service on mountain divisions of steam railroads is yet in the future.

TRACK PROGRESS IN THE YEAR 1910

The past year will be notable for the great amount of constructive work which was done, by both the electric railway associations and individual companies, toward the attainment of higher standards in track construction and maintenance. Among the important problems which received fruitful discussion were corrugation, choice of rail joints, special work, steel ties, timber preservation and parked right-of-way in cities. It may not be amiss to comment briefly in the following paragraphs on some of the work done in connection with each of the subjects noted by the way committee of the American Electric Railway Engineering Association and others.

Rail corrugation theories are more numerous than ever, but a rather popular and convenient one at present is that which asserts that the corrugations are due to irregularities in molecular structure caused by the rails being rolled at too low a temperature. It will be recalled, however, that tests on the hardness of some corrugated rails conducted for the *STREET RAILWAY JOURNAL* in 1907 by George L. Fowler, and published in the *STREET RAILWAY JOURNAL* of Oct. 5, 1907, did not disclose any difference in hardness in the metal at the crests and in the valleys of the corrugations. A more elaborate plan to determine whether the rolling mills are at fault is now being carried out by the International Street & Interurban Railway Association. Instead of using the drop test on the rails after they have become corrugated, as was done by Mr. Fowler, new rails will be tested at the mills and will then be laid on $1\frac{1}{2}$ miles of track with various substructures in Berlin. The conditions under which the corrugations begin and continue will then be carefully observed.

The report of the 1910 committee on way matters contained a remarkably interesting section on both mechanical and welded rail joints. One pertinent suggestion was that the deeper types of joint plates should be slightly curved so as to present a concave face to the rail web. It is believed that this change would give a larger surface contact than the present straight joint plates which become convex to the rail web when they buckle in service. Special insistence was placed also on the necessity of grinding or filing the rail ends to eliminate imperfectly surfaced joints of whatever character. This precaution seems obvious, but it is a fact that out of 29 companies which were asked about their practice in this respect 15 admitted that they did not grind the rail ends to a true surface. In addition to several improvements in methods for applying copper bonds, the past year also brought some noteworthy betterments in the different forms of welded joints. The cast weld joint now is made with a water jacket to prevent excessive heating of the railhead; the bars of the new electric welded joint are provided with center offsets to support the rail head and the latest thermit reaction joint gives a weld of the entire rail section. The oxy-acetylene process is now being tried here and abroad both for rail welding and for attaching joint plates, bonds, etc. Like the reaction process, the oxy-acetylene method possesses the great advantage of permitting each weld to be made, and if need be remade, individually without cumbersome apparatus or highly skilled labor. All in all, several satisfactory solutions are now available for treating rail joint and conductivity problems. Many of the changes noted are not so much confessions of previous failures as they are evidences of healthful emulation among the manufacturers and of

the desire of the railway companies to secure a design most suitable for their particular conditions.

In special work, practice is still at odds as to solid or insert lay-outs, although the former are favored for heavy traffic. Valuable help was given to the 1910 committee on way matters by the special work manufacturers in the standardization of switch pieces as to lengths and radii, and also in the standardization of mates and frogs. It is pertinent to point out to those who lay too much stress on "local conditions" that the lead in this field has been taken by a company which probably has more variations throughout its city and country divisions than any other electric railway in existence. Considering the advantages of standardization in first cost, maintenance and stock keeping, there seems little reason why city railways should go to the trouble and expense of using spiraled switches.

The steel tie has made considerable headway during the past year in concrete street railway construction, for which it appears to be most suitable. Improvements have been made in the form of clips used to join the rails and the ties. A steel tie at \$2 for an assumed life of 30 years costs about twice as much as a preserved wooden tie of practically equal durability. Its economy, therefore, is due largely to the fact that a smaller number is required per mile. The spacing of steel ties, however, is still involved in uncertainty, for some companies install them at 3-ft. centers and others set them even as far apart as 7 ft. 6 in. It is highly desirable, therefore, that the problems involved in the proper spacing of steel ties should be worked out on a scientific basis for different classes of sub-structures so that cost comparisons with wooden ties can be made more accurately. Although the steel tie is naturally a part of a concrete track, engineers who have had experience with it believe that some changes should be made in its shape to permit it to be taken out of the concrete at little cost when such removal is necessary during periods of reconstruction. The steel tie is not so desirable in paved streets with stone-ballasted track because the amount of tamping required during the first year of installation leads to a frequent and expensive disturbance of the pavement.

The question of the preservation of the wooden ties is becoming more acute from year to year despite the introduction of the steel tie. In a few years it will be considered foolhardy to install untreated ties under any conditions. Only two large electric railways in this country have practised tie preservation long enough to understand from experience its real merits. One of these companies uses a permeative and the other a superficial preservative. The experiences of these companies have been very favorable, but they do not cover a sufficient variety of geographical conditions of treatments and of timbers to serve as sole criterions for other railways. Exact data are sorely needed on the comparative value of the numerous preservatives now on the market. This subject might well be taken up by a sub-committee on way matters, working in harmony with a similar committee of the American Railway Engineering and Maintenance of Way Association, with representatives of the Bureau of Forestry, and with the experts of the manufacturers of wood preservatives. In such an investigation particular attention should be given to special treatments for ties buried in rock ballast or incased in concrete under street paving. The merits of tie plates and screw spikes in lengthening the usefulness of superficially preserved ties should also form a part of this study. An excellent basis for

work of this kind, with reference to city conditions, would be afforded by the chapter on chemical treatment of ties published in the second annual report of the Board of Supervising Engineers, Chicago Traction. The same report also contained a valuable study of problems relating to track deflections and materials in connection with different classes of track and roadways. These data included analyses of manganese steel special work and figures on the comparative holding power of track and screw spikes in different kinds of wood.

Electric railways, both here and abroad, are beginning to agitate more strongly for right-of-way operation through sodded or parked sections of wide city streets. Because of the noiseless and faster service thus made possible, this innovation has met with the strong approval of the public in those cities in this country and abroad where it has been introduced. It is needless to add that the street railways are even more pleased, since their track maintenance cost has been reduced to a minimum while paving expenses and wagon obstructions are simply unpleasant memories. The problem of adequate city transportation is so intimately intertwined with the construction of wide roadways that American street railways would do wisely to discuss city right-of-way operation with their municipalities whenever the opportunity presents itself, either in existing or proposed wide streets.

POWER STATION AND DISTRIBUTION SYSTEMS

Recent power station construction has for its most noticeable feature the simplification of design by the use of larger units, particularly the larger sizes of steam turbines. The ordinary electric road, which at the present time generates its power by three-phase turbo-generators, transmits it to substations, whence it is delivered to the working conductor as direct current. For an equipment of this kind the large turbo-generators now available are quite ideal, being extremely simple and reliable and lending themselves to a very convenient and compact power house design. Hence one recent power station differs from another chiefly in the number and size of the units employed. It is greatly to be regretted, however, that the direct-current turbine has not found its way into greater favor than it has. It is very easy to write eulogistic papers regarding the beauty and simplicity of the standard equipment of three-phase generators and synchronous converters, yet every station operator knows perfectly well that the losses in the system, however well designed, are large and the possibilities of breakdown materially increased owing to the necessary complication of apparatus of this character.

The switchboard of a recent turbo-generator station is a structure of fearful and wonderful complexity, and its cost is a very material fraction of the total cost of the plant. Every railway man knows in his heart that if he could get big direct-current turbo-generators comparable in efficiency and reliability with the big direct-connected engine-driven railway generators he would be very glad to supply from them the major part of the current used on his railway lines, always excepting of course, the purely interurban ones. Undoubtedly the smaller capacities of direct-current turbines are even now in a state of pretty fair development, but much yet remains to be done along this line. Recent advances in the commutating-pole type of construction have brought improvement and are likely to bring more until there will be no hesitation in using

such machines, which are already in successful use in a few places, for the central territory of a road of considerable size. There is no reason, except the absence of suitable direct-current turbo-generators, why power should be generated as alternating current at one end of a good-sized power station and transformed through costly machines at the other end of the station to serve the immediately surrounding territory.

One of the directions in which power-station design has advanced is in the combination of low-pressure turbines with reciprocating engines. This process virtually provides another stage of expansion with its resulting economies, without adding anything more than electrical linkage to the rest of the machine. And it may be pertinent to suggest here that such a combination meets in part the objection which has just been raised to some current power-station practice, because it is a perfectly simple matter to supply the center of a railway network with energy by feeding direct current to it from the engine-driven generators while the low-pressure turbines take care of the outlying lines, through the converters at the substations. At all events the low-pressure turbine furnishes an admirable means of increasing the output and efficiency of existing stations whether the original generators are for direct or three-phase current.

Aside from these considerations in generating practice the most important subject before the railway power station superintendent is the fuel question. The price of fuel has its ups and downs, but the ups are more frequent and permanent than the downs, so that, by and large, the fuel problem is steadily growing in seriousness. The key to the situation unquestionably lies at the furnace. No fact is a more commonplace matter of knowledge than that the cost of fuel is not in direct proportion to its heating capacity. The high-grade coals cost disproportionately more than the low-grade coals, because any sort of firing will yield passable results in almost any kind of furnace with the former and consequently they are in the greatest demand. Researches in the last year or two have made it certain that even the meanest low-grade bituminous coals can give first-class economical results if they are properly fired in suitable furnaces.

The electrical part of the station equipment is, on the whole, in extremely good condition with the exception already noted. The apparatus is reliable, efficient and easily handled. The same is true of the prime movers. The boilers and automatic stokers are reliable enough, but in too many instances they are anything but efficient. Inability to utilize fuel of low cost for its thermal value is the weakest point in modern power generation.

As regards the distribution of power for railway purposes the present standard practice is structurally good; that is to say, when transmission is undertaken it is generally at conservative voltages and utilizes sound and conservative line construction. Only in a few instances does a railway system cover territory extensive enough to warrant using high voltages, and by this term we mean high in the sense defined by Professor Baun half a dozen years ago, when he cheerfully classified as of moderate voltage anything below 30,000 volts. Railway transmission practice, however, differs from that of ordinary hydroelectric systems in that it often involves considerable amounts of power and the lines have to be constructed largely along frequented ways. The overhead construction, therefore,

must be adapted to carrying fairly heavy copper and must be to the last degree secure and reliable.

Recent practice in transmission work is tending considerably toward steel pole lines, generally of the tower type, but in the conditions met in transmission for railway purposes tower construction is usually unnecessary and some very successful examples of latticed poles have been installed within the last year or two. In such cases there is a good deal to be said for the beautiful "A" type of pole, used by some of the Italian engineers, which gives sufficient longitudinal flexibility to relieve extraordinary strains upon the line. In the same connection a good word should be said for the suspension insulator which is now beginning to be used for moderate voltages as well as for extreme voltages. A transmission line carried by suspension insulators on a not too rigid steel pole line is about as reliable an overhead structure as could well be imagined and is very well adapted to secure protection from lightning when equipped with a guard wire grounded at every pole. There is an increasing tendency to require railway companies to put their lines underground, a demand which has its origin in a certain distrust of overhead circuits as well as in a desire to get them out of sight. But so long as the trolley wire remains overhead there is little reason for objecting to the feeders also being overhead, and by proper construction the overhead line can be made fully reliable.

The great moot point of electric railroading—that is, alternating current versus direct current in the motors—still remains undecided. Some excellent examples of direct-current high-tension roads of 1200 volts or more have been described in our columns. But voltages like this, however desirable for long-distance interurban service, have merely palliated matters and have left the main problem of heavy work still unsettled. So far as we have observed, the advocates of both systems of working listen more patiently than formerly to each other's arguments, but still remain unconvinced. Even the lengthy discussion of the matter at the Berne Congress during the past summer left in the mind of the reader little except an earnest desire to find some seer able to separate the facts from the hypotheses on both sides of the argument. Meanwhile both systems are practically doing well, so that the argument from experience is of but small assistance to the dubious. Perhaps the only class really grateful for this uncertain state of affairs is composed of the steam railroad magnates, who find therein an excellent reason for doubt and hesitation when confronted by demands for electrification.

The quite ideal system in which long sections of road are supplied at high voltage from a single trolley wire without feeders has not yet been materialized by either party to the dispute. Until this is accomplished distribution for the larger work of railways is still to be deemed among those desiderata whose substance is hoped for but whose evidence is not yet seen. One shudders at the thought of keeping 1000 miles of third-rail system between New York and Chicago clear during an average winter, and if he takes the other horn of the dilemma and visualizes the overhead system of the New York, New Haven & Hartford Railroad along the same far vista, he will derive little comfort from its contemplation. Aside from the commonplaces of ordinary interurban electric railway service, the distribution problem in its relation to the motor service still remains a riddle.

RAIL SECTIONS AND SPECIFICATIONS.

The extremely important subject of specifications for the composition and rolling of rails was among the foremost questions discussed and acted upon during the past year, and its treatment by the committee on way matters of the American Electric Railway Engineering Association was marked by a clear understanding of the essential differences between street railway and steam railroad requirements. The approved 1910 report of this committee recommended for electric railway open-hearth girder and high T-rails a steel containing at least 0.60 per cent carbon, a desired average of 0.68 per cent carbon and a maximum of 0.75 per cent carbon. In this composition the phosphorus was not to exceed 0.04 per cent. The original draft of this committee's report called also for a higher grade composition in which the corresponding minimum, desired and maximum carbon amounts were 0.72 per cent, 0.77 per cent and 0.85 per cent, while the phosphorus was set at the low mark of 0.03 per cent. This higher grade composition was not recommended in the final report, however, because of the manufacturers' refusal to roll a high-carbon, low-phosphorus rail at standard prices. The tendency toward higher carbon content in street railway rails is illustrated in the case of the Metropolitan Street Railway, New York, which has changed over from a respective minimum and maximum of 0.45 per cent and 0.55 per cent to 0.65 per cent and 0.80 per cent. The latest open-hearth rails for the subway service of the Interborough Rapid Transit Company, New York, also show an increase in carbon content, as the permissible limits have been changed to read "0.75 per cent to 0.90 per cent" in place of "0.70 per cent to 0.85 per cent." Since no other electric railway in the world must cope with such traffic as the New York subway, the rails used for this service are mentioned only to prove that the committee on way matters was not demanding an impossibility when it suggested an open-hearth rail with an upper limit of 0.85 per cent carbon whether for T or girder rails. It is to be hoped that during the coming year many railways will order their rails in harmony with the committee's specifications, so that the merits of the proposed standard composition and tests will receive a fair trial.

The standardization of girder rail sections has not made much progress despite the concrete suggestions contained in the 1907 and 1909 reports of the committee on way matters. A settlement of this problem is of the greatest importance to city railways, but we fear that much good committee work will be lost unless recommended standards can be brought more directly to the attention of member companies and others than is now the case. First of all, an earnest endeavor should be made to select the standards from the enormous variety already extant. Secondly, if entirely new sections are considered a necessity it is only fair that the rail makers should have some assurance that enough companies will adopt them as standard to justify the design and construction of the new rolls required. In this question of standard rail sections the United States has lagged behind both England and Germany. The excuse is usually made that the choice of section is dependent upon the city engineer and the local authorities rather than upon the railway company. Surely local authority is supposed to be as strong abroad as here, yet, by a vigorous effort in which in Great Britain the railway companies were supported by the Institution of Civil Engineers, the railway associations and other national organizations, practical standardization has been

reached. In Great Britain the five standard rails for tangents weigh respectively 90 lb., 95 lb., 100 lb., 105 lb. and 110 lb. per yard, and the corresponding curved rails 6 lb. more per yard. The German standard city rails for tangents weigh respectively 85 lb., 98 lb., 112 lb. and 115 lb. per yard, and the corresponding curved rails 5 lb. to 6 lb. more per yard. The new German standards have been made effective by a system of co-operation with the rail makers whereby the penalty of higher cost is suffered by those few companies which insist upon something special. It is greatly to be desired that not only shall the 1911 committee on way matters select acceptable standards but that the parent association shall also devise some method to make the recommendations enforceable. A viva voce vote at the convention or even a tacit approval by a letter ballot is a long way from the actual adoption of the standard as certified by the requisition of the purchasing agent.

REGULATIVE LEGISLATION IN 1910

The strongly defined tendency toward further extension of governmental control over the electric railways which marked the early part of 1910 appears to have undergone some change. This is indicated by the political events of the year and by a moderation of public policy which may be temporary or may prove to be permanent. At the beginning of the year the trend of public opinion throughout the country appeared to be definitely in favor of an extension of the national policy of regulation. This was naturally reflected in various movements in States where the Legislatures were in session.

The most important steps taken in the assumption of larger authority were those of the Congress of the United States. These, because of their application only where interstate commerce is concerned, affect only remotely most of the electric railways of the country. In so far, however, as they represent the crystallization of the sentiment of all sections on a subject which is really the control of State corporations that happen to be engaged in interstate commerce they represent a sentiment that may easily drift in its application from the greater national problems to those of more purely State or local importance.

It was pointed out by the committee on interstate commerce commission affairs in the report presented at the last convention of the American Electric Railway Association that of 74 bills relating to interstate commerce which were presented during the first and second sessions of the Sixty-first Congress of the United States but four became law. The most important of these was the act which created the commerce court and amended further the interstate commerce act.

A section of this act which is of potential importance is that which authorized the President to appoint a commission to investigate questions pertaining to the issue of stocks and bonds by railroad corporations. This was a more temperate treatment of the subject than that which was proposed in some of the bills introduced in Congress in reference to this matter. The scope of the inquiry upon which this commission has entered is indicated by the preliminary hearings. The commission is taking testimony from eminent bankers, lawyers and corporation representatives and public officials of the country. The opinions which it solicits touch not only the expediency of the regulation of securities by the United States government but also the subject of the power of Congress in this matter.

In the ultimate disposition of the questions involved, if final

decision is to be made, the position of outstanding securities as well as the terms on which new issues are to be made must receive consideration. When the investigation shall have been concluded and the report placed before the country there will be an opportunity to pass upon the conclusions of the commission. It should be remembered that the commission was appointed in pursuance of the policy of the party in power to enlarge to an almost unlimited extent its control over railroads engaged in interstate commerce. As that party did not meet with the same favor at the hands of the people at the elections in November that it had enjoyed theretofore, some of the issues which it has raised will be settled by others whose real views and strength can scarcely be judged accurately and in full so far in advance as this.

There is one other reason why we refer thus at length to the additions made by Congress to the act to regulate commerce. Because of the obstructive policy of the government the increases in rates desired by the steam railroads have been held in abeyance pending determination as to their reasonableness. These increases were designed to offset in part the larger expenses to which the companies have been put by advances in the rates of wages of employees. If allowed, they will be a forceful argument for the electric railway companies which are in a position to make or seek higher rates of fare. In an editorial published in our issue of May 7, 1910, we pointed to the moral effect of the salutary object lesson which was afforded by the movement for advances in steam railroad rates. This effect will not be diminished but will rather be enhanced if the increases pass the tests imposed by the legislation of 1910.

In the various States less legislation designed to create or extend commission control over electric railways was enacted than was threatened. The State of New York amplified and made clear some of the provisions of the public service commissions law which relate to street railroads. In New Jersey a law was passed and became effective which enlarged the powers of the Railroad Commission, extending jurisdiction over other classes of public utilities. Through the passage of a law similar to the original law creating the New York commissions the State of Maryland created a public service commission.

No one less than an inspired prophet could predict the ultimate results of the sessions of Legislatures, but the questioning attitude which the public has assumed toward the national policies of the party in power and the surprising victories of the Democratic party point to change.

The year 1910 closed therefore with regulative policies in less definite shape than they held twelve months ago. That there will be a gradual extension of the policy of regulation through the creation of new commissions is a probability which is made stronger by the expressions of feeling in various parts of the country against the "new nationalism" and in favor of a vigorous assertion of State rights. But the powers given by new regulative laws should be limited and made reasonable if the companies concerned present their needs. Where there is to be legislation, reasonable laws and men who will enforce them in a reasonable way are the essential requirements for success. Both the proponent of radical restrictive legislation and the corporation official who resents any suggestion or inquiry from the public as an intrusion should give way to legislation which will lead to co-operation and a recognition that each interest has rights which the other is bound to respect.

THE ELECTRIC RAILWAY SITUATION IN 1910

The electric railway situation was affected during 1910 by an unusual number of influences of a political and business nature, national, State and local. The results of operations and the present outlook, therefore, vary to an unusual extent with the companies throughout the country. So far as we can judge from a number of individual experiences, the grand totals of gross traffic and gross revenues of all companies, if available, would show substantially the same average increases which, under all circumstances but those of extraordinary depression, continue, as a rule, to be made from year to year by local public utility corporations of all classes. Gross earnings of electric railways increase when the total business of the country increases. It is the experience of most companies that gross earnings decrease to a very small extent or remain on about a level with the previous year when the gross volume of general business decreases. Changes are very rarely as sudden or sharp, however, as with other industries.

The general business of electric railways, their financial condition and their plans for future expansion are still to an extent under the pall of the panic of 1907, from which the country as a whole has not yet entirely recovered. The slower development of the industry is due in part to the banking and investment attitude of the country, which has consistently operated to produce a policy of conservatism and to restrict expansion. The situation has not been wholly favorable for either temporary or permanent financing by established companies, and it has been still less encouraging for new enterprises.

When electric railways borrow on short-time notes they usually do so in anticipation of the sale of long-time securities with whose proceeds they redeem the short-time obligations. The bond market in 1910 was poor. As the public did not buy securities freely, the bankers, who are the wholesale purchasers, were not willing to buy freely. It was a question more of unreceptive markets than of prices. Electric railway securities are not ordinarily subject to the same extremes of market fluctuation as the great steam railroad and corporation issues, which have had a year of depression and unsatisfactory salability on the New York Stock Exchange. This redeeming fact is due in part to better sustained gross earning power, although it is true that issues of stocks and bonds of individual electric railway companies are not sufficiently large to facilitate trading in heavy or frequent volume.

The influences that determine the state of the investment market from year to year were complicated in 1910 by the demand for money throughout the civilized world and by the public utilities legislation pending and threatened by the national and the various State governments. A policy of financing by the sale of preferred stock, instead of bonds, has been followed by some companies with distinct success. While this tends to make the net cost of the capital higher, it is permanent financing, the necessity of refunding in the future is avoided, and it has the additional advantage of substitution of a voluntary dividend payment for a fixed interest charge. Curtailment of fixed charges may prevent receivership in the event of a prolonged period of business distress. While the more general issue of stock instead of bonds is to be recommended as a wise protective measure, the record of

electric railways in this respect compares favorably with that of the steam roads. The 1907 census report showed that of the total outstanding capital of street and electric railways (operating and lessor companies) 44.43 per cent was represented by funded debt. The corresponding percentage for steam railways, as shown by the Interstate Commerce Commission report for the same year, was 54.25.

More widespread and severe effects from the depression that followed quickly after the panic of 1907 were felt by electric railways located in some of the mining and industrial regions of Pennsylvania than by the companies engaged in this business in any other general section of the country. The chief industries in Pennsylvania districts thus affected are mining and the manufacture of iron and steel products and coke. Early in 1908 some of the electric railways in these regions showed reductions of gross earnings as compared with the corresponding period of the previous year, which amounted for a time, although a very brief time, to as much as 40 per cent or 45 per cent. Recovery has been slower in these districts than in other sections, but 1910 showed material improvement. In some parts of the country continued development has caused an increase of gross earnings where there was a sharp reduction in 1908. However, the experiences of individual companies have been so varied that in attempting a review of the entire situation we are justified only in pointing to the records of certain groups of representative companies under common control, which showed fair general increases until October or November, when the recession in business began to produce some decreases which lessened the previous satisfactory gains.

As a result of continued higher costs of labor and materials, operating expenses rose still further during the year. The same difficulties of securing competent, dependable men at the established scales of wages were experienced as in more prosperous years, although in a less accentuated degree. The maintenance policy of the companies shows as great diversity as any other feature of their operations. Many roads which were obliged to meet higher transportation expenses reduced their expenditures for maintenance in order to keep a balance. As the rate of fare on city lines is almost universally inflexible under the terms of franchise contracts, only a few urban companies have been able to recoup themselves by increases in the fare unit. On interurban lines many readjustments and increases have been made. Distinct improvement in the average results per passenger carried has been effected in a number of cities by a comprehensive rearrangement of the system of free transfers. By elimination of the illegal and unwarranted use of transfer privileges some unnecessary riding has been stopped and various forms of gross abuse have been ended.

The unadaptability of the short-term franchise to the real needs of the community has been emphasized by the experience of the companies which furnish the urban railway service in Cleveland, Detroit and Toledo. No plan of contract which jeopardizes, either in theory or in fact, the enormous capital investment that is required to produce a satisfactory system of transportation for a developing city is entitled to acceptance as in the true public interest. When the date of expiration of such contracts is near financing becomes difficult and the disappointed holders of securities sell at a sacrifice. The lessons of the year point with new force

to the reasonableness of unlimited franchises of the character of those granted in the States of Massachusetts and New York.

As the new year opens the situation is complicated by the political changes which the elections of November have brought throughout the country. What effect these new forces will produce on the conditions governing business and on the great problem of the national election of 1912 only time will show. Business hopes for early decisions in the trust cases before the United States Supreme Court and in the steam railroad rate cases in which testimony has been presented before the Interstate Commerce Commission. Freedom from general unrest in business will help all industries and thus promote the development of electric railways. Projects involving enormous outlays of capital in Boston and New York will progress further during the coming year, and in other large cities of the country definite or tentative steps toward the creation of greater transit facilities will be taken. These will involve, we believe, greater capital requirements than the additions and betterments of 1910.

The greater conservatism which marks the status of the electric railway situation at the turn of the year affords a wholesome opportunity for the companies to consider the weaknesses and the strength of their position. Weaknesses lie in franchise conditions, public relations, loose transfer regulations, extensions built because of over-enthusiasm, the need of better trainmen and the constant demands for more and better facilities and, in spite of all that may be given, the equally insistent demands for lower fares and longer hauls. Strength lies in the provision of a service which is one of the most necessary conveniences of life. The electric railway company and the community are interdependent.

THE INTERURBAN RULES SITUATION

Practically all of the members of the American Electric Railway Association are anxious for that body to designate as standard a new code of rules for interurban electric train operation. Such a code should be of such general applicability that it could be used as a foundation on which every interurban company can formulate a set of rules suitable for its local conditions. One of the committees of the Transportation & Traffic Association now has this work in hand, but it has not yet met, so that its program during 1911 cannot definitely be announced. The executive committee and the association as assembled at Atlantic City outlined certain work for this new committee. These assignments included the following:

To confer with the American Railway Association and attempt to adjust discrepancies between the A. R. A. code and the 1910 T. & T. code.

To confer with the city rules committee and adjust conflicts with the standard city rules.

To take under consideration the extent to which prepayment service will affect any set of interurban rules.

To ascertain what action has been or probably will be taken in the near future by national or State commissions regarding interurban rules.

It is not our understanding that the Transportation & Traffic Association at the Atlantic City convention last fall voted either its approval or its disapproval of the code presented by the 1910 committee. Rather, it recommended that

the rules committee study the interurban rules situation for another year and present its suggestions. It can continue to work along the lines followed by the 1910 committee or not, whichever plan it thinks will best meet the requirements of a majority of the interurban railway companies which are members of the association. The rules committees in the past have repeatedly urged the member companies to state these requirements with definiteness. Nevertheless there has been a paucity of both information as to existing conditions and expressed opinion as to the proper rules. It is sincerely to be hoped that the roads will assist the rules committee during the coming year in this respect better than in the past. It is very necessary that only such a code be adopted for general use as seems to fulfil the requirements after diversified opinions and criticisms have been expressed in a country-wide discussion. We think we are safe in saying that the chairman of the rules committee is anxious to receive letters on the subject, and, as is quite generally known, the columns of this paper are always open for expressions of opinion on any subject of such general welfare as that of improved interurban rules.

Unless preliminary thought is given to the rules situation by others than the members of the committee, the real purpose of the appointment of the rules committee will not be accomplished. When the subject is under discussion in convention the tendency of those who have not followed the work of the committee previous to the convention is to explain why the rules do not fit their local situations. Thus time is wasted and the subject, as at Atlantic City, is tabled for another year.

Should this year's committee decide to take the 1910 code as a basis for its work and then be able to formulate its recommendations and publish them as early as June, ample time would be allowed for its revision by the committee previous to the presentation of the report in the fall. If this is done decisive action should be expected at that time.

The foregoing remarks indicate the situation which confronts the present rules committee. No committee, even though composed of men carefully chosen to represent the best ideas and practices of all sections of the country, can formulate a code of rules which will be found acceptable in their entirety to all companies. In electric railway train service, as in any other specialized business, the individuality of the man in charge is prominently reflected. The superintendent of an interurban road in the East, for instance, has to deal with a certain kind of employees and operating conditions and if he has been following certain methods successfully he will naturally think that no others will meet his local conditions. A similar procedure will be followed by the man in the West. Each will believe that his methods are the best which he can use and will object to a code of rules not in accord with his practice. This parallel between the Eastern and the Western man might just as well have been drawn between the man who has been brought up in the interurban school and the graduate of the steam-railroad school. One feels that the steam code will not suffice for his service and the other holds similar ideas about the interurban code. Numerous examples of men holding the contrary views just presented can be found among the member companies of the association, and so the difficulty of obtaining a code which will meet the views of the operators of all roads grows.

This rules situation is similar to that which confronted

the standardization committee of the Engineering Association. This committee at first attempted to design or select certain car parts of such dimensions as would most nearly meet the average conditions as they existed. Later the committee realized that the subject in hand had a broader aspect than that of choosing compromise designs. Then the committee resolved itself into a body of designing engineers. During the last few years this committee, in connection with the committees on special topics of the Engineering Association, has originated designs which are intended as models for the future rather than as adjustments for the present. It has been the idea to place before the association designs toward which the companies might work, and when car parts conforming to these designs could be introduced on a road vast benefits to be obtained from standardization would be realized. Briefly, the committee has given up the idea of restricting its recommended practices to those which might at once be adopted on the average road. In contrast, it has undertaken to present correct, and one might say almost ideal, designs toward which the roads should work.

Whether or not the interurban rules committee can pursue similar methods is doubtful. Nevertheless, we feel that the men chosen to represent the association on the rules committee have been and are of such high quality as operators that the association as a body should place upon them the responsibility of deciding upon all details and could safely confine its discussions at conventions to the general principles involved in the rules which the committee recommends. In this way only can the association get a well-thought-out code which can safely be used by any company as the foundation for a set of rules to serve for any particular road.

The need for standardization of rules hardly calls for repetition at this time, since it has been presented in these columns many times. Probably the prime reason that has actuated the standard rules movement has been the desire for increased safety. It is well known that a trainman operating under one set of rules may by a sudden mental reversion to a contrary practice formerly allowed endanger the safety of his passengers. Such an act would hardly be called carelessness. It is rather a weakness of the mind which is known often to exist and must be guarded against in every possible way. A most effective precaution against this danger is uniformity in rules and in train operating practice. It is noteworthy, in this connection, that the several regrettable accidents of this fall were not caused by a misinterpretation of the rules.

The three more important features to be held in mind when considering the choice of a code of interurban rules are in the order of their importance: (1) Does it supply the necessary degree of safety? (2) Are the rules sufficiently plain for prompt assimilation by a trainman? (3) Will the code facilitate the economical performance of train service?

These are the objects sought, and these purposes should not only direct the work of the rules committee, but should also control the criticism of the conclusions reached by the committee. Finally, we bespeak for the committee the most cordial co operation on the part of other managers. Theirs is a most difficult task. It involves a reconciliation of many diverse views, yet we feel that it is not impossible of accomplishment if each person interested will approach the subject in a broad-minded way and bring to its solution as much careful consideration as if he personally were a member of the committee. If

this plan is followed at least a satisfactory start will be made this year upon the general adoption of a standard set of inter-urban rules.

ASSOCIATION WORK

Five years have passed since the American Street Railway Association was reorganized in Philadelphia. This is a sufficient length of time in which to judge the success or non-success of the principles then adopted. The general plan of organization was patterned largely after that of certain existing associations, particularly that of the American Association for the Advancement of Science. Nevertheless, it was largely experimental and depended for its success upon the co-operation of a widely distributed membership, bound together more by common interest in the advancement of the art than by commercial ties. It is not too much to say that the progress made during the past five years has been far greater than many of those instrumental in the reorganization in Philadelphia in 1905 anticipated and that it has realized the best hopes of those who were sanguine of its success. Although a considerable increase was made in the annual dues required of member-companies, the growth of the association in number of members has been continuous since 1905. In work accomplished the development has been even greater, as a survey of the printed proceedings of the association for the past five years will show. Since the association is now beginning its second half decade of existence and has adopted a new name more in consonance with the field which it covers, the present seems a suitable time to discuss briefly its past work and future problems. In doing so the logical plan is first to review what questions have been solved as a result of the experience of the last five years and then to consider what remains to be done.

Chief among those questions which seem to have been settled satisfactorily is that of general administration. The plan of a central organization, represented by the permanent office of all five associations, gives a stability which was not possessed by the old organization, and the secretary's office has proved not only desirable for many of the committee meetings, but also efficient in collecting and distributing data of various kinds. The autonomous organization of the affiliated associations, with their numerous committees, gives wide opportunity for individual initiative and preferment while assuring co-ordinated and well directed work by the different organizations. No conflict in regard to spheres of work has occurred between the affiliated bodies, although several subjects have been taken up in common. Of these there will doubtless be more as time goes on. Thus far there have been only two joint sessions and these have been held by the Accountants' Association and the Engineering Association, although joint committees have met on other occasions. Again there has been no lack of subjects. The difficulty up to this time has not been in finding subjects to consider, but in finding time to discuss them.

The financial condition of the association is equally satisfactory. The last report of the treasurer shows a surplus of about \$5,000. This gives a slight margin for increasing the efficiency of the association. The total budget, it might be added, is less than that of organizations with whose work that of the association is most nearly allied.

In looking toward the future the principal question to be solved is that of increasing the membership, both active and

associate. The membership list of the association is now well representative of the country, but it still falls short in number of what it should be when the value of the work done by the association to the industry at large as well as to individual roads is considered. On Dec. 31, 1910, the percentage of companies in the United States and Canada which were members of the association was only a little over 27 per cent, and the proportion of electric railway mileage represented in the association as compared with that in the entire country was 64 per cent. The statistics on the mileage basis for the groups of States were as follows: In New England 68 per cent of the total electric railway mileage belongs to companies which are members of the association; in the Eastern States the percentage is 55; in the Central States it is 67; in the Southern States it is 72, and in the Western States it is again 67. These figures show that the same ratio holds remarkably closely in most parts of the country, but also that there is still opportunity for strong missionary work. It might be interesting to add in this connection that 288 different electric railway companies had representatives present at the last Atlantic City convention and that last year 204 men were engaged in committee work in addition to those on the active and associate membership committees.

It is useless to expect that every company in the country will become a member of the association. There will be a percentage in every State to which, either because the road is in the hands of a receiver or from some other cause which is controlling, membership seems impracticable. The only thing to do in cases of this kind is to make the membership as near 100 per cent as possible. With the associate membership there is not the same limitation. The associate members of the association are much greater in number than a year ago and very much greater than two years ago, but the associate membership is still small compared with possibilities and compared with the number of the individuals who are interested or actually engaged in the industry. It is true that when a comparison is made with allied lines of industry, like the lighting industry, the number of operating companies is small, but the investment and the number of employees per company are much greater. Any addition to the active and associate membership of the association would not only be a great help to its finances and thus would increase the work which the association can do, but it would also enlist a large body of individuals who have a personal interest in co-operating in its aims. The plan adopted this year of definitely grouping the associate members with the particular association with which they wish to affiliate themselves should bring each associate member more closely in touch with the line of research in which he is most closely interested.

Another question concerning the organization as a whole not yet settled is that of the location of the annual convention. Undoubtedly the action taken at the Atlantic City convention not to accept the proposition of Saratoga Springs was a wise one, but it leaves the executive committee in the dilemma this year of being obliged either to hold the 1911 convention at a place which has already been visited three times, or to begin a weary hunt for some other city which will possess the almost impossible qualifications of good hotels with ample capacity and charging reasonable prices, conveniently located to a hall with proper facilities for caring for the exhibits and for the association meetings. This is one of the first problems to be

undertaken by the present executive committee of the association.

Besides these questions which face the association as a whole, each of the five departments into which the activities of the body are divided has its own problems. We shall not attempt to discuss these in detail because they are treated at length in this issue by the presidents of the four affiliated associations as well as by Mr. Brady, president of the parent body. It is instructive to note, however, that each of these contributors sees opening before the association of whose work he treats a widening vista of opportunity and usefulness. In no one year probably have more questions presented themselves for solution in each of the fields represented by these different sections. Certainly they have not been so apparent in earlier years. Standardization of equipment is being taken up for the first time actively with other national and State associations by the Engineering Association. The matter of standardizing rules and of determining the practical advantages and limitations of signal systems in connection therewith is confronting the transportation managers. The subject of signals will be taken up this year by the Transportation Association in connection with the Engineering Association. The detection of fraudulent claims by means of a central bureau is closely engaging the attention of the claim agents. The advice of the accountants is being demanded by two of the other affiliated associations on questions which concern them, and in addition the accountants have before them the multifarious questions which belong peculiarly to their department.

Among the problems of the parent organization that of public relations seems most important. Mr. Brady's article outlines clearly the economical and political conditions which have brought many of these problems to a focus during the last few years, especially during 1910, and comments upon the similarity of their aspect in all parts of the country. He also explains the importance to the public and the railway interests, but particularly to the latter, of a settlement of these questions upon an equitable basis and with a full understanding of all the conditions rather than by hasty and unconsidered action. It is fortunate that the industry should have had at the beginning of the present year such a clear exposition of the present purposes and objects of the American Electric Railway Association as that contained in Mr. Brady's article. Active work on the part of the committees of the association has already been commenced, and undoubtedly at the midyear conference, on Jan. 27, the reports of that already accomplished or under consideration by them will be presented to the members.

THE ENGINEERING ASSOCIATION "QUESTION BOX"

The executive committee of the Engineering Association at its last meeting discussed the advisability of discontinuing the publication of the "Question Box," which has been a feature of the convention program of that association since 1904. As a substitute it was proposed that the secretary of the association should act in the capacity of an information bureau and obtain directly from member companies answers to any questions relating to engineering matters which might be referred to him. It has been apparent for the last two years that interest in the "Question Box" has been lagging. Comparatively few of the questions have been of especially timely or general interest, and

the answers, for the most part, have conveyed little information of real value. Other associations which have conducted a "question box" in the past have had a similar experience. After a few years of existence the plan has been abandoned because of lack of interest.

A "question box" is a convenient and simple medium for the general exchange of specific information about the details of any industry. The value of this interchange of ideas and experience is not confined alone to the men who prepare the questions or write the answers. In nearly every railway organization there are men in subordinate positions who are eager to learn the practice of other companies on the specific points considered, but have few opportunities for personal observation outside of their own city. If the Engineering Association through the "Question Box" can be of help to these men in enlarging their knowledge and usefulness to their employers, the time and money spent in the preparation of the questions and answers once a year should not be begrudged. One way to improve the "Question Box" would be to give these men a better opportunity for submitting questions relating to practical details of their work and for answering the questions which are asked. Under the present plan a circular requesting suggestions for questions is sent to member-companies and associate members early in the summer. This circular reaches busy heads of departments, who give it only passing attention, and later on when the data sheet containing the questions submitted is sent out comparatively little attention is paid to preparing answers, except in a few individual cases. A few duplicate copies of both the circular and the data sheet could be sent to each member company with a request that they be distributed among the foremen and others in subordinate positions who might be interested. This would entail but little extra cost and would tend to create interest in the association's affairs among a class of men who at some future time may develop into active and valuable members.

The proposed substitute plan of having the secretary of the Engineering Association act in the capacity of an information bureau has been followed by the American Association for a number of years, but the general distribution of the information collected and compiled in the form of confidential bulletins to member companies entails a large amount of clerical work and is expensive. While similar bulletins of the Engineering Association seldom would contain information of a confidential nature, they would never be so widely distributed as the "Question Box" now is and the data contained in them would not be generally available. It might be worth while to give the plan a trial for a year before deciding to abandon the "Question Box" if that step seems advisable. If the two methods of collecting and disseminating information are continued the "Question Box" should be expanded to include all of the data published in the bulletins, as well as the usual questions and answers on subjects of minor importance.

In the past the "Question Box" has contained a vast quantity of extremely valuable data covering a wide range of subjects, but for lack of an index information on any particular point can be found only after a long search through the volumes of previous years. It would not entail a great deal of labor or expense to compile an index or classified list of the questions asked and answered during the last six years and to include this index in the future in the proceedings, where it can be permanently preserved and brought up to date each year.

ELECTRIC RAILWAY ROLLING STOCK ORDERED IN 1910

The orders placed by electric railways for rolling stock in 1910 are shown in the accompanying table. The total of all cars, locomotives and miscellaneous rolling stock ordered was 5481, an increase of 10.6 per cent over 1909. As in previous years the table has been compiled from the ELECTRIC RAILWAY JOURNAL records kept from week to week, from data received from the railway companies on special blanks sent to them and from records obtained from the car building companies.

The orders, classified according to the service in which the cars are used, are given below.

	1907	1908	1909	1910
Passenger cars, city.....	3483	2208	2537	3571
Passenger cars, interurban.....	1327	727	1245	990
Freight and miscellaneous cars.....	1406	176	1175	820
Total	6216	3111	4957	5481

It will be seen from the foregoing annual comparison that 1910 was marked by greater activity in the total purchases of rolling stock than 1908 or 1909, but it was 735 cars short of the total orders for the year 1907.

Among the striking features of rolling stock orders last year was the increase in the number of prepayment cars, of which 1878 were purchased, as compared with 1096 in 1909. These figures relate only to new cars; they do not include rolling stock which was rebuilt for prepayment operation. The prepayment cars are marked by an asterisk (*) in the accompanying table.

There was a decrease of 255 in the total orders for interurban passenger cars, or 20.4 per cent as compared with 1909.

The figures for interurban cars include orders for elevated and subway equipment. The greater attention which has been given to the maintenance of service in winter is indicated by the purchase of 117 snow plows and sweepers.

The number of electric locomotives ordered was 43 as against 49 in the preceding year. However, 24 of the 49 locomotives ordered during 1909 were for the New York electrification of the Pennsylvania Tunnel & Terminal Company. It should be noted in connection with the accompanying table that in the case of electric locomotives the truck column gives the name of the company which constructed all the mechanical parts, while the column headed "builder" shows the name of the company which manufactured the electrical equipment.

ROLLING STOCK EQUIPMENT ORDERED IN 1910

Purchaser	No.	Class	Length	Serv.	Truck	Builder	Purchaser	No.	Class	Length	Serv.	Truck	Builder
Aberdeen Ry.....	7	Closed	22-0	City	.....	.....	.....	5	Express	36-0	Int.	Hol.	Holman
.....	1	Pl. & Wk.	.....	City	.....	.....	.....	1	Express	45-0	Int.	Brill	Holman
Alton, Jack. & Peoria Ry....	5	Closed	55-0	Int.	.....	American	Central Kentucky Trac. Co....	4	Comb.	52-8	Int.	Brill	Brill
Arkansas Valley Inter. Ry....	1	Closed	52-0	Int.	Bald.	Jewett	Charles City Western Ry.....	8	Semiconv.*	24-0	City	St. L.	McGuire-C.
Asheville Electric Ry.....	4	Open	.....	City	Brill	Brill	.....	1	Gas.Mot.	55-0	Int.	McK.	McKeen
.....	2	Semiconv.	30-1	City	Brill	Brill	.....	1	G.M. Loco.	.....	Int.	McK.	Co. Shops
Atchison Ry., Lt. & Pwr.Co....	5	Semiconv.	27-4	City	Brill	Brill	Charleston Con. Ry.& Lt.Co..	4	Semiconv.	30-1	City	Brill	Brill
Athens Elec. Ry.....	3	Open	35-0	City	Brill	American	.....	4	Open	43-0	Int.	Brill	Brill
.....	3	Closed	34-10	City	Brill	American	Chat., Wall'b'g & L.Erie Ry....	2	Trailer, O.	.....	Int.	.....	.....
Atlanta Northern Ry.....	2	Trail C.	30-8	Int.	Brill	Brill	.....	3	Frt., Box	.....	Int.	.....	.....
Atlantic Shore Line Ry.....	1	Semiconv.	40-1	Int.	Std.	Stephenson	.....	17	Fl.&Gon.	.....	Int.	.....	.....
Aurora, Elgin & Chicago R.R.	5	Closed	32-0	City	Brill	Niles	.....	1	Ballast	.....	Int.	.....	.....
.....	1	Comb.	50-0	Int.	.....	Russell	.....	1	SnowPlow	.....	Int.	.....	.....
.....	1	Express	46-0	Int.	.....	Niles	.....	2	Elec.Loco.	.....	Int.	.....	.....
.....	1	Sweeper	29-0	City	Mc-C.	McGuire-C.	Chattanooga Ry. & Lt. Co....	10	Closed*	45-0	City	Brill	Kuhlman
Austin Elec. Ry.....	3	Open	31-0	City	Balt.	Southern	.....	2	Dump	.....	City	K.&J.	Kilbourne & Jacobs
Bakersfield & Kern Elec.Ry....	6	Closed*	40-0	City	Brill	American	.....	1	Semiconv.	33-0	City	Brill	Brill
Balt. & Wash. Transit Co....	2	Gas. Mot.*	30-6	City	Brill	Stephenson	Cheyenne Elec. Ry.....	1	Semiconv.	33-0	City	Brill	Brill
Bangor Ry. & Elec. Co.....	2	Semiconv.	30-8	City	Brill	Brill	Chicago, Aurora & DeK. R.R	3	Comb.	45-0	Int.	Tay	Danville
.....	1	Express	30-0	City	Brill	Brill	.....	1	Express	45-0	Int.	Mc-C.	McGuire-C.
Beaumont Traction Co.....	3	Semiconv.*	37-4	City	Brill	American	.....	6	Dump	36-0	Jnt.	.....	Western
Beloit Traction Co.....	2	Closed*	40-0	City	St. L.	St. Louis	Chicago City Ry.....	2	Funeral	42-1	City	Brill	Kuhlman
Belton & Temple Traction Co..	1	Flat	24-0	Both	Am.	Co. Shops	.....	1	Sweeper	28-3	City	Mc-C.	McGuire-C.
.....	4	Dump	18-0	Both	St. L.	Co. Shops	.....	1	Closed	44-2	City	Brill	Co. Shops
Birmingham Ry., Lt. & P. Co.	9	Closed	36-0	City	Balt.	Mc-Guire-C.	.....	1	Closed	45-2	City	Brill	Co. Shops
.....	4	Freight	36-0	City	Co.	Co. Shops	Chic., Har. & Gen. Lake Ry...	1	Flat	36-0	Int.	.....	Hicks
.....	1	Concrete	.....	City	Co.	Chic. C. M.	Chicago & Joliet Elec. Ry....	4	Closed*	34-0	City	Cin.	Kuhlman
Bluffton, Geneva & Celina	1	Closed	52-0	Int.	Tay.	Jewett	.....	2	Comb.*	40-0	City	Brill	Brill
Trac. Co.....	1	Frt., Box	50-0	Int.	Tay.	Interstate	.....	1	Pl. & Spr.	33-6	Int.	Mc-C.	McGuire-C.
Boise Interurban Ry.....	1	Closed	31-8	Int.	Brill	American	Chicago, L. S. & So. Bd. Ry...	3	Closed	57-0	Int.	Bald.	Niles
.....	2	Closed	.....	City	.....	St. Louis	Chicago & Mil. Elec. Ry.....	1	Express	51-6	Int.	Bald.	Co. Shops
.....	1	Comb.	41-0	Int.	Brill	American	.....	1	SnowPlow	34-0	Int.	.....	Co. Shops
Boston Elevated Ry.....	50	Semiconv.*	48-2	City	.....	Laconia	Chicago Railways.....	215	Closed*	.....	City	.....	Co. Shops
Bos. & Me. R.R. (for H. Tun.)	5	Elec.Loco.	48-0	P.&F.	Bald.	West	.....	2	Dump	.....	City	Co.	Co. Shops
Boston & Northern St. Ry....	24	Open	40-11	Both	Std.	Stephenson	.....	1	Derrick	.....	City	Co.	Co. Shops
.....	2	Work	35-0	Both	Std.	Smith & W.	Chickasha St. Ry.....	1	Closed	30-1	City	Brill	Brill
.....	4	S. T. Plows	26-0	Both	Was.	Wason	Chillicothe El. R.R. L.&P.Co..	1	Sweeper	.....	City	Brill	Brill
.....	2	D. T. Plows	47-0	Both	Was.	Wason	Cincinnati Trac. Co.....	50	Open	30-3	City	Brill	Cincinnati
.....	1	D. T. Plow	44-6	Both	Rus.	Russell	.....	18	Dump	15-0	City	.....	Continental
Boston & Worcester St. Ry....	5	Closed	46-8	Int.	Std.	Osg.-Brad	.....	1	Lococrane	.....	City	.....	Browning
Brooklyn Rapid Transit Co....	1	Sweeper	28-3	City	Mc-C.	McGuire-C.	Citizens' Ry.....	3	Semiconv.*	30-8	City	Brill	Danville
.....	1	Elec.Loco.	29-4	Freight	A. L. C.	Gen. Elec.	.....	1	Flat	20-8	City	Peck	Co. Shops
.....	1	Lococrane	23-4	City	Br'n	Brown	.....	1	Sprinkler	20-8	City	Peck	Co. Shops
British Columbia Elec. Ry....	10	Closed	44-0	Sub.	Brill	Preston	Citizens' Trac. Co.....	2	Closed	30-0	City	Brill	American
.....	5	Semiconv.*	44-10	City	Brill	Ottawa	City of Raleigh, N. C.....	1	Sprinkler	.....	City	Mc-C.	McGuire-C.
.....	5	Semiconv.*	42-6	City	Brill	Stephenson	City & Suburban Ry.....	2	Open*	28-8	City	Brill	Brill
.....	38	Semiconv.*	43-6	City	Brill	Co. Shops	Clarksville Ry. & Lt. Co....	4	Open	27-6	City	Brill	Danville
.....	4	Baggage	53-8	Int.	Brill	Co. Shops	Cleburne St. Ry.....	3	Closed*	30-1	City	Brill	Danville
.....	1	Express	50-0	Int.	Brill	Co. Shops	Cleve., Paines'le & E. R.R....	3	Closed	52-0	Int.	Bald.	Niles
.....	1	Work	36-0	Int.	Brill	Co. Shops	Cleveland Ry.....	25	Closed*	51-6	City	Brill	Kuhlman
.....	50	Frt., Box	41-0	Int.	.....	Hicks	.....	2	Sweeper	28-3	City	Mc-C.	McGuire-C.
.....	25	Flat	40-0	Int.	.....	Hicks	Clinton St. Ry.....	2	Semiconv.	30-1	City	.....	American
.....	25	Flat	41-0	Int.	.....	Canada	Colorado Ry. & L. P. Co....	1	Elec.Loco.	36-0	Coal	Co.	Co. Shops
.....	50	Flat	41-0	Int.	.....	Seattle	Colorado Springs & Inter. Ry.	7	Trailer, C.	.....	City	Co.	Co. Shops
.....	1	Snow Plow	.....	Int.	.....	Co. Shops	Colum. Elec. St. Ry. L.&P.Co.	4	Semiconv.*	43-0	Both	Brill	Brill
.....	1	Sweeper	30-0	City	Brill	Ottawa	Columbus, Del. & Marion Ry..	1	Express	55-0	Int.	Peck	Jewett
.....	1	Sprinkler	.....	City	Brill	Brill	Columbus, Mar. & Bucy. Ry..	2	Closed	54-0	Int.	Curtis	Jewett
.....	3	Elec.Loco.	33-0	Int.	Brill	Co. Shops	Columbus R.R.....	3	Closed	34-4	City	Brill	Southern
.....	4	Caboose	.....	Int.	.....	Seattle	Columbus Ry. & Lt. Co.....	7	Closed*	31-6	City	Brill	Kuhlman
Bryan College Int. Ry.....	12	Stock	.....	Int.	.....	Fairbanks	.....	4	Closed	46-6	Int.	Brill	Kuhlman
.....	1	Trailer, C.	.....	Int.	.....	Fairbanks	Columbus, Urb. & W. El. Ry..	1	Semiconv.	50-0	Int.	Mc-C.	Jewett
.....	4	Gas.Mot.	19-0	Int.	.....	Fairbanks	Conestoga Trac. Co.....	1	Open	28-8	City	Brill	Brill
Buffalo & Lackawanna Tr.Co.	5	Comb.	47-2	Int.	Bald.	Cincinnati	Coney Isl. & Brooklyn R.R....	1	Gondola	41-0	City	Brill	Co. Shops
Burlington Trac. Co.....	3	Closed	28-0	City	Tay.	Jones	Connecticut Co.....	89	Open	.....	City	Std.	Osg.-Brad.
Butte Elec. Ry.....	1	Closed	35-0	City	Co.	Co. Shops	.....	91	Closed	40-0	City	Std.	Osg.-Brad.
Caldwell Trac. Co.....	1	Closed	.....	Int.	Co.	St. Louis	.....	1	Closed	43-0	City	Std.	Wason
Calgary St. Ry.....	3	Closed	46-6	City	Brill	Ottawa	.....	1	Closed	38-0	City	Brill	Brill
.....	3	Semiconv.*	46-0	City	Brill	Preston	.....	6	Express	41-0	Int.	Std.	Wason
.....	12	Semiconv.*	33-6	City	Tay.	Preston	.....	2	SnowPlow	41-0	Int.	Was.	Wason
California St. & Cable R.R....	2	Calif.	.....	City	Co.	Co. Shops	.....	7	SnowPlow	47-0	Int.	Was.	Wason
Cape Girard-Jack. Int. Ry....	2	Open	35-0	City	Brill	Brill	.....	2	Sweeper	28-3	City	Mc-C.	McGuire-C.
.....	6	Closed	30-1	City	Brill	Brill	Corpus Christi St. & Int. Ry...	1	Open	40-0	Both	Tay.	Southern
.....	1	Comb.	30-0	City	Brill	Brill	Cumberland Elec. Ry.....	2	Closed	32-0	City	Std.	Stephenson
Capital Trac. Co.....	150	Closed*	41-0	City	Brill	Jewett	Cumberland Ry.....	2	Comb.	41-0	Int.	Brill	Brill
Carlisle & Mt. Holly Ry.....	1	Gondola	22-0	City	Brill	Brill	Danbury & Bethel St. Ry....	2	Open	41-8	City	Brill	Brill
Centerville Lt. & Trac. Co....	1	Closed	31-0	City	St. L.	St. Louis	.....	3	Closed	39-5	City	Brill	Brill
.....	1	Comb.	41-0	Int.	Mc-C.	McGuire-C.	Dayton St. Ry.....	7	Conv.	31-4	City	B.&S.	Barney & Smith
Central California Trac. Co...	4	Closed	50-0	Int.	Brill	Holman	Denver City Tramway.....	27	Closed	43-10	City	Brill	Woebler
.....	2	Comb.	40-0	Int.	Brill	Holman	.....	10	Trailer, C.	38-1	City	Woeb.	Woebler

Purchaser	No.	Class	Length	Serv.	Truck	Builder	Purchaser	No.	Class	Length	Serv.	Truck	Builder
Des Moines City Ry.....	1	Sweeper	28-3	City	Mc.-C.	McGuire-C.	Kankakee Elec. Ry.....	2	Closed	....	City	....	St. Louis
Detroit United Ry.....	50	Closed	42-3	City	Std.	Kuhlman	Kan City, Lawr. & Top. El.R.R. R.4	Closed	40-0	Both	St.L.	St. Louis	
	25	Closed	42-3	City	Std.	Niles	Knoxville Ry. & Lt. Co.....	10	Closed	33-8	City	Balt.	McGuire-C.
	10	Closed	52-8	Int.	Bald.	Niles	La Crosse City Ry.....	2	Semiconv.	32-0	City	Brill	American
	4	Closed	46-4	Int.	Bald.	Niles	L. Char. Ry. & Wtr. W. Co.....	4	Semiconv.	30-1	City	Brill	American
	5	Express	50-0	Int.	Bald.	Niles	Lawton & Ft. Sill Elec. Ry.....	1	Closed	24-0	City	Brill	Wason
Dominion P. & Trans. Co.....	9	Closed*	43-0	City	Brill	Ottawa		1	Comp., C.	57-0	City	A.L.C.	Wason
	3	Closed	55-0	Int.	Bald.	Preston	Lawrence Ry. & Lt. Co.....	3	Closed*	31-0	City	Brill	St. Louis
East St. Louis Ry.....	6	Closed*	45-0	City	Brill	American	Lehigh Valley Transit Co.....	10	Closed*	41-9	Int.	Brill	Brill
	1	Swp., Wk.	39-8	Both	Mc.-C.	McGuire-C.		1	Comb.	40-0	Int.	Brill	Brill
East Shore & Suburban Ry....	3	Closed	48-0	City	Brill	Danville		1	SnowPlow	32-0	Int.	....	Russell
Edmonton St. Ry.....	2	Closed	36-0	City	Brill	American	Lexington & Interurban Rys.	5	Semiconv.	30-1	Both	Brill	Brill
	16	Closed*	42-0	City	Brill	Ottawa		4	Semiconv.	55-0	Both	Brill	Brill
	4	Semiconv.	46-0	City	Brill	Preston		1	Sweeper	28-3	City	Mc.-C.	McGuire-C.
Elmira Wtr., Lt. & R.R. Co.....	1	Sweeper	30-0	City	Otta	Ottawa	Lincoln Trac. Co.....	1	Elec. Loco.	40-0	Both	Tay.	Co. Shops
El Paso Elec. Co.....	6	Closed*	32-0	City	Brill	Brill	Linwood St. Ry.....	1	Closed	38-0	City	....	Wason
Emigration Canyon R.R.....	6	Closed	21-0	City	Brill	Cincinnati	Little Rock Ry. & Elec. Co.....	7	Semiconv.	44-0	City	St.L.	Co. Shops
	2	Trailer, C.	38-1	Int.	Bald	American	London St. Ry.....	1	Sweeper	28-3	City	....	Ottawa
Enid City Ry.....	1	Elec. Loco.	28-2	Freight	Bald	West	Long Island R.R.....	100	Closed stl.	63-5	Int.	....	A. C. & F.
Ft. Dodge, Des Mo. & So. RR....	2	Elec. Loco	31-4	City	B.S.	Bar & Smith		6	Closed*	33-4	City	Brill	Brill
Evansville Rys.....	1	Flat	40-0	City	Dor.	Co. Shops		15	Comb.stl.	63-5	Int.	....	A. C. & F.
	1	Stock	34-0	City	....	Interstate		25	Exp. stl.	63-5	Int.	....	A. C. & F.
Evansville & So. Ind. Tr. Co.....	1	Sweeper	34-0	City	Mc.-C.	McGuire-C.	Los Angeles Ry.....	300	Cal.	44-7	City	Co.	St. Louis
	1	Elec. Loco	20-0	Yard	Co.	Co. Shops	Los Angeles & Redondo Ry....	10	Open	48-4	Int.	Co.	Co. Shops
Fairmont & Clarksburg Tr. Co.	1	Steel	34-0	City	Mc.-C.	McGuire-C.		1	Elec. Loco.	30-0	Int.	Co.	Co. Shop
	4	Closed	44-0	Int.	Brill	Jewett	Lynchburg Trac. & Lt. Co.....	4	Semiconv.*	40-0	City	Brill	Brill
	6	Closed	30-0	City	Brill	Jewett	Macon Ry. & Lt. Co.....	8	Closed*	42-0	City	Brill	Brill
	4	Comb.	34-4	Int.	Brill	Kuhlman	Mah'g & Shen'go Ry. & Lt. Co.	12	Closed	42-4	City	....	Niles
Fairmont & Mannington R.R.	2	Express	45-0	Int.	Brill	Kuhlman		6	Closed	50-10	Int.	....	Niles
	6	Open	40-6	Both	Brill	Kuhlman	Marion, Bluffton & E. Tr. Co.	1	Conv.	52-0	Both	Tay.	Cincinnati
Fonda, Johnst'n & Glov. R.R.	1	Express	44-0	Int.	Brill	Kuhlman	Meridian Lt. & Ry. Co.....	4	Conv.	51-0	City	Balt	Southern
Fort Dodge, Des Moines & Southern R. R.....	2	Comb.	29-0	Int.	Tay.	Brill	Metropolitan St. Ry.....	25	Closed*	47-2	City	Std.	Cincinnati
	1	Lococrane	....	Int.	....	Browning		25	Closed*	41-3	City	Std.	Co. Shops
	2	Elec. Loco.	....	Int.	Bald	West	Michigan United Rys.....	30	Closed	41-0	City	Brill	Brill
Ft. Scott Gas & Elec. Co.....	1	Closed	33-0	City	Brill	American		8	Closed	28-0	City	Brill	Kuhlman
Ft. Smith Lt. & Trac. Co.....	8	Semiconv.	31-8	City	Brill	Danville		2	Ex-Trail.	40-0	Int.	Mc.-C.	McGuire-C.
Frederick R.R.....	4	Open	22-0	City	Peck	Co. Shops		1	Comb.	58-6	Int.	Mc.-C.	McGuire-C.
	1	Semiconv.	46-1	Int.	Brill	Brill		1	Special	....	Int.	Mc.-C.	McGuire-C.
	1	Semiconv.	41-1	Int.	Brill	Brill		2	Swp. & Ex.	28-3	City	Mc.-C.	McGuire-C.
	1	Elec. Loco.	23-0	Freight	Bald.	West		2	Swp. & Ex.	39-8	Int.	Mc.-C.	McGuire-C.
Freeport Ry., Lt. & P. Co.....	6	Closed	22-0	City	Brill	Brill		1	SnowPlow	50-0	Int.	Mc.-C.	McGuire-C.
Galt, Prest. & Hespeler St. Ry..	2	Closed	30-0	City	St.L.	St. Louis		1	Sprinkler	....	City	Mc.-C.	McGuire-C.
Galveston Elec. Co.....	3	Closed	54-0	Int.	Bald.	Preston	Minn., St. P., Roch. & Dub. T. Co.	4	Trail, C.	44-0	Int.	Brill	Brill
	5	Open	41-0	Freight	Bald.	West		2	Gas. Elec.	60-0	Int.	A.L.C.	Wason
Galveston-Houston Elec. Ry..	10	Closed	28-10	City	Brill	Kuhlman		10	Flat	....	Int.	....	....
Gary & Interurban Ry.....	8	Closed	....	City	....	St. Louis	Missoula St. Ry.....	7	Semiconv.*	38-0	City	Brill	American
	4	Trail	....	Int.	Mc.-C.	McGuire-C.		2	Trailer, O.	42-0	City	Brill	Brill
	2	Sweeper	20-0	Int.	Mc.-C.	McGuire-C.		1	Work	36-0	City	Brill	American
	1	Sweeper	28-3	Int.	Mc.-C.	McGuire-C.	Mobile Lt. & R.R. Co.....	3	Sweeper	....	City	Brill	Brill
Georgia Ry. & Elec. Co.....	6	Closed	30-0	City	Balt.	Co. Shops	Mont. & South. Cos. Ry.....	2	Trailer, C.	49-8	Int.	Tay.	Co. Shops
	6	Closed	38-0	City	Brill	Co. Shops		1	Plow	35-0	Int.	Peck	....
	4	Closed*	42-0	City	Brill	Co. Shops	Montreal St. Ry.....	50	Semiconv.*	47-0	City	....	Ottawa
Gettysburg Ry.....	1	Closed	16-0	City	Peck	Stephenson		2	Trailer, O.	49-6	Sub.	Brill	Preston
Goldsboro Trac. Co.....	1	Open	26-0	City	....	....		3	Trailer, C.	38-0	Int.	....	Ottawa
	2	Closed	22-0	City	....	....		25	Dump	....	Int.	....	Canadian
Gr. Junc. & Gr. R. Val. Ry. ...	3	Closed	50-0	Int.	Brill	Woerber	Moose Jaw Elec. Ry.....	6	Closed	31-0	City	Brill	Ottawa
	1	Elec. Loco.	36-0	Int.	Brill	Woerber	Morris Co. Trac. Co.....	5	Semiconv.	38-0	City	Brill	Stephenson
Grand Rapids (Mich.) Ry.....	12	Closed*	46-4	City	Brill	American	Municipal St. Ry.....	1	Closed	32-0	City	Brill	American
Granite City Ry.....	4	Closed	37-0	City	Mc.-C.	St. Louis		2	Trailer, C.	30-0	City	Brill	Co. Shops
Great Falls St. Ry.....	2	Open	28-3	City	Mc.-C.	Danville	Nashville Ry. & Lt. Co.....	12	Closed	33-4	City	Brill	Co. Shops
	2	Closed	29-11	City	Mc.-C.	Danville	Nelson St. Ry.....	2	Closed*	41-6	City	Brill	Ottawa
	1	Sweeper	28-3	City	Mc.-C.	McGuire-C.	New Orleans Ry. & Lt. Co.....	50	Closed*	32-8	City	Balt.	St. Louis
Greenville Trac. Co.....	7	Closed	....	City	....	St. Louis	NewPaltz, High. & P. Tr. Co.	1	Open	28-8	City	....	Brill
Han. & McSherry's St. Ry....	2	Dump, Wk.	34-0	City	Co.	Co. Shops	N.Y., N.H. & H.R.R. (el. div.)	4	Closed M.	70-10T.	Line	Std.	Standard
Hartford & Springfield St. Ry.	1	SnowPlow	41-0	Int.	Was.	Wason		12	Trailer, C.	70-10T.	Line	Std.	Standard
Holton Interurban Ry.....	1	Comb.	44-0	Int.	Brill	Holman		1	Elec. Loco.	37-0	Switch	Bald.	West
Holyoke St. Ry.....	4	Closed	42-0	City	Tay.	Wason		1	Elec. Loco.	48-0	Freight	Bald.	West
	1	Plow	47-0	City	Was.	Wason	New York & N. Shore Tr. Co.	2	Semiconv.*	30-8	City	Brill	Kuhlman
Houghton County Trac. Co.....	2	Closed	41-7	City	Brill	Kuhlman		1	Sweeper	....	City	Brill	Brill
Houston Elec. Co.....	15	Closed*	38-6	City	Brill	American	New York & Queens Co. Ry..	25	Closed	41-0	Both	Std.	Jewett
	10	Semiconv.*	31-0	City	Brill	Cincinnati	New York State Rys.....	25	Semiconv.*	31-0	City	Brill	Kuhlman
	5	Semiconv.*	41-0	City	Std.	Cincinnati		2	Sweeper	28-3	Both	Mc.-C.	McGuire-C.
	1	Work	35-0	City	Std.	Co. Shops	Nipissing Central Ry.....	4	Closed	40-0	Int.	Bemis	Preston
	1	Wreck	23-0	City	Balt.	Co. Shops	Norfolk & Bristol St. Ry.....	1	Semiconv.	41-10	Int.	Std.	Southern
	1	Dump	25-0	City	....	Rodgers		1	SnowPlow	41-4	Int.	Was.	Wason
Hudson & Manhattan R.R.....	50	Closed	48-2	Tunnel	Bald.	A. C. & F.	Norfolk City & Suburban Ry.	2	Closed*	42-0	Int.	Brill	Brill
	30	Closed	48-2	Tunnel	Bald.	Pressed Stl.	Norfolk & Portsmouth Tr. Co.	8	Semiconv.*	42-8	City	Brill	Brill
Hull Elec. Co.....	3	Semiconv.	49-10	Int.	Brill	Preston	Northampton St. Ry.....	1	Closed	42-8	City	Was.	Wason
Humboldt Transit Co.....	4	Comb.	33-0	City	Std.	Holman		3	Closed	39-0	City	Tay.	Wason
Hummelst'n & Camp. St. Ry..	1	Semiconv.	41-0	Int.	Brill	Brill		1	Plow	47-0	Sub.	Was.	Wason
Hutchinson Interurban R.R.	1	Closed*	32-7	City	Brill	Danville	Northampton Trac. Co.....	2	Open	43-0	Both	Was.	Wason
Illinois Trac. System.....	31	Closed*	35-8	City	Curtis	Danville		2	Closed	40-3	Both	Was.	Wason
	10	Closed	55-6	Int.	Bald.	Danville	Northern Ohio Trac. & Lt. Co.	14	Closed	41-10	Int.	Brill	Kuhlman
	1	Office	54-6	Int.	....	A. C. & F.		4	Closed	22-6	City	Brill	Kuhlman
	4	Comb.	52-6	Int.	Curtis	McGuire-C.		10	Semiconv.	30-8	City	Brill	Kuhlman
	5	Par. Obser.	55-6	Int.	AC&F	Danville		13	Conv.	35-6	City	Brill	Kuhlman
	2	Sleeper	57-0	Int.	B.S.	Bar-Smith		1	Work	50-0	City	Peck	Co. Shops
	4	Ex-Trail.	....	Int.	Co.	Co. Shops	Northern Illinois Elec. Ry. ...	2	Closed	31-0	City	Brill	American
	4	Express	55-6	Int.	Curtis	McGuire-C.	Northern Texas Trac. Co.....	15	Closed*	39-0	City	Brill	American
	35	Ex-Trail.	41-5	Int.	Mc.-C.	McGuire-C.		1	Closed	52-0	Int.	Bald.	Cincinnati
	25	Prt., Box	....	Int.	....	Haskell-B.		4	Closed	40-0	Int.	....	Kuhlman
	50	Gondola	....	Int.	....	Haskell-B.		7	Trailer, C.*	40-8	City	Brill	American
	22	Coal	....	Int.	....	Haskell-B.		1	Express	50-0	Int.	Brill	Co. Shops
	8	SnowPlow	....	Int.	Co.	Co. Shops		1	Work	40-0	Int.	Brill	Co. Shops
	4	Sweeper	28-3	City	....	McGuire-C.	North Jersey R. T. Co.....	6	Closed	42-0	Int.	Bald.	Jewett
	6	Elec. Loco.	34-0	Int.	A.L.C.	Co. Shops		1	Wk. & Pl.	40-0	City	Mc.-C.	McGuire-C.
	4	Caboose	....	Int.	Co.	Co. Shops		1	Flat	....	City	....	....
	1	Coal Crane	....	Int.	....	Browning	Oak Bluffs St. Ry.....	3	Ballast	30-0	Int.	....	Wes. Wheel
Ind'lis, Newc'tle & Tol. El. Ry.	4	Flat	36-0	Constr.	....	Browning		2	Open	....	City	Bemis	Jones
	1	Dump	34-0	Constr.	....	Interstate	Oakland & Antioch Ry.....	2	Open	45-0	Int.	Brill	Holman
Indianapolis Trac. & Ter. Co.	25	Closed	33-2	City	Std.	Cincinnati	Oakland Trac. Co.....	60	Closed*	....	City	Brill	St. Louis
Interborough R. T. Co.....	75	Motor	47-0	Sub.	Std.	Pressed Stl.	Oakwood St. Ry.....	2	Closed	....	City	....	McGuire-C.
	40	Trail	47-0	Elev.	Brill	Wason	Ogden R. T. Co.....	2	Semiconv.	46-0	Both	St.L.	St. Louis
	40	Motor	47-0	Elev.	Brill	Jewett		3	Trailer, C.	38-0	Both	Brill	American
	20	Motor	47-0	Elev.	Brill	Cincinnati		4	Comb.	48-0	Both	St.L.	St. Louis
	1	Sweeper	28-3	City	Mc.-C.	McGuire-C.		5	Flat	36-0	Both	....	....
Interurban Construction Co.	3	Closed	....	Int.	....	St. Louis		4	Dump	....	Int.	....	....
	16	Gondola	....	Int.	....	St. Louis		1	Elec. Loco.	....	Int.	St.L.	St. Louis
Inter-Urban Ry.....	21	Sweeper	28-3	Both	Mc.-C.	McGuire-C.	Ohio Elec. Ry.....	10	Closed	61-6	Int.	Tay.	Cincinnati
Interurban Ry. & Ter. Co.....	21	Sweeper	28-3	Both	Mc.-C.	McGuire-C.		8	Closed	27-6	City	Elho.	Cincinnati
Jacksonville Elec. Co.....	10	Closed*	39-1	City	Std.	Cincinnati		14	Semiconv.	20-8	City	Elho.	Cincinnati
Jersey Central Trac. Co.....	8	Semiconv.	42-9	Int.	Brill	Brill		6	Express	50-0	Int.	Tay.	Cincinnati
	10	Dump	....	Int.	....	Kilbourne & J.		8	Ex-Trail.	40-0	Int.	Std.	Cincinnati
								2	Sweeper				

Purchaser	No.	Class	Length	Serv.	Truck	Builder	Purchaser	No.	Class	Length	Serv.	Truck	Builder
Oklahoma Inter. Trac. Co.	1	Closed	24-0	City	Brill	Brill	Shreveport Trac. Co.	1	Snow Plow	36-0	Both	S.&W. Smith & W.	
Oklahoma Ry.	6	Closed	45-0	Int.	Brill	Niles	Sioux Falls Trac. System	5	Closed	30-1	City	Brill	American
Old Colony St. Ry.	4	Comb.	30-0	Int.	Brill	Danville	South Bethlehem & Saucon	1	Sweeper	22-0	City	Mc-C.	McGuire-C.
	8	Open	40-11	Both	Std.	Stephenson	St. Ry.	2	Open	30-0	Both	Peck	Brill
	4	Express	39-0	Both	Std.	Stephenson		2	Closed	30-0	Both		American
	2	Work	35-0	Both	Std.	Laconia	Southern Pacific Co.	1	Snow Plow		Both	Was	Wason
	4	SnowPlow	47-0	Both	Std.	Smith & W.		40	Closed	72-4	Int.	Bald.	A. C. & F.
	1	SnowPlow	29-6	Both	Rus.	Wason		60	Trailer, C.	72-4	Int.	Bald.	A. C. & F.
Omaha&Council Bluffs St. Ry.	25	Closed*	42-0	City	Brill	Russell		25	Comb.	72-4	Int.	Bald.	A. C. & F.
	2	Work		City		American	Southern Wisconsin Ry.	4	Semiconv.	31-2	City	Brill	American
	2	Flat		City			Southwest Missouri R.R.	4	Open	45-0	Int.	Tay.	Co. Shops
	1	Lococane		City		Browning		4	Closed	45-0	Int.	Tay.	Co. Shops
Oneida Ry.	1	Sweeper	28-3	City	Mc-C.	McGuire-C.	South Morgantown Trac. Co.	2	Semiconv.	40-1	City	Brill	Kuhlman
Ont. & San Ant. Hghts R.R.	3	Closed	20-4	City	Brill	Kuhlman	Spokane & Inland Emp. R.R.	10	Closed	41-1	City	Brill	St. Louis
Oregon Elec. Ry.	2	Obsrv.	61-2	Int.	Bald	Niles		2	Elec.Loco.	38-5	Freight	Bald.	West.
	4	Trailer, C.	62-0	Int.	Bald.	Niles	Springfield Consol. Ry.	5	Closed*	33-6	City	Brill	Kuhlman
	3	Comb.	57-8	Int.	Bald.	Niles	Springfield (Mass.) St. Ry.	12	Open	39-6	City	Std.	Wason
	10	Frt., Box	40-0	Int.	Bald.	Seattle		6	Closed	40-11	City	Std.	Osg.-Brad.
	15	Flat	36-0	Int.	Bald.	Seattle		8	Closed	40-11	City	Std.	Wason
	10	Gondola	41-0	Int.	Bald.	Seattle		5	Express	41-2	Both	Std.	
	2	Elec.Loco.	34-0	Int.	A.L.C.	Gen. Elec.	Springfield Trac. Co.	2	Gondola	40-6	Both	City	Brill
Ottawa Elec. Ry.	18	Semiconv.*	45-6	Both	Brill	Ottawa		3	Trailer, O.	37-11	City	Brill	Stephenson
Pawcatuck Valley St. Ry.	4	Open		City	Brill	Stephenson		1	Sweeper	28-3	City	Mc-C.	McGuire-C.
	2	Closed	28-0	City	Brill	Brill	Springfield, Troy & Piqua Ry.	3	Frt., Box	39-0	Int.		
Peekskill Ltg. & R.R. Co.	1	Semiconv.	30-1	City	Brill	Brill	Syra., Lakeshore & Nor. R.R.	5	Closed	52-0	Int.	Bald.	Kuhlman
Pennsylvania Tun.&Ter.R.R.	2	SnowPlow		Int.	Rus.	Russell	Syracuse Rapid Trans. Ry.	23	Semiconv.*	30-11	City	Brill	Kuhlman
Peoples Ry., Wilmington	1	Comb.	30-0	City	Rus.	Russell	Taylorville Ry., Lt. Ht. & P. Co.	2	Open	30-0	City	Brill	American
Peoria Ry. Terminal Co.	5	Comb.	56-0	Int.	Mc-C.	McGuire-C.		2	Closed	30-0	City	Brill	American
	1	Pl. & Loco.		Int.				2	Coal		City		
Philadelphia R. T. Co.	35	Closed	49-7	Elev.	Brill	Pressed Stil.	Terre H. Ind. & Eas. Trac. Co.	6	Closed		Int.	Std.	Co. Shops
	10	Closed*	34-0	City	Brill	Co. Shops		1	Closed	22-0	City	Std.	Cincinnati
	9	Express	33-2	City	Brill	Co. Shops		1	Special		Int.		Cincinnati
	3	City Ash	33-6	City	Brill	Brill	Texarkana Gas. & Elec. Co.	1	Express	50-0	Int.		Cincinnati
Phila. & West Ches. Trac. Co.	1	SnowPlow	43-6	Int.		Smith & W.		1	Semiconv.	30-1	City	Brill	Danville
Pittsb., Har., But. & N.C. Ry.	2	Closed		Int.		Standard		1	Work	34-0	City	Mc-C.	McGuire-C.
Pitts., McKeespt. & W'd Ry.	1	Closed	33-0	Both	Peck	Co. Shops		2	Work	16-0	City	Mc-C.	McGuire-C.
	1	Comb.	34-0	Both	Peck	Co. Shops	Third Avenue R.R.	30	Stor. Bat.	27-1	City	Co.	Co. Shops
	1	Coal	20-0	Both	Peck	Co. Shops		1	Derrick	40-10	City	Mc-C.	McGuire-C.
Pittsburgh Rys.	50	Trailer, C.*	45-0	City	Std.	Standard		1	Sweeper	28-6	City	Brill	Brill
	50	Closed*	46-8	City	Std.	Pressed Stil.	Toledo Rys. & Lt. Co.	20	Semiconv.*	30-8	City	Brill	Kuhlman
	3	Frt., Box	45-0	Int.	Brill	Kuhlman	Topeka Ry.	6	Closed		City	Curtis	Danville
Pittsfield Elec. St. Ry.	1	Open	42-6	City	Was.	Wason	Toronto Ry.	50	Conv.*	4-0	City	Curtis	Co. Shops
	2	Open		City		Wason	Toronto Ry.	50	Conv.*	4-0	City	Curtis	Co. Shops
Pt. Arthur & Ft. Will. Elec. Ry.	2	Semiconv.	46-0	City		Jones	Toronto Suburban Ry.	2	Semiconv.*	46-0	Int.	Brill	Preston
	8	Semiconv.	46-0	Int.	Brill	Preston	Trans-St. Mary's Trac. Co.	2	Trailer, O.	26-0	City	Brill	Brill
	2	Semiconv.	46-0	Int.	Brill	Preston	Trenton St. Ry.	10	Closed*	44-8	City	Std.	Cincinnati
Port Jervis Trac. Co.	1	Sweeper	46-0	Int.	Curtis	Preston	Tri-City Ry.	15	Closed*	44-8	City	Std.	Cincinnati
Portland (Maine) R.R.	2	Open	35-11	City	Brill	Brill	Tulsa St. Ry.	4	Semiconv.	31-4	City	B.&S.	Bar. & Smith
	3	Closed	38-0	City	Brill	Brill	Twin City Lt. & Trac. Co.	2	Closed	40-0	Int.	Bald.	Niles
	2	Closed		City		Brill		1	Express	40-0	Int.	Bald.	Niles
Portland Ry., Lt. & P. Co.	65	Closed*	45-0	City	Brill	Co. Shops	Twin City R. T. Co.	75	Closed	46-8	Both	Co.	Co. Shops
	57	Closed	47-10	City	Brill	American		3	SnowPlow	44-0	Both	Co.	Co. Shops
	6	Closed	51-2	Int.	Brill	Co. Shops	Union Ry.	100	Semiconv.*	43-0	City	Brill	Brill
	1	Exp. & Ml.	41-0	Int.	Bald.	Co. Shops		3	Sweeper	28-6	City	Brill	Brill
	15	Flat	41-0	Int.	Seattle		12	Open	30-0	City	Std.	Bradley	
	10	Flat	45-0	Int.	Seattle		12	Closed	28-0	City	Std.	Jones	
	10	Ballast	36-0	Int.	Rodgers		1	Open	42-0	City	Jew.	Jewett	
	3	Elec.Loco.	37-6	Int.	Bald.	Co. Shops	Union Trac. Co., Sistersville.	2	Closed	45-0	City	Jew.	Jewett
								1	Closed	36-4	City	Brill	Danville
Pough. & Wapp'r's Fls. El. Ry.	2	Semiconv.	27-8	City	Brill	Brill	Union Traction Co.	3	Semiconv.	30-1	City	Brill	Danville
Public Service Ry.	100	Closed*	44-0	City	Brill	Cincinnati		1	Semiconv.	30-1	City	Brill	American
	10	Closed	46-4	City	Brill	Co. Shops	Unit'd Railr'ds, San Francisco	80	Closed*	47-0	City	Std.	Jewett
Puget Sound Elec. Ry.	1	Closed	56-0	Int.	Bald.	Cincinnati	United Rys. Co. St. Louis	25	Semiconv.*	48-0	City	Co.	Co. Shops
	1	Parlor	58-6	Int.	Bald.	Cincinnati		1	Closed	46-10	Int.	Brill	
Quebec Ry., Lt. & P. Co.	16	Closed*	30-0	City	Tay.	Ottawa		1	Comb.	51-6	Int.	Brill	
	2	Closed	60-0	Int.	Tay.	Ottawa	United Rys. & Elec. Co. Balt.	60	Closed*	42-1	City	Brill	Brill
	2	Dump	33-0	Cons.	Co.	Canadian	Utah Lt. & Ry. Co.	12	Semiconv.		City	Std.	St. Louis
	2	SnowPlow	23-4	City	Co.	Ottawa		12	Semiconv.	45-5	Int.	Std.	St. Louis
	2	Sweeper	27-0	City	Co.	Ottawa	Vancouver Trac. Co.	1	Semiconv.	38-0	City	Brill	American
	1	Sprinkler	27-0	City	Mc-C.	McGuire-C.	Virginia Ry. & Pwr. Co.	20	Closed*	44-11	City	Brill	Brill
Reading Transit Co.	10	Semiconv.*	41-6	City	Brill	Brill	Visalia Elec. R. R.	2	Closed	57-3	Int.	Bald.	Moran
Rhode Island Co.	31	Open		City	Std.	Osg.-Brad.	Wahpeton-Brecken'ge St. Ry.	2	Closed	30-0	Both	Mc-C.	McGuire-C.
	50	Closed	30-0	City	Std.	Osg.-Brad.	Warren-Bisbee Ry.	2	Trailer, O.		Int.	Mc-C.	McGuire-C.
Richmond & Henrico Ry.	12	Closed*	47-0	Both	Brill	Brill	Wash., Balt. & Annap's Ry.	10	Pass.	50-0	Int.	Bald.	Niles
Riverside Trac. Co.	1	SnowPlow		Int.	Brill	Brill	Washington Ry. & Elec. Co.	50	Closed*	41-1	City	Brill	Brill
	1	Sweeper	28-3	City	Mc-C.	McGuire-C.		1	Comb.	35-0	City	Brill	Brill
Roanoke Gas. & Water Co.	2	Open		Incline	Brill	Stephenson	Washington Wtr. Pwr. Co.	25	Closed*	51-0	City	Brill	Brill
Roanoke Ry. & Elec. Co.	4	Semiconv.*	40-0	City	Brill	Brill	Waterloo, Cedar Fls. & No. Ry.	2	Open		City	Mc-C.	McGuire-C.
	1	Sweeper	28-3	City	Mc-C.	McGuire-C.		6	Closed	28-11	City	Mc-C.	McGuire-C.
Roch., Syr. & East. R.R.	13	Closed	42-10	Int.	Bald.	Kuhlman		3	Comb	57-2	Int.	Mc-C.	McGuire-C.
	1	Comb.	30-0	Int.	Rus.	Russell		35	Flat	36-0	Int.		Hicks
	1	Private	55-0	Int.	Bald.	Kuhlman		1	Sweeper	28-3	City	Mc-C.	McGuire-C.
Rockford & Interurban Ry.	4	Closed	31-6	City	Brill	Kuhlman		1	Elec.Loco.		Int.	Co.	Co. Shops
	2	Closed*	41-0	City	Brill	Kuhlman	Westchester Elec. R.R.	1	Sweeper	28-6	Both	Brill	Brill
Rock Island Southern R.R.	2	Semiconv.	62-2	Int.	Bald.	St. Louis	Western Ohio Ry.	8	Gondola		Int.		Hicks
	2	Trailer, C.	62-2	Int.	Bald.	St. Louis	West Penn. Rys.	1	Closed	56-8	Int.		Cincinnati
	2	Comb.	62-2	Int.	Bald.	St. Louis	Whatcom Co. Ry. & Lt. Co.	3	Closed*	47-0	City	Std.	American
	2	Express	62-2	Int.	Bald.	St. Louis	Wheeling Trac. Co.	8	Semiconv	30-0	City	Brill	Kuhlman
Rock. Thom. & Cam. St. Ry.	2	Semiconv.	40-10	Both	Tay.	Laconia	Wichita Falls Trac. Co.	4	Closed*	34-0	City	Brill	American
Rome Ry. & Lt. Co.	2	Closed	30-6	City	Balt.	Southern		4	Trailer, C.	60-0	City	Brill	Danville
St. Joseph Ry., Lt. & P. Co.	5	Closed*	44-0	City	Brill	American	Wichita R.R. & Lt. Co.	4	Open	42-0	City	Brill	American
	1	Sweeper	28-3	City	Mc-C.	McGuire-C.		4	Closed	42-0	City	Brill	American
St. Jos. & Savannah Int. Ry.	3	Closed	44-0	Int.	Brill	American		4	Trailer, O.	42-0	City	Brill	Danville
St. Louis Water Works.	1	Closed	32-0	Int.	Brill	American		1	Sweeper	28-3	City	Mc-C.	McGuire-C.
Saginaw Bay City Ry.	6	Closed*	28-0	City	Brill	Kuhlman		1	Sweeper		City	Brill	Brill
Salt Lake & Ogden Ry.	10	Comb.	56-0	Int.	Bald.	Jewett	Winnipeg Elec. Ry.	8	Dump		Both		Canadian
San Antonio Trac. Co.	10	Semiconv.*	38-0	City	Brill	American		3	Sweeper	28-3	Both	Mc-C.	McGuire-C.
San Diego Elec. Ry.	12	Comb.	40-0	City	Brill	Co. Shops	Winona Interurban Ry.	6	Open		Int.	Tay.	Jewett
Sandpoint & Int. Ry. Co., Ltd.	1	Open		Int.				5	Comb.	57-8	Int.	Bald.	Jewett
	2	Closed		Int.				1	Express	60-0	Int.	Bald.	Jewett
	1	Trailer, O.		Int.				1	Work Line		Int.	Peck	Co. Shops
San Juan Light & Transit Co.	10	Open	30-0	City	Brill	Brill		2	Frt., Box		Int.	Std.	Hicks
	1	Comb.		Int.		A. C. & F.		2	Stock		Int.	Std.	Hicks
	50	Flat		Int.		Magor		2	Frt.Trailer		Int.	Tay.	Co. Shops
	4	Dump		Int.		Canadian		1	Elec.Loco.		Int.	Bald.	Co. Shops
Savannah Elec. Co.	2	Semiconv.	32-0	City	St.L.	Co. Shops	Winona Ry. & Lt. Co.	2	Semiconv.	18-0	City	Brill	Stephenson
Schuykill & Dauphin Trac. Co.	1	Gas.Mot.	27-0	Int.	Brill	Brill	Woodstock & Syca. Trac. Co.	1	Gas. Mot.	55-0	Int.	McK.	McKeen
Scioto Valley Trac. Co.	1	Frt., Box	36-0	Int.	B.&S.	Bar.&Smith	Worcester Consol. St. Ry.	15	Open		City	Std.	Osg.-Brad.
Seattle-Everett Trac. Co.	6	Closed	52-0	Int.	Bald.	Niles		14	Closed	28-0	City	Std.	Osg.-Brad.
	6	Flat	36-0	Int.	Seat.	Seattle		2	SnowPlow	47-0	City	Was.	Wason
Selma St. & Inter. Ry.	2	Closed	36-0	City	Brill	Brill		1	Closed	34-0	Int.	Brill	Brill
Sheboygan Ry. & Elec. Co.	2	Comb.	50-0	Int.		Cincinnati		1	Closed	43-8	Int.	Std.	Niles
	1	SnowPlow		Int.		Russell		2	Closed	32-0	City	Brill	Stephenson
Sherbrooke Ry. & Pwr. Co.	2	Closed*	31-0	City	Brill	Ottawa		2	Closed	29-5	City	Brill	American
	1	Sweeper	30-0	City		Ottawa		1	Conv.	43-0	Both	Brill	American
Shore Line Elec. Ry.	10	Closed	40-6	Int.	Bald.	Jewett		1	Gas. Mot.		Int.	McK.	McKeen
	2	Closed	28-0	City	Bald.	Jewett		12	Gondola	42-0	Int.	Seat.	Seattle
	3	Flat	30-0	Freight	Brill	Brill	Yonkers Ry.	1	Sprinkler		City	Brill	Brill
							York Rys.	1	Sweeper	28-6	City	Brill	Brill

NEW ELECTRIC RAILWAY TRACK CONSTRUCTION

IN 1910

The accompanying table shows in detail the new electric railway track mileage built and opened for operation during the year 1910 in the United States and Canada. The table has been compiled from answers received from the railway companies whose names appear so that the mileage given in each instance is official. The only mileage represented in the table is track which was completed and placed in operation during the year. Of course, the table is not absolutely correct as far as the totals per state are concerned, since some companies did not reply in time for this compilation.

The total new mileage represented this year is 1397.26, as against 887.16 miles built in 1909 and 1258.51 built in 1908.

In the classification of mileage by states New York heads the list with 174.66 miles as against 129.08 miles in 1909; Illinois is second, with 139.56 miles as against 41.85 miles in 1909. The mileage in New York is made up largely of the Pennsylvania tunnels and the extension of the New York Central's electric zone to White Plains. No reports were received concerning new work by Mexican electric railways.

		Miles.
ALABAMA		
Birmingham & Edgewood Electric Ry.	2.50	
Birmingham Railway, Light & Power Co.	2.00	
Montgomery Traction Co.—Through Cloverdale.	2.00	
	6.50	
ARKANSAS		
Fort Smith Light & Traction Co.	2.00	
Little Rock Railway & Electric Co.	0.60	
	2.60	
CALIFORNIA		
Bakersfield & Kern Electric Ry.	2.00	
Bakersfield & Ventura R. R.	5.00	
East Shore & Suburban Ry.	1.00	
Monterey & Del Monte Heights Ry.	3.00	
San Diego Electric Co.	2.50	
Stockton, Terminal & Eastern R. R.—Between Stockton, Waterloo, Linden and Bellotta.	17.00	
United Railroads of San Francisco.	1.40	
Visalia Electric R. R.	11.00	
	42.90	
COLORADO		
Colorado Railway, Light & Power Co.	1.00	
Colorado Springs & Interurban Ry.	1.50	
Denver & South Platte Ry.—South of Littleton.	0.75	
Denver & Interurban R. R.—From Westminster Station to Westminster University.	1.82	
Grand River Junction & Grand River Valley Ry.—Between Grand Junction and Fruita.	17.00	
Greeley & Denver R. R.	6.00	
	28.07	
CONNECTICUT		
Connecticut Co.	4.84	
Shore Line Electric Ry.—Between Ivoryton, Essex, Saybrook, Westbrook, Clinton, Madison, Guilford and Stony Creek.	31.00	
	35.84	
DISTRICT OF COLUMBIA		
Washington Railway & Electric Co.	1.19	
Washington, Spa Springs & Greta R. R.—Between Washington and Bladensburg.	4.00	
	5.19	
GEORGIA		
Athens Electric Ry.	2.48	
City & Suburban Ry.	2.00	
Georgia Railway & Electric Co.	10.00	
Rome Railway & Light Co.	0.13	
	14.61	
IDAHO		
Sandpoint & Interurban Railway Co., Ltd.—Between Ponderay and Kootenai.	6.00	
	6.00	
ILLINOIS		
Aurora, Elgin & Chicago R. R.	3.33	
Calumet & South Chicago Ry.—In Chicago.	1.21	
Central Illinois Public Service Co.—In Charleston.	1.00	
Chicago, Aurora & DeKalb R. R.—Between Aurora, Kaneville, Maple Park, Cortland and DeKalb (electrified).	30.00	
Chicago City Ry.—In Chicago.	10.69	
Chicago & Joliet Ry.—Turnouts on city lines.	0.30	
Chicago Railways	8.11	
Dixon, Rock Falls & Southwestern Electric Ry.—Between Tampico, Yorktown and Hoopole.	8.00	
East St. Louis Ry.	1.20	
Illinois Central Electric Ry.—Between Norris and Fairview.	7.22	
Illinois Traction System—Belt Line near Granite City.	2.50	
Metropolitan West Side Elevated Ry.—Surface.	1.00	
Northern Illinois Electric Ry.—Between Amboy and Lee Center.	6.00	
INDIANA		
North Kankakee Electric Light & Railway Co.	2.00	
Peoria Railway Terminal Co.	4.69	
Rock Island Southern Ry.—Between Monmouth and Galesburg—Electrified.	19.20	
Between Monmouth & Rock Island.	31.00	
Taylorville Railway, Light, Heat & Power Co.	2.00	
	139.36	
Beech Grove Traction Co.—Between Indianapolis and Beech Grove.	4.30	
Bluffton, Geneva & Celina Traction Co.—Between Bluffton, Vera Cruz, Linn Grove and Geneva.	18.50	
Chicago, Lake Shore & South Bend Ry.	10.00	
Evansville Railways—Rockport to Grandview, Second track.	6.75	
Indianapolis, New Castle & Toledo Electric Ry.—Completed line, New Castle to Indianapolis.	40.25	
Winona Interurban Ry.—Between Mentone and Chile.	22.00	
	101.80	
IOWA		
Albia Interurban Ry.	1.50	
Cedar Rapids & Iowa City Ry.	5.75	
Centerville Light & Traction Co.—Between Centerville, Brazil and Mystic.	6.60	
Charles City Western Ry.—Between Charles City and Marble Rock.	15.00	
Fort Dodge, Des Moines & Southern R. R.—Electrified.	17.00	
Ottumwa Railway & Light Co.	1.00	
Sioux City Service Co.	1.25	
Tri-City Ry.	3.00	
Waterloo, Cedar Falls & Northern Ry.	63.10	
	63.10	
KANSAS		
Arkansas Valley Interurban Ry.—From Wichita to Valley Center and Sedgwick.	10.00	
Atchison Railway, Light & Power Co.	2.53	
Joplin & Pittsburg Ry.—From Pittsburg to Frontenac.	1.00	
Lawrence Railway & Light Co.	1.00	
Manhattan City & Interurban Ry.	1.50	
Topeka Ry.—In Topeka.	2.34	
	18.37	
KENTUCKY		
Lexington & Interurban Ry.—City.	2.00	
Interurban between Lexington and Nicholasville.	12.00	
Owensboro City R. R.	2.00	
	16.00	
LOUISIANA		
New Orleans Railway & Light Co.	6.00	
	6.00	
MAINE		
Aroostook Valley R. R.—Between Presque Isle and Washburn.	2.20	
	2.20	
MARYLAND		
Cumberland Electric Ry.	0.75	
Frederick R. R.	4.00	
United Rys. & Elec. Co.	0.66	
	5.41	
MASSACHUSETTS		
Berkshire Street Ry.—Between Great Barrington and So. Egremont.	3.45	
Boston & Northern Street Ry.	6.80	
Middlesex & Boston Street Ry.	2.00	
Old Colony Street Ry.	2.00	
Springfield Street Ry.—In Westfield.	1.01	
	15.26	
MICHIGAN		
Benton Harbor, St. Joe Railway & Light Co.—Benton Harbor to Paw Paw Lake.	15.00	
Detroit River Tunnel Co.—Electrified.	5.00	
Detroit United Ry.—In Flint City.	1.47	
Escanaba Electric Street Ry.—Interurban between Wells and Gladstone.	6.50	
Grand Rapids Ry.	0.13	
Lansing & Northeastern Ry.—Between Haslett, Perry, Shaftsbury, Morrice and Owosso.	23.00	
Menominee & Marinette Light & Traction Co.	1.33	
Twin City General Electric Co.—Toward Bessemer.	1.50	
	53.93	
MINNESOTA		
Grand Forks Street Ry.	2.00	
Minneapolis, St. Paul, Rochester & Dubuque Traction Co.—Between Bloomington, Savage, Lakeville and Northfield.	40.00	
	42.00	
MISSISSIPPI		
Gulfport & Mississippi Coast Traction Co.—Built into Pass Christian.	7.20	
Meridian Light & Railway Co.	1.50	
Summit & McComb Motor Line.—Between Summit, McComb and Godbold Wells.	5.25	
	13.95	
MISSOURI		
Cape Girardeau-Jackson Interurban Ry.	1.50	
Illinois Traction System.	6.09	
Kansas City, Lawrence & Topeka Electric Ry.—Between Monrovia, Alden's Golf Club Grounds and Zarah.	5.00	
Metropolitan Street Ry.	11.50	
St. Joseph Railway, Light, Heat & Power Co.—City.	2.00	
Interurban between St. Joseph and Savannah.	12.00	
Springfield Traction Co.	5.00	
United Railways Co.	3.84	
	46.84	

	Miles.		Miles.
MONTANA		Pittsburg, McKeesport & Westmoreland Ry.—Between	
Butte Electric Ry.....	2.00	West Newton and Blackburn.....	11.00
Missoula Street Ry.....	16.50	Pittsburgh Railways.....	4.31
	18.50	Port Vue Street Ry.....	1.50
NEBRASKA		Scranton Ry.....	1.50
Lincoln Traction Co.....	3.00	Southern Cambria Ry.....	1.60
Omaha & Council Bluffs Street Ry.....	7.00	United Traction Street Ry.....	0.50
	10.00	York Railways.....	0.84
NEW JERSEY			22.60
Atlantic Coast Electric Ry.—Extending line to North Long		SOUTH CAROLINA	
Branch.....	0.66	Columbia Electric Street Ry., Light & Power Co.....	1.75
Jersey Central Traction Co.—Between South and Perth			1.75
Amboy.....	3.55	SOUTH DAKOTA	
Morris County Traction Co.—From Denville to Boonton...	5.00	Aberdeen Ry.....	4.50
From Morris Plains to Mt. Tabor.....	5.00	Sioux Falls Traction System.....	0.50
From Hopatcong to Bertram Island.....	2.25		5.00
From Morris Plains to State Hospital.....	1.60	TENNESSEE	
In Summit.....	0.50	Bristol Belt Line Ry.....	0.75
Mountain Railway Co.—South Mountain and Rock Springs	0.50	Chattanooga Railway & Light Co.—City line.....	1.30
North Jersey Rapid Transit Co.—Between Waldwick,		Interurban between Chattanooga and Rossville.....	3.00
Allendale, Ramsey and Mahwah.....	7.50	Jackson Railway & Light Co.....	0.75
Public Service Ry.—Englewood to Tenafly.....	4.38	Johnson City Traction Co.....	4.06
	30.24	Knoxville Railway & Light Co.....	0.50
NEW MEXICO.		Memphis Street Ry.....	4.56
Citizens' Traction & Power Co.....	2.00	Nashville Railway & Light Co.....	4.00
	2.00		18.92
NEW YORK.		TEXAS	
Albany Southern R. R.—From Rensselaer to Electric Park,		Austin Electric Ry.....	2.50
second track.....	15.09	Belton & Temple Traction Co.....	0.80
Auburn & Syracuse Electric R. R.....	0.55	Bryan College Interurban Ry.—Between Bryan and College	
Brooklyn Rapid Transit Co.....	7.57	Station.....	5.00
Black River Traction Co.....	0.60	Citizens' Ry.....	2.00
Buffalo & Lake Erie Traction Co.—Extension of Fredonia		Corpus Christi Street & Interurban Ry.....	6.00
City Lines.....	0.75	Galveston-Houston Electric Ry.—Galveston to Houston...	50.00
State Line, Northeast cut-off.....	3.40	Haskell Traction Company.....	3.75
Cortland County Traction Co.....	2.10	Houston Electric Co.....	3.39
Elmira Water, Light & Railroad Co.....	1.00	Northern Texas Traction Co.....	2.42
Hudson & Manhattan R. R.—(Including cross-overs and		San Angelo Street Ry.....	1.00
extra track, but not the track to Henderson Street		San Antonio Traction Co.....	8.00
Yard).....	2.82		84.86
Hudson Valley Ry.—In Saratoga Springs.....	1.12	UTAH	
Huntington R. R.....	1.21	Ogden Rapid Transit Co.—Interurban between Harrisville,	
Interborough Rapid Transit Co.—Viaduct structure.....	0.14	Hot Springs, Willard City, Perry and Brigham City...	16.00
Kingston Consolidated R. R.....	5.00	Salt Lake & Ogden Ry.—Electrified.....	40.00
Long Island R. R.—Main line electrified, Jamaica to Wood-		Utah Light & Railway Co.—To Sandy, Midvale & Murray.	7.00
side.....	7.04		63.00
Springfield Junction to Long Beach, electrified.....	9.60	VERMONT	
New York Central & Hudson River R. R., electrified elec-		Rutland Railway, Light & Power Co.—Between Fairhaven	
tric zone from Wakefield to North White Plains.....	30.50	and Poultney.....	7.75
New York City Interborough Ry.....	1.75		7.75
New York & North Shore Traction Co.—Between Roslyn,		VIRGINIA	
Manhasset, Great Neck, Little Neck, Douglaston, Bay-		Danville Railway & Electric Co.....	0.67
side, Auburndale, Broadway, Whitestone and Flushing		Newport News & Old Point Railway & Electric Co.....	1.00
New York State Rys.—Rochester Lines.....	0.52	Norfolk & Portsmouth Traction Co.....	4.20
Oneida Ry.....	0.07	Roanoke Railway & Electric Co.....	1.00
Pennsylvania Tunnel & Terminal Railroad Co.—From Har-			6.87
rison through Manhattan to Woodside Avenue, Queens.	54.20	WASHINGTON	
Port Jervis Traction Co.—Port Jervis to Sparrowbush....	1.00	Everett Railway, Light & Water Co.....	1.72
Poughkeepsie City & Wappinger's Falls Electric Ry.—		Seattle-Everett Traction Co.—Between Hall Lake and	
Electrified.....	2.00	Everett.....	13.08
Schenectady Ry.....	0.91	Washington Water Power Co.....	7.33
Syracuse Lake Shore & Northern R. R.....	14.00	Yakima Valley Transportation Co.....	10.00
Syracuse Rapid Transit Ry.....	0.31		32.13
	174.66	WEST VIRGINIA	
NORTH CAROLINA		Elkins Electric Ry.—Between Elkins and Roaring Creek	
Charlotte Electric Railway, Light & Power Co.....	2.00	Junction.....	7.00
Goldsboro Traction Co.....	5.00	Fairmount & Northern Traction Co.—Between Barnsville,	
North Carolina Public Service Co.—At High Point.....	2.50	Riversville, Baxter, Granttown, Bassettville and Fair-	
	9.50	view.....	12.00
NORTH DAKOTA		Morgantown & Dunkard Valley R. R.....	2.00
Wahpeton-Breckenridge Street Ry.—From Wahpeton, N.		South Morgantown Traction Co.....	3.10
D., to Breckenridge, Minn.....	1.60		24.10
	1.60	WISCONSIN	
OHIO		Beloit Traction Co.....	0.50
Cincinnati Traction Co.....	1.13	Milwaukee Electric Railway & Light Co.....	5.00
Dayton, Springfield & Xenia Southern Ry.—Extended		Sheboygan Railway & Electric Co.—Near Plymouth.....	2.00
Spring Valley division into Spring Valley, in the city		Sparta-Melrose Electric Railway & Power Co.—From	
of Dayton.....	0.64	Sparta to Trout Falls.....	10.00
Dayton Street Ry.....	2.00	Waupaca Electric Light & Railway Co.....	0.25
Fostoria & Fremont Ry.—Between Fostoria, Amsden,			17.75
Kansas, Burgoon, Havens and Fremont.....	21.40	WYOMING	
Minster & Loramie Ry.—Between Minster and Loramie...	3.10	Cheyenne Electric Ry.....	0.40
Northern Ohio Traction & Light Co.....	0.30		0.40
Tri-State Traction Co.....	1.00	CANADA	
	29.57	British Columbia Electric Ry. Co.—In Vancouver City and	
OKLAHOMA		Suburbs.....	13.28
Citizens' Traction Co.—Between Oklahoma City and Great		Between New Westminster and Chilliwack.....	63.40
Northeast Park.....	4.50	Cape Breton Electric Co.....	0.60
Enid City Ry.....	0.50	Chatham, Wallaceburg & Lake Erie Ry.—To Pain Court..	4.00
Oklahoma Ry.....	31.00	Grand Valley Ry.....	3.50
Oklahoma Union Traction Co.....	3.00	Hull Electric Co.....	0.85
Sapulpa & Interurban Ry.—Between Sapulpa and Kiefer..	3.80	Montreal Street Ry.....	1.90
Tulsa Street Ry.....	2.00	Montreal & Southern Counties Ry.—Between Montreal	
	44.80	South and Longueuil.....	4.00
OREGON		Niagara, St. Catharines & Toronto Ry.—Between Welland,	
Portland Railway, Light & Power Co.....	8.23	Humberstone and Port Colborne.....	7.00
	8.23	Ottawa Electric Ry.....	1.00
PENNSYLVANIA		Quebec Railway, Light & Power Co.—In Quebec and from	
Central Pennsylvania Traction Co.....	0.50	Montcalmville to St. Columban.....	5.07
Eastern Pennsylvania Ry.....	0.50	Toronto Ry.....	3.18
Frankford, Tacony & Holmesburg Street Ry.—Between			107.78
Wissinoming and Bridesburg.....	1.00		
Hanover & McSherrystown Street Ry.—From McSherrys-			
town to Edgemoor and Chapel.....	1.50		
Lehigh Valley Transit Co.....	0.35		
Philadelphia Rapid Transit Co.....	1.81		

RECEIVERSHIPS AND FORECLOSURE SALES IN 1910

The records show that a total of eleven electric railway properties went into receivership during 1910. This is one-half of the number of companies for which receivers were appointed during the previous year. The 1910 record involves companies operating 696.61 miles of track and having outstanding capitalization, according to the latest available statistics, as follows: Bonds, \$75,490,735; stock, \$12,629,400. The statistics, according to the records of the ELECTRIC RAILWAY JOURNAL, compare for 1909 and 1910 as follows:

	No. of Companies.	Miles of Track.	Outstanding Bonds.	Outstanding Stock.
1909	22	558	\$22,325,000	\$29,962,200
1910	11	696.61	\$75,490,735	\$12,629,400

The 1910 figures of mileage and outstanding bonds would be made very much smaller if the complications which arose in Chicago, affecting the Chicago Railways Company, had not forced that company into voluntary receivership. The appointment of receivers for this company was not due to bankruptcy but was brought about by the management, as a protective measure. This company contributed nearly one-half of the mileage and 80 per cent of the outstanding bonds shown in the record of 1910. The direct cause of the receivership for this company was a court decision favorable to the holders of bonds of the Chicago Consolidated Traction Company, a corporation formerly controlled by the Chicago Union Traction Company, the predecessor of the Chicago Railways Company. In the reorganization of the Chicago Union Traction Company's system and the acquisition of its properties by the Chicago Railways Company, it was believed that no liability under an old guarantee of securities by the Chicago Union Traction Company would accrue to the reorganized corporation, the Chicago Railways Company. Since the court held otherwise, and notwithstanding the fact that the decision was rendered by a lower court and was subject to appeal, the attorneys of the Chicago Railways Company decided that as a protective measure receivers should be appointed. Before the end of the year 1910 the complication which resulted in the temporary receivership of the company was settled and the receivers were discharged without formal foreclosure sale.

Some of the companies which went into receivership during the year had not progressed very far with the construction of the properties which they were organized to promote. The receiverships for 1910 were as follows:

RECEIVERSHIPS DURING 1910.

Company.	Miles of Track.	Bonds Outstanding.	Stock Outstanding.
Belton & Temple Traction Co., Temple, Tex.....	13.40	\$300,000	\$300,000
Chicago Railways Co.....	317.34	60,360,735	100,000
Chicago & Southern Traction Co., Chicago, Ill.....	72.00	2,500,000	2,500,000
Ft. Dodge, Des Moines & Southern R. R. Co., Ft. Dodge, Ia.....	175.00	5,800,000	3,200,000
Janesville Street Railway Co., Janesville, Wis.....	7.00	75,000	50,000
Lancaster & Southern Street Railway Co., Lancaster, Pa.....	6.10	.....	93,700
Nebraska Traction & Power Co., Omaha, Neb.....	11.50	100,000	200,700
Portsmouth & Exeter Street Railway Co., Haverhill, Mass.....	12.27	145,000	185,000
St. Louis, Monte-Sano & Southern Railway Co., St. Louis, Mo.....	8.00	2,500,000	3,000,000
Sedalia Light & Traction Co., Sedalia, Mo.....	9.00	710,000	1,000,000
South Shore Traction Co., Patchogue, N. Y.....	65.00	3,000,000	2,000,000
	696.61	\$75,490,735	\$12,629,400

The foreclosure sales during 1910 affected twenty-two properties, operating a total of 724.36 miles of track. This is not far from the total number of miles of track operated by the companies which went into receivership during the year. If the receivership of the Chicago Railways Company be eliminated from consideration, it is apparent that the mileage of the companies whose properties were sold at foreclosure sale and whose reorganization was thus effected during the year was almost double that of the other receiverships. The foreclosure sales for two years compare as follows:

	No. of Companies.	Miles of Track.	Outstanding Bonds.	Outstanding Stock.
1909	21	488	\$21,174,000	\$22,265,700
1910	22	724.36	26,374,065	19,106,613

The list of companies whose property was sold at foreclosure includes one company concerning which an explanatory note should be made. An effort was made to effect a reorganization of the properties of the Indianapolis & Cincinnati Traction Company and avoid a foreclosure sale. There was no formal foreclosure sale, although a sale of the properties was made under order of the court in the receivership, due to the fact that holders of \$18,000 of the outstanding \$2,000,000 of bonds refused to join in the reorganization agreement. The Atlantic Shore Line Railway, which is shown in the list of foreclosures, was placed there because a reorganization was effected by means of a formal foreclosure sale, although there was no preliminary receivership for this property. The Southern Colorado Power & Railway Company is included, although the sale of the property took place just before the close of the year 1909, too late to be included in our compilation for that year. The Wilmington, New Castle & Southern Railway is shown in the list of foreclosure sales. The property of this company is undergoing reorganization and in this process the system has been divided into two parts. One part was sold during 1910 and the balance, it is expected, will be sold early during 1911. During the year the court confirmed the formal sale of the property of the Norfolk & Southern Railway, a steam railroad property which has been reorganized as the Norfolk Southern Railroad. This company operates electric divisions with a mileage of 45.6 miles, but shows no separate capitalization for that part of its system. It has not been included in the compilations. The foreclosure sales during 1910 were as follows:

FORECLOSURE SALES DURING 1910.

Company.	Miles of Track.	Bonds Outstanding.	Stock Outstanding.
Ardmore Traction Co., Ardmore, Okla.....	.....	.....	\$500,000
Atlantic Shore Line Railway Co., Sanford, Maine.....	5.00	.....	.....
Belton & Temple Traction Co., Temple, Tex.....	97.00	\$2,700,000	3,000,000
Burlington County Railway Co., Hainesport, N. J.....	13.40	300,000	300,000
Camden & Trenton Railway Co., Camden, N. J.....	14.80	475,000	484,790
Catskill Electric Railway Co., Catskill, N. Y.....	31.17	1,371,500	1,750,000
Citizens Electric Co., Eureka Springs, Ark.....	5.40	132,000	138,000
Chicago Consolidated Traction Co., Chicago, Ill.....	3.00	175,000	50,000
Consolidated Railway & Power Co., Fayetteville, N. C.....	184.00	12,459,000	*650,000
Eastern Ohio Traction Co., Cleveland, Ohio.....	4.00	.....	60,000
Holmesburg, Tacony & Frankford Electric Railway Co., Tacony, Pa.....	80.00	763,065	2,258,823
The Indianapolis & Cincinnati Traction Co., Indianapolis, Ind.....	17.60	400,000	100,000
Owosso & Corunna Electric Co., Owosso, Mich.....	107.00	2,000,000	2,000,000
Philadelphia & Chester Railway Co., Chester, Pa.....	10.00	120,000	150,000
Pittsburg & Allegheny Valley Railway Co., Leechburg, Pa.....	8.83	350,000	350,000
Pittsburg & Westmoreland Railway Co., McKeesport, Pa.....	8.50	533,500	1,500,000
St. Francois County Railway Co., Farmington, Mo.....	8.00	335,000	350,000
Southern Colorado Power & Railway Co., Trinidad, Col.....	15.00	240,000	300,000
Toledo & Indiana Traction Co., Toledo, Ohio.....	21.00	1,000,000	1,000,000
Trenton & New Brunswick Railroad Co., Trenton, N. J.....	52.00	1,650,000	2,500,000
Washington, Berwyn & Laurel Electric Railroad Co., Washington, D. C.....	23.70	1,000,000	1,000,000
Wilmington, New Castle & Southern Railway Co., New Castle, Del.....	8.96	220,000	500,000
	6.00	150,000	165,000
	724.36	\$26,374,065	\$19,106,613

*Underlying companies.

The Schöneberg (Berlin) Electric Underground Railway was opened to public traffic on Dec. 1, 1910. A 5-minute service is provided during the greater part of the day, with a 10-minute service early in the morning. Steps have been taken to increase the capacity of the Berlin Elevated & Underground Railway, which interchanges traffic with the Schöneberg line; a 3½-minute service is to be arranged. The six-car trains recently introduced on the elevated railway are being increased in number during the rush hours.

INTERURBAN CONSTRUCTION IN THE CENTRAL STATES DURING 1910

WITH ACCOMPANYING MAP

The mileage of the interurban railways of the North Central States showed comparatively little growth during 1910. The largest additions to the interurban network of these States were made by roads that were well under way toward completion before the year began. Other scattering mileage is composed chiefly of small extensions and short connecting links. The plans for 1911 as so far announced do not indicate that any considerable mileage will be added in these States.

The ELECTRIC RAILWAY JOURNAL again presents with the first issue of the year a map showing the location of the interurban lines in those Central States in which interurban railroading first began and has shown the greatest development. The preparation of the map has been made with due regard to accuracy. Imprints of the map as it was published a year ago were mailed to all the roads within the territory shown, with requests that corrections and additions for the 1911 map be indicated. The information thus received has been transferred to the original map, from which the accompanying engraving has been made. In addition to the corrections and additions as thus obtained, the proposed lines have been checked with the news items presented in the construction columns of this paper. Thus every effort has been made to present the map of the interurban roads of the Central States in as correct a form as possible. However, on account of the wide scope of the territory included, there may be some errors of location and if such are observed this paper will greatly appreciate any advice that may assist in making more complete the records of new construction and proposed roads. Acknowledgment is made to The Arnold Company, Chicago, Ill., for the use of the original drawing from which the engraving for the accompanying map was made.

The growth of the interurban mileage in the North Central States during 1910 has been fairly well distributed among the different States. In Ohio no new line of any considerable length has been completed. Probably the most important road now under way is that between Fostoria and Fremont. This line, nearly 22 miles long, has been graded and the track is about completed so that it is expected to begin service about March, 1911. The Fostoria and Fremont line is of particular interest because it is a connecting link which will greatly shorten the through route between Lima and Cleveland, Ohio. Lima, it will be noted, is now served by interurban roads radiating in six directions. The three lines to the south and west have through connections with the three lines to the north and east. The present business for points east of Toledo on the Lake Shore Electric Railway has, of necessity, been sent through Toledo. With the completion of the Fostoria-Fremont line a direct route from Lima to Cleveland will be available. This line has been promoted and built by interests friendly to those of the Western Ohio Railway. The lines of the latter company form the mid-section of the well-known Dayton and Toledo through route over which considerable traffic from the southern part of Ohio is carried each year to the Great Lakes region by way of Lima, Findlay and Toledo. The new connection from Fostoria, the northeastern terminus of the Western Ohio system, will offer a fast through route from Lima direct to the numerous resorts located along the south shore of Lake Erie and served by the Lake Shore Electric Railway.

The interurban network of Indiana is closely connected with the Ohio lines. A new road crossing the State line, which is said to be well under construction, will connect Fort Wayne and Bryan, Ohio, thus offering a short route between Fort Wayne and Toledo via the Toledo and Indiana property. The line from Fort Wayne to Bryan is being graded and some bridges have been built. This route between Fort Wayne and Toledo when completed will be about 100 miles long.

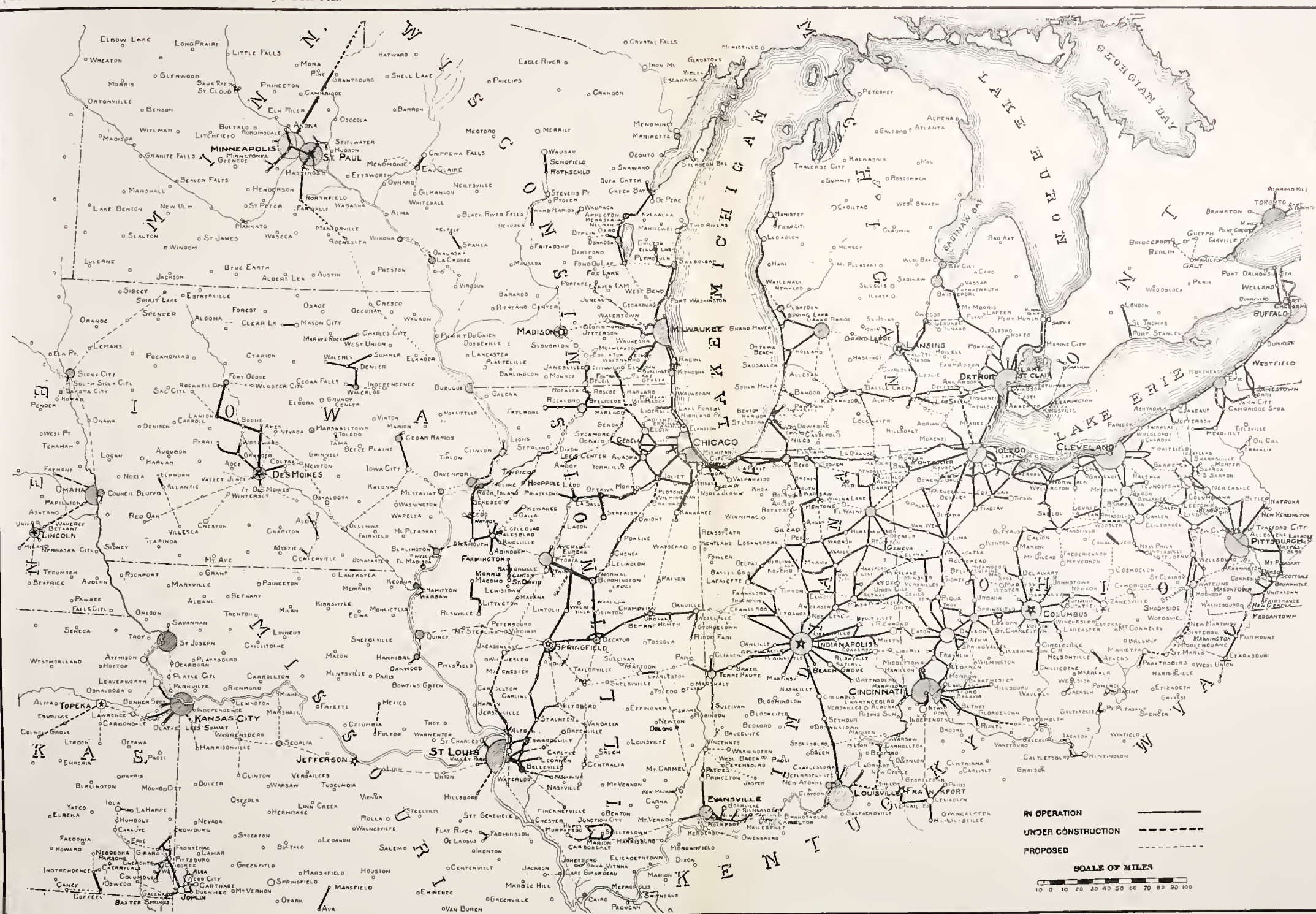
The largest piece of new track to be put into service during 1910 in Indiana was the Indianapolis, New Castle & Toledo road from Indianapolis to New Castle, 41.5 miles long. The Bluffton, Geneva & Celina Traction Company inaugurated service during the year on a new road extending 18.5 miles southeast from Bluffton toward Celina, Ohio. This company announces that in 1911 it will build 21 miles of additional track to connect its present line with the Western Ohio Railway at Celina. Considered from the standpoint of long-distance travel, the most important track link which was completed in 1910 was that of the Winona Interurban Railway between Mentone and Chili in the north central part of Indiana. This link has made possible through electric travel from Sheboygan, Wis., by way of Milwaukee, Chicago, South Bend, Warsaw, the newly built section to Peru, Fort Wayne, Lima and Toledo, to Detroit, Cleveland and east along the south shore of Lake Erie to Buffalo and other New York State points. From the cities named in Indiana and Ohio other routes radiate to the important traffic centers in Indiana and Ohio and to Louisville, Ky. Through service is now operated between South Bend and Indianapolis over the lately completed section by the Chicago, South Bend & Northern Indiana, the Winona Interurban and the Indiana Union Traction companies. During the past year the Chicago, Lake Shore & South Bend Railway, a high-speed single-phase line between South Bend and Pullman, Ill., completed double-tracking 10 miles of its road through the densely populated manufacturing district south of Chicago. The Kokomo, Frankfort & Terre Haute Traction Company announces that during 1911 it probably will build from Kokomo 26 miles southwest to Frankfort. This company is allied with the Kokomo, Marion & Western Traction Company. Another larger project which it is stated may be got under way during 1911 is that of connecting the "Ben Hur Route" at Crawfordsville with the Illinois Traction System at Danville, Ill. This link will require 42 miles of track and its completion will make possible fast service between Indianapolis and the larger cities in central and southern Illinois.

In 1909 the Michigan United Railways completed a 37-mile high-speed line between Jackson and Lansing. During 1910 this company has nearly completed construction work on a line 23 miles long connecting Haslett, a suburb 9 miles east of Lansing, with Owosso. These new lines of the Michigan United Railways are operated by third-rail and are built for high-speed passenger and freight service. In southwestern Michigan the Benton Harbor-St. Joe Railway & Light Company has completed a 15-mile line from Benton Harbor southeast to Eau Claire and Paw Paw Lake. During 1911 it is announced that this company will extend this new line eastward to Dowagiac.

The Detroit River Tunnel Company early in October inaugurated service through its twin tubes extending under the Detroit River and connecting its Canadian lines with those in Michigan.

The increase in electrically operated track has been greater in Illinois than in others of the Central States, the largest mileage having been added by the Rock Island Southern Railway and the Chicago, Aurora & De Kalb Railroad. The Rock Island Southern line consists of a 50.2-mile, 11,000-volt substantially built freight and passenger road from Rock Island to Monmouth, Ill. A 19-mile section of this track is a branch of the Chicago, Rock Island & Pacific steam railroad system, which the interurban company has leased for a term of 25 years. In constructing the new roadbed lately put into operation 1,300,000 cu. yd. of earthwork was handled in 31 miles and a number of large bridges and trestles were built. One of the steel bridges is 625 ft. long and 75 ft. high. The Chicago, Aurora & De Kalb Railroad during the year electrified a 30-mile gasoline-operated line between Aurora, De Kalb and Cortland.

The ceremonies attending the dedication of the McKinley Bridge at St. Louis probably attracted as widespread attention from the public as any piece of electric railway construction work consummated during 1910. This bridge was formally



Map Showing Electric Interurban Railways in Operation, in Construction or Proposed in the Central States.

opened Nov. 10 in the presence of the Governors of Illinois and Missouri and many other people of commercial and political note. The entrance to St. Louis of the Illinois Traction System over its bridge and new line within that city has been made possible by constructing the most extensive terminal project ever undertaken by an interurban railway, the general and detail features of which have been described fully in numerous articles presented by this paper during the past year. The total cost of the project, which includes the McKinley Bridge; 10 miles of double track, largely on private right-of-way through congested territory; a 14,000-kw generating station; the improvement of a 24-acre carload freight terminal and the construction of passenger and express stations within St. Louis, is approximately \$7,000,000. Since the completion of the bridge link between Illinois and Missouri the traffic passing in and out of the St. Louis terminal has more than met expectations.

The Illinois Traction System announces that during the present year it will complete the construction of its extension from Morris northeast to Joliet. This will give it a system in northern Illinois of more than 100 miles of track, separated from its principal system in the central part of the State by a gap of less than 50 miles. Construction plans for the latter gap have not been announced.

In Wisconsin the Sparta-Melrose Electric Railway & Power Company built 10 miles of track during 1910, from Sparta to Trout Falls, and now announces that the road will be completed to Melrose during 1911. It is expected also that the Chicago, Harvard & Geneva Lake Railroad interests, under the name of the Marengo, Harvard & Northern Illinois, during the present year will construct 10 miles of track north from Walworth to Delavan Lake in Wisconsin.

In Iowa during 1910 the Waterloo, Cedar Falls & Northern Railway constructed an 8-mile extension to Waverly. A line 6.6 miles long between Centerville and Mystic was also put into operation in Iowa last year. The Tri-City Railway Company, of Davenport, expects to build about 35 miles of interurban line westward from Davenport to Muscatine and five miles of city track are planned for 1911. Another new line put into operation in Iowa during the past year connects Charles City and Marble Rock and is 15 miles in length.

The Minneapolis, Rochester & Dubuque Railway, of St. Paul, Minn., has inaugurated service during 1910 on 40 miles of line extending south from St. Paul to Northfield. Service is given with gasoline motor cars.

The Lexington & Interurban Railway in Kentucky completed during the early part of the year a fourth interurban line out of Lexington, extending southward 12 miles to Nicholasville, and passing through a rolling country which required particularly heavy earthwork.

TESTS ON GERMAN ACCUMULATOR CARS

The Halle (Germany) railways have recently completed some tests with a six-axle accumulator car on the line between Koltbus and Schonwäldte, which is 40 miles long. The car weighs 60.5 tons, and was loaded with 6 tons to represent passengers. The route was first traversed at 30 m.p.h., stopping at all stations, then at 37.5 m.p.h. without stopping and finally at 37.5 m.p.h. including stops. The results are shown in the following table:

State of Rails.	Speed in miles per hour.	No. of stops.		Energy consumption (kw.-hours).		Watt-hours per ton mile.	
		hour.	Go. Return.	Go. Return.	Go. Return.	Go. Return.	Go. Return.
Damp	30	10	10	61	63	22.9	23.7
Damp	37.5	1	3	52.5	53.5	19.8	20.0
Dry	37.5	10	10	67.5	66.5	25.3	24.9

The battery consisted of 168 cells and had a capacity of 368 amp-hours. It can run 62½ miles on one charge.

Texas Traction Company, Dallas, Tex., and several gas and electric companies under the same management have issued a card extending the season's greeting.

RECENT ELECTRIC RAILWAY CAR DESIGN

The table which is printed on pages 22, 23 and 24 of this issue gives the principal dimensions and other descriptive data of more than 100 representative types of electric railway cars for city, suburban and interurban service. Most of these cars have been built during the last two or three years, and many of them have been illustrated and described in the *ELECTRIC RAILWAY JOURNAL*. In the following explanatory notes references are given to the date and page number of these descriptive articles. The weights and dimensions of cars given in the table were obtained from the railway companies and acknowledgment is made to all those who supplied the data from which the table was compiled.

NOTES ON TABLE OF CAR DIMENSIONS

(1) This car was illustrated and described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 9, 1909, page 841. The platforms are inclosed with folding doors and gates and folding seats holding six passengers may be let down on the front platform, giving a total seating capacity of 42.

(2) The closed cars of the Little Rock Railway & Electric Company are not designed for prepayment operation, but the conductor stands near the rear door and collects fares from passengers as they enter the car.

(3) All cars of the Los Angeles Railway are being rebuilt to conform to the standard dimensions given in the table. The roofs are of the arched type.

(4) These are the new standard cars of the United Railroads of San Francisco. Eighty cars of this type are under construction.

(5) Four-motor equipments. These cars were described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 2, 1909, page 503. They are the standard type of the Denver City Tramway.

(6) Two-motor equipments. Bodies are the same as the four-motor equipments.

(7) Standard trail car. Has arched roof and center side entrance.

(8) These cars were described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 2, 1909, page 503. They have folding platform doors and steps, manually operated.

(9) See *ELECTRIC RAILWAY JOURNAL* for Sept. 18, 1909, page 434, for description of these cars. Used in city and suburban service. They have sliding platform doors and folding steps pneumatically operated.

(10) These cars were described in the *ELECTRIC RAILWAY JOURNAL* for Dec. 24, 1910, page 1247. The platforms are open with folding gates over the steps.

(11) All-steel cars. Described in the *ELECTRIC RAILWAY JOURNAL* for Aug. 28, 1909, page 312. These cars have the same dimensions and substantially the same weight as the wooden cars of the same design, of which the company has more than 600 in service.

(12) These cars have platforms arranged for conversion to prepayment operation at small expense.

(13) Complete detail weights and full description of these cars were printed in the *ELECTRIC RAILWAY JOURNAL* for April 2, 1910, page 571.

(14) Described in *ELECTRIC RAILWAY JOURNAL* for Oct. 1, 1910, page 498.

(15) The platforms of these cars are inclosed with folding gates; can be used as prepayment cars if desired. The weights given are actual scale weights.

(16) See *ELECTRIC RAILWAY JOURNAL* for March 13, 1909, page 469.

(17) These cars were illustrated and described in the *ELECTRIC RAILWAY JOURNAL* for Dec. 31, 1910, page 1285.

(18) Platforms inclosed with folding gates.

(19) Described in *ELECTRIC RAILWAY JOURNAL* for Nov. 2, 1907, page 917.

(20) See *ELECTRIC RAILWAY JOURNAL* for April 2, 1910, page 566. The weights given are scale weights.

(21) Floor plan of this car was shown in the *ELECTRIC RAILWAY JOURNAL* for July 16, 1910, page 119.

Name of Railway.	Class of Service.	Type of Car.	Date Built.	Single or Double End.	Prepayment Operation.	Length Overall.	Platform Length			Pt. In Body.	Type of Seats.	Distance C. to C.	Approx. Wt. of Body.	Approx. Wt. Trucks and Elec. Equip.	Approx. Wt. Total Lbs.	Single or Double Trucks.	Type of Truck.	Pt. Truck Wheelbase.	Diam. of Wheels.	Type of Wheels.	Type of Motors.	Type of Control.	
							Pt. Front.	Pt. Rear.	Pt. In.														
CITY CARS																							
ALABAMA																							
Birmingham Ry., Lt. & Pwr. Co. (1)	City	Closed	1910	Double	Yes	37-0	6-0	6-0	8-6	11-8½	3½	29½	17,000	13,000	30,000	Single	Warner	9-0	33	C. I.	G.E.-57	K-10	
ARKANSAS																							
Little Rock Ry. & Elec. Co. (2)	City	Semicon.	1908	Double	No	43-6	6-0	6-0	8-1	12-0	40	Long.&Cross	32½		46,000	Double	St. L.-17	4-6	33	C. I.	G.E.-80	K-28	
Little Rock Ry. & Elec. Co.	City	Closed	1905	Double	No	39-5	5-8	5-8	8-1	12-0	32	Long.&Cross	32½		32,000	Double	Brill 27-G.	4-0	33	C. I.	G.E.-57	K-11	
Little Rock Ry. & Elec. Co.	City	Closed	1904	Double	No	29-5	4-6	4-6	8-1	12-0	26	Long.			20,000	Single	St. L.-34	7-0	33	C. I.	G.E.-67	K-10	
Little Rock Ry. & Elec. Co.	City	Open	1905	Double	No	43-3	4-6	4-6	7-6	12-0	70	Cross	32½		22,000	Double	Brill 27-G.	4-0	33	C. I.	G.E.-57	K-35	
Little Rock Ry. & Elec. Co.	City	Open	1904	Double	No	32-0	4-0	4-0	7-6	12-0	50	Cross	32½		20,000	Single	St. L.-34	7-0	33	C. I.	G.E.-67	K-10	
CALIFORNIA																							
Los Angeles Ry. (3)	City	Calif.	1910	Double	Yes	44-7	6-9	6-9	8-2	12-0	44	Long.&Cross	28½	19,300	36,000	Double	Ins. Hung	5-3	30	C. I.	West. 306	K	
Northern Elec. Ry.	City	Calif.	1908	Double	No	39-3			8-4	12-6½	44	Long.&Cross	32	15,000	21,000	Double	St. L.-47	4-6	33	C. I.	G.E.-202	K-11	
Northern Elec. Ry.	City	Open		Double	No	39-4			8-2	11-11	84	Cross	31	9,000	21,000	Double	St. L.-47	4-6	33	C. I.	G.E.-67	K-10	
United R. R. San Francisco (4)	City	Closed	1910	Double	Yes	47-0	7-4	7-4	9-0	11-6½	48	Long.		27,000	26,000	Double	Out. Hung	4-6	33	C. I.	G.E.-216	K-28	
United R. R. San Francisco	City	Closed	1907	Double	No	45-4	6-6	6-6	9-2	12-0	44	Long.&Cross		28,000	27,000	Double	Brill 27-G.	4-4	33	C. I.	G.E.-90	K-28	
United R. R. San Francisco	City	Closed	1906	Double	No	45-4	6-6	6-6	9-2	12-0	44	Cross	33	26,000	26,000	Double	McG. 10 A.	6-0	33	C. I.	G.E.-80	K-28	
COLORADO																							
Denver City Tramway (5)	City	Side Ent.	1909	Single	No	43-10	3-8½		8-2	11-11	52	Cross	30	13,178	25,202	Double	Brill-27G.	4-6	33	C. I.	G.E.-58	K-35	
Denver City Tramway (6)	City	Side Ent.	1909	Single	No	43-10	3-8½		8-2	11-11	52	Cross	30	13,178	22,662	Double	Brill-27G.	4-6	33	C. I.	West. 306	K-36	
Denver City Tramway (7)	City	Trailer	1905	Single	No	38-11			8-2	11-11	46	Cross	28½	6,760	6,880	Double	Arch Bar	4-4	30	C. I.			
DIST. OF COLUMBIA																							
Capital Traction Co. (8)	City	Semicon.	1910	Double	Yes	41-0	5-7	5-7	8-5	11-7	36	Cross	33	17,500	16,100	Double	Max. Trac.	4-6	31	C. I.	West. 306	K-27	
Capital Traction Co. (9)	Sub.	Semicon.	1909	Double	Yes	43-8	5-7	5-7	8-9	11-6	40	Cross	31	21,300	26,800	Double	Std. O-50	4-6	33	F. S.	West. 101	K-29-B.	
Wash. Ry. & Elec. Co.	City	Closed	1909	Double	Yes	41-9	5-2	5-2	8-3	11-6½	40	Long		18,000	17,000	Double	Brill-39	4-6	32	S. T.	G.E.-210	K-39	
FLORIDA																							
Jacksonville Elec. Co. (10)	City	Closed	1910	Single	Yes	39-6½	5-0	5-0	8-8		44	Cross		12,179	21,293	Double	Max Trac.	4-6	33	C. I.	G.E.-219	K-36	
GEORGIA																							
Georgia Ry. & Elec. Co.	City	Closed	1910	Double	Yes	41-6	6-0	6-0	8-2	12-6	36	Cross	29½	16,000	18,500	Double	Max. Trac.	4-6	33	R. S.	West. 112	K-35	
Georgia Ry. & Elec. Co.	Sub.	Closed	1907	Double	No	45-0	5-0	5-0	8-2	12-8	48	Cross	30	28,000	25,000	Double	Brill-27F.	4-6	33	C. I.	West. 101	K-28	
Georgia Ry. & Elec. Co.	City	Closed	1910	Double	No	31-8	5-0	5-0	8-2	12-6	28	Cross	31	8,000	12,000	Single	Balt.	7-6	33	C. I.	West. 101	K-11	
ILLINOIS																							
Chicago Rys. (11)	City	Closed	1909	Double	Yes	49-2	8-4½	8-4½	8-9	11-8	40	Cross	32	19,800	33,200	Double	Out. Hung	4-10	33	R. S.	G.E.-216	K-35	
Chi. & Mil. Elec. Ry.	City	Semicon.	1909	Double	Yes	49-2	7-3	7-3	8-6½	12-4½	52	Cross	29½	21,500	30,500	Double	Ins Hung	6-3	33	R. S.	G.E.-216	K-28	
Springfield Consol. Ry. (12)	City	Closed	1910	Double	No	34-6	6-3	6-3	8-0	11-4	28	Long.		9,800	9,200	Single		7-0	33	C. I.	G.E.-54	K-10	
INDIANA																							
Ft. Wayne & W. V. Trac. Co.	City	Closed	1909	Double	No	32-1	5-2½	5-2½	8-7	12-1	32	Long		8,000	12,140	Single	Curtis	8-0	33	C. I.	G.E.-80	K-10	
Ind. Trac. & Ter. Co.	City	Closed	1909	Single	No	46-9½	4-6	8-0	8-6	12-1½	43	Long.&Cross	30	23,200	20,300	Double	Std. O-50	4-10	34	R. S.	West. 93	K-11	
KENTUCKY																							
Louisville Ry.	City	Closed	1910	Single	Yes	45-3	6-0	7-6	8-3	12-2½	41	Cross	32		44,000	Double	Out. Hung	4-10	34	R. S.	West. 307	K	
MARYLAND																							
United Rys. & Elec. Co., Balt.	City	Semicon.	1910	Double	Yes	43-9	5-8½	5-8½	8-2	12-5	42	Cross	32	15,500	26,500	Double	Out. Hung	4-6	33	C. I.	West. 101	K-28	
United Rys. & Elec. Co.	City	Semicon.	1907	Double	No	44-4	5-7½	5-7½	8-2	12-7	44	Cross	32	20,500	31,000	Double	Ins Hung	6-0	34	S. T.	West. 101	West. M. U.	
United Rys. & Elec. Co., Balt.	City	Semicon.	1905	Double	No	42-3	5-0	5-0	8-2	12-5	44	Cross	32	18,500	26,500	Double	Out. Hung	4-6	33	C. I.	West. 101	K-28	
MASSACHUSETTS																							
Boston Elevated Ry.	City	Semicon.	1911	Double	Yes	48-2½	6-0	6-0	8-8½	12-0	52	Cross	30	19,000	34,000	Double	Ins Hung	6-1	33	R. S.			
Boston & Northern St. Ry. (13)	City	Semicon.	1909	Double	No	39-6	5-3½	5-3½	8-4	11-9	40	Long.&Cross	32	11,170	30,920	Double	Std. O-50	4-10	34	R. S.	G.E.-80	K-28	
Boston & Northern St. Ry. (14)	City	Open	1910	Double	No	40-11			9-0	11-6	70	Cross			36,158	Double	Std. O-50	4-10	33	C. I.	G.E.-80	K-28	
MICHIGAN																							
Detroit United Ry.	City	Closed	1910	Single	Yes	42-3	5-2	5-10	8-4½	12-2½	43	Long.&Cross	29½	18,000	23,800	Double	Out. Hung	5-0	33	C. I.	West. 310	K-35	
Grand Rapids Ry.	City	Semicon.	1910	Double	Yes	46-6	8-3	8-3	9-0	11-10	36	Cross	31½	15,000	19,260	Double	Brill-39E.	4-6	33	C. I.	G.E.-210	K-36	
MINNESOTA																							
Duluth St. Ry.	City	Closed	1910	Single	No	46-7½	5-3	5-9	9-3½	12-2	50	Cross	30	23,960	23,940	Double	Ins Hung	6-0	34	R. S.	G.E.-213	K-37	
Duluth St. Ry.	City	Closed	1906	Single	No	45-2½	4-9	4-9	8-8½	12-0½	50	Cross	30	20,600	27,600	Double	Ins Hung	6-0	33	C. I.	G.E.-70	K-28	
Duluth St. Ry.	City	Closed	1900	Single	No	43-2½	3-8½	3-8½	8-8½	12-0½	30	Cross	30	22,200	21,840	Double	Ins Hung	6-0	33	C. I.	G.E.-67	K-6	
Winn City Rapid Transit (15)	City	Semicon.	1910	Single	No	46-8	6-6½	6-7½	9-1	12-2	50	Long.&Cross		18,614	27,586	Double	M.C.B.	6-0	34	R. S.	G.E.-216	K-37	

Name of Railway.	Class of Service.	Type of Car.	Date Built.	Single or Double End.	Preparation.	Length Overall.	Platform Length			Width of Body.	Height Overall.	Number Seats.	Type of Seats.	Distance C. to C.	Approx. Wt. of Body.	Approx. Wt. of Trucks and Elec. Equip.	Approx. Wt. Total.	Single or Double Trucks.	Type of Truck.	Pt. Truck Wheelbase.	Diam. of Wheels.	Type of Wheels.	Type of Motors.	Type of Control.
							Pt. Front.	Pt. Rear.	In.															
Missouri																								
United Rys. St. Louis (16).....	City	Closed	1909	Single	Yes	47-2½	6-10½	6-10½	9-0	12-3	50	Cross			23,300	26,250	49,550	Double	Out Hung	4-6	33	C. I.	G.E.-80	K-35
NEBRASKA																								
Omaha & Council Bluffs (17).....	City	Closed	1910	Single	Yes	42-0	5-0	6-8	8-3	.....	40	Long & Cross					40,000	Double	Max Trac.	4-6	33	C. I.	G.E.-80	
NEW JERSEY																								
Pub. Serv. Ry., Newark (18).....	City	Closed	1910	Double	Yes	46-4	7-2	7-2	8-7	11-6	41	Long.			21,400	24,200	45,600	Double	Brill-27G.	4-6	33	C. I.	West-101	K-6
Pub. Serv. Ry., Newark.....	Sub.	Closed	1910	Single	Yes	44-0	5-0	7-0	8-7	11-6	41	Long.			20,000	25,500	45,500	Double	M.C.B.	5-10	34	F. S.	West-101	K-6
NEW YORK																								
Brooklyn Rap. Transit Co. (19).....	City	Semicon.	1907	Double	No	38-3¾	5-1½	5-1½	7-11½	11-11½	36	Long.			17,860	17,340	35,200	Double	Max Trac.	4-4	34	R.S.	West-93	K-28
Coney Island & Brooklyn.....	City	Closed	1907	Double	No	38-10	4-10	4-10	7-11	11-6	36	Long.			15,970	16,550	32,520	Double	Std. O-45	4-4	34	C. I.	G.E.-90	K-11
Coney Island & Brooklyn.....	City	Open	1904	Double	No	39-0	3-0	3-0	8-8	11-9	65	Cross			13,540	11,640	25,180	Double	Max Trac.	4-0	33	C. I.	West-49	K-10
Fonda, Johns. & Gloversville.....	City	Closed	1910	Double	No	40-1	4-8½	4-8½	8-6	13-6	38	Cross			17,073	20,927	38,000	Double	Max Trac.	4-3	33	R.S.	G.E.-88	K-34
Metropol. St. Ry. N. Y. (20).....	City	Closed	1908	Double	Yes	46-11	7-5½	7-5½	8-3	11-3½	47	Long.			21,400	27,200	48,600	Double	Brill	4-6	33	C. I.	G.E.-219	K-35
Rochester Ry.....	City	Semicon.	1910	Single	Yes	44-7	8-4	8-4	8-4	12-4½	42	Cross			23,250	23,150	46,400	Double	Brill	4-0	33	C. I.	G.E.-80	K-28
Rochester Ry.....	City	Semicon.	1907	Double	No	46-2	8-0	8-0	8-0	12-3	50	Cross			21,830	29,170	51,000	Double	Ins. Hung	4-6	33	C. I.	G.E.-216	K-35
Syracuse R. T. Ry. (21).....	City	Semicon.	1910	Single	Yes	43-11	5-5	6-5	8-5	11-5½	41	Long & Cross			16,192	20,463	36,655	Double	Max Trac.	4-6	33	R.S.	West-310	K-27
Third Ave. R.R. (22).....	City	Semicon.	1908	Double	Yes	43-0	6-6	6-6	8-8	11-1½	48	Cross						Double						
OHIO																								
Cleveland Ry. (23).....	City	Closed	1908	Single	Yes	52-0	8-0	8-0	8-5½	11-4	50	Cross			17,676	23,980	41,656	Double	Brill	4-6	33	C. I.	West-101	K
Nor. Ohio Trac. & Lt. Co. (24).....	City	Convert	1909	Single	No	42-6	4-10	5-4	8-7	13-6	48	Long & Cross			24,000	26,000	50,000	Double	Out Hung	4-0	33	C. I.	West-101	K-28
Nor. Ohio Trac. & Lt. Co. (25).....	City	Semicon.	1902	Single	No	40-0	4-6	4-10	8-6½	13-2	40	Cross			22,000	23,000	45,000	Double	Brill-27F.	4-0	33	C. I.	West-38	K-6
PENNSYLVANIA																								
Phila. Rapid Transit Co. (25).....	City	Semicon.	1910	Double	Yes	36-4	5-0	5-0	7-7	12-0	32	Long.			15,500	15,700	31,200	Double	Max Trac.	4-6	33	R.S.	G.E.-80	K-11
Pittsburgh Rys. (26).....	City	Semicon.	1910	Single	Yes	46-8	0-0	6-10	8-2	12-4	57	Long & Cross			18,000	30,000	48,000	Double	Ins. Hung	5-7½	34	R.S.	West-306	K-43
TEXAS																								
San Antonio Traction Co. (27).....	City	Semicon.	1910	Double	Yes	44-6	7-9	7-9	8-1½	12-0	40	Cross					40,700	Double	Brill-27G.	4-6	33	C. I.	G.E.-54	K-12
San Antonio Traction Co. (28).....	City	Semicon.	1909	Double	No	43-8	7-10	7-10	8-0	12-1	40	Cross					36,500	Double	Brill-27G.	4-6	33	C. I.	G.E.-54	K-12
San Antonio Traction Co. (29).....	City	Semicon.	1907	Double	No	40-0	6-0	6-0	8-0	12-1	40	Cross					34,500	Double	Brill-27G.	4-6	33	C. I.	G.E.-54	K-12
UTAH																								
Utah Lt. & Ry. Co. (30).....	C. & S.	Semicon.	1908	Double	Yes	44-0	6-0	6-0	8-6	11-6	44	Cross			21,290	26,710	48,000	Double	Std. L-47	4-6	33	C. I.	G.E.-80	K-28
WASHINGTON																								
Tacoma Ry. & Pwr. Co. (31).....	City	Closed	1910	Single	Yes	44-0	4-6	6-6	7-0	12-2	55	Long.			14,055	20,565	34,620	Double	Brill-27G.	4-0	33	C. I.	G.E.-58	K-6
WISCONSIN																								
Milwaukee Elec. Ry. & Lt. Co. (32).....	City	Closed	1910	Double	Yes	50-0	6-9	6-9	8-7	.....	52	Long & Cross			26,000	24,000	50,000	Double	Ins. Hung	6-0	34	R.S.	G.E.-216	K
Milwaukee Elec. Ry. & Lt. Co. (33).....	City	Closed	1906	Double	No	41-0	5-2	5-2	8-4½	12-5	44	Long & Cross			17,000	23,000	40,000	Double	Ins. Hung	5-10	34	R.S.	G.E.-80	K-28
CANADA																								
Toronto Ry. (27).....	City	Convert.	1910	Single	Yes	44-9	6-6	7-0	7-11	12-6	38	Long & Cross			24,000	23,356	47,356	Double	Curtis	4-6	33	C. I.	G.E.-80	K-6
Winnipeg Elec. Ry. (28).....	City	Closed	1909	Single	Yes	45-4	4-0	6-5	8-7½	12-2	40	Long.			20,000	27,247	47,247	Double	Brill-27G.	4-6	33	R.S.	G.E.-80	K-6
INTERURBAN CARS—																								
CALIFORNIA																								
Los Angeles Pacific Co. (34).....	Int.	Calif.	.....	Double	No	49-2	4-8	4-8	9-4	12-8	56	Cross			30,360	44,440	74,800	Double	Ins. Hung	6-5	34	R.S.	G.E.-73	Type M
Los Angeles Pacific Co. (35).....	Int.	Calif.	.....	Double	No	41-2	4-2	5-2	8-6	12-0	48	Cross			18,880	21,520	40,400	Double	Ins. Hung	5-6	33	C. I.	West-89	K-28
Northern Elec. Ry. (36).....	Int.	Calif.	1907	Double	No	55-4	5-6	5-6	9-3½	13-2	60	Cross			32,200	51,200	83,400	Double	Bald-200	6-10	37½	R.S.	West-121	West. M. U.
Pacific Electric Ry. (37).....	Int.	Calif.	1910	Double	No	43-0½	4-1½	4-1½	8-2½	12-1½	48	Cross			29,596	28,904	58,500	Double	M.C.B.	5-7	30	R.S.	West-306	West. M. U.
Pacific Electric Ry. (38).....	Int.	Calif.	1907	Double	No	50-10½	5-2½	5-0½	8-10½	12-3½	56	Cross			34,596	35,004	69,600	Double	Std. L-23	6-4	33	R.S.	West-112	West. M. U.
Pacific Electric Ry. (39).....	Sub.	Calif.	1910	Double	No	39-1	3-10½	3-10½	8-2	11-8	44	Long & Cross			16,030	28,720	43,750	Double	Ins. Hung	5-3	30	C. I.	West-101	K-14
ILLINOIS																								
Chi. & Mil. Elec. Ry. (40).....	Int.	Clo. Mot.	1910	Double	No	52-3	5-4	5-4	8-8½	13-5½	52	Cross					75,000	Double	M.C.B.	6-6	35	R.S.	G.E.-73	Type M
Chi. & Mil. Elec. Ry. (41).....	Int.	Buffet	1910	Double	No	52-3	5-4	5-4	8-7½	13-5½	29	Chairs					75,000	Double	M.C.B.	6-6	35	R.S.	G.E.-73	Type M
E. St. L. & Sub. Ry. (42).....	Sub.	Closed	1909	Double	No	45-4	5-6	5-6	8-8	13-0	30	Long & Cross			26,800	27,000	53,800	Double	Brill-27E.	6-6	34	R.S.	G.E.-216	Type M
INDIANA																								
Chicago, L. S. & So. Bend (43).....	Int.	Trailer	1908	Double	No	50-0	4-1	4-1	10-0	13-0	52	Cross			25,000			Double	Bald-398	6-6	33	C. S.		
Chicago, L. S. & So. Bend (44).....	Int.	Closed	1907	Single	No	57-2	3-4	4-0	10-0	15-4	60	Cross			37,000	75,000	112,000	Double	Bald-363	7-6	38	R.S.	West-148	West. M. U.
Chicago, L. S. & So. Bend (45).....	Sub.	Closed	1908	Double	No	42-8	4-0	4-0	8-5	14-0	44	Cross			24,000	45,000	69,000	Double	Bald-384	6-6	33	C. S.	West-135	Hand.
Ft. Wayne & W. V. Trac. Co. (46).....	Int.	Closed	1909	Single	No	55-0	5-0	5-0	8-8	13-8	36	Cross			41,000	39,000	80,000	Double	Ins. Hung	7-0	37	R.S.	G.E. 205	L-4
Ft. Wayne & W. V. Trac. Co. (28).....	Int.	Closed	1905	Single	No	61-6	.....	7-0	8-8	13-8	46	Cross			60,000	40,000	100,000	Double	Ins. Hung	6-5	37	R.S.	West-121	West. M. U.
T. H. I. & E. Trac. Co. (47).....	Int.	Closed	1908	Double	No	61-6	11-8½	5-0	9-0	13-10	58	Cross			44,200	40,200	84,400	Double	Std. C-80	7-0	38	R.S.	West-121	West. M. U.

Name of Railway.	Class of Service.	Type of Car.	Date Built.	Single or Double End.	Prepayment.	Platform Length Overall.	Platform Length.	Width of Body.	Platform Height Overall.	Number Seats.	Type of Seats.	Distance C. to C.	Approx. Wt. of Body Lbs.	Approx. Wt. of Trucks and Equip. Lbs.	Approx. Total Lbs.	Single or Double Trucks.	Type of Truck.	Truck Wheelbase.	Dia. of Wheels.	Type of Wheels.	Type of Motors.	Type of Control.
MICHIGAN																						
Detroit United Ry.	Int.	Closed	1910	Single	No	52-7½	5-4½	8-6	13-1	53	Cross	33	40,000	33,900	63,900	Double	Ins. Hung	6-6	36	R.S.	West 317	K-34
Detroit United Ry.	Int.	Closed	1910	Single	No	46-4	5-1	8-6	12-9½	45	Cross	32	25,000	31,350	56,350	Double	Ins. Hung	6-6	33	R.S.	West 317	K-34
New York																						
Brooklyn Rapid Transit Co. (29)	Elev	Semicon.	1907	Double	No	48-11	4-3	8-9½	13-2½	53	Long & Cross		27,080	44,570	71,650	Double	Ins. Hung	6-8	34	R.S.	West 300	West M.U.
Fonda, Johns. & Gloversville	Int.	Closed	1904	Double	No	55-4	5-0	8-11	13-0	56	Cross	34			86,500	Double	Taylor	6-10	34	R.S.	G.E.-73	Type M
Fonda, Johns. & Gloversville	Int.	Closed	1902	Double	No	45-4	5-6	8-5	13-0	52	Cross	32			58,850	Double	Ins. Hung	6-0	34	S.T.	G.E.-57	K-14
Oneida Ry.	Int.	Semicon.	1906	Double	No	49-0	5-6	8-6	13-0	52	Cross	33	26,533	52,542	79,075	Double	Ins. Hung	6-6	37	R.S.	G.E.-73	Type M
Rochester & Eastern Ry.	Int.	Closed	1909	Double	No	51-3½	4-2	8-6½	13-7	52	Cross	33	35,564	52,666	88,230	Double		6-6	34	S.T.	G.E.-204	K-34
Utica & Mohawk Valley	Int.	Semicon.	1901	Single	No	45-8	4-2	8-6½	13-0	48	Cross	33	21,020	32,515	53,535	Double	Ins. Hung	6-6	35	R.S.	West -03	K-14
Ohio																						
Lake Shore Elec. Ry.	Int.	Closed	1907	Single	No	51-0	4-7½	8-5	13-10	52	Cross	32½	37,395	35,350	72,745	Double	M.C.B.	7-0	38	R.S.	West 121	Type M
Lake Shore Elec. Ry.	Sub	Semicon.	1907	Single	No	48-6	4-1	8-0	13-0	52	Cross	31½	22,503	23,000	45,503	Double	Brill-27E	6-6	33	S.T.	West 101	K-14
Nor. Ohio Trac. & Lt. Co.	Int.	Closed	1910	Single	No	60-0	4-6	8-8½	13-11	52	Cross		28,000	52,000	80,000	Double	M.C.B.	6-0	35	R.S.	G.E.-204	B-8
PENNSYLVANIA																						
Pittsburgh Rys.	Int.	Semicon	1910	Single	No	52-6	5-6	8-2	14-2	64	Cross	30	30,000	43,000	73,000	Double	Ins. Hung	6-6	34	R.S.	West 303	Type M
Wisconsin																						
Milwaukee Lt. Ht. & Trac Co. (30)	Int.	Closed	1909	Double	No	53-5	5-10	8-7	12-5	64	Long & Cross	29½	41,000	39,000	80,000	Double	M.C.B.	6-6	36	R.S.	G.E.-207	M.U.

(22) These cars were described in the ELECTRIC RAILWAY JOURNAL for May 1, 1909, page 828.

(23) See ELECTRIC RAILWAY JOURNAL for Oct. 24, 1908, page 1259.

(24) Illustrated in the ELECTRIC RAILWAY JOURNAL for June 18, 1910, page 1072. Are convertible on one side only.

(25) These cars are equipped with roller-bearing journals and ball-bearing armature bearings.

(26) Semi-steel bodies; rear platform inclosed with folding doors. Have no front platform. Described in ELECTRIC RAILWAY JOURNAL for Oct. 15, 1910, page 834.

(27) Will seat 70 passengers when used as open car. Described in ELECTRIC RAILWAY JOURNAL for Dec. 3, 1910, page 1118.

(28) Has smoking compartment with eight chairs. Observation rear platform; used for limited service.

(29) One motor and one trailer truck. Trailer truck has 31-in. wheels and 5-ft. 6-in. wheelbase.

(30) These cars were described in the ELECTRIC RAILWAY JOURNAL for July 16, 1910, page 103.

TYPES OF CITY CARS

Four types of city cars, closed, semi-convertible, convertible and open, are represented in the table. Closed cars with single sashes, either raised part way into pockets back of the letter board or dropped completely down into pockets between the side panels and the inside lining, are being built in the largest numbers, but the semi-convertible cars, which are equally well adapted to winter and summer service, are displacing open and closed cars on many roads. Open cars have the two advantages of large seating capacity and light weight, but they represent an idle investment for six months in the year and require storage under cover when not in use. The semi-convertible car permits prepayment fare collection at all seasons of the year and eliminates the danger from accidents to persons on the running board. The semi-convertible suburban cars of the Capital Traction Company are of a type which combines the advantages of cross-seats, prepayment fare collection, inclosed platforms and in summer as free circulation of air as can be had on an open car owing to the absence of the end bulkheads in the car and the use of drop sashes in all the platform windows. The Third Avenue Railroad cars are another type which is equally well adapted to congested city service in summer and winter. On the Pacific Coast the so-called California-type car, in which about half the seats are in an open-side section and the remainder are in a closed section, is used in large numbers, both for city and interurban service. This type of car is adapted only for mild and equable climates and has not been used in the Eastern or Northern States. The one-side convertible cars of the Northern Ohio Traction & Light Company are adapted only for single-end operation. The cross-seats are made in a long section against the closed side and a short, removable section against the open side. When used as a closed car the short sections are removed to form an aisle along the side of the car.

SEATING ARRANGEMENT

The use of cross-seats with a narrow center aisle instead of two longitudinal seats and a wide aisle is now quite general for city cars. Experience with semi-convertible cars with cross-seats demonstrated the feasibility of handling heavy loads in spite of the narrow aisle, and the greater comfort of both the seated and standing passengers was an argument in favor of cross-seats. The strongest objection to the narrow aisle was that it retarded the conductor in collecting fares and caused him to jostle the standing passengers as he moved backward and forward through the car. The prepayment method of fare collection overcomes this objection.

The semi-steel cars of the Pittsburgh Railways have a longitudinal seat along one side and cross-seats on the opposite side separated by an aisle 37-in. wide as compared with a 22-in. aisle on cross-seat cars of the same width inside. The arrangement of seats near the entrance and exit doors is an important detail and a wide variation is found in cars of the same general type. In the semi-convertible pay-as-you-enter cars of the Third

Avenue Railroad there are 10 cross-seats on each side of a 30-ft. body and folding double longitudinal seats are placed in each of the four corners adjoining the entrance and exit door openings. This arrangement provides the maximum possible number of cross-seats without interfering with the free movement of passengers in or out at either end of the car. The other extreme in a cross-seat car is found in the single-end cars of the Indianapolis Traction & Terminal Company, which have six cross-seats on each side at the forward end and two longitudinal seats 13 ft. in. long at the rear. The longitudinal seats of the Metropolitan Street Railway cars are cut back about 3 in. for a distance of 30 in. away from the bulkheads so as to increase the width of the aisle near the end doors.

The spacing of cross-seats longitudinally, as shown in the table, varies from 29 $\frac{3}{8}$ in. to 33 in. The usual allowance of 16 in. of length per passenger in longitudinal seat cars compares with a 32-in. spacing for cross-seats. There is a tendency to increase the distance between seats, especially in cars used for long runs on account of the greater comfort of passengers. While a difference of 1 in. or 2 in. in the seat spacing does not appear to be important it affects the entire body framing and must be taken into account in making comparisons of weight and seating capacity per foot of body length.

The desire to provide as many seats as possible has led to the use of folding seats on the platforms. The Birmingham single-truck cars and the prepayment cars of the Metropolitan Street Railway and the Third Avenue Railroad, among others included in the table, are provided with seats of this kind. From four to six passengers may be seated on the front platform of a car without interfering with the motorman or the exit of passengers. The latest Pittsburgh cars have no front platform; the longitudinal seat on the left-hand side is carried forward to the extreme end of the car and the motorman is separated from the passengers only by a pipe railing.

PLATFORMS

Before the introduction of the prepayment method of fare collection the ordinary length of platforms on closed cars varied from 4 ft. to 5 ft. This has been increased in most prepayment cars to from 6 ft. to 7 ft. 6 in. The earlier designs of prepayment cars had excessively long platforms, but experience has shown that the successful operation of cars of this type does not require platforms longer than 6 ft. The all-steel, single-end, pay-as-you-enter cars put in service in Montreal in 1907 had rear platforms 9 ft. 8 in. long, and the pay-as-you-enter cars of the Cleveland Railway, built in 1908, had platforms 8 ft. long. In contrast with these long platforms may be mentioned the single-end pay-as-you-enter cars of the Detroit United Railway with 5-ft. 10-in. platforms and the Jacksonville pay-as-you-enter cars with 5-ft. platforms. The latter cars, however, have the bulkheads set in about 20 in. from the corner posts. The platforms of the Capital Traction Company's pay-within cars are 5 ft. 7 in. long.

The maintenance of long platforms supported by wooden sills bolted and clamped to the body underframing is a serious problem, and in most of the recent designs of long-platform cars metal side knees carried well back toward the body bolsters have been used. One prominent car builder employs two channels bent to the proper shape and bolted together with spreaders to form a shallow truss, while another builder uses riveted plate girder knees.

The arrangement of platform steps, doors and gates, partition railings and body end doors of prepayment cars is very varied. Hardly any two designs of cars built during the past year have been alike in this respect. The individual ideas of the car builders and their customers have largely governed the design of platforms. The patent situation with regard to the details of prepayment platforms is very complicated, and to some extent, at least, has been responsible for the numerous designs now in use. It is interesting to note in this connection a marked tendency toward the use of platform doors or gates as a means for effectually preventing boarding and alighting accidents.

CAR FRAMING

In nearly all of the recent types of double-truck cars more or less steel has been used in combination with wooden members for the underframing and body framing below the window sills. All-steel construction has not yet been developed to the point where it can compete in first cost and low weight with wooden construction reinforced with steel. Unlike a steam railroad car body, a street car is not subjected to severe draft stresses which must be transmitted from end to end through the underframing, nor is it necessary to provide great strength against collisions. On the other hand, it is subjected to severe longitudinal stresses due to the rapid and constant acceleration and braking, and also to severe transverse stresses when passing around sharp curves. Utilization of the strength of the car side below the windows to carry the vertical stresses rather than a number of longitudinal sills in the bottom frame has produced greater stiffness for the same or less weight. Where drop sash are used with wood side panels this result is accomplished by introducing a thick steel plate, 10 in. to 12 in. wide, to reinforce the side sills. Overhang and drop truss rods are also employed to stiffen the car side. Diagonal braces in the floor framing are essential in street car construction owing to the cross-bending and twisting stresses set up when running

UNIT WEIGHTS OF CARS.

Railway Company.	Weight per Seat.	Wt. per Ft. of Length.	Wt. per Sq. Ft.
CLOSED.			
Birmingham Ry., Light & Power*.....	831	820	95
United R. R., San Francisco.....	1105	1125	126
Denver City Tramway, 4-motor.....	738	874	107
Denver City Tramway, 2-motor.....	689	816	100
Washington Railway & Electric Co.....	795	838	101
Jacksonville Electric Co.....	757	844	98
Georgia Railway & Electric Co.....	957	830	102
Georgia Railway & Electric Co*.....	712	632	78
Chicago Railways.....	1324	1078	131
Springfield Consolidated Railway*.....	678	550	69
Ft. Wayne & Wabash Valley Traction*.....	628	627	73
Indianapolis Traction & Terminal Co.....	1012	931	110
Detroit United Railway.....	973	989	119
United Railways, St. Louis.....	993	1050	117
Public Service Railway.....	1110	984	115
F. J. & G. Railway.....	1158	1096	129
Metropolitan Street Railway.....	808	809	98
Cleveland Railway.....	834	800	100
Philadelphia Rapid Transit.....	945	859	113
Tacoma Railway & Power Co.....	622	780	112
Milwaukee Electric Railway & Light Co..	960	1000	117
SEMI-CONVERTIBLE.			
Capital Traction Co.....	934	820	97
Capital Traction Co.....	1202	1100	126
Chicago & Milwaukee Electric Railway..	1000	1059	124
United Railways & Electric Co.....	1000	960	118
Boston Elevated Railway.....	1019	1098	127
Boston & Northern Street Railway.....	1070	1083	128
Grand Rapids Railway.....	951	736	81
Twin City Rapid Transit.....	923	998	119
Brooklyn Rapid Transit.....	975	920	115
Rochester Railway.....	1156	1092	131
Syracuse Rapid Transit Railway.....	1242	1162	137
Third Avenue Railroad.....	763	854	98
Pittsburgh Railways.....	842	1028	128
San Antonio Traction Co.....	1018	914	112
Utah Light & Railway Co.....	1090	1090	128
OPEN AND CALIFORNIA TYPE.			
Los Angeles Railway (Cal.).....	817	816	99
Northern Electric Railway (Cal.).....	817	915	110
Northern Electric Railway (Open).....	357	761	94
Boston & Northern Street Railway.....	517	886	98
Coney Island & Brooklyn.....	386	643	74

*Single-truck cars.

around sharp curves. Some car builders introduce these members at the corners between the bolster and the end sill, while others frame them in the center between the bolsters. They are not so necessary in steel underframes, where gusset plates can be used to stiffen the corners and hold the framing square.

A comparatively recent development in car body framing is the use of cast-steel body bolsters. The loads carried by the side framing must be transmitted to the truck center plates through the bolsters and these members of the underframe must be strong and rigid. The Denver City Tramway has been using cast-steel body bolsters for nearly three years at a considerable saving of weight over built-up bolsters. The 1910 report of the Engineering Association committee on equipment contained an interesting and valuable discussion on car framing in which several principles of design were given.

The problem of reducing the weight of city cars is still absorbing the attention of car builders. Progress is being made

in the direction of eliminating unnecessary weight in the innumerable small parts not subjected to severe stresses rather than in the principal members of the framing, where both strength and stiffness are essential. Studies of detail weights, such as have been made by the Boston & Northern Street Railway and other companies have furnished data which have never before been in the hands of the designers of cars. Even the car builders did not know the weight of the cars which they built a few years ago. The effort to reduce weights has been directed chiefly toward the car body, but it will be observed from the table on pages 22 and 23 that the weight of the trucks and electrical equipment in most cases exceeds the weight of the body. There is an opportunity for reducing the weight of these parts also.

Comparisons of car weights should take into account conditions of climate, schedules and track. The weight per seat is perhaps the most common basis of comparison, and weight per foot of length and weight per square foot of floor area have also been proposed as units. In the accompanying table of unit weights of a number of cars of recent design the comparison has been made in each of these three ways. The weight used in each case is the total weight of the car, trucks and equipment. The length is the length over bumpers and square feet of floor area was computed by multiplying the length over bumpers by the width over belt rail.

The wide variations in these ratios are apparent from an inspection of the table. The weight per seat for closed cars varies from 622 lb. to 1324 lb. Single-truck cars weigh per seat nearly 40 per cent less than the average for double-truck cars, while open cars weigh as low as 357 lb. per seat. The two-motor and four-motor cars of the Denver City Tramway have the same bodies and trucks, but the difference in the weight of the electrical equipment alone is reflected in a striking manner in the three ratios which are given in the table on page 25 of this issue.

APPLICATIONS TO BUILD TRACKLESS TROLLEY LINES IN GREAT BRITAIN

Sixteen applications have been made to Parliament for powers to establish trackless electric railways in various localities throughout Great Britain. Some of these proposals are from local authorities, some from existing tramway companies and others are from companies formed expressly to build trackless lines. Leeds, Bradford, Sheffield and Newcastle have already received permission to operate trackless tramways and powers are being sought by the Northampton Corporation, Halifax Corporation, Malvern Electric Traction Company, Matlock District Railless Traction Company, Brighton, Hove & Preston United Omnibus Company, Aberdare Urban District Council, the Macclesfield & District Railless Electric Traction & Electricity Supply Company, Rotherham Corporation, the Croydon & Southern District Railless Electric Traction Company, Newcastle-upon-Tyne Corporation, the Western Valleys (Monmouthshire) Railless Traction Company, the Rotherham, Maltby & District Railless Electric Traction Company, the Oldham & Saddleworth District Electric Railless Traction Company and the Chiswick Urban District Council. At present no trackless trolley systems are operated in Great Britain.

Attorney-General O'Malley, of New York, after reviewing the work of his department during the year, recommends that power to equalize special franchise assessments should be given to the State Board of Tax Commissioners, thus rendering it unnecessary to apply to the courts, the latter having decided that special franchise assessments must be equalized at the rate at which local real property is assessed. Mr. O'Malley also urges an amendment to the tax law providing that the occupation of a highway by a public service corporation shall be prima facie evidence of the existence of the special franchise.

THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

BY ARTHUR W. BRADY, PRESIDENT

The American Electric Railway Association represents a growth of more than a quarter of a century and now embraces within its membership all classes of electric railways, surface, elevated and subway, urban, suburban and interurban, as well as partially electrified steam railroads. It owes its existence to the principle of co-operation that has played so large a part in the advancement of the material growth and prosperity of this continent. The principal questions confronting the electric railway industry in policy, management and operation are much the same north and south, east and west. The trend of events is to increase the similarities, rather than the divergencies, in these questions. It is obvious that the substantially identical problems constantly presented for solution at points hundreds or thousands of miles apart can be solved most wisely and permanently through the co-operation of all affected by them, so that the conclusion reached by one management may represent the combined thought and experience of many. The American Electric Railway Association is intended to afford the opportunity for this necessary co-operation. The measure of its success is the extent to which it has furnished and is furnishing this opportunity.

The objects of the association are largely accomplished through its affiliated associations, the Engineering, Claim Agents', Transportation & Traffic, and Accountants' associations, which deal with practical questions affecting all branches of electric railway operation. The high quality and the amount of work which these associations have done in the past demonstrate the standard which these bodies have set for themselves. The work planned by them for the coming year will open up some new fields and add to results accomplished in old ones.

The work of the parent association is naturally of a different character from that falling within the scope of the affiliated associations. It affects the industry at a different angle. Generally speaking, the parent association deals, on the one hand, with those problems which affect the fundamental relations between the electric railway industry and the public, and, on the other hand, with those internal concerns of electric railway management which affect the business as a whole, rather than some particular part or department of it.

A brief reference to part of the plans which have been laid for the coming year will indicate some of the things that the association is doing.

Of the questions affecting the relations between the companies and the public none is more important than those relating to the permanence and terms of franchises, without which electric railroads cannot exist, and to the kind, extent and method of public regulation. The determination of all such questions under a popular form of government depends finally on the views which the public shall adopt concerning them. The education of the public to the point of a correct conclusion has not been accomplished in some prominent instances without extended periods of stress and struggle, costly, if not disastrous, to both railways and public. There should be some better method of arriving at correct views. War in industrial affairs is to be deplored almost as much as in affairs of state. In either case victory is determined by force, not reason and justice. There is no reason for wonder at the universality with which false views on electric railway affairs have been entertained by the general public. The sincere enthusiasm of honest promoters, combined with extraordinary profits, real or apparent, of earlier years, tended to create the belief that every franchise was a mine of wealth. Disillusionment on the part of owners and managers came quickly, as the concurrence of shrunken income and extended rides was disclosed, and as demands for extensions and improvements, for renewals and replacements had to be met. The general public, however, knew little of these developments and has often continued to cling to the old view. Recogn-

nition of the mutual interest of public and company, and of the fact that an unfair and excessive burden upon a company will necessarily at some time and in some way be shifted to the shoulders of the public, has made way with discouraging slowness.

This question of fostering the formation of correct views on all matters relating to franchises and regulation will engage the especial attention of the association during the present year. Work done in this direction comes within the purview of the committee on public relations. It is expected that part of the results of its labors will be submitted to the members of the association before the winter is over.

At the recent convention in Atlantic City two subjects were decided to be of sufficient importance to require the appointment of additional committees to consider them particularly. One of these subjects is that of taxation. An exhaustive report read at the convention disclosed the heterogeneous character of the systems—if they may properly be called such—for the taxation of electric railway properties. The burden of taxation is a heavy one for every company and rarely can it be reduced, even when business conditions necessitate the cutting down of every other item of expense. The importance of the subject is so clear that unquestionably the convention acted with wisdom in authorizing the appointment of a committee to give it attention. The committee has been named, and the plans for its work are being laid.

The other subject referred to is that of the proper basis for the determination of rates and fares. This subject is of fundamental importance, the success of even the most favorably situated companies depending on the correct solution of the problem presented. In these days, when the fixing of rates and fares by legislatures, commissions and municipal bodies is constantly up for decision, the matter is of more than usual importance. The committee to consider this subject has been appointed and its work is under way.

The association will continue to give attention to matters affecting the relations between electric railways and the federal government. The increased number of matters at the national capital which the committee on interstate commerce commission affairs has been forced to look after has caused a change of name to that of the committee on federal relations. The increased powers and duties of the Interstate Commerce Commission are of themselves likely to multiply the matters before the commission itself requiring the attention of the committee. In addition to these, and to matters of federal legislation, attention must be given to the two commissions authorized at the last session of Congress, one to deal with the regulation of capitalization and the other with employees' compensation. It may be found wise to arrange for hearings on behalf of the association before these commissions.

Arrangements have been made to keep member companies advised of proposed legislation affecting those electric railways engaged in interstate commerce and therefore subject to federal legislation. The number of such companies is now large, and even those not subject to the interstate commerce acts have an interest in legislation of this character, for it is likely to serve as a model for State legislation.

Another item of general interest relating to the federal government is that of compensation for carrying United States mail. This matter stands apart from other federal affairs and falls to the charge of another committee. This subject will receive renewed attention during the year, and it is hoped that some real progress will be made.

The highly practical value of the work which the association has already done through its committee on insurance is generally recognized. This committee will continue its efforts, and hopes to put into workable shape certain plans which it has developed and which it believes will accomplish important results for the industry.

The association has at all times taken an interest in matters affecting the welfare and the training of employees. It is well understood that opportunity exists for the accomplishment

of valuable results on both of these lines. This is work which an international organization such as the American Electric Railway Association is especially fitted to do. The committees which have this work in charge will continue to give it attention with a view to reaching practical results.

In all of its work the American Association is proceeding in a spirit of close co-operation with the various State and district associations. These associations and the American Association have but one common purpose—the advancement of the electric railway industry. This being so, the work of all should be so planned and carried out that, as far as possible, each will support and supplement the other. With this end in view, the practice was first instituted last year, and will be continued, of placing on the committee on public relations the presidents of these various associations. The field of this committee's work is so broad and important that any conclusions reached should be much more than a reflection of local views. Assurance that this will be the result is given by the widely representative character of this committee brought about by the practice referred to.

The extent to which the association can accomplish all that such an association should accomplish depends largely on the degree of unanimity with which it has the support of the electric railway industry within its territory. This support has always been freely given to the association, but there are still a number of companies which should become active members, and a much larger number of individuals who should become associate members. The committees on active membership and associate membership respectively are planning active campaigns, and by the next convention the association should be more nearly representative than ever before of the entire electric railway industry of the United States, Canada and Mexico.

Last January, for the first time, a mid-year conference was held at the offices of the association in New York. This practice will be again followed this year, and Jan. 27 has been fixed as the date. The sessions at this conference are executive in character, and the opportunity is presented to discuss freely some of the more important questions relating to electric railway companies. The success of the conference last January demonstrated the wisdom of the innovation, and all signs point to a meeting fully as successful on Jan. 27. Assurances have been given of the presentation of matters which will be of unusual interest and profit to all who attend.

It is the belief of those who have closely watched its progress that the association is year by year becoming a more potent instrument for good to electric railway companies, whether members or not. Every year should mark a decided gain, not merely in the numerical and financial strength of the association, but also in the beneficial results which the association is accomplishing for its members. If the plans which have been partially outlined above are carried out, as it is expected they will be, the present year will mark such a gain.

ELECTRIC TRACTION IN SPAIN

The society Hijos de Francisco Gambus Soler has applied to the Governor of Barcelona for authorization to build an electric station for the supply of light and motive power in Olesa de Montserrat and to a factory in Monistrol. The "Linea de Barcelona al Vallés" is the title of another Barcelona company just formed to construct trainways for linking the towns named. A third Barcelona company, styled "la Sociedad de Tranvías de Barcelona á San Andrés," is seeking a concession to build an extension to San Andrés from the Horta terminus of the Barcelona to Horta electric line.

Governor Marshall of Indiana presented his address to the State Legislature on Jan. 3, 1911. The only recommendation by him which affects the electric railways relates to the advisability of passing a law to give interurban railways the right of eminent domain to remove obstructions near the right-of-way which interfere with the view of the crews of cars.

THE AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION

BY W. J. HARVIE, PRESIDENT

During the last few years the American Electric Railway Association and its affiliated associations have been progressing wonderfully, and in no case is this progress more noticeable than in the Engineering Association. The work done and the results produced have increased in volume and value to such an extent that the problem of providing time enough both for the work of its committees and for the proper handling of the committee reports is becoming a very serious one.

It is needless to review the stages by which this has come about. Suffice it to say that if the present rate of increase continues (and there appears to be no reason for assuming otherwise) some very radical departure from present methods for conducting the association work must be devised in order to provide the time required and to obtain the best results.

The work of the past year has been very gratifying, and has resulted in the crystallization of a number of matters that have previously been before the association, among them the matter of laying out definite lines of procedure for the main portion of the association's work. The method of adoption of standards was most thoroughly investigated and the general plan previously laid out continued. A committee appointed for the purpose is at present engaged in further amplifying the present scheme. The work this year will follow strictly the outlined procedure, and should therefore be even better than that of last year.

The matter of ratification of standards and recommended practice by the American Association by letter ballot instead of by acclamation on the floor of convention is a step which is in line with the best practice of older associations, and should inure to the benefit of all concerned.

The American Association and its affiliated bodies stand first of all for the advancement of the electric railway industry, and from this viewpoint welcome most heartily the various inquiries and suggestions which have come to them recently from similar national or State organizations and contemplate the co-operation with them of this association. Joint interest established along the broad lines of betterment of the industries so represented cannot but work to the advantage of the organizations concerned. The American Electric Railway Engineering Association may be relied upon to co-operate fully on any subject so far as it is in its power to do so on any basis that is reasonable and equitable. That a great amount of good can be accomplished by a closer relationship with other like associations cannot be questioned.

A glance at the work for this year as laid out shows that it includes the investigation of some very important subjects, and the personnel of the various standing and special committees is assurance that the investigations of those subjects which are taken up will be most thorough. It was this year deemed wise to increase the membership of the various standing committees by 50 per cent, thus increasing the number of members on each committee from six to nine. This increase of membership is a most important move, and makes possible the opportunity for a broader vision and a more thorough investigation of subjects, both of which will make the deductions and recommendations of committees and of this association of more value than ever before. This enlargement of committee membership should be carried still further from time to time as the association progresses and the industry develops. This year the additional appointments were made for one, two and three years' service. This arrangement retires three committeemen each year, and the three new appointments in future years will be made for three years each.

The appointment on committees of associate members who may not be connected with member companies has resulted in benefit to the association in several ways, and is also an argument in favor of the increased size of working committees as well as for an increase in associate members. The increase

in number of associate members during the last year sets a high mark for this year's associate membership committee, but the rearrangement of this associate membership committee work, by which each of the affiliated associations will have its own committee on associate membership, should noticeably increase the efficiency of this branch of the work.

The engineering association was never in better condition than now to produce the best results with its organization. It is safe to say that it has before it this year more live subjects than ever before, as well as the best facilities for investigation of these matters that it has ever had. Developments are occurring so rapidly that it is extremely difficult to keep abreast of the advance, to select the important matters and to treat them rapidly enough and with sufficient care to make the conclusions both valuable and timely. It is only by broadness of view, co-operative effort and business methods that this can be accomplished, and these conditions we are more nearly approaching each year. This year will, without question, add its full share of advancement to the total progress of the Engineering Association.

THE AMERICAN ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

BY WILLIAM H. FORSE, JR., PRESIDENT

The first recorded meeting of a national body of street railway accountants was the one held at Cleveland, Ohio, in March, 1897, when the Street Railway Accountants' Association of America was organized. This was the predecessor of the organization known since the Atlantic City convention of 1910 as the American Electric Railway Accountants' Association. The arch which spans the years between may be said to represent the development of street and interurban railway accounting in America. At that first meeting the organizers wisely selected as the keystone of the arch, "A Standard System of Accounts and Form of Report." This keystone has well fulfilled its purpose by serving as a strong center about which are grouped the other features of the association work.

The association's committee on standard classification of accounts and form of report has rendered valuable service during the past decade. It has assisted the electric railways of the country in bringing order and uniformity out of what was formerly chaos in records and accounts. The committee is still actively engaged in constructive work. When the Interstate Commerce Commission was preparing the classifications of electric railway accounts which became effective on Jan. 1, 1909, the committee was in session for days at a time with representatives of the commission, and the commission makes acknowledgment in its printed classifications of the aid rendered by the committee in formulating these systems of accounting.

As an outgrowth of the committee's assistance in the preparation of the Interstate Commerce Commission classifications there is at present a permanent working arrangement between this association and the commission. The arrangement provides that when any electric carrier submits a question under the classifications of the commission the question and the proposed reply of the commission shall be first submitted to the members of the classification committee. Each member of the committee considers the question and if any inconsistency or unreasonableness is manifest in the proposed reply the subject is further discussed and a unanimous opinion agreed upon before the reply is finally sent to the railway and the case embodied in the official bulletins of the commission. The arrangement has resulted in decisions which are practical rather than purely technical. Every railway is benefited by the clearness with which perplexing questions are interpreted.

During the past two years valiant work has been done by a committee of our association working jointly with a committee of the Engineering Association. The appointment of this committee was an expression on the part of the associations of

the desirability for a closer working relation between them. At the 1908 convention the president of the Engineering Association delivered an address on the relation between the engineering and accounting departments which indirectly brought about the appointment of this committee. The report presented by the committee at the 1910 convention treated in an able manner the subject of cost accounting as expressed by subdivisional accounts, shop orders and the detail forms and records in connection therewith. The committee has been enlarged and continued during the coming year, and it will continue to accumulate data of value to the member companies of the association. Power costs, shop records which shall provide reliable units for ascertaining costs of repairs, and the broad field of manufacturing cost, with due regard to overhead charges, are a few of the studies which will probably engage the attention of the committee.

At the first convention of the Transportation & Traffic Association, which was held in 1908, a paper on the subject of "Freight and Express Traffic" was presented and discussed. The importance of uniformity in accounting for the revenue and expense of this service was at once recognized and much interest was manifested in considering the bases from which to arrive at the proper conclusions. The same subject was discussed in the 1909 and 1910 conventions of that association and it has been constantly realized that the subject is one of great importance. In view of the experience of the steam railroads in endeavoring to secure adequate cost records of particular classes of service it is not at all unlikely that considerable difficulty will be encountered in blocking out a system of accounting for the purpose of arriving at the real cost of handling freight and express traffic on electric railway lines. Nevertheless, it is a fact that if a uniform plan is agreed upon and consistently adhered to by the numerous electric railways engaged in this business, it will greatly assist the owners and executive officers in making comparison year by year of widely separated properties operating under different conditions. To gather all possible data upon this subject a joint committee composed of three members of the Transportation & Traffic Association and a like number of accountants has been appointed with instructions to prepare a report for the next convention. The task of the committee will primarily be to outline a plan that can be used by electric railways in uniformly computing the revenues and expenses of freight and express traffic.

The work of the joint committee will no doubt be facilitated by the special investigations to be made by the newly appointed committee on car miles and car hours. There is a wide field of usefulness for this new committee. It is impracticable and of little worth to make comparisons of costs per car mile and revenue per car mile without taking into consideration the varying factors which go to make up the unit. For example, the mile made by a heavy interurban motor car and the same distance traversed by a single-truck small-town car or by a modern prepayment type car of the large city cannot be intelligently compared unless tonnage and other features are taken into consideration. There must also be considered the trailer car mileage, non-revenue mileage, etc., in order to secure valuable data. The new committee on this subject will investigate and make recommendations for uniform practice in the preparation of such statistics.

The interurban lines which exchange traffic, both freight and passengers, have received particular attention from the committee on interline accounting, which presented a report at the 1909 convention outlining a system of accounting for interline transactions. The committee has been continued for the coming year and will take up the new problems which arise in connection with this subject. Attention will also be given to details not mentioned in the 1909 report, which was a general treatment of the subject.

It has been the policy of this association to study some phases of accounting through the appointment of committees, while other subjects are treated in the form of papers prepared by accountants who are qualified by experience to present valuable ideas. It has also been occasionally found advisable to

invite persons outside of the association to contribute to the convention programs. It had been planned to have a paper on the subject of "Overhead Charges" by Dean M. E. Cooley, of the University of Michigan, at the 1910 convention, but the author was unavoidably detained. This is a subject of considerable interest to accountants and may be discussed at the next convention. Two of the papers which were read at the last convention had not been printed for distribution at the convention, as is customary. These were the papers entitled "Accounting Features of the Cleveland Street Railway Franchise," by Henry J. Davies, secretary Cleveland Railway Company, and "Census and Electric Railway Statistics," by W. M. Steuart, chief statistician for manufactures, Bureau of the Census. The papers contained so many valuable data that they have since been published in one pamphlet and distributed to members of the association.

Our executive committee will meet during the latter part of January and until then no definite plans for the next convention program can be announced. It has been suggested that a paper describing the problems in the accounting of a small property will be interesting, because of the ingenuity required in simplifying records and forms. Methods adopted through sheer necessity for simplicity are sometimes found surprisingly valuable as eliminating waste and shortening labor. The problems of the little company, when well solved, are everywhere interesting, for the accountant who can, with due regard to clarity and accuracy, accomplish most in the elimination of waste and the shortening of labor best deserves the title "American Electric Railway Accountant."

THE AMERICAN ELECTRIC RAILWAY TRANSPORTATION & TRAFFIC ASSOCIATION

BY H. C. PAGE, PRESIDENT

The outlook for the work of the Transportation & Traffic Association in 1911 is most attractive. Although the association is in only the third year of its existence, the importance of its field is being widely recognized, and the large and enthusiastic attendance upon its meetings at the recent convention of the organization demonstrated many possibilities of usefulness to the industry as a whole. An excellent start in the coming year's activities has been made by the executive committee, which met in the general offices of the association in New York on Nov. 22, nearly six weeks ahead of the customary time of beginning preparations for the next convention. Present at this meeting were J. N. Shannahan, C. E. Learned, C. D. Emmons, J. V. Sullivan, A. Gaboury and the writer, only two of the committee members being absent in the representation of the entire country. This full attendance enabled the work in sight to be gone over in a comprehensive manner, and the subdivision of duties among the various committees of the organization was discussed in considerable detail. The executive committee desires to keep in the closest touch with the work of all topical committees and from the beginning has exercised a general direction of activities which will unquestionably tend to bring about positive results through the co-operation of those responsible for the detailed investigation of assigned subjects.

COMMITTEE ON SIGNALS

An important task is to be undertaken by this committee, which has come into being this fall for the purpose of investigating in a broad way the many pressing and interesting problems connected with the safeguarding of traffic. In conjunction with a corresponding committee of the Engineering Association, the committee will make a thorough study of systems of signaling and dispatching in present use on high-speed electric railways throughout the country, including interurban, suburban, elevated and underground lines. Both automatic and manually operated block signaling are to be reviewed, and a special effort will be made to set forth the principles

which bear upon a maximum of safety in the operation of electric railways. The formation of a committee on this subject arises from the belief held by many operating officers that too great a diversity exists in apparatus and methods for the safeguarding of traffic, and that the influence of localities is less important in signaling and dispatching than in many other branches of electric railway service. In other words, given the same conditions of alignment, grade, speed and frequency of cars, a system of signals applicable to the movement of traffic in Ohio ought to be equally useful in New Hampshire or New Jersey. The advantages of taking a few steps toward more standard equipment and methods need not be enlarged upon except to emphasize the tendency toward safer operation which must result from greater uniformity, particularly at intersection points of different railway lines. The use on a single road of a number of signals greatly diversified in type is a source of great inconvenience to transportation employees.

COMMITTEE ON PASSENGER TRAFFIC

On the floor of the 1910 convention the point was well made that too little consideration has thus far been given to the problems of increasing the every-day or routine business of electric railways, in view of the extensive discussions which have centered around the development of pleasure riding, excursion business and extraordinary demands of one kind and another upon the operating organization and its equipment. The executive committee feels that there is an opportunity here for work of the most suggestive character, including the consideration of methods of encouraging short-distance riding, admittedly highly profitable to operating companies, the meeting of competition in local and suburban service, and, in general, the adaptation of transportation facilities to the life of specific communities in such a way as to draw out the highest annual per capita patronage. While the detailed problems which this committee will investigate this year have not yet been set forth, the work will be directed along the foregoing lines in the hope of securing recommendations which will be of value in enabling the member companies to enlarge their regular business and still further to remove electric railway service from that point of view which considers even short rides a luxury, and to bring it still closer to the list of vital necessities of modern life in the public mind.

COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC

The growing importance of electric railway freight and express service renders the work of this committee of great interest to the member companies. The work of the coming year will be directed along the lines of promoting the general advancement of the electric railway as a common carrier within the special fields in which its rapidity, accuracy and reasonable cost of service enable it to perform a unique duty to the community; of bringing home to sections at present without a large express development the results which may fairly be anticipated from such service, and of making a thorough investigation of the various State and municipal requirements and regulations bearing upon this branch of the business. The great variety of regulations now in force in different localities tends to create unnecessary burdens upon the companies and to hamper the full and free development of the service as a highly organized modern convenience. The committee will endeavor to frame a set of rules and regulations which it considers reasonable, and will sift in detail the satisfactory and troublesome features of existing regulations drawn from many parts of the country.

SPECIAL COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTS

At the meeting of the executive committee in New York in November it was voted to form a special committee of three members on the important subject of express and freight accounting. This is now in process. The committee is to confer with the corresponding committee of the Accountants' Association regarding the proper methods of keeping records of the earnings and expenses of express and freight departments, going further into details than was possible in the report of the committee on freight and express traffic to the 1910 con-

vention of the association. It is generally recognized that without a fairly accurate knowledge of the cost of providing specific express and freight services there can be no intelligent development of such business in the future, and no satisfactory basis for the maintenance, change or defense of existing rates. The handling of merchandise within special fields is destined to become a fundamental source of electric railway revenue within a comparatively few years, and the importance of adequate accounting methods particularly suited to the size of the property involved needs no further comment. It is indisputable that not a few companies are at present furnishing the public with an efficient express and freight-handling service without certain knowledge of the extent to which the facilities maintained are profitable. This was thoroughly appreciated by the 1910 committee.

COMMITTEE ON TRANSFERS AND TRANSFER INFORMATION

Important work awaits this committee this year in carrying the report of the 1910 committee further afield, namely, in an investigation of the relation of the transfer to the operation of prepayment cars; in the study of the percentage of waste resulting from the practice of dating transfers and punching out the date before the conductor's period of service begins, and in the study of existing laws relating to the transfer. The able paper on transfers read at the 1910 convention has done much to stimulate work along these lines, and the great importance of the transfer problem in relation to operating revenue and a reasonable return upon the investment in the properties justifies the expenditure of a large amount of time and energy upon it.

COMMITTEE ON TIMETABLES AND SCHEDULES

The work of the past year will be continued by this committee, and some matters of definition will be taken up, notably that of the words "tripper" and "extra," in addition to previous definitions of traffic terms bearing directly upon the important matter of schedules. Other topics to be discussed by the committee will be, the best methods of ascertaining schedule speed, problems bearing upon meal reliefs, the revolving extra list, and a complete study of schedules and timetables as applied to interurban railways.

COMMITTEE ON THE TRAINING OF TRANSPORTATION EMPLOYEES

Efforts to improve the quality of transportation employees will constitute the foundation of this committee's work in 1911. The important question of permanent records of trainmen and others will be considered; the determination of the minimum proper breaking-in period for both city and interurban service will be attempted; the maintenance of records during this period, and State and national regulations affecting the employment of trainmen will be investigated. On account of the intimate concern which the public has with the subjects of both this and the preceding committee's work, a thorough study of the topics assigned in each case is anticipated, with permanent recognition of the possible benefits to be gained by the service from the strengthening of weak spots in the selection and training of car service employees.

COMMITTEE ON INTERURBAN RULES

Prepayment car service will occupy a prominent place in the discussions of this committee, and an effort will be made to formulate suitable rules governing trainmen on interurban lines who may be charged with the handling of equipment of this particular type. Conferences will be held by the committee with the committee on city rules, with a view toward eliminating points of conflict in the regulations of operating companies. The importance of governing all trainmen in the same general territory by rules which are consistent with a given operating policy is almost self-evident. Another conference session is planned for the committee with a committee of the American Railway Association, the topic for discussion being differences in the operating rules of steam and electric interurban railways. The possibilities of bringing the rules closer to a common meeting point will be considered, and, if feasible, recommendations will be made so as to take advantage of the best experience of both classes of transportation.

COMMITTEE ON CITY RULES

This committee will confer with that on interurban rules as above indicated, striving to secure a more uniform wording of rules having similar meanings, and endeavoring to improve the service jointly given by interurban and city lines on through routes. In view of the larger use of prepayment cars on city lines, even more attention will probably be given to rules for the operation of this type of rolling stock than was accorded it by the previous committee.

CONVENTION MATTERS

The writer desires to express his commendation of the plan of stimulating the growth of membership through the activity of the branches of the parent organization. The benefits which an associate member obtains for a nominal sum are very great. President Brady's influence in thus subdividing the growth of membership is deserving of much praise. The value of the papers, proceedings and privilege of attending the conventions is far beyond the cost to the associate member.

In conclusion, the writer desires to emphasize the importance of the member companies adopting a liberal policy in sending their men to conventions with positive instructions, in the traffic department, to take part in or at any rate to be in constant attendance upon the meetings of the Transportation & Traffic Association. If possible every man sent from an operating company should figure in some way in the proceedings, at least in attempting to take part in discussions, which are often the most vital features of conventions, since they bring out differences in practice in all parts of the country and enable united action to be taken with justice to all sections. Committee work is exacting and consumes valuable time, but companies which are willing to pay the cost of membership should be willing to do all that they can to insure the highest possible return on their investment. This means that officials should be permitted to take sufficient time from their regular duties to perform committee work, and where this is the practice a long step has been taken toward reaping the full benefits of membership.

THE AMERICAN ELECTRIC RAILWAY CLAIM AGENTS' ASSOCIATION

BY H. V. DROWN, PRESIDENT

The general manager of one of the big street railway systems remarked to a friend at the last Atlantic City convention: "If you want to get on a live wire, drop in at one of the Claim Agents' meetings." Had his friend acted on the suggestion he would have found a body of earnest men who had not left their busy desks at home with a feeling that they were going on a junketing trip at the expense of their companies. On the contrary they had come to the convention to work and learn, and to exchange with each other the results of their observations and experience.

Although the number of claim department representatives at the last convention was the largest since the organization of the Claim Agents' Association, which began with the getting together of a handful of men at St. Louis in 1904, there was apparently not a single absentee at any of the meetings. Could the executive officers of all the street railway companies of the country have attended one of our meetings, as did the general manager referred to, I am sure that each company would have at least one claim department representative at our next convention. It is a significant fact that practically all of the claim agents who have been regular attendants at our conventions and have gone into the work earnestly report a gradual decrease in their expenditures. Certainly no man can stand alone in this or any other complicated business, and the fact that these men have been constantly exchanging their best thoughts and ideas with other men who have been devoting the best part of their lives to the work must have

helped them greatly in achieving the excellent results which they have shown. The time has passed when the claim department was frowned upon as a necessary evil and profanely referred to as the "rat hole" of the treasury. Broad-minded executive officers to-day look upon the expenditures for accidents and damages much as they do on taxes or depreciation in rolling stock. They insist, however, that their claim departments be conducted in a clean, thorough and businesslike manner, to the end that the total expenditures for this account be minimized to the utmost and, at the same time, that the business be handled in such a manner as to promote confidence in and respect for the company and that the men engaged in the work be up to the minute with the latest and best methods. No man can keep up to date and fill these requirements unless he profits by the experience of others. To do this he must come in personal contact with the other men in his calling. Therefore, I cannot too strongly urge those claim men who have not attended our meetings to make every effort to join us in our 1911 convention. After they have once attended I am sure they will be with us each year thereafter. It is not likely that the executive officers to whom they report will refuse to send them as delegates if the matter is presented in the right way.

The papers read at the last convention and the discussions thereon were not only exceedingly interesting to members of our association, but attracted wide notice among street railway men in general. These papers were not hastily thrown together at the last moment. On the contrary they were the result of much thought and research. The subjects were assigned to the writers early in the year so that plenty of opportunity was given for careful study and the gathering of data. The subjects committee appointed this year is busily engaged in selecting subjects for papers at the coming convention. The members of this committee are especially well fitted for the work, and an excellent list of subjects will be made up, and men will be chosen to treat them who will furnish papers well worth while. Some of these papers will be founded on statistics gathered from all the member companies. I earnestly urge that all members reply promptly and fully to any inquiries for such statistical information so that the results may be of permanent value to us all.

Our association has endeavored to secure beneficial results for its membership along a number of different lines, but its most conspicuous efforts have been in the promotion of two radical movements, viz., the prevention and proper handling of accidents and the establishment of a national index bureau. The former has already given results of inestimable value in reducing casualties and increasing the efficiency of employees. When more fully developed through the general co-operation of the member companies the index or reporting bureau will without a doubt be the direct cause of substantial reductions in claim expenditures.

A great deal has been said in our conventions and a number of interesting and instructive papers have been written on accident prevention and instruction of employees, but the most earnest exponent of the work, and the man who probably had most to do with promoting it, is F. W. Johnson, of Philadelphia. Although others have done some work in this direction in recent years, he was apparently the first to take it up in earnest and make a comprehensive study of it, and many of his methods were entirely new. The results which he obtained in increasing the efficiency of employees, reducing accidents and increasing the number of witnesses obtained to accidents are now generally known. A great many companies, and practically all those that have had claim representatives at our conventions, are now carrying on this work in some form or other with marked success.

The movement for a national index bureau, more recently put into effect, has been for many years the claim agent's dream, but ways and means of establishing it were not in sight. It was with the idea that some plan could be devised for bringing it about that a few claim agents met in St. Louis in 1904 and

organized what is now the Claim Agents' Association. Nothing concrete was accomplished, however, at that time, as we were then not connected with the American Street & Interurban Railway Association, and our members lacked the full support of their employers. After our association was affiliated with the parent body, the proposition began to take form. Each year the desirability of a central reporting bureau which would be available to every member company was discussed. All agreed that such a bureau would be of tangible value and give the members something to which they could in later years point with pride and with satisfaction. All along H. R. Goshorn, general claim agent of the Philadelphia Rapid Transit Company, had taken a most active part in promoting the project, and naturally when a committee was chosen in 1908 to look into the matter he was put at its head. He devoted a great deal of time to a study of the situation, and it was through his efforts that the officers of the parent body became interested and were persuaded to give it moral and financial support.

Mr. Goshorn, as chairman of the index committee, reported to the 1909 convention at Denver that it would be more feasible and practicable for us to accept a very reasonable proposition made by the well-known and long-established Hooper-Holmes Information Bureau, of New York City, than to attempt to establish and maintain a bureau entirely of our own. Aside from the question of economy, a great incentive for accepting the Hooper-Holmes service was the fact that it had for many years maintained a bureau including practically all the accident insurance companies, most of the steam railroads and many of the trolley companies, thus covering the entire country, and that from these companies it already had in its files over 1,500,000 names of persons who had presented claims in accident cases. The proposition of this bureau was that, providing the parent body would contribute \$500 per annum, the bureau would index all claims reported to it at the rate of 5 cents each and would report immediately any duplicates found, giving the names of the companies against which claim or claims had been presented. The claims were to be reported by the various roads direct to the secretary of the American Electric Railway Association (H. C. Donecker, No. 29 West Thirty-ninth Street, New York City), who would, in turn, refer them to the bureau, the bureau to look to the secretary for payment. The secretary, in his turn, would bill periodically the companies reporting. The parent body looked so favorably upon the proposition that the executive committee voted to subscribe the \$500 per annum. The proposition approved by the Claim Agents' Association was accepted by the parent body, and the bureau is now in active operation. Any claim agent, or other claim representative of a member company, can now report his claims to the secretary, giving claimant's name, age, residence, occupation and date of accident, and he will immediately be notified if duplicates are found showing that any claimant has previously been reported as having had a claim or a damage suit.

To make this reporting service a complete success, *every* personal injury claim must be reported. It should be, and by this system can be, made almost impossible for a duplicate claim for personal injury to be made in this country against a street railway company without the various companies interested being immediately acquainted with the fact. This sounds like a big and expensive proposition, but, on the contrary, when analyzed it is found to be extremely simple and surprisingly inexpensive. The Public Service Railway Company of New Jersey, which I represent, has reported every personal injury claim presented for more than a year past, and although our system is a large one, as we cover practically all of the State of New Jersey, I have found the task of reporting all our claims very simple. It involves but a few moments' work each day and the cost is trifling compared with the excellent results obtained. To demonstrate how inexpensive it is, figure all your personal injury claims for a year at 5 cents each. You will find the total less than you often pay to dispose of

one unimportant claim. For the smaller roads the amount is very trifling. In considering this proposition the accident faker, so-called, plays a small part, for there are few such, but there are a great many among the traveling public and those persons who migrate who have been paid by some corporation for injuries real or feigned, and in the event of their meeting with other accidents they are almost sure to attempt to palm off the old injury. Every claim agent knows how effective in settlements or trial is the production of evidence proving a previous injury or physical defect. It often wipes out the claim altogether and invariably reduces it to a minimum.

Of course the longer this bureau continues the more valuable it will be to us, but from the very start it has proved itself to be an exceedingly good investment. The companies who have already taken advantage of it in real earnest report that the help they have received from the accident insurance and steam railway companies alone has paid them many times over on their investment.

There are many other questions bearing on our work that I should like to discuss, but lack of space forbids. I wish, however, in the few remaining lines allotted to me earnestly to urge all claim men to co-operate heartily with one another whenever and wherever possible. If you have witnesses to locate, claims to adjust, or information to be got somewhere out of your territory and in that of a brother claim agent, request him to attend to the matter for you, and, of course, to bill you for any expense incurred. I know it is quite unnecessary for me to ask all claim agents receiving such requests to put forth their best efforts in seeing that the work intrusted to them is properly executed. By co-operating in this manner you will make substantial savings for your companies, and the work will be more satisfactorily handled by the local men acquainted with the territory, conditions and people. Whenever in your travels you find yourself in a brother claim agent's territory, look him up and get acquainted. You will find yourself better off for having done so. Give the various committees and the individual members of our association to whom subjects have been assigned all the help you can in their work. By all means make every effort to attend our conventions. It will give you new life and confidence to mingle with the boys assembled there from all parts of America. You will not only profit by hearing the papers read and discussed, but you will have no trouble in getting some of the boys aside between sessions and threshing out the problems that have been troubling you most. I am sure you will learn something worth while, certainly more than enough to compensate for the expense of the trip, however long it may be, and for the loss of your services at home for a few days.

PAYMENTS UNDER CORPORATION TAX LAW

The annual report of Royal E. Cabell, commissioner of internal revenue of the United States, covering the fiscal year ended June 30, 1910, gives some details of the amounts of special excise tax paid by corporations. The total taxes paid are divided into five classifications as follows: Class A, financial and commercial, \$2,663,419; class B, public service, \$6,299,046; class C, industrial and manufacturing, \$9,130,896; class D, mercantile, \$1,731,208; class E, miscellaneous, \$1,135,214; total \$20,959,783.

The public service corporations included in Class B comprise the following classes of properties: Railroad, steamboat, ferry boat and stage line companies, pipe line, gas and electric light companies, transportation and storage companies, telegraph and telephone companies. The number of returns received from corporations of Class B was 24,252. The amount of capital stock of such corporations was \$18,902,060,130 and the amount of bonded and other indebtedness was \$14,472,398,675. The net income of such companies for the year was \$808,960,651.

ELECTRIC TRACTION IN GREAT BRITAIN

BY A SPECIAL CORRESPONDENT

The year 1910 has not, on the whole, been a bad one for electric traction in this country. The weather, that all-important factor in regard to earnings, though not by any means ideal during the year, was better than in either 1909 or 1908, and the various reports published by undertakings all over the country tell of increased gross earnings. Trade also has improved, and if the Board of Trade returns are to be taken as an index it would seem that we are in for better times. The very first to feel the effects of trade revival are invariably the country's tramways.

Owing to the unsettled political conditions, very few new promotions were recorded, most systems being satisfied to apply for small extensions of their existing lines. The London County Council, as usual, led the way with about 15 miles of new lines, a mileage doubtless small to American ears, but in these strenuous times in England quite a respectable addition.

The first overhead line in Great Britain was opened in Leeds in January, 1893.

STATUS OF EXISTING LINES

The total length of tramways now open for traffic is just over 2500 miles (of which 2360 are electric, 48 steam, 28 cable, 4 gas motor and 84 horse). Of these, 1679 miles are owned by local authorities and 846 miles by private companies. The original purchasing periods under the Tramways Act of 1870 are in many cases nearly reached, and these figures are likely to be changed in the near future in favor of municipalities, although a big field still remains open for private enterprise, by way of joining various systems and extending urban tramways into country districts.

The largest system in the kingdom is that owned by the London County Council, with about 130 miles of route; next comes the Manchester Corporation system with over 100 miles, and next the Glasgow Corporation system with about 95 miles.

The London County Council opened its first line from Westminster Bridge to Tooting in 1903. From that time onward it gradually acquired lines from the old London Street Tramways, the North Metropolitan Tramways, the London Tramways, the South Eastern Metropolitan Tramways, the South London Tramways, the London, Deptford & Greenwich Tramways, the London, Camberwell & Dulwich Tramways, the Woolwich & South East London Tramways, and the London Southern Tramways. These are being gradually electrified, and the lines now owned by the Council consist of about 75 miles on the conduit system, about 10 miles on the overhead system and about 45 miles of horse tramways, including lines in process of reconstruction.

The generating station was partly opened in 1906 and extended in 1909. The plant includes four vertical horizontal reciprocating engines, coupled to three-phase alternators of 3500 kw capacity each, and four three-phase turbo-alternators of 5000 kw each. Substations are scattered all over the districts, provided with motor generators of a total capacity of 43,100 kw, which change the current to 550-volt direct current. The Council has about 1200 cars; the revenue in 1909 was £1,539,434. The car mileage run was about 32,000,000 car miles and 345,000,000 passengers were carried.

One of the features of the year 1910 as regards tramways is the fact that the first lines on the trackless trolley system were sanctioned by Parliament. In 1909 a large number of municipal corporations and companies had applied for powers to run trackless trams. But, as this was a novelty and the powers that be had apparently not come to any definite decision in regard to the procedure to be adopted, the bills were withdrawn and nothing was done. During 1910, however, the towns of Leeds and Bradford obtained their powers, and a considerable number of others are now following suit, including Newcastle, Halifax, Northampton, Brighton and Rotherham.

It is not generally recognized how complete a network of tramways has gradually developed in certain districts, and as

an illustration of this it may be stated that a passenger can now ride uninterruptedly by tramcar from Liverpool, through Manchester, as far as Leeds.

Another interesting feature of the times is the supersession by the trolley system of other forms of electric traction where these existed. At Torquay the Board of Trade has quite recently agreed to the removal of the existing surface contact system, and the overhead system is in course of construction. The lines between Rawmarsh and Mexborough in Yorkshire have already been converted. At Hastings the matter is under consideration. At Bournemouth a decision has also quite recently been come to to remove the conduit system and to set up the overhead wires which during so many years it was declared would never be tolerated. Edinburgh, the home of the cable tramways, is building extensions on the overhead system. The Highgate Hill cable tramways, in London, disappeared last year, and slowly but surely the popular trolley is pushing its way into London, where already short bits of lines have appeared, as mentioned above, and powers are being taken to construct more.

PRESENT-DAY PROBLEMS

The antagonism between local authorities and privately owned tramways is gradually giving way to a better understanding. It is felt that the interests of the two as regards tramways are identical on many points, and co-operation and friendly working are becoming increasingly evident. This is due chiefly to the fact that existing tramway legislation bears harshly upon both. The famous veto vested in local authorities, giving them power under certain conditions effectively to block future construction, has long been a bone of contention. At first only the companies felt the pinch. Now, however, when local authorities are promoters as well as companies, the hardship falls upon them as well. The London County Council, for instance, has yearly to face the uncompromising opposition of the neighboring local authorities when seeking to extend, or to unite, portions of its existing lines. This obstruction not only delays the expansion of the tramways, which are badly needed by the public, but it affects the economical working of an imperfectly laid-out whole. There has long been a feeling that the present procedure was unbusinesslike and unscientific, and the Royal Commission on Traffic as far back as 1904 gave voice to this feeling by recommending to the government the advisability of modifying, or of altogether abrogating, the existing veto of the local authorities. No effect has, however, been given to this recommendation so far.

The question of running powers and inter-running is also responsible for bringing former opponents into closer touch, and a policy of mutual "give and take" has in a great number of cases resulted in mutual advantages to both parties.

As the tramways of the country grow older, the all-important question of repairs and renewals forces itself to the front. Every engineer and manager responsible for the financial success of his undertaking is faced with the problem of devising methods whereby the ever-increasing expenditure under these heads may be met by an equivalent increase in earnings or by cutting down the working expenses to the lowest possible minimum compatible with the maintenance of an adequate service. The mere suggestion of increasing fares is invariably met by a storm of protest from both public and press, although it is a fact that the fares actually charged are a good deal lower than the maximum fares chargeable under the parliamentary powers obtained.

Various expedients suggested themselves, such as offering the public inducements to ride by the issue of return tickets at slightly reduced fares, altering existing stages to meet local requirements, issue of season tickets, etc. There was even a suggestion that a new coin of the realm be issued in order to meet tramway requirements. One of the larger undertakings in the kingdom inaugurated a system designated by the name of "fair fares," which is being extensively tried at the present moment. The idea is to issue tickets not, as heretofore, for specific stages, but available from any spot on the line, whence a passenger may ride a given distance for the smallest coin issued,

namely, one farthing. These farthing stages are marked out by a system of painting the poles, and the passenger may ride as many farthing stages as he pleases, thus securing the full-value possible for his money. The system is reported to be meeting with a considerable amount of success.

In order to reduce working expenses managers have been studying very closely the question of car meters on tramcars. The savings recorded in the amount of current consumed resulting from the use of these instruments are in some cases quite startling. Hour-meters, so popular on Continental lines, were the first meters to be tried, but they are gradually being replaced by watt-hour and ampere-hour meters. It is claimed for these instruments that not only do they very considerably reduce the amount of energy consumed, but that they at the same time teach drivers to drive more scientifically, with the result that great savings are effected in the life of the various parts both of the rolling stock and of the permanent way. It has been stated that whereas 12 months ago only about half a dozen lines used car meters over 60 now use them extensively. One of the latest reports at hand indicates that in the case of a good-sized undertaking the use of ampere-hour meters resulted in a saving in current consumption amounting to £6,000 for the first year. That this is a question of increasing interest to tramway men is clearly shown from the fact that at every recent meeting of the various tramway associations papers were read upon the subject.

Another question of great importance, the solution of which has yet to be found, is that of rail corrugation. This is causing grave anxiety to many managers who are face to face with the unpleasant fact that the life of their rails will apparently be of very much shorter duration than was at first anticipated. Nor can this anxiety be wondered at since the track is the most vital portion of the entire system. The disease, as corrugation is aptly termed, is of comparatively recent date, for although it was known in the old days of steam tramways and railways the introduction of electric traction has enormously increased its evil workings. The subject has also become a "hardy annual" at tramway meetings and congresses, but, although forms of inquiry without number have at various times been issued to managers by the various associations and other technical bodies, no conclusive replies have been forthcoming.

The latest published report of the replies received from over 70 Continental undertakings carries the matter no further, and the consensus of opinion still points to the eight following causes as being the chief offenders: (1) Composition of rail metal, (2) unduly hard metal tires, (3) too sudden application of brakes, (4) rapid acceleration, (5) high speeds, (6) side rolling of cars, (7) curves of large radius, (8) nature of foundations.

It became increasingly evident that the gravity of the subject demands that it should be dealt with scientifically. A combination of the various constituent associations agreed to delegate to a selected body of experts of wide experience the task of thoroughly investigating the whole question, and with that end in view various public bodies subscribed considerable sums of money in order to enable the committee of investigation to carry out the necessary tests and experiments. In England the matter is at the present moment the subject of an extensive inquiry organized by the Municipal Tramways Association, which invited representatives from the other British tramway associations to join in the researches. It is understood that the committee is being financially assisted by some of the leading cities where corrugation is most keenly felt. At a public meeting held not very long ago the general manager of the Glasgow Corporation Tramways stated that corrugations cost it from £10,000 to £15,000 annually.

TRAMWAY ASSOCIATIONS

The tramway industry in Great Britain is served by two associations, the Municipal Tramways Association and the Tramways & Light Railways Association. There is also an Association of Scottish Tramway Managers, the laws of that country relating to tramways being somewhat different from the English law.

The Municipal Tramways Association, as its name implies, is formed of the various municipal tramways in the kingdom, their managers and other officials. It has a membership of about 200. Every year during the month of September this association holds a three days' conference, at which papers are read and discussed. These conferences are very well attended. The corporations of the towns at which they are held offer their hospitality to the members, and this usually includes a public banquet at the town hall. It is this association which is carrying out by means of a special committee the investigation into rail corrugation mentioned above.

The Tramways & Light Railways Association is more catholic in its composition and numbers among its members, in addition to every tramway company in the kingdom, several leading municipal tramways, engineers, officials and manufacturers. It has a membership of from 300 to 400 and has the Duke of Argyll as its president. The work of this association is done by means of special committees appointed to carry out special work and to report thereon to a council consisting of 20 representative members.

Both of the above associations issued in 1908 exhaustive reports on the question of brakes for tramcars, which have since become quite classical works. They have also been instrumental in agreeing with the Board of Inland Revenue on a standard method of assessing tramway undertakings for income tax purposes. One of the special committees submitted a carefully worked out report, with the result that a representative of the Board of Inland Revenue attended some of its meetings, and the above-mentioned agreement was reached. That this has been productive of much good is proved by the fact that two of the leading tramway companies were credited with from £4,000 to £6,000 each, representing moneys paid in excess of the amounts really due to the government in past years, owing to the want of uniformity previously existing in the methods of assessing. Other undertakings were, of course, less fortunate, since it must obviously happen that where no standard exists some benefit while others suffer. Any disadvantages which may have accrued, however, are fully compensated for by the fact that at present each undertaking knows exactly in what form to submit its accounts to the local surveyors.

It may be of interest to describe very briefly the basis upon which this arrangement was arrived at. The life of the permanent way was calculated on a basis of the number of car miles run thereon, working out at 12, 14 or 16 years respectively. A fixed sum, amounting to £4,400 per mile of single track, was then allowed for renewals, as a deduction before arriving at the net amount to be assessed. In addition, allowances of 5 per cent were allowed on the cost of plant and machinery, 3 per cent on cables, etc.

The associations are now engaged upon similar work in regard to the question of rating, and one of the special committees is going into the matter of existing tramway legislation with a view to obtaining amendments thereto which it is hoped may benefit the industry generally.

Another subject being dealt with at the present moment by a joint committee of the Municipal Tramways Association and the Incorporated Municipal Electrical Association refers to the charges to be made for electrical energy. The committee is appointed to consider and report upon a suitable scheme for the measurement of and charging for energy supplied by combined stations to tramway departments and the method of checking the meters used for recording such supply.

It is a matter of great satisfaction that the various government departments meet the representations of the associations with unflinching fairness and courtesy. There have been innumerable cases in which, thanks to the united action taken by tramway undertakings in delegating their grievances to their associations, these have been either redressed or considerably mitigated. It is not surprising that the various government departments should infinitely prefer to deal with one or two thoroughly representative bodies rather than with numerous separate units working unsystematically on different lines.

The value of combined action is so generally recognized that in the last few months a further body has come into being under the somewhat bulky name of the Committee for the Protection of Electrical Interests. This committee consists of some 80 members representing the leading electrical interests in the country. Other institutions and associations, representing special sections of the industry, have joined this committee, which is intended to be the meeting ground for all. One of its first acts was to arrange that a certain number of members of Parliament should be available to represent electrical interests in Parliament in the event of future legislation affecting the electrical industry. The organization is, of course, entirely non-political.

The procedure to be gone through in order to obtain Parliament's sanction to the construction of new tramway lines is both cumbersome and costly, and with a view to simplifying this procedure under certain conditions the Light Railways Act in 1896 was passed. It was hoped that by means of this act the country would soon be covered with a network of light railways somewhat on the lines obtaining in Belgium and other countries, where both agricultural and manufacturing districts are advantageously served to the great benefit of the community at large. The act has now been in force 14 years, but an official report recently published shows that the hopes then raised have not been realized. Out of a grand total of 600 applications for the construction of lines under this act 380 orders were granted, but the records show that of this total only 95 are actually constructed or in course of construction, representing 409 miles laid on private grounds and 327 miles laid on public roads. Of this total of 736 miles 333 miles are electric and 403 miles are steam.

It will scarcely be maintained, therefore, that the act of 1896 has proved an unqualified success. Indeed, the Light Railway Commissioners themselves, in the course of their last report to the government, state that in their opinion the act needs revising.

HEAVY ELECTRIC TRACTION

Turning from tramways and light railways to the heavier lines of electric traction it is evident that in this field we stand on the threshold of very considerable developments.

The last 10 years have completely revolutionized the traffic problem in London, which is now served from end to end by a system of electrically worked tube and underground railways. The two old steam "Circle" lines are now worked electrically, and half a dozen new electric tube lines, having through-booking arrangements with all connecting lines, enable the Londoner to travel from and to any part of the metropolis with ease, comfort and celerity. Above ground, too, the successful experiment of the London, Brighton & South Coast Railway in electrifying its line from Victoria Station to London Bridge will doubtless be followed by other trunk lines in order to deal with the suburban traffic.

The following is a list of the electric railways working in England to-day. They may be classified under the headings of (1) London and district, (2) provincial.

I. THE LONDON AND DISTRICT LINES

(1) The group controlled by the Underground Electric Railways Company of London, Ltd., about 100 miles of line, consists of:

(a) Metropolitan District Electric Traction Company: Opened for traffic in 1884 as a steam line; converted to electric traction in 1905, with a route mileage of 24 miles of double track; 161 motors and 198 trailers; third and fourth rail system.

(b) Charing Cross, Euston & Hampstead Railway: Opened for traffic 1907; 2 circular iron-lined tunnels, 11 ft. 6 in. diameter; 8 miles double track; 60 motors, 90 trailers; third and fourth rail system.

(c) Great Northern, Piccadilly & Brompton Railway: Opened for traffic, 1906; 2 iron-lined tunnels; 9 miles double track; 72 motors, 146 trailers; third and fourth rail system.

(d) Baker Street & Waterloo Railroad: Opened for traffic 1906; 2 iron-lined tunnels; 5 miles double track; 36 motors, 72 trailers; third-rail system.

The power house for these lines is at Chelsea; the total h.t. system when complete will equal 156 miles, or 363 miles, including associated companies. The company also has a controlling interest in the London United Tramways, which operates about 54 miles of tramways in the southwestern suburbs of London and there are through booking arrangements with all connecting railways.

(2) Central London Railway: Opened for traffic 1900; 1 tunnel; 6 miles double track; 66 motors, 172 trailers; third-rail system.

(3) City & South London Railway: Opened for traffic 1890; 2 cast-iron ring tunnels, 10 ft. 6 in. diameter; 8 miles double track; 52 locomotives, 170 trailers; third-rail system.

(4) Great Northern & City Railway: Opened for traffic 1904; 2 tunnels, 16-ft. diameter; 3 miles double track; 32 motors, 44 trailers; third-rail system.

(5) Hammersmith & City Railway: Opened for traffic 1906; 4 miles double track; third and fourth-rail system.

(6) Metropolitan Railway: Opened for traffic originally as steam line, converted into electric traction 1905; 26 miles double track; 130 motors, 210 trailers; third and fourth-rail system.

(7) Waterloo & City Electric Railway: Opened for traffic 1898; 1.5 miles double track; 17 motors, 12 trailers; third-rail system.

II. PROVINCIAL LINES

(8) Lancashire & Yorkshire Railway: Converted to electric traction 1904; 37 miles of route; 62 motors, 52 trailers; third-rail system.

(9) Liverpool Overhead Railways: Opened for traffic 1893; 6½ miles double track; 44 motors, 7 trailers; third-rail system.

(10) London, Brighton & South Coast Railway: About 9 miles of route between London Bridge and Victoria Station; opened for traffic 1909; overhead high-tension transmission system; single-phase, 7000 volts; current taken from one of the London Lighting Companies' power stations. In the 1911 session of Parliament the company will seek powers to electrify a further instalment to the Crystal Palace.

(11) Mersey Tunnel Electric Railway: Connecting Birkenhead with Liverpool; converted to electric traction in 1903; 4½ miles double track; 24 motors, 37 trailers; third and fourth-rail system.

(12) Midland Railway: A section of this company's line was electrified in 1908; about 9 miles double track; run in connection with the electrified Burton & Ashby Light Railways, 10 miles; 3 motors, 6 trailers; single-phase, overhead system.

(13) North Eastern Railway: A section of this company's lines was electrified in 1904 in Newcastle-on-Tyne and neighboring districts; 2 miles of four track, 35 miles double track, 4 miles single track; 62 motors, 44 trailers; third-rail system.

As regards the future, the promotions notified for the year 1911 are more numerous than was the case last year.

Several of the existing electric railways in London are proposing to extend or to improve their systems by junctions with other lines, the addition of new stations, or otherwise. The London, Tilbury & Southend Railway seeks powers to electrify its lines. Between 20 and 30 tramway promotions are announced, some by existing systems seeking further extensions, others by new concerns, the majority of which advocate the railless trolley system. In addition there are about a dozen applications for provisional orders under the Light Railways Act.

THE MANUFACTURING INDUSTRY

The condition in the electrical manufacturing industry in Great Britain during the past year has been far from satisfactory. It has been a season of little work and low prices. Considerable has been done, however, in foreign trade in the sale of general electrical supplies, and the outlook is a little better than it was a year ago. The difficulty in Great Britain at present is that there is too much manufacturing capacity for the demand. If a general electrification of the railroads should

occur during the next five or ten years a great deal of work would have to be done, and this, of course, would put a new aspect on affairs.

THE ELECTRIC RAILWAYS OF GERMANY DURING THE YEAR 1910

BY A GERMAN ENGINEER

During 1909 the financial situation in Germany was so bad that most of the activities of the electric railways in that country were devoted to the maintenance of their properties rather than to extensions. During 1910, however, conditions improved so much that it was possible to build a large amount of new track and to introduce important betterments in rolling stock and equipment. It is fair to say that at this time the financial and operating conditions of the German electric railways are very sound indeed. These conditions are due partly to the stringent laws, particularly in Prussia and Saxony, which contain about four-fifths of all the electric railway mileage in Germany, and partly to the fact that the electric railway equipment business is controlled absolutely by four large companies, whose policy forbids both the manufacture of inferior goods and the encouragement of doubtful enterprises. No review of the electric railway situation in Germany would be complete without referring at some length to these four companies. They are as follows:

The Allgemeine Elektrizitäts-Gesellschaft (A. E. G.), including the German branch (Union Elektrizitäts-Gesellschaft) of the old Thomson-Houston Company; the Siemens-Schuckert-Werke (S. S. W.), which is a fusion of the Siemens-Halske and the Schuckert Works of Nürnberg; the Lahmeyer-Gesellschaft, of Frankfurt-on-Main, which recently combined with the Felten & Guillaume Cable Works; and finally the Bergmann Gesellschaft, Berlin, which first became noted for switch-board and power station work, but which has been making railway equipments also for several years past. Even these four companies are being subjected to further consolidation. Several months ago the Allgemeine Elektrizitäts-Gesellschaft purchased the Lahmeyer Company, and now the Siemens-Schuckert-Werke are contemplating consolidation with the Bergmann interests. Consequently, Germany will soon have only two important firms manufacturing railway apparatus. It is likely that the two companies will divide the territory with one another. All of the original Siemens lines use the sliding-bow collector, while most of the other railways are equipped with the under-running trolley.

The existence of these large companies and their willingness to spend a great deal of money for research gave the impetus to the great electrification plans of the several German State railways. The syndicate which was formed to carry out the famous Zossen tests of 1902 and 1903 no longer exists, but the results of its work are seen in the great projects of to-day. The main reason for the delay in the electrical equipment of the German State railways is the fear that in case of war an electric railway could be put out of operation much more easily than a steam railroad. Another reason is the lack of money. Despite the fact that the German Empire began its existence in 1871 with the French indemnity of 4,000,000,000 francs, the government debt now is fully as large as the indemnity, and little money is obtainable for developments. The large electrical companies have formed banking firms to loan money to the States and municipalities for railway development purposes at 4 per cent, but thus far little advantage has been taken of such offers.

INTERPOLE MOTORS AND DECREASE IN POWER COST

The most noteworthy features of the year in the street railway field proper have been the increase in mileage, the wide adoption of the interpole motor and the abandonment of a large number of small power stations, which have been replaced by large central generating plants. These small stations sold

electrical energy at 5 cents to 6¼ cents per kw-hour, whereas it is now possible in many parts of the Empire to buy 6000-volt, three-phase current for 1½ cents per kw-hour, and in some districts like Schleswig for even 1¼ cents per kw-hour. One of the largest of the new power stations is the Upper Schleswig Electrical Works, which were built by the A. E. G. in a great mining and industrial district. This station supplies energy at the rate of 12½ cents per kw-hour for the first 1000 kw-hours, and charges only 1¼ cents for each additional kw-hour. As the conversion cost adds but 15 per cent to 20 per cent to the prices quoted, the average electric railway is now enabled to hire power for less than one-half the former prices. This reduction in power expenses has made possible the construction of a considerable number of new lines.

The interpole motor has also been a factor in encouraging new construction, because its use permits much higher voltages on the suburban divisions. However, it has not been taken up as fully as it deserves. Its advantages are admitted, but its general adoption is delayed because its initial cost is about 15 per cent more than that of the ordinary type. Assuming that a motor car in Germany averages 40,000 car km (24,800 miles) a year, the increased cost means an additional fixed charge of 0.0325 cent per car kilometer (0.62 car mile). But it is also true that the better accelerating qualities of the interpole motor are not appreciated as they should be, despite the fact that they eliminate a great deal of brush and commutator trouble. In short, the further employment of the interpole motor is simply a question of lower prices.

The recent reduction of customs duties has encouraged some American manufacturers of electric railway material to enter the German market, and their advertisements appear quite frequently in German technical papers.

TRACK AND PAVING

Changes in the engineering and operating standards of German electric railways are reflected in the proceedings of the German Street & Interurban Railway Association. These changes include the standardization of rails, the use of new asphalt paving, cement block paving and new rail joints, including welded types, and improvements in motors. The standardization of rails, which has been described in detail in the *ELECTRIC RAILWAY JOURNAL* (see issue for Jan. 1, 1910), was very necessary, as there are still over 100 sections in common use.

The maintenance of asphalt paving constitutes one of the most costly repair charges in the large cities, excepting Hamburg, where the heavy vehicle traffic makes the use of asphalt impracticable. The paving in Hamburg consists of a foundation of concrete about 20 cm (7.8 in.) deep, covered with stone block 18 cm to 20 cm (7.1 in. to 7.8 in.) high. The joints are filled with bitumen. This paving is so durable that in many cases it does not have to be taken up until the stones have worn down to 4 cm (1.6 in.).

The Berlin street railway system finally has received permission to build parked tracks in very wide streets. Various forms of this construction have been described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 30, 1909, and Oct. 1, 1910. During the year several German railways tried the experiment of laying a line of wood block paving along rails in asphalted streets to avoid the disintegration and wear of the paving at the rails, but these experiments do not seem to have proved particularly successful.

Many improvements have been made in rail joints. The Melaun milled head type is widely used and is entirely satisfactory except for its high cost. The Goldschmidt thermit joint has also been perfected within the past year. This joint is used by many of the principal railway systems, which report that the breakages are only 1 per cent or less. It was formerly considered necessary to install expansion joints every 600 ft. to 980 ft., but this is no longer done, as the open joints at crossings and switches permit all the equalization necessary.

The inventors of the electric arc rail welding process have also improved their method, although this system has been

used so far to but a very modest extent. Its advantage is that the various joints can be treated individually so that defects can be corrected at once. Its disadvantages, however, as compared with the thermit joint are that it requires skilled labor and costly apparatus. The oxy-acetylene method also permits individual treatment of the joints, but has been adopted only to a very limited extent because it does not furnish heat enough to penetrate the rails deeply. This process has been found satisfactory for such light work as welding splice bars on joints.

Track construction on longitudinal stringers without ties, common in Germany, has proved unsatisfactory when used in streets with concrete paving. Attempts have been made to provide a stronger construction by using plates or cross-ties at intervals of from 6 ft. to 13 ft., or, in some cases, placing them under the joints only. These changes, however, do not seem to have brought the desired result because the character of the paving does not permit permanent uniformity in construction after service has begun.

CAR SERVICE, INTERURBAN MILEAGE AND FARES

The German municipal authorities, who are noted for their adherence to the letter of the law, are no longer so insistent regarding the conditions under which railways can carry standing passengers. Formerly standing was permitted only under certain conditions, such as inclement weather, after-theater hours, last-car schedule, etc., but these limitations are no longer enforced so inflexibly. The railways are now able to relieve the peak of the load by a little crowding. This crowding, however, is far from being as great as in American cities, because the average German would rather wait half an hour in the rain than travel in discomfort.

The number of miles of interurban railway track in Germany is increasing, principally through the extension of city systems. In some thickly populated districts these extensions now meet those of neighboring cities, so that it has become possible to travel considerable distances by electric railway. These connections have brought a welcome increase in traffic. The prosperity of these suburban and interurban lines is due to the improved economic condition of the people and the increase in the number of native summer tourists.

Fares have been raised in a number of cities, due largely to the fact that the initiative was taken in cities possessing municipal railways. The authorities in these cities have found that it is not possible to give good service at the low fares which many of the privately owned lines have been forced to grant. The increase in fares has been especially welcome, because German railways, like those in America, have had to face the situation of higher wages and increased prices for railway materials.

HEAVY ELECTRIC RAILWAYS

The electrification of the government railways, as previously noted, is making slow progress. The responsible engineering officials are thoroughly convinced of the engineering and financial merits of electrification under certain conditions as developed by their study of the work done in the United States. Their plans are handicapped, however, by their inability to obtain the money, which the government thinks it can use to better advantage elsewhere. The military objection previously mentioned is especially strong because the very lines which could most profitably be electrified are exactly those important highways which the government would want to keep open in time of war. Aside from the Hamburg-Altoona line, which is a local proposition, electrification has been begun on secondary roads only. Thus plans have been completed by the Prussian government for the electrification of the Dessau-Bitterfeld section of the Magdeburg-Leipzig railway south of Berlin. This line will be operated at 15,000 volts, single phase. The experiences gained on this line and on the Hamburg system will form a basis for the electrification of the Berlin belt lines, a project which would require about 250,000,000 marks (approximately \$62,500,000).

The Bavarian government is electrifying the Basel-Zell sec-

tion of the Wiesental Railway for operation at 10,000 volts, 15 cycles.

In addition to the foregoing extensive electrification plans, several German states, notably Prussia, Bavaria and Wurtemberg, are making considerable use of storage-battery cars on branch lines as described in the *ELECTRIC RAILWAY JOURNAL* for June 18, 1910. Most of these cars have a capacity of about 50 passengers. They are intended for lines of light traffic where only four to six steam trains have been operated daily. Gasoline and gasoline-electric cars have also shown successful results in this work, but the storage-battery cars are preferred wherever power can be bought cheaply and where the grades are not prohibitive. The increase in traffic shows that the public is greatly pleased with these cars. Most of the storage-battery cars are equipped with two 80-hp motors which operate at 310 volts. The latest cars have shunt-wound motors and regenerative control.

ELECTRIC RAILWAYS IN CANADA

BY J. L. PAYNE, COMPTROLLER OF STATISTICS, DEPARTMENT OF RAILWAYS AND CANALS, DOMINION OF CANADA

To the electric railway corporations operating in Canada the year 1910 brought marked and gratifying prosperity. This statement must, however, be accepted in the collective sense. They were not all prosperous. A few of the smaller roads failed to make ends meet and several others managed to show a merely nominal balance; but, grouping the 56 reporting companies together, they did a great deal more business than in 1909, increased their earnings substantially, added to their assets and broadened the foundations for successful work in the future.

Canada is a growing country. With a swelling tide of immigration from Europe and the United States, which this year will reach 325,000 souls, all commercial interests have been stimulated to a high degree. There is activity everywhere. The West—which we boastfully, and quite truthfully, speak of as “the last great West”—is rapidly filling up with sturdy settlers, and the growth of commercial centers is a natural product of pastoral development. Montreal is now a city of 600,000; Toronto has passed well beyond the 340,000 mark; Winnipeg is climbing swiftly toward 200,000; Calgary and Edmonton, nestling in the very shadow of the Rocky Mountains, have passed from the status of prairie towns 10 years ago to the eminence of populous cities. In short, this northland is fairly on the way toward realizing upon her splendid heritage in agricultural, forest and mineral resources. It is reasonably certain that the census of 1911 will reveal an increase in population of 80 per cent within the decade. That would mean between 8,000,000 and 9,000,000 people. The throb of a new life is felt throughout the land, and the Canadian people, at first a little slow to realize that things were at last coming their way, are now, in sheer excess of optimism, refusing to set limitations to the possibilities in any direction.

In this rapid expansion, especially of urban life, one sees the promise of proportionate progress in electric railway interests. Many standards have been proposed to test the advance of civilization. Some have suggested the consumption of soap, and others the use of writing paper. Be that as it may, it would appear to be a safe assumption, in the peculiar conditions of our day, that the application of electric power to the transportation and general economic needs of a community may be taken as the measure of that community's progress. For the present, the electric railway mileage of Canada has this year passed the 1000-mile mark. To be exact, it reached 1,049.07 miles, as compared with 988.97 last year. Of second track there were 95.20 miles constructed. These figures do not include the mileage of lines under construction.

Capital liability reached \$102,044,979, representing an increase over 1909 of \$10,439,990. Having regard to new lines

being built, to extensions of existing systems and to projects in process of taking positive shape, it may be assumed that investments in Canadian electric railways will mount up rapidly. An increase of 161 per cent in 10 years fairly shows the steady movement which has been going on in this regard throughout the Dominion.

The gross earnings for 1910 amounted to \$18,458,816—a betterment of \$2,275,853 as against the preceding year. Toward this total, passengers contributed \$16,125,995; freight, \$575,537, and mail and express, \$68,604. Other car earnings reached \$51,241, and under the head of "miscellaneous" there came in \$1,382,692. Gross earnings have increased by 220 per cent within the decade. The operating expenses for the year were \$10,121,781, representing a ratio of 59.4 per cent to total income. This left a net income of \$8,337,035. The profits actually earned for the year were \$9,572,315; but, as has been said, there were some lines which incurred a deficit. After making deductions aggregating \$2,953,759 for taxes and interest on funded debt a balance of \$5,383,276 was left available for dividends.

Operating expenses were distributed as follows: Maintenance of way and structures, \$797,895.03; maintenance of equipment, \$1,532,542.87; operation of power plant, \$1,586,927.37; operation of cars, \$4,814,761.63, and general expenses, \$1,406,943.49. The wages bill included in the foregoing amounted to \$6,316,777.20, or 62.4 per cent of the total. This is not up to the proportion established by steam railways, which is somewhat surprising. It may be that the same method of accounting is not observed; but there would not seem to be any specific reason why the ratio of labor to aggregate operating expenses should, in the case of electric roads, fall below the percentage which obtains among other railways. The rates of pay are not by any means uniform. They are considerably higher at the Pacific Coast than the Atlantic, and are also higher in the larger centers than in the smaller. Conductors and motormen receive nearly equal rates, and the maximum is not over 24 cents an hour in Ontario and 32 cents in the West.

The equipment consisted of 3789 cars of all classes, divided up as follows: Passenger cars—closed, 1795; open, 994, and combination, 337. Other cars—freight, 282; mail, express and baggage, 25; combination, 7; work, 87; snow plows, 62; sweepers, 97, and miscellaneous, 103. This represented an increase for the year of 106 closed passenger cars, 130 freight cars, 5 mail and express cars, 8 snow plows, 7 sweepers and 10 miscellaneous cars. It might be said that all the cars added during the year were manufactured in Canada, although the trade returns show a very considerable importation of parts from the United States. Altogether about \$3,000,000 worth of motors, generators and electric apparatus of one sort and another was brought in; but it would be impossible to say how much was distinctly for electric railways. The establishment of a large branch of the Westinghouse business in Canada has led to a marked reduction of imports as compared with 15 and 20 years ago.

The addition of eight snow plows and seven sweepers suggests the difficulties which have to be overcome in the Dominion during the winter season. The snowfall in all the Eastern cities, except Toronto, is usually heavy, and when electric lines were first mooted in Montreal, Ottawa and other centers capital was exceedingly shy because of the well-founded fear that operation would be impracticable during at least three months of the year; but ingenuity and dogged persistence won out against the obstacles interposed by our winter conditions. To-day electric railway investments are regarded with special approbation, and those who backed their faith in the early nineties do not look back with regret upon the venture.

Victory was not gained, however, without a desperate and sustained struggle. When a blizzard from the West was blowing it was found that the relatively small sweepers at first available were not always able to keep the tracks clear, and if a tie-up for half an hour took place the battle was lost. The

larger sweepers now in use, with much greater motive power beneath them, have quite satisfactorily overcome that trouble. In nearly all cases electric lines are obliged to keep the snow on the streets down to a certain depth, and wing plows are generally used for this purpose. The wing plow follows so closely after the sweeper that the snow is never permitted to accumulate to a depth of more than 2 in. or 3 in. After each storm the snow piled up along the extreme margin of the roadway is removed by sleighs to convenient dumping points. The company supplies large boxes for the purpose and, at a specified contract figure, sleighs are provided by private owners. Last year the cost of removing snow amounted to \$238,882.

The public service of electric railways in 1910 was represented in the carrying of 360,964,876 passengers, over and above transfers, and 852,294 tons of freight. This was a better passenger business by 46,938,205 than for 1909, and 246,030,220 above the figures of 10 years ago. A growth of over 200 per cent in the volume of traffic within the decade must be accepted as highly encouraging. The contribution of the larger centers to the total was, of course, large. Montreal had 102,377,923 passengers; Toronto, 103,480,724; Winnipeg, 28,841,161; Ottawa, 15,987,849, and the cities at the Pacific Coast, 33,417,659, apart from transfers. The conduct of the entire service of the Dominion involved 65,249,166 car miles, of which 889,561 were identified with the movement of freight and mails.

The freight business has not reached relatively large proportions, but it is growing steadily. Like the passenger traffic to which allusion has just been made, it has increased by 200 per cent within 10 years. The outlook, however, points to expansion. In the Niagara orchard district the electric lines carry small fruits to the markets much more expeditiously and conveniently than can the steam roads. In fact, this method of handling orchard and garden products has very decided advantages, and the business is developing rapidly. In the western sections of Ontario rural lines are also doing well, and their success has led to the projecting of quite a number of roads in other parts of the Province. In fact, apart from the fast filling up West, the extension of electric railway interests in Canada will probably take place to a considerable extent along the line of these freight roads. They will not be devoted exclusively to the carrying of products of various sorts, but to passengers as well.

Right here it may not be amiss to refer to an aspect of this freight business which has recently arisen. The Railway Commission of Canada has large and comprehensive powers with respect to the regulation of rates, and the question of jurisdiction over lines holding charters from the Provincial Legislatures has become a matter of legal controversy. At the present time a suit is pending before the Imperial Privy Council to which the Railway Commission and the Montreal Street Railway are parties. The issue will affect electric roads directly, but will also have an important bearing on steam lines.

This whole subject of electric railways in Canada cannot, unhappily, be dismissed without a reference to accidents. During the year 95 persons were killed and 2538 injured. Of the killed, 14 were passengers and 13 employees; of the injured, 1595 were passengers and 227 employees. This toll of life and limb is reflected in the operating expenses to the extent of \$340,000 for damages. The steam roads killed one passenger in every 598,243 during 1910, while the electric lines had one killed in every 25,783,205. This showing is favorable to the latter; but the fact remains that loss of life and injury to passengers and others exhibits an ascending tendency.

STATISTICS OF THE GENERAL ELECTRICAL INDUSTRY

In this week's issue of the *Electrical World* the statement is made that 1910 was not a bad year for the general electrical industry. In fact, all industries enjoyed a steady advance much more sound and healthy than marked the notable expansion up to four or five years ago. In support of this statement it presents the table published on the next page as an estimate of the approximate sums for the items given.

In connection with this table it says: "The gain in electrical manufacture has been taken at about 10 per cent; in electric railways at 10 per cent, which may be slightly low; in central station work at 20 per cent, which is about right; in telephony, nearly 20 per cent; in telegraphy, about 7 per cent; in isolated plant service, nearly 30 per cent, which may be excessive, but

	1909	1910
Electrical apparatus made.....	\$275,000,000	\$300,000,000
Electric railway earnings.....	475,000,000	520,000,000
Central-station sale of energy, etc.....	250,000,000	300,000,000
Telephone earnings.....	250,000,000	275,000,000
Telegraph earnings.....	60,000,000	65,000,000
Isolated light and power plant earnings.....	75,000,000	100,000,000
Miscellaneous electric service.....	50,000,000	75,000,000
	\$1,435,000,000	\$1,635,000,000

includes a lot of big power work, mines, battleships, etc.; in miscellaneous service, 50 per cent, which also may be high, but is likely to be correct. In other words, the largest single item of gain is taken at a low rate, and this method of computation would offset any excess in the smaller gains assumed at a higher rate."

COMMUNICATION

PITTSBURGH CAR SERVICE

CHICAGO, Dec. 29, 1910.

TO THE EDITORS:

I have delayed answering the letter in your issue of Sept. 24 from Judge J. H. Reed, vice-president of the Pittsburgh Railways Company, while making an effort to secure more information about the relative car service in Pittsburgh, in regard to which there has been some correspondence in your columns.

The main point at issue is whether or not, as originally stated and as questioned in Judge Reed's first letter, "according to this record the *standard* of service furnished decreased from 1902 to 1908, with a considerable improvement in 1909."

This statement was made in my report in connection with a table showing the total passengers per revenue car mile for each month from January, 1902, to March, 1910. This record was shown graphically in the diagram therewith, together with the corresponding records of "gross earnings per revenue car mile" and the "operating expenses per revenue car mile," so that as far as the records, using the car-mile unit, can indicate, this diagram tells the story *by months* of the operation of the Pittsburgh Railways Company since the formation of the companies into one combined system a little over eight years ago, and proves the statement to be correct when the service is compared on a "car-mile basis."

There seems to be no question that the standard of service in 1909 was considerably improved over that of 1908, which confirms the latter part of the original statement.

Whether or not the standard of service in 1908 was higher or lower than in 1902 can be more accurately determined only by a study of the "seat-mile record," and in order to avoid any further approximations I have made an unsuccessful effort, as shown by the following letters, to secure the exact information:

"Chicago, Oct. 10, 1910.

"Judge J. H. Reed,

"Vice-president Pittsburgh Railways Company,

"Pittsburgh, Pa.

"My dear sir:

"I have read your interesting letter, published in the Sept. 24 issue of the *ELECTRIC RAILWAY JOURNAL*, replying to my letter published in the Sept. 17 issue of the same journal, and it seems to me that, notwithstanding the interest that this controversy might have to some, there is no necessity of its continuing, for my only object is to know the exact facts and draw correct deductions from them, and if I find that I have based my original statement upon wrong information and drawn wrong deductions, I shall be very glad to correct it. Your letter seems to indicate that you have correct records of the

exact number of seat miles operated by your company during the period of years under discussion, and if you have and will place this information at my disposal, so that I can check it up, I shall be very glad to do so, and, after I have done so, write a reply to the *JOURNAL* which will rectify any error, if one has been made, and also correct my report accordingly before its final publication.

"I have ready what appears to me to be a very satisfactory reply to your last communication to the *JOURNAL*, which I shall hold until I have had time to hear from you, as it seems to me that the plan I have outlined above would be better if we can carry it out.

"I shall be in Pittsburgh on Saturday, the 15th inst., and if you should think well of my suggestions I will appreciate it if you will place the information so that it will be available to Messrs. Damon and Bibbins, of my Pittsburgh office, between now and that time, so that it could be got in shape for me to look it over on the 15th inst. when there.

"Yours very truly,

(signed) "Bion J. Arnold."

"PITTSBURGH RAILWAYS COMPANY.

"Pittsburgh, Pa., Oct. 31, 1910.

"Mr. Bion J. Arnold,

"181 La Salle Street, Chicago.

"My dear Mr. Arnold:

"Your letter of Oct. 10, addressed to Judge Reed, has been referred to me.

"I owe you an apology for not having replied at an earlier date, but many things have occurred since my personal interview with you which have caused me to think it would be unwise at this time to have any more checking of our records, although I can assure you that the statements contained in Judge Reed's letters are correct and can be proven at any time the necessity may arise.

"Very truly yours,

(signed) "James D. Callery, President."

As the matter stands at present the records originally furnished me by the company *do* indicate that the standard of service decreased from 1902 to 1908, but it now appears that the railway company has other records, which it feels that it cannot furnish at this time, which apparently show considerable improvement in the standard of service in 1908 over that of 1902. By the company's statement, as given in Judge Reed's letter of Sept. 19, that it had cars stored in 1908 which were not operated, it seems to admit that the service in 1908 was not as good as the company could have made it, and that the service was improved in 1909. The question, therefore, as to whether the crowding, and, therefore, the service, was better or worse in 1908 than in 1902 can only be determined by a comparison of the "seat-mile records," which I regret are not available to me.

In conclusion, I might say that this statement in regard to the service is only one of possibly several statements made in the report which, in order to maintain a consistent position, the company may find it necessary to question. But I have endeavored in my analysis of the Pittsburgh transportation situation to maintain an impartial attitude, and I believe that an examination of my entire report, which is now in press, will show such an attitude. In order to maintain this attitude, in view of the present conditions, I am sending you this letter in place of the reply which I had previously prepared, and which is referred to in the second paragraph of my letter to Judge Reed of Oct. 10, 1910.

BION J. ARNOLD.

NOTE: The report on car service in Pittsburgh to which this letter refers was submitted by Mr. Arnold to Mayor Magee on July 28, 1910, and was printed in abstract in the *ELECTRIC RAILWAY JOURNAL* for Aug. 13, page 265. The other letters to which Mr. Arnold refers were printed in this paper as follows: Aug. 20, page 304; Sept. 17, page 441; Sept. 24, page 475.

[Ebs.]

OPERATING AND MAINTENANCE RULES ADOPTED BY THE AUSTRIAN STREET RAILWAY ASSOCIATION

The Austrian Street Railway Association has recently published a set of standard rules for operation and maintenance. This code which went into effect Jan. 1, 1911, has been formally approved by the Austrian government. It has been issued to the members as a pamphlet which is sold for about 21 cents a copy. There are four sections, as follows: General rules, track, line and rolling stock.

The section on track recommends that the track construction should be examined at least twice a week on unpaved sections where the operating speed does not exceed 20 km an hour (12.8 m.p.h.) and on paved sections where the operating speed does not exceed 30 km an hour (18.6 m.p.h.). Daily inspection is recommended for higher speed lines. Switches should be examined every day on all lines, irrespective of operating speeds. An inspection means the tightening of joints, the re-adjustment of bonds, the operation of switches and signal towers, the inspection of drainage, the cleaning of grooves and the lubrication of curves. The annual track examination should include the measurement of gage, rail wear and curve elevation. Rails in cross-tie construction should not remain in service if the dead weight on them exceeds 1200 kg per square cubic centimeter (16,500 lb. per square inch). The grooves of rails must not exceed 65 mm (2½ in.) in width on curves except where steam cars are also run. In the latter case the groove must not exceed the original width by more than 25 mm (0.88 in.). The wear of the railhead must not exceed 30 per cent of its original width. The test widths of the groove and of the railhead must be taken along a line 10 mm (0.39 in.) below the tread.

The line section states that the insulation of underground feeders should be measured four times a year and that underground cable boxes should be examined twice a year. The insulation of the overhead trolley wire connections and its supports is to be measured four times a year when located near telegraph, telephone and other weak current circuits; otherwise twice a year will be sufficient. The insulation against trolley and ground of all span and other supporting wires must be at least 1 megohm. The trolley wire should be examined twice a year to observe its wear, position with regard to the center of the track, suspension and the condition of the ears. This inspection should also include the insulation, section breakers, overhead circuits, switches, auxiliary wires, circuit-breaker boxes, telephone wires, span wires, lightning protection, etc. Inspection should be made every two years of the connections between span wires and wall rosettes, strain insulators, etc. The permissible wear of trolley wire on tangents should not exceed 65 per cent of the original cross-section. Spans and suspension wires must be removed when one-fourth of the cross-section has been lost through rust or other causes.

Iron poles should be examined for oxidation every three years and for painting. Wooden poles should be tested annually during the dry season. These examinations are to be made by sounding and in doubtful cases by boring the pole directly above the ground line. The sawdust, of course, will show the condition of the wood. All boring holes must be plugged up with a piece of hard wood. The wooden poles should be exposed for a depth of 20 cm (7.8 in.) every two years to permit the inspection of the wood fibers with some sharp instrument. The latter examination should be made annually on poles which have been used for over 10 years.

The rolling stock section recommends that motor cars should be examined daily. The general overhauling should be made every 50,000 km (31,000 miles) or at least once a year. Trailers should be overhauled at least every 60,000 km (37,000 miles) or 1½ years. Limits of wear also are specified for different portions of the car equipment. Brake shoes without special heads must not be used if less than 10 mm (0.39 in.) thick. The tires of driving wheels used for wheel loads up to 3 metric tons should be at least 16 mm (0.6 in.) thick and for

wheel loads up to 4.5 tons, at least 18 mm (0.7 in.) thick. Trailer wheels and tires for the same load may be 2 mm (0.078 in.) thinner. If the tires are keyed to the wheels the corresponding limits of tire wear are 20 per cent less than those hereinbefore given. The wheel flanges may be worn to 8 mm (0.31 in.) thickness and 12 mm (0.47 in.) height. The same wheel flange rule applies to curved T-rails if the latter have guards on the inner side at least. If this is not the case the minimum flange height should be 15 mm (0.59 in.) and the minimum flange thickness 12 mm (0.47 in.).

NOTES ON THE NORTHERN ELECTRIC STREET RAILWAY, SCRANTON, PA.

On July 1, 1910, the Northern Electric Street Railway Company, Scranton, Pa., was leased to the Scranton-Binghamton Railroad Company for 990 years. According to the agreement, the stockholders of the leased company will receive 3 per cent on their stock during the first year (1911) of the lease and ½ per cent more for each year following until a permanent dividend rate of 6 per cent is attained.

Since publication of the description of this company's property in the *ELECTRIC RAILWAY JOURNAL* of March 21, 1908, the railway has built an extension of 6 miles to a large private park on Lake Winola, giving a total trackage of 20 miles. The gross earnings of this company for the year ended June 30, 1910, were practically \$169,000 on 20 miles of track. It is expected that the gross earnings for the next fiscal year will show an increase of 10 per cent to 15 per cent owing to the completion of the Lake Winola extension and the general growth of the business. The detailed figures for the fiscal year ended June 30, 1910, are as follows:

Passenger earnings	\$155,010.71
Freight earnings	8,090.89
Other earnings, including car advertising.....	6,028.37
Total gross earnings.....	\$169,129.97
Operating expenses	106,737.37
Income less operating expenses.....	\$62,392.60
Net income after deduction of fixed charges, taxes, etc.	416.21

The net earnings for July and August, 1910, were \$24,835.52, which is \$2,247.48 more, or 10 per cent greater, than for the corresponding months of 1909.

The figure of \$8,090.89 given as the freight earnings covers the work of a single milk car. This car makes two trips, or 80 miles, a day on weekdays and one trip, or 40 miles, on Sundays. The weekday business amounts to 80 40-quart cans. While profitable, this business is no larger because most of the producers have a rather short haul to market. The business emanating from the vicinity of Lake Winola, which is 20 miles from Scranton, is handled for 18 cents a 40-quart can.

Since the opening of the line in 1907 four more sidings have been installed on the 20-mile section between Scranton and Lake Winola. This makes 17 sidings in all, thereby permitting a 15-minute instead of a 30-minute schedule. During the summer a 15-minute service is given over the entire line, and the same schedule is maintained half way out of Scranton for eight months in the year. About \$46,000 was spent in the last fiscal year for various track improvements, such as the reballasting of the track, straightening out of curves and the construction of 6600 ft. of track around Lake Winola. All of the sidings have Pennsylvania split switches. The special work within the limits of Scranton is of solid manganese.

The company has recently installed in the Dalton power station a 100-k.v.a. motor generator set, which converts current from the 370-volt station busbars to supply light for Factoryville, La Plume, Dalton, Waverly, Glenburn and Clark's Summit. This plant will also be enlarged later to take two 750-kw turbines for the projected Scranton-Binghamton Railroad.

The company now has 14 passenger cars and four service cars. Rolling stock in service is inspected every night and overhauled on a basis approximating 50,000 miles. Wheel sets are sent to Scranton and turned for \$7 per set exclusive of the transportation charges, which are paid by the railway. All of the wheels are of solid steel of Latrobe, Schoen or Standard design. As a rule 60,000 miles is secured before a turning. Some of these wheels have already run for over 200,000 miles. It is proposed to install wheel-handling machinery when rolling stock is purchased for the allied Scranton-Binghamton Railroad. Since beginning operation in 1907 the company has not had a single breakage of the motor frames or malleable iron gear cases originally installed. All armature and field winding is done by an outside electrical contractor. The motors, which are of the Westinghouse 101-D type, have given excellent satisfaction and have required no change except in the field coil terminals. The original terminals proved too light for the service because the plain solder connection did not give enough contact area. The terminals are now re-soldered and riveted to the ribbon winding by two copper rivets which are passed through the terminal slot.

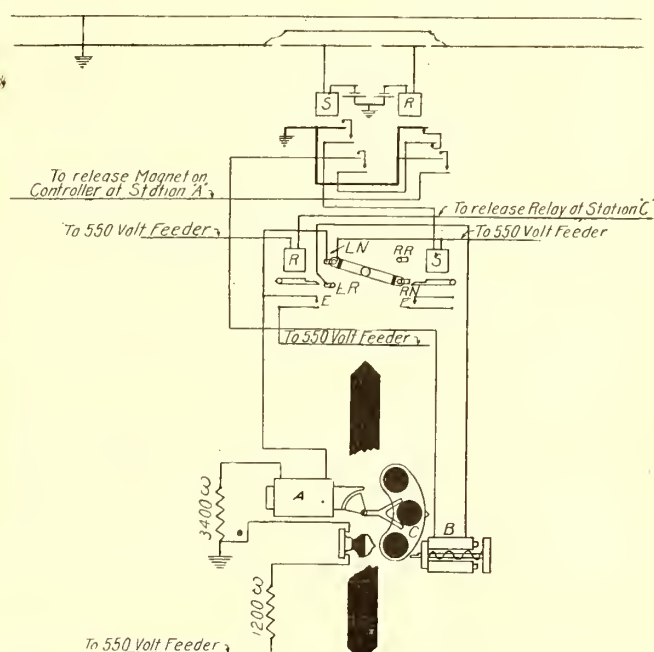
The cars of the company are painted Tuscan red. They are washed twice a week with cold water and at intervals of four to six weeks with the No. 000 emulsion of the Imperial Car Cleaner Company. After the dried cleaner has been rubbed off, Devco's furniture polish is applied to secure a high finish. The cost of this work is as follows: Imperial cleaner at \$1.05 per car; ½ quart furniture polish at 75 cents per quart; 14 hours of labor at 15 cents per hour, a total cost of \$3.52½.

BLOCK SIGNAL SYSTEM ON BALTIMORE VIADUCT

An interesting installation of signals has just been completed by the Kinsman Block System Company, New York, on the Guilford Avenue line of the United Railways & Electric Company's system in Baltimore, Md. These signals are located on a double-tracked elevated structure known as the North Street Viaduct. They are used to protect the spans and stations at Madison Street and Center Street, and also to give protection on account of steam and smoke which are caused by steam locomotives which run underneath this portion of the structure. The length of track protected is about 1500 ft. There are six signals, three on the southbound track, "A," "B" and "C," and

the signal and before it passes the section point the signal indicates either "Clear" or "Stop." When the signal indicates "Clear" the semaphore is in the vertical position and a white light is shown as a night indication. When it indicates "Stop" the semaphore is horizontal and a red light is shown.

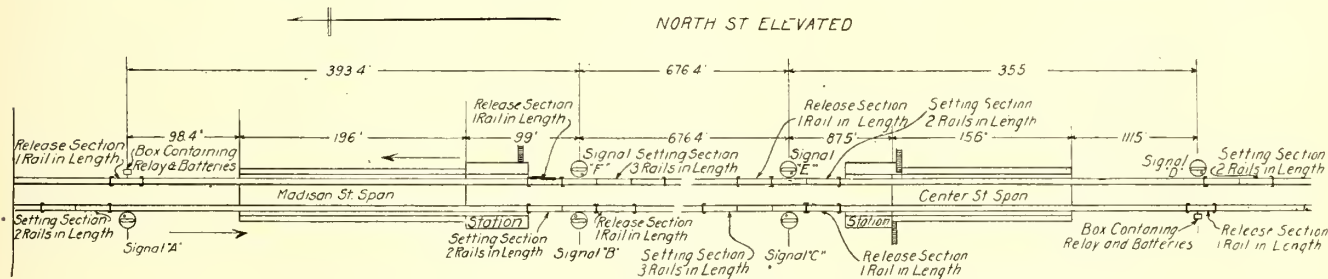
If the signal indicates "Clear," or that the block is unoccupied, the car passes onto the setting section and the signal



Signals in Baltimore—Arrangement of Circuits and Apparatus at Signal "B"

operates from the vertical position to the oblique or 45 deg. position. In this case, the light changes from white to green. This movement of the semaphore or its change of position is an indication to proceed through the block at usual speed.

If the signal is in the "Stop" position the motorman of an approaching car is instructed to stop at the section point and wait until the signal changes to "Clear." Then he may proceed with caution until he gets his indication to proceed at



Signals in Baltimore—General Arrangement of Signals and Circuits

three on the northbound track, "D," "E" and "F." The average length of each block is about 500 ft.

The signals are operated by track circuits. As a car approaches a signal and before it enters the block it passes over a section of track known as the setting section, which is from 60 ft. to 90 ft. long. As it leaves the block it passes over a section known as the release section, which is 30 ft. long. It will be seen from the track plan that a car passes over the setting section to signal "A" as it approaches that signal and it passes over the release section to signal "A" after it has passed signal "B."

A marker has been installed at the left of the track and at the beginning of the setting section. This marker is a green board with a green light for night indication. It marks what is known as the "Section Point." When a car approaches

his customary speed as described hereinbefore. Should the motorman run past the section point before bringing his car to a stop, he is instructed not to back up but to wait on the setting section. The signal will remain at "Stop" until the car which is in the block passes out into the block ahead; as it passes over the release section the signal in the rear will operate to the "Clear" position, and will then fall to the 45 deg. position. The latter change of position of the semaphore is the "proceed" indication to the motorman who has his car at the setting section. The rule that the motorman stop his car at the section point should be obeyed so as to give him ample time to observe the operation of the signal. However, a failure to observe this rule does not prevent the signal from giving its proper indication.

After a car passes over the setting section, and as it passes

the signal and enters the block, the semaphore moves to the horizontal position and shows a red light by night, indicating "Stop." The signal remains in this position as long as the block remains occupied.

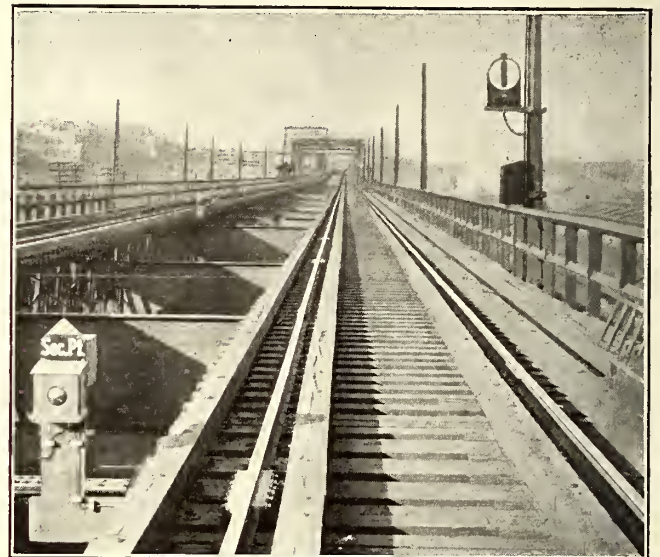
If the apparatus should become deranged either of three things would happen: First, the semaphore would immediately operate by gravity to the "Stop" position and remain there until repairs are made; second, the signal would operate

give protection for reverse movements. The signal operates for each car when run independently, or it will operate once for each train if a number of cars are coupled.

In this system only one line wire is required. The circuit drawing shows grounded circuits, but the circuits are metallic and are only grounded because the wires are connected to the grounded rails. The signals, the controller and other apparatus used are the same as employed in the single-track



Signals in Baltimore—Proceed Indication

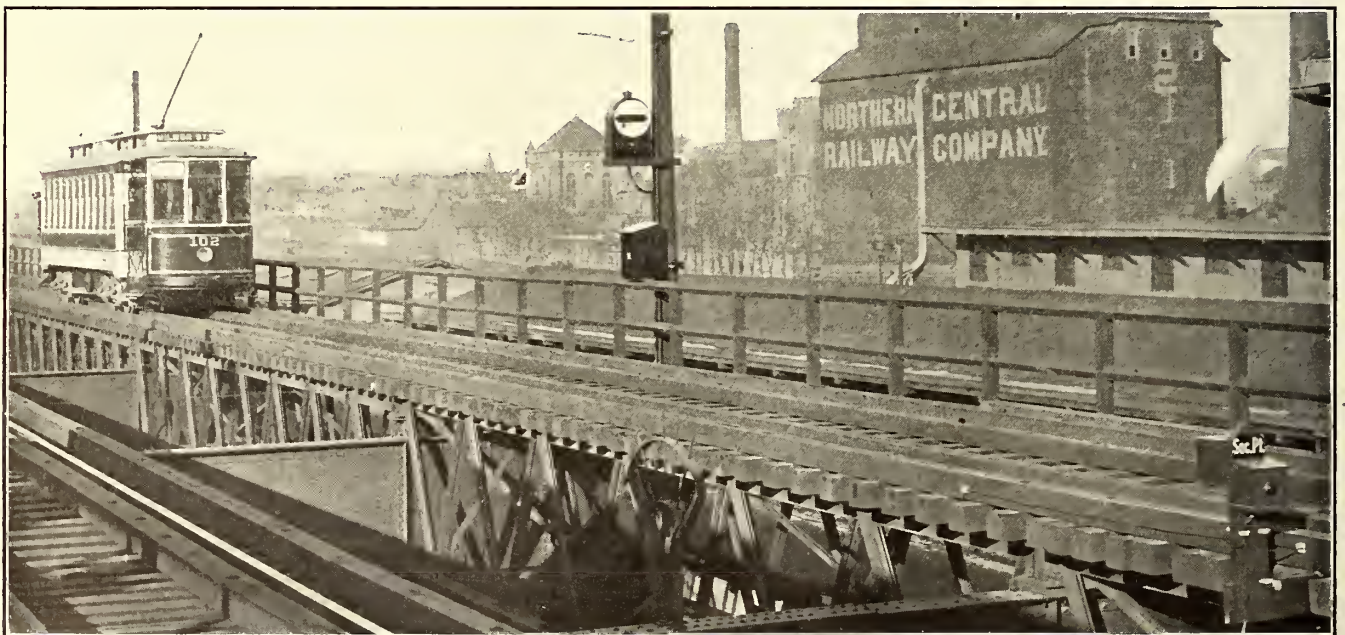


Signals in Baltimore—Clear Indication

normally to allow the first car to enter the block and would assume the "Stop" position and remain in this position; third, the signal would not operate as the car passes the section point to give the indication to proceed. This failure of the signal

system which this company has installed. All wires are carried to the tops of the poles and to the track in loricated conduit.

It is necessary to insulate only one of the traffic rails, and as the insulated sections are short jumper cables are used, the



Signals in Baltimore—Stop Indication and Section Point

to operate is a danger indication. The burning out of the lamp in the signal is also considered as a danger indication.

If a signal is out of order or shows a "Stop" indication continuously the motorman is instructed to hold the car at the section point or on the setting section long enough to assure him that if there is a car ahead it has had time to pass entirely through the block. Then the motorman may proceed with extreme caution according to the regular operating rules governing traffic on trestles and bridges. As the traffic is always in one direction on each track it is not necessary to

ends being bonded to the uninsulated rails near the joints.

The relays are operated by current from caustic soda batteries. The Edison cell with a low temperature electrolyte is used so that it is not necessary to install the batteries in wells or chutes placed underground.

In the diagram relating to signal "B," the point marked "A" is the operating magnet; "B" the magnet which slots the signal at 45-deg. position; "C" the spectacle which carries colored glasses; "E" the contacts which are closed when the release magnets are energized.

LONDON LETTER

(From Our Regular Correspondent)

The work of extending the use of electricity on the Lancashire & Yorkshire Railway system converging on Liverpool has been commenced on the line from Maghull to Town Green. When completed this line will form a portion of the original electric "belt" system from Liverpool to Southport via Ormskirk.

The Metropolitan Electric Tramways, Ltd., operating in the north of London, was recently summoned by the Tottenham District Council for the recovery of £371, the balance of the general district rate for the half year. The company contended that the tramway came within Section 211 of the Public Health Act, 1875, and should therefore be assessed in the proportion only of one-fourth of the annual value. The tramway is, in fact, linked with a light railway, and the company claimed that on this account it was also exempt from the full rate. The court decided that the tramway was not a railway within the meaning of Section 211 and ordered the payment of the full rate with costs.

Robert Hammond, as arbitrator, has determined the price which the Paisley District Tramways Company is to pay the Paisley Corporation for electricity for operating the tramways. Under the Paisley District Tramways order of 1901 the rates were fixed for seven years and subsequently fixed for two years additional as follows: 2d. per unit for the first 200,000 units per annum, 1¼d. per unit for the next 100,000 units per annum, 1½d. per unit for the next 100,000 units per annum and 1¾d. per unit for all additional energy. Mr. Hammond has decided that the rate to be paid by the company to the corporation for seven years shall be a fixed sum of £4 15s. per kilowatt per annum of the maximum power delivered to the tramway feeders and in addition the sum of 0.475d. per unit for all units delivered to the tramway feeders and metered at the generating station. The maximum power delivered to the tramway feeders during the year is to be taken as the average power delivered to the tramway feeders during the period of 30 consecutive minutes in which the electrical energy supplied to the company is a maximum for the year. Pending the determination of the amount of the maximum power and of the cost of coal each year monthly payments of £275 are to be made by the company and 0.475d. per unit for all units supplied, the necessary adjustments of the accounts to be made at the end of each year. As the company has been taking about 1,300,000 units from the corporation and the maximum load for the tramways has been about 575 kw, the capital charge to be made by the corporation is 0.504d. per unit and the total charge 0.979d. per unit. The corporation claimed that the average price of 1.4d. per unit which the company has been paying should be continued and the company asked for a reduction to 0.56d. per unit, so that the award is almost the mean of the two prices.

The highways committee of the London County Council reported at a recent meeting that it had considered the tenders submitted recently for 5000 tons of track rails and about 700 tons of conductor rails. It has been decided to award the contract for the conductor rails to the Frodingham Iron & Steel Company, the lowest bidder. The lowest tender for the track rails was received from a London firm which proposed to supply rails manufactured by the Belgian Steel Rail Syndicate, but as this tender was only about £800 lower than the tender of Walter Scott, Ltd., Leeds, which amounted to £32,855, it was decided to order the rails from that firm. The committee pointed out that the difficulties of inspection during manufacture were greatly increased when the rails were made abroad, and that the same control could not be exercised over the work as when the product was turned out at home.

The libel action against Sir John Benn by Griffiths & Bedell for remarks which he had made against the G. B. surface contact system, constructed for the London County Council in the Mile End Road, which was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 3, 1910, page 1121, continued for 12 days, and resulted in the jury awarding the plaintiffs £12,000 damages, to be equally divided between them. The defence contended that Sir John Benn

had made the disparaging remarks in political speeches, and that they referred to the system as laid down in London and not to the system as a whole. Evidence was produced to show that the system had been greatly modified as applied to London, and Mr. Bedell, the inventor, claimed that if the system had been installed as he desired it would have been satisfactory. The decision rested upon whether the remarks made by Sir John Benn were libelous and made with malice. Sir John described the G. B. system as constructed in the Mile End Road as a "mischievous and impossible system," a "jerry-built system" and a system that "had been condemned by all experts as unsuitable for London." He also referred to the system as a "fiasco." During the action he maintained that the system was inefficient, unsafe and unsatisfactory. The judge decided that the comment which had been made could not be said to apply only to the system as laid down in the Mile End Road. The case was interesting, but it is hardly necessary to go into the details. Briefly, the system was constructed by other contractors with modifications insisted upon by the London County Council. When it was put in operation it was found to be unsatisfactory on account of so much trouble with live studs. William Mordey, an independent expert, after a careful investigation of the system under the very worst circumstances, reported that the system could be made to work satisfactorily with certain changes. Afterward the London County Council decided to replace the system by the overhead trolley. Since the decision the impression has grown that Justice Ridley, before whom the case was tried, did not sum up the case impartially and an appeal has been taken.

The British Electric Traction Company tried recently to solve the problem of fares by adopting farthing fares. Now Mr. Dalrymple, the general manager of the Glasgow Municipal Tramways, has reported on the question. As is well known, Glasgow has been very liberal in the matter of fares. One can travel between two and three miles for a penny, and there are stages a little more than half a mile for which one can travel for a halfpenny. Notwithstanding this, efforts have been made for some time to increase the length of this halfpenny stage. It has practically been decided by the committee not to change the penny stages, which are about 2½ miles, but to institute a three-farthing stage, the distance of the three-farthing stage to be equivalent to two halfpenny stages. To avoid the difficulty which the British Electric Traction Company had in regard to the farthing, a coin which is not in general use, the Council of Glasgow has decided to issue books containing 12 tickets for 9d. The two-stage coupon books are to be tried for a period of four months. It is feared that the new system will interfere with the penny traffic. At first it was contended that the three-farthing fare would benefit the workman, but as it has been decided to sell books of a dozen coupons it is thought that well-to-do people will benefit most. Should it be found that this new departure interferes with the traffic receipts, it will be discontinued at the end of four months. Mr. Dalrymple is opposed to the conductors themselves handling the coupon books, so passengers will have to purchase them in the offices of the company. The conductors will be supplied with three-farthing tickets and they will exchange them for the coupons.

The Stepney Borough Council and the London County Council are unable to agree with regard to the proposed reconstruction of the horse trams along Burdett and Grove Roads, forming a junction with Commercial Road and Mile End Road. The London County Council has proposed that the overhead trolley system be installed, especially as the line is not expected to be remunerative at first. The Stepney Council insists upon the conduit system being adopted.

In order to encourage efficiency at Bradford, C. J. Spencer, general manager of the Bradford Corporation Tramways, who had to report recently on the application of the employees for increased remuneration, has suggested that increases in pay should not be granted automatically by right of seniority. Mr. Spencer evidently believes that many of his employees could increase their efficiency appreciably, and that only those who become known for their general efficiency should be rewarded with an increase in pay.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

N. W. Harris & Company, New York, N. Y., in their proposal to finance the Cleveland Railway, which was presented to the board of directors of the company on Dec. 31, 1910, suggests three changes in the conditions of the grant, the most important of which is to the effect that an annual reserve fund be established to amortize the franchise valuation of \$3,615,843.89, which was fixed by the late Judge R. W. Tayler. The establishment of such a reserve fund would add another division to the distribution of the income, and it is believed that the present fare of 3 cents plus a cent for a transfer would not cover the additional charge. The suggestions made by N. W. Harris & Company are contained in the following portion of the proposition placed before the directors:

"As a result of our recent investigation of the street railway situation in Cleveland, we are prepared to enter into a contract to purchase an issue of bonds sufficient to meet your present financial obligations.

"Our examination of the franchise under which you are at present operating, however, leads us to make certain suggestions to you which we believe to be of vital importance, looking particularly to the increase of facilities and the development and extension of the property.

"We have been familiar with the street railway conditions in Cleveland since about 1893, when we made our first purchase of the bonds of your company. We have observed the rapid growth of the city and the consequent necessity for increased service and extension of facilities. There is every reason to assume that this growth will continue and it will inevitably mean greater service and increased facilities to be provided by the continued contribution of new capital.

"It is of vital importance that you should be in a position to raise new money by the sale of stock as well as by the sale of bonds, that you may have these combined resources to avail yourselves of as other companies do, and in order that a proper ratio between bonds and stocks should be preserved.

"The financial stability of a company and the resources which it has on hand to raise money in the future are points carefully considered by the discriminating investor. Your bonds would be more secure and we could therefore make the terms of purchase more attractive to you if the Tayler ordinance were amended in the following particulars:

"First—You are given the right to sell 6 per cent bonds, but in our judgment, from the standpoint of credit, the bond issue should not bear more than 5 per cent interest. You should therefore be given the right to sell 5 per cent bonds at not lower than a 6 per cent basis, to meet varying market conditions with the right to amortize any discounts which may, from time to time, be made to dispose of the bonds. At the present time some discount would have to be allowed to sell a 5 per cent bond.

"Second—To make possible any future sales of stock, the intrinsic value of the same must be protected and the franchise should be so amended as to make it clear that all future extensions and actual additions to the present property shall be maintained at 100 per cent of their reproductive value through a reserve fund set apart annually.

"Third—For the same reason an annual reserve fund should be provided to amortize the principal of the franchise value of \$3,615,843.89 established by the Tayler ordinance.

"With these three items corrected, we would feel that you were in a position to take care of the future expansion of the street railway business by the sale of both stock and bonds, instead of being absolutely limited to bonds, as seems to be your present situation.

"It has been suggested by Winthrop Coffin in his report that the growth of the city before the expiration of the franchise may require such extensions, betterments and increased service that the present maximum rate of fare will be too low; but we judge that should this at any time

be found to be the case, the city would grant such reasonable modifications as would continue to insure a 6 per cent return on your stock, without which it could not be sold at par; which in turn would prevent the company from meeting the requirements of a growing city."

Messrs. Harris & Company did not state that they would refuse to purchase the bonds unless their suggestions were adopted. They said that if other bond houses were invited to consider the matter they might be willing to take the bonds under present conditions. The proposal was presented to the directors by Horace E. Andrews, former president of the company, and a discussion covering three hours followed. Nothing was given to the public at that time regarding the view of the directors.

J. J. Stanley, president of the Cleveland Railway, has since transmitted a communication to Mayor Baehr in which he asks that the changes in the Tayler grant suggested by N. W. Harris & Company be made. Street Railway Commissioner Dahl is opposed to any change in the franchise except such as will provide against loss in marketing bonds below par. Mr. Dahl says the provisions named were asked for the purpose of placing the stock in a better position and not for the benefit of bondholders. The bond house, however, stated that the stock should be of such value that the company would not be compelled to depend solely upon the disposal of bonds to take care of its needs. The letter by Mr. Stanley follows in part:

"The Cleveland Railway has realized for some time the inadequacy of the service rendered by it to the public, and has hoped to dispose of stocks or bonds sufficient in amount to enable it to make needed extensions and additions. It has found, however, that investors decline to purchase its stock, mainly for the reason that, while for a series of years 6 per cent income may be relied upon, they feel that the return of the principal at the expiration of the franchise is not so well assured. As bearing upon this question, we inclose a letter received Dec. 31, 1910, from N. W. Harris & Company.

"We desire to call your attention to the situation as it exists. The company has accepted a valuation of its property and has agreed to be satisfied with 6 per cent upon its stock. The elements of speculation having been taken out of the stock and the rate of profit definitely limited, it is all the more necessary, in order to invite new capital, to make the payment of the limited rate of interest, together with the return of the entire amount of the principal, perfectly secure. The company must, however, rely upon the sale of its stock and bonds for additional financing, and now finds that under the Tayler ordinance careful investors do not feel that any new principal they may invest in the stock of the company is protected.

"While it was the idea and purpose, frequently expressed, that the stockholders of the company should be assured not only of 6 per cent interest upon their stock, but of the return of the principal of their stock if the city should exercise its option to purchase the property, and while the ordinance itself declares that the purpose of the settlement is the making of a contract between the company and the city which, in the words of the ordinance, 'will secure to the Cleveland Railway unimpaired the capital value' fixed by Judge Tayler, yet prospective investors in the company's securities are of the opinion that the ordinance imperfectly provides for the accomplishment of this purpose, and they ask that it be so modified as to protect the principal of both present and future investment.

"It is to the mutual interest of the city and the company that additional capital to provide for reasonable service and proper extensions be obtained. The company wishes to join with the city in any method that may be found feasible for the fullest investigation of all conditions and for working out the fewest changes possible in the Tayler ordinance necessary to attract and protect investment.

"We are ready to meet you or any representatives that may be appointed by you for that purpose, feeling confident that if investors can be assured of the security of their investment, we shall be able at once to obtain money for the

purchase of 200 new cars, the building of necessary extensions and the improvement of the service."

The annual meeting of the stockholders of the company will take place on Jan. 25, 1911, and it is said that the question of issuing \$3,500,000 of bonds, bearing 5 per cent interest, will be submitted to them for consideration at that time. This will open the way to compliance with the demands of the city and the directors will ask that the terms and conditions upon which the securities are issued be left to them, so that further action will be unnecessary should an agreement that is considered fair be reached. Should the city agree to the establishment of a reserve fund to take care of the franchise value, it will require something like \$12,000 per month for the franchise term to aggregate the amount necessary.

Mayor Baehr, Street Railway Commissioner Dahl and the special committee of the City Council named some time ago made a report to that body on the evening of Dec. 27. The report states that it will never be possible to operate the system efficiently without a subway terminal under the public square and reaching out a reasonable distance in the downtown section. A high-level bridge across the Cuyahoga River to reach the West Side, the elimination of grade crossings over steam roads and the addition of 200 cars to present equipment are other needs that were mentioned. The construction of the bridge has been provided for and many grade crossings will be eliminated within the next year or two, but the other requirements are yet uncertain. The committee states that the service during the rush hours in the evening is inadequate. The report, in part, follows:

"There are certain physical obstacles in the way of rapid and efficient service during the rush hour period in the evening which have always obtained in Cleveland, and which will be removed in the immediate future. The most serious obstacle to service on the West Side is Superior viaduct. On the East Side the various grade crossings have the same effect, though, of course, in a smaller degree.

"At the present time, during the evening rush hour, there is a car operated east on Euclid Avenue, between the square and East Ninth Street, every 20 seconds; south on Ontario Street from the square every 18 seconds, and west across the Superior viaduct every 18 seconds. It is difficult to operate under a much closer headway, and no matter how many cars are in operation, it will never be possible to operate efficiently without a subway terminal under the square and reaching out to a reasonable distance in the downtown section in order to avoid congestion.

"But before the grade crossings are eliminated, the high-level bridge constructed, and surely before a subway terminal at the square can be constructed, it will be necessary to better the service during the evening rush hour, and it is apparent that the Cleveland Railway should acquire additional equipment at the earliest possible time. At least 200 more cars should be purchased.

"To procure money for these cars and in view of further financing, which it will soon be necessary to undertake, a comprehensive scheme of refinancing and refunding the present debt of the Cleveland Railway is necessary, and the practicability of this financing is now in process of investigation and, we hope, successful solution by the railway company and the street railroad commissioner. In its last analysis, then, the problem of immediate efficient service is the problem of financing."

Toledo Traction Situation

Dr. J. F. Demers, a member of the board of directors and the executive committee of the Toledo Railways & Light Company, Toledo, Ohio, died at his home in Levis, a suburb of Quebec, Can., on Dec. 26, 1910.

The resignation of William B. Hale, Chicago, as a member of the board of directors and chairman of the executive committee was received on Dec. 29. Mr. Hale stated that he desires to devote his entire time to private business in Chicago. The remaining members of the executive committee are Albion E. Lang and Jay K. Secor, Toledo, and William E. Hutton, Cincinnati. The board of directors consists of six Toledo men and Mr. Hutton. The vacancies will not be filled until the annual meeting on Jan. 19, 1911.

At a meeting of the council committee of the whole on the evening of Dec. 28, 1910, the following form of reply to the letter of A. E. Lang, president of the company, was agreed upon:

"In response to your letter of Dec. 24, 1910, in which you proposed that as a basis for the discussions suggested in my letter of Dec. 15, 1910, an ordinance be drawn based upon the principles enunciated in my letter, I am authorized to say that we shall prepare memoranda of such an ordinance at once, copies of which will be at the disposal of your company and others who may be interested in inspecting them. The city authorities are pleased by your acquiescence in the method of procedure suggested, and we now go forward on the understanding that the public discussions before the Council between representatives of your company and of the city will begin immediately upon the completion of the memoranda."

City Solicitor Schreiber stated at this meeting that he will proceed as rapidly as possible with the preparation of memoranda for the ordinance, and he will have the aid of Mayor Whitlock, Chairman John B. Merrill, of the committee on railroads and telegraph, and others.

Several important points have not yet been decided by the administration. One of them is the question of inserting the rate of fare in the draft that is to be prepared; another is whether the valuation should be placed in the grant before the public discussions are opened.

Program Wisconsin Electrical Association.

The tentative program for the annual meeting of the Wisconsin Electrical Association, which is to be held at the Hotel Pfister, Milwaukee, Wis., on Jan. 18 and 19, 1911, was published in the *ELECTRIC RAILWAY JOURNAL* of Dec. 24, 1910, page 1249. Under date of Dec. 30, 1910, J. S. Allen, Lake Geneva, Wis., secretary and treasurer of the association, has announced the following definite program:

"Publicity Campaigns."

"Some Principles Established by the Wisconsin Railroad Commission."

"Electric Meter Testing."

"Ornamental Street Lighting."

"Insurance."

"Electric Railway Repair Shop Practice."

Mr. Allen says that the question of holding a banquet on the evening of Jan. 18, 1911, is under consideration by the executive committee of the association. Suggestions are solicited in regard to the convention and the work of the association.

Transit Affairs in New York

The joint committee of the Chamber of Commerce and the Merchants' Association appointed at the Mayor's request to examine the subway problem and report its conclusions has submitted a unanimous report approving the offer of the Interborough Rapid Transit Company and expressing the hope that the plan of subway construction therein proposed would be promptly accepted by the city, in order that the work of construction may begin as soon as possible. The committee examined the question from all sides—that of the financial interests of the city, that of the merit of the routes held out with respect to the accommodation of the public and to the distribution of traffic, and that of the taxpayer and the farepayer. The committee was broadly representative of the city. It contains the names of an ex-Mayor of New York who had also been Mayor of Brooklyn, of an ex-Mayor of Brooklyn, of men of great experience in finance, of men of technical qualifications, engineers and architects, of leading merchants, of men who represent broadly distributed real estate interests, of lawyers and of representatives of the commercial interests of the port. The members of the committee on engineering were Charles SooySmith, chairman; Alfred P. Roller, William E. McCord, Samuel Rea, Franklin Remington, William J. Wilgus and Seth Low, *ex officio*.

The long-standing dispute over the claims for extra work on the original subway contract has been settled. The Public Service Commission sent to the Board of Estimate and Apportionment a communication which embodied the set-

tlement reached by arbitration after a year and a half or more. It was not a finding by the arbitrators, however, as an agreement had been reached already by representatives of the city and the Interborough interests. It was announced in August that an agreement had been reached by which the city should pay \$2,000,000 in settlement of the extra claims. The claim was made under the original contract with John B. McDonald, which the Rapid Transit Subway Construction Company took over. The full amount was \$6,198,514.92. This has been reduced to \$1,684,109.33.

Association Meetings.

Massachusetts Street Railway Association—Boston, Mass., Jan. 11.
Central Electric Traffic Association—Indianapolis, Ind., Jan. 16.
Wisconsin Electrical Association—Milwaukee, Wis., Jan. 18 and 19.
Central Electric Railway Association—Indianapolis, Ind., Jan. 19.
Interstate Electric Railway Association—Chicago, Ill., Jan. 19. Meeting to organize.
New England Street Railway Club—Boston, Mass., Jan. 26.
American Electric Railway Association—New York, N. Y., Jan. 27, 1911. Mid-year meeting.
Central Electric Accounting Conference—Springfield, Ohio. Date to be fixed.

Public Utility Measure Advocated in West Virginia.—A committee appointed by the State Board of Trade has conferred with Governor Glasscock for the purpose of framing a bill to be presented to the Legislature of West Virginia to create a public service commission to have control of all public utilities in the State. The plan outlined for the bill provides for a non-partisan commission of three persons, with the right to appeal to the courts from the decisions of the commission.

Winnipeg Strike Settled.—The strike of the employees of the Winnipeg (Man.) Electric Railway, which was begun on Dec. 16, 1910, was declared off on Jan. 2, 1911. The company is said to have agreed to reinstate the four men who were discharged for violating the rule of the company which prohibits employees from entering a saloon while in uniform, but to have insisted upon its right hereafter to deal summarily with all men who are found guilty of breaking the rule regarding drinking while in the uniform of the company.

Report by City on Value of Des Moines Property.—The City Council of Des Moines, Ia., has adopted a resolution authorizing Mayor James R. Hanna to negotiate for the services of expert engineers to examine and report on the physical value of the Des Moines (Ia.) City Railway. The Mayor recently introduced a resolution in the Council which provides that the Council approve municipal ownership of street railways and that the legislators elected from Polk County be asked to assist in securing to cities in Iowa the right to acquire, own, operate and lease street railways. Action on this resolution was postponed pending further discussion.

Volume of Business of the Second District Commission in New York.—At the close of business for 1910 the Public Service Commission of the Second District of New York had presented to it for action 2071 different matters. These included 1438 complaints, which were handled informally by the commission and settled without the necessity of formal orders; 371 formal complaints and 262 applications from various corporations for authorization by the commission. During the year the commission disposed of and closed 1670 of the matters presented. During the three years of the commission's existence 5496 matters have been presented to it for action. In addition to daily sessions and consideration of disposition of cases, the commission handled 554 hearings, covering a period of 196 days. During the year the commission authorized capitalization to the amount of \$151,048,108. In 1909 there was authorized \$142,855,035.85; in 1908, \$92,253,900; for the last six months of 1907, \$17,730,745.49; a total for the three and a half years of the commission's existence of \$403,887,789.34.

Financial and Corporate

New York Stock and Money Market

Jan. 3, 1911.

The opening of the new year brought no relief to the stock market. The conditions that prevailed in 1910 seemed to hold over and the market to-day was dull and inactive. While the prices of stocks have been well maintained, it has only been because there was no trading. Every one in the stock market seems to be waiting the decision of the Supreme Court in the important trust cases. The money market has been higher, but rates have not been prohibitive. Call money went to 7 per cent last week, but this rate held only momentarily. Quotations to-day were: Call, 3¼@6 per cent; 90 days, 3¼@4 per cent.

Other Markets

There has been considerable trading in traction shares on the Philadelphia market during the past week, but prices have not materially changed. Rapid Transit, which is the most active of the lot, closed the year at 18½ and was dealt in to-day at about the same price.

In Chicago there has been considerable dealing in Chicago Railways certificates Series 2, but otherwise tractions have been neglected. Prices have not advanced with the activity and the close of the year was 25¼. Other traction securities were not traded in on the market.

In the Boston market during the last week of the old year there was little trading in traction shares. Massachusetts Electric was the most active of the list, but prices for these issues were unchanged.

In the Baltimore market there were some sales of United Railways certificates, but prices were unchanged. The bonds continued to sell at former prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 27.	Jan. 3.
American Railways Company.....	442½	442½
Aurora, Elgin & Chicago Railroad (common).....	45	44½
Aurora, Elgin & Chicago Railroad (preferred).....	83½	83½
Boston Elevated Railway.....	128	129
Boston Suburban Electric Companies (common).....	16	16
Boston Suburban Electric Companies (preferred).....	70	72
Boston & Worcester Electric Companies (common).....	10	10
Boston & Worcester Electric Companies (preferred).....	39½	39½
Brooklyn Rapid Transit.....	74¾	75¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	82½	83½
Capital Traction Company, Washington.....	129	129
Chicago City Railway.....	165	165
Chicago & Oak Park Elevated Railroad (common).....	3¾	3¾
Chicago & Oak Park Elevated Railroad (preferred).....	7¼	7¼
Chicago Railways, ptcptg., ctf. 1.....	295	295
Chicago Railways, ptcptg., ctf. 2.....	25¾	25¾
Chicago Railways, ptcptg., ctf. 3.....	10	11¼
Chicago Railways, ptcptg., ctf. 4.....	26¼	26½
Cleveland Railway.....	91½	91½
Consolidated Traction of New Jersey.....	27	27
Consolidated Traction of N. J., 5 per cent bonds.....	104	104
Detroit United Railway.....	68	69¾
General Electric Company.....	153¾	151½
Georgia Railway & Electric Company (common).....	117	117¾
Georgia Railway & Electric Company (preferred).....	88	87¼
Interborough-Metropolitan Company (common).....	19¼	19¼
Interborough-Metropolitan Company (preferred).....	53¼	54¼
Interborough-Metropolitan Company (4½s).....	79½	79½
Kansas City Railway & Light Company (common).....	22¾	22¾
Kansas City Railway & Light Company (preferred).....	27½	27
Manhattan Railway.....	139	140
Massachusetts Electric Company (common).....	18½	18½
Massachusetts Electric Companies (preferred).....	286	285
Metropolitan West Side, Chicago (common).....	2½	2½
Metropolitan West Side, Chicago (preferred).....	268	270
Metropolitan Street Railway, New York.....	19½	19½
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	64½	65¾
Northwestern Elevated Railroad (common).....	22	22
Northwestern Elevated Railroad (preferred).....	260	265
Philadelphia Company, Pittsburg (common).....	49¾	50½
Philadelphia Company, Pittsburg (preferred).....	443	43
Philadelphia Rapid Transit Company.....	18¾	18½
Philadelphia Traction Company.....	83¾	84
Public Service Corporation, 5 per cent col. notes.....	295¼	296
Public Service Corporation, ctf. 5.....	100½	100½
Seattle Electric Company (common).....	108	106½
Seattle Electric Company (preferred).....	102	102½
South Side Elevated Railroad (Chicago).....	69½	72
Third Avenue Railroad, New York.....	10	10
Toledo Railways & Light Company.....	8	8
Twin City Rapid Transit, Minneapolis (common).....	108	109
Union Traction Company, Philadelphia.....	42¾	44¾
United Rys. & Electric Company, Baltimore.....	14½	14½
United Rys. Inv. Co. (common).....	15	31¾
United Rys. Inv. Co. (preferred).....	52	60
Washington Ry. & Electric Company (common).....	23¾	23¾
Washington Ry. & Electric Company (preferred).....	286¼	286¼
West End Street Railway, Boston (common).....	291	291
West End Street Railway, Boston (preferred).....	291	291
Westinghouse Elec. & Mfg. Co.....	66	66
Westinghouse Elec. & Mfg. Company (1st pref.).....	124	124

a Asked. *Last sale.

Annual Report of the Boston Elevated Railway

The thirteenth annual report of the Boston Elevated Railway covers the period of nine months ended June 30, 1910. This is due to the fact that the fiscal year has been changed by the Board of Railroad Commissioners so as to end on June 30, instead of Sept. 30. A summary of the business for nine months is as follows:

Gross earnings from operation.....	\$11,383,686
Operating expenses.....	7,321,396
Net earnings from operation of owned and leased lines	\$4,062,290
Interest accrued and charged to construction account	135,998
	\$4,198,288
Subway rental.....	\$158,813
Less amount collected from the Boston & Northern St. Ry.....	20,189
	\$138,622
Interest on funded debt of West End St. Ry.....	\$10,135
Dividend on preferred stock of West End St. Ry., 8 per cent.....	384,000
Dividend on common stock of West End St. Ry., 7 per cent.....	583,808
Dividend on stock of Somerville Horse R. R., 6 per cent.....	6,885
Taxes on West End St. Ry.....	468,033
Interest and taxes on leased property of the Old Colony St. Ry.....	35,601
Interest on leased property of the Boston & Northern St. Ry.....	678
Total payments on account of leased railways....	2,127,762
	\$2,070,526
Interest on funded debt.....	\$417,000
Taxes, Boston Elevated Ry.....	342,417
Compensation and income taxes.....	106,239
Washington Street tunnel rental.....	255,000
East Boston tunnel rental.....	41,674
	1,162,330
Balance	\$908,196
Dividend paid Feb. 15, 1910, 3 per cent.....	\$598,500
Dividend reserve.....	299,250
	897,750
Surplus for nine months.....	\$10,446

The details of gross earnings and operating expenses are as follows:

EARNINGS FROM OPERATION:	
From passengers carried.....	\$10,984,441
From carriage of mails.....	28,006
From tolls for use of tracks by other companies.....	31,518
From rentals of real estate.....	106,152
From advertising	87,047
From interest on deposits, etc.....	138,064
From miscellaneous income.....	8,458
Total	\$11,383,686
OPERATING EXPENSES:	
For general expenses.....	\$862,443
For maintenance of roadway and buildings.....	831,538
For maintenance of equipment.....	736,871
For transportation expenses.....	4,890,544
Total	\$7,321,396

William A. Bancroft, the president, states in part in his report to the stockholders:

"No additional capital stock has been authorized during the nine months covered by this report. At the close of the last fiscal year the capital outstanding amounted to \$13,450,100, and there were capital stock subscription payments to the amount of \$4,520,075, covering payments on account of subscriptions to the stock authorized by the vote of the stockholders of Nov. 18, 1908, and by the order of the Board of Railroad Commissioners of Dec. 18, 1908. The final subscription due Jan. 25, 1910, has all been paid, and the capital outstanding as shown in the balance sheet is now \$19,950,000, par value.

"The year has been one of activity on the company's part.

"The construction of the East Cambridge elevated extension has been continued. The temporary bridge has been removed, the piers completed, and eight concrete arches are nearly completed. Portions of the foundations in both East Cambridge and Boston have been completed, plans for the station on Causeway Street in front of the Boston & Maine Railroad station have been approved by the Railroad Commissioners, and contracts for the steel work for the extension have been let.

"In connection with the Forest Hills extension tracks have been laid in the terminal yard to connect by incline with the elevated structure on Washington Street.

"At Dudley Street the platforms have been extended, and miscellaneous changes made for the purpose of providing for the increased business. The waiting rooms on the upper level have been completed, and many alterations made for the comfort and convenience of our patrons at this point.

upon the three levels now in use. Little remains to be done to provide for the operation of 8-car trains at this station.

"The route of the Malden and Everett elevated extension has been approved by the Railroad Commissioners, and a portion of the land has been purchased. The engineers are now designing the structure and stations.

"Plans for the alterations of the Sullivan Square station for the operation of the Malden extension, for 8-car trains, and for separate platforms for in and out passengers have also been approved by the Railroad Commissioners.

"Upon the Cambridge Main Street subway construction work has been pushed vigorously during the year. The main line is now substantially completed, except portions of the Harvard Square station and of the terminal yard.

"At the South Station the elevated structure has been changed to provide for a shuttle track to accommodate trains between the North and South stations.

"The Railroad Commissioners have approved the route for the elevated structure in Boston, between the Boston end of the Cambridge bridge and the Beacon Hill tunnel, which the Boston Transit Commission is now constructing.

"At the Thompson Square station changes in the steel work for track structure, incident to changing the platforms for 8-car trains, are now completed. The material for the platform changes has been delivered.

"The Railroad Commissioners have determined that we should build an elevated station at Green Street in Jamaica Plain, and plans therefor have been approved.

"On the surface an additional track has been laid on Hyde Park Avenue, so that that thoroughfare is now double-tracked to the Hyde Park line.

"On Oct. 27 last cars began to run over the Mystic Avenue bridge, on the Middlesex Fells line, enabling the company to abandon the Union Street tracks and to run its cars direct.

"A large lot of land, containing nearly 24 acres, situated in South Boston at tide water, has been purchased as a site for a power station. Contracts have been made with the Stone & Webster Engineering Corporation for the erection thereon of a large coal unloading and coal storage plant, and also for the erection of a power station, to contain turbo-generators of the largest type, designed to supply an alternating current system, together with a distributing system, and the provision of transformer stations, to be located at suitable points.

"Besides its ordinary taxes the company's contribution to the public during the 12 months ending Sept. 30 amounted to at least \$497,307, made up as follows:

Compensation tax for the use of streets under the acts of 1897..	\$130,846
Interest at 4 per cent. on \$4,382,000, cost of paving laid in streets by company.....	175,280
Cost of maintaining street paving by company.....	105,236
Amount of subway rental devoted to sinking fund.....	51,945
Moving snow removed from sidewalks and roofs (estimated), not less than.....	34,000
Total extraordinary payments to the public.....	\$497,307
Add taxes assessed on real estate.....	308,843
Add taxes assessed on capital stock and income.....	703,864
Total	\$1,510,014
To the above may be added the balance of subway rental.....	132,378
Also the rental of the East Boston tunnel.....	56,077
Also the rental of the Washington Street tunnel on account....	336,000

Grand total, which is about 13.2 per cent of the gross revenue of the company for the year.....\$2,034,469

"Concerning the capitalization of the properties owned and leased by this company, your directors wish you to know that the capital stock of the West End Street Railway Company on June 30, 1910, was as follows: Preferred, \$6,400,000; common, \$11,120,150; total, \$17,520,150. Of this capitalization the preferred stock was the amount authorized by the Legislature for the purchase of the horse railroads which made up the West End system, and was considered only the value of these properties. Of the common stock \$7,150,000 was paid in in cash at par, and the balance was sold under orders of the Railroad Commissioners for cash at prices ranging from 40 to 80 per cent in excess of the par value, realizing a premium of \$1,978,331.

"Of the \$19,950,000 par value of the stock of the Boston Elevated Railway the first \$10,000,000 was paid in in cash at par, and the balance was sold under orders of the Railroad Commissioners for cash at a price of from 10 to 55 per cent in excess of the par value, realizing a premium of \$2,510,958 above the par value. The capitalization of the two companies on June 30, therefore, represents an actual payment

in cash of \$4,489,289 above the par value of the outstanding stock. So there is not only no capital inflation of these properties, but much more has been paid in than is represented by the par value of the stocks. The dividends paid on the stocks and the interest paid on the bonds of the two companies make an average return to the capital invested of 5.15 per cent per annum. It is not true, therefore, of these properties that 'excessive dividends are paid on watered stock.'

"From the summary of stockholders of record June 30, 1910, it appears that the total number is 4539, holding 199,500 shares of stock. Of these 4014, holding 176,799 shares, live in Massachusetts. In other words, over 88 per cent of the stock is held in Massachusetts. The average number of shares held by each stockholder of the company is a little less than 44 shares.

"The total length of surface tracks controlled by the company is now 461.049 miles. This, with the elevated mileage of 24.170 miles, makes a total mileage of 485.219.

"For a number of years there have been petitions to the Legislature for the construction of more subways in various parts of the community than there is any probable revenue to support. Moreover, interested people have endeavored to give the impression that the company has not accepted or built additions or extensions.

"To show to the public that the company has in fact accepted, built and undertaken large additions and extensions, during the months of September, October and November last we advertised in the newspapers by map and statement a recital of the additions and extensions which have been made to our system since we began to operate it in 1898, together with the funds which have been provided therefor.

"We showed that when this company took charge the population of the cities and towns in which it operates was approximately 843,090. Now it is approximately 1,098,917—an increase of only about 30 per cent. At the beginning of the period there was invested \$25,960,000. To-day the investment stands at \$81,440,000—an increase of 213 per cent.

"Our advertisements, in reply to the charge that we have not been progressive, of course, show conclusively that the company's accomplishments and undertakings have far outstripped the growth of the community in which we operate, so far as that growth is represented by population and wealth, progressing eight times as fast as the population and five times as fast as the wealth. Not only have we been extremely progressive, but obviously for the present we must act with caution in respect to future extensions."

Traffic statistics compare as follows:

	Nine Months Ended June 30, 1910.	Year Ended Sept. 30, 1909.	1908.
Round trips.....	4,299,705	5,549,774	5,571,459
Revenue car miles, surface.....	\$32,890,016	\$43,599,806	\$43,818,640
" " " elevated.....	6,234,967	7,295,450	7,806,503
" " " U. S. mail cars..	171,530	232,425	232,746
" " " Total.....	39,296,522	51,127,681	51,857,889
Total revenue passengers carried.....	\$220,127,890	\$281,008,471	\$273,132,584
Average receipts per passenger.....	\$0.1990	\$0.04991	\$0.04989

Metropolitan Street Railway Reorganization Plan Filed with Commission

The joint committee on reorganization of the Metropolitan Street Railway, of which Guy E. Tripp, of Stone & Webster, is chairman, filed with the Public Service Commission of the First District of New York, on Dec. 29, 1910, a petition asking the approval of a plan of reorganization of the company prepared by the joint committee with the sanction and co-operation of the committee representing the 5 per cent general mortgage bonds and the committee representing the 4 per cent refunding mortgage bonds. Briefly, the plan provides for a total of securities of about \$96,000,000, including new securities and old securities which will be allowed to remain undisturbed. This is a reduction of about \$40,000,000 from the present outstanding securities and obligations. The new securities to be issued are approximately as follows: \$11,768,000 of new fixed-charge 4 per cent bonds; \$39,000,000 of new adjustment income bonds and \$14,000,000 of stock. The fixed charges represented by the interest on the bonds have been reduced by more than \$1,000,000 a year by the readjustment.

The holders of the stock and improvement notes of the

Metropolitan Street Railway are given the right of participation on the payment of an assessment sufficient to furnish the new cash needed, which it is estimated will not exceed \$10,000,000. The plan does not, however, provide for the participation of the Metropolitan Securities Company or the New York City Railway. A novel feature is that, subject to the permission of the Public Service Commission, the holders of personal injury claims are offered the right to participate under the same terms as the most favored bondholder. No assessment is required of these tort claimants. Ford, Bacon & Davis, the experts employed by the receivers, have prepared an inventory and appraisal of the properties of the system which show a valuation largely in excess of the total securities to be outstanding after the adoption of the plan. A summary of the plan follows:

Decrees of foreclosure, respectively, of the \$12,500,000 general mortgage and of the \$16,604,000 refunding mortgage have been entered by the court, and the said properties subject thereto ordered to be sold under these decrees. The joint reorganization committee contemplates the purchase of these properties at the sale. It is proposed that a new railroad corporation shall be formed under the provisions of Sections 9 and 10 of the stock corporation law. In accordance with the provisions of the statutes of the State of New York the joint committee proposes to utilize for the consummation of such proposed purchase, to wit:

OUTSTANDING SECURITIES OF SYSTEM:	
Bonds, debentures and collateral notes.....	\$57,285,000
Stocks	67,900,000
Total	\$125,185,000
LESS THOSE TO BE ACQUIRED UNDER FORECLOSURE:	
Bonds	\$3,700,000
Stocks	5,792,000
	9,492,000
Total held by public.....	\$115,693,000

Added to the above \$115,693,000 held by the public the following special items are to be included: Improvement notes made by the Metropolitan Street Railway to the Metropolitan Securities Company, \$4,000,000; allowances decreed by the court in favor of the tort claimants, the full amount of which is estimated to be \$1,875,000; a maximum estimate of cash requirements, \$10,000,000; accrued and defaulted interest on the following bonds and notes held by the public, and interest thereon, as of Oct. 1, 1910:

On 5 per cent. bonds.....	\$2,116,969
On 4 per cent. bonds.....	2,094,800
On Central Crosstown notes.....	92,635
On Metropolitan Crosstown first mortgage bonds.....	78,884
Total	\$4,383,250

This places the total of public holdings and special items at \$135,951,250. Regarding the above amount of \$10,000,000 estimate of cash requirements, the plan states that the minimum of the bids which the court has authorized to be accepted at the foreclosure aggregate \$12,000,000. It is stated to be certain that a sum not to exceed the above maximum estimate will ultimately and in any event be required to be paid under a purchase made for the purpose of this plan. Out of this fund the outstanding receivers' certificates, substantially \$6,500,000, claims adjudged or which may be adjudged to be preferential, receivers' liabilities and obligations, costs, allowances and other sums ordered to be paid by the court will have to be met, and in addition the charges and expenses of reorganization will be provided for.

SECURITIES TO REMAIN UNOBTURBED:	
Bonds	\$25,646,000
Stocks	15,300,000
Total	\$40,946,000
Less those to be acquired under foreclosure.....	9,492,000
Total held by public.....	\$31,454,000

The \$9,492,000 to be acquired on the foreclosure are securities to be pledged under a new mortgage or held as muniments of title, or canceled, or otherwise disposed of to effectuate the plan.

SECURITIES TO BE READJUSTED:	
Bonds	\$31,369,000
Stocks	52,600,000
Total	\$84,239,000
To which must be added for special items aforesaid:	
Improvement notes.....	4,000,000
Tort claimants.....	1,875,000
Interest as above stated.....	4,383,250
Cash requirements, estimated.....	10,000,000
Total	\$104,497,250

The total of new securities, as proposed, will consist of the following:

New 4 per cent bonds.....	\$11,768,100
New adjustment bonds.....	38,933,400
Stock	14,150,000
Total	\$64,851,500

The Public Service Commission has fixed Jan. 11, 1911, as the date for the hearing on the proposed plan for reorganization of the Metropolitan Street Railway.

Chicago Railways

On Dec. 27, 1910, Judge Grosscup, of the United States Circuit Court at Chicago, signed the necessary orders providing for the payment of the various judgments and claims against the Chicago Consolidated Traction Company on a compromise basis and ending the receivership, and also confirmed the sale of the property of the company and its subsidiaries on Nov. 30, 1910, to Andrew Cooke, and the sale by him of all the property of the Chicago Consolidated Traction Company within the city limits of Chicago to the Chicago Railways and the property outside of the city to the County Traction Company. The sale of the property of the Chicago Consolidated Traction Company under foreclosure was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 10, 1910, page 1170, and the acceptance by the Chicago Railways of the ordinance passed by the city which granted it permission to absorb the Chicago Consolidated Traction Company was noted in the *ELECTRIC RAILWAY JOURNAL* of Dec. 17, 1910, page 1212.

On Dec. 28, 1910, the day following the orders of Judge Grosscup, the physical connection between the lines of the old Consolidated Traction Company within the city limits and those outside of the city was broken and passengers coming into the city over the lines of the County Traction Company, or going out of the city on the lines of the Chicago Railways Company, formerly operated by the Chicago Consolidated Traction Company, were required to pay an extra fare. As the public had not been fully informed in regard to the change considerable disorder resulted among passengers. On Dec. 29, 1910, a compromise was arranged whereby passengers from all the suburbs will be carried to and from the city until Feb. 12, 1910, for a 5-cent fare. Heated shelters will be provided for the convenience of passengers at the city limits. The resolution providing for the temporary armistice which was adopted by the various bodies which represented the public in the negotiations with the companies follows:

"Whereas, The Chicago Railways has expressed a willingness to enter into an arrangement for the period and upon the terms hereinbefore stated, provided the entering into the performance of such an arrangement on its part shall be without prejudice to its legal rights; and,

"Whereas, The arrangement above referred to shall commence within 24 hours after the passage and approval of this ordinance and shall continue from such time until and including Feb. 12, 1911, and shall at midnight of that day cease and determine; and,

"Whereas, Said arrangement is as follows: 'First, the Chicago Railways during said period shall give without charge to any passenger upon its railway lines desiring same a transfer entitling such passenger to transportation over connecting lines of the County Traction Company located in this municipality.

"Second—The Chicago Railways shall cause such transfers above mentioned to be honored during said period by the County Traction Company.

"Third—The Chicago Railways shall make arrangements with the County Traction Company, which said last-named company shall give during said period to each passenger without charge from its lines of railway desiring same a transfer entitling such passenger to transportation over connecting lines of the Chicago Railways to the business district of Chicago and intermediate points.

"Fourth—The Chicago Railways shall honor upon its lines between the city limits and the business district of Chicago such transfers so given by the County Traction Company during said period.'

"Therefore, Be it and it is hereby ordained:

"Section 1—That if the Chicago Railways will enter into and carry out the above-mentioned arrangement during the

period aforesaid, this municipality shall not claim or insist that by virtue of the entering into and carrying out of such arrangement the Chicago Railways loses or prejudices any of its legal rights, and that during the continuance of such arrangement and until the expiration thereof this municipality shall not commence or prosecute or allow to be commenced or prosecuted in its name or on its behalf against the Chicago Railways any action at law or in equity, or prior to the date of the termination of said period upon any grounds or for any relief whatever, provided that nothing herein contained shall be construed as affecting or prejudicing any rights of the municipality of any kind whatsoever against the Chicago Railways which the municipality may seek to have enforced after the expiration of said period.

"Section 2—If the County Traction Company shall be prevented by the action of any municipality, its officers or agent from operating its cars from the city limits of Chicago to and from that part of said lines lying within this municipality, the Chicago Railways shall be under no obligations to carry out said arrangement, and may terminate said arrangement as to the line or lines of street railway so affected, nor shall the Chicago Railways be under any obligations to carry out such arrangements unless and until the villages of — and — have each passed an ordinance of the same tenor as this ordinance."

Street Railway Bonds and Massachusetts Savings Banks

In accordance with Chapter 590 of the Acts of 1908, the Massachusetts Railroad Commission has transmitted to the Bank Commissioner the following list of street railways which have annually earned and properly paid, without impairment of assets or capital stock, dividends at the rate of 5 per cent or over upon their outstanding capital stock in each of the five preceding years: Boston Elevated Railway, Boston & Northern Street Railway, Boston & Revere Electric Street Railway, Citizens' Electric Street Railway, Dartmouth & Westport Street Railway, East Middlesex Street Railway, Fitchburg & Leominster Street Railway, Holyoke Street Railway, Springfield Street Railway, Union Street Railway, West End Street Railway, Worcester Consolidated Street Railway. The bonds of these companies are legal investments for savings banks in Massachusetts.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—George M. Seward & Company, Chicago, Ill., as fiscal agents of the Falkenau Electric Construction Company, Chicago, Ill., offer for subscription at 95 and interest, with a 40 per cent stock bonus, the unsold portion of a block of \$100,000 of first mortgage 5 per cent 30-year gold bonds of the Alton, Jacksonville & Peoria Railway, dated July 1, 1910, and due July 1, 1940, but redeemable at 105 after July 1, 1920. The Alton Banking & Trust Company, Alton, Ill., is trustee of the issue. The total authorized issue of bonds is \$600,000.

City Railway, Los Angeles, Cal.—The City Railway, which was incorporated recently to build new extensions and new lines for the Los Angeles Railway Corporation, will issue a mortgage for \$5,000,000 to cover the new lines when built. The City Railway has a capital stock of \$5,000,000, fully subscribed, all of which is owned by the Los Angeles Railway Corporation.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—The Public Service Commission of the First District of New York has granted permission to the Coney Island & Brooklyn Railroad to issue \$500,000 of 3-year 6 per cent notes, to be redeemable at 101. The purposes for which the money will be used follow: (1) For reconstruction and relocation of railroad on Coney Island Avenue, from Prospect Park to Coney Island, \$354,945.50. (2) To discharge or refund obligations, \$36,684.93. (3) To pay for or on account of the reconstruction of railroad on Franklin and De Kalb Avenues, the relaying of the rails on Smith Street, and paving all three streets, \$98,369.57. (4) To pay the expenses of the sale of the notes authorized and the discount thereon caused by the sale at 98 per cent of the face value, \$10,000.

Denver (Col.) City Tramway.—The Metropolitan Railway, Denver, has made provision for the redemption of its first mortgage 6 per cent gold bonds on Jan. 1, 1911, at the office of the Mercantile Trust Company, New York.

Pursuant to the terms of the first and refunding sinking fund mortgage 25-year 5 per cent gold bonds of the Denver City Tramway, \$953,000 of these bonds are authorized to be issued to pay off the bonds of the Metropolitan Street Railway, and the latter may be exchanged for the bonds of the Denver County Tramway referred to prior to Jan. 1. The exchange may be made at the office of Clark, Dodge & Company, New York, or the International Trust Company, Denver, the Metropolitan Railway bonds to be received at 100 and accrued interest to Jan. 1 for the Denver City Tramway bonds at 95 and accrued interest to date of exchange, or, if exchange is not desired, the bonds of the Metropolitan Railway will be purchased at 100 and accrued interest to date of delivery.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—The Hocking-Sunday Creek Traction Company has made a mortgage to the Columbus Savings & Trust Company, as trustee, to secure an authorized issue of \$200,000 of first mortgage, 6 per cent, 20-year gold bonds, dated Nov. 1, 1910, issuable at \$13.333 per mile of road.

Louisville & Eastern Railroad, Louisville, Ky.—The property of the Louisville & Eastern Railroad was purchased at foreclosure sale on Jan. 3, 1911, by the Louisville & Interurban Railroad, a subsidiary of the Louisville Railway, for \$1,000,000, the upset price.

Manistee Light & Traction Company, Manistee, Mich.—The property of the Manistee Light & Traction Company will be sold at the Court House in Manistee on Jan. 18, 1911, by order of the United States District Court.

New Orleans Railway & Light Company, New Orleans, La.—Bertron, Griscom & Jenks, New York, N. Y., and Philadelphia, Pa., offer for subscription at 83 and interest the unsold portion of \$500,000 of general mortgage 4½ per cent gold bonds of the New Orleans Railway & Light Company, dated July 1, 1905, and due July 1, 1935, but redeemable, in whole or in part, after 60 days' notice, on any coupon date at 105 and interest.

Old Colony Street Railway, Boston, Mass.—The Railroad Commission of Massachusetts has been asked to approve an issue of \$300,000 of additional common stock of the Old Colony Street Railway on account of extensions, equipment, etc.

St. François County Railway, Farmington, Mo.—The St. François County Railway, the property of which was sold under foreclosure in August, 1910, has been succeeded by the St. François County Railroad, which has elected officers as follows: M. P. Cayce, president; William P. Taylor, vice-president, general manager and purchasing agent; William P. Lang, secretary; F. V. Isenman, general freight and passenger agent.

St. Louis (Mo.) Terminal Electric Railway.—The St. Louis Terminal Electric Railway, which is controlled by the McKinley interests, has filed for record in Missouri a certificate increasing its authorized capital stock from \$1,000,000 to \$2,000,000.

South Shore Traction Company, Patchogue, N. Y.—Judge Chatfield, of the United States Circuit Court, on the application of Paul T. Brady, appointed Paul T. Brady and Willard V. King receivers of the South Shore Traction Company, on Dec. 31, 1910.

Syracuse (N. Y.) Rapid Transit Railway.—William H. Newman, formerly president of the New York Central & Hudson River Railroad, has been elected a director of the Syracuse Rapid Transit Railway to succeed the late E. V. W. Rossiter.

Third Avenue Railroad, New York, N. Y.—Justice Amend of the Supreme Court has granted a writ of certiorari giving the Public Service Commission of the First District of New York 20 days within which to file in the county clerk's office all the records of protests before it and decisions upon which it refused to approve the plans for the organization of the Third Avenue Railroad dated Dec. 2, 1909, and further agreement of plan of readjustment dated Feb. 23, 1910. The suit was brought by the Third Avenue Railroad and by James N. Wallace and others of the bondholders' committee.

West Chester, Kennett & Wilmington Electric Railway, Kennett Square, Pa.—In the ELECTRIC RAILWAY JOURNAL of Dec. 17, 1910, page 1215, mention was made of the appointment of a protective committee, consisting of R. J.

Brunker, Geo. B. Atlee, Morris Ebert and Wm. S. J. Wetherill, as the result of the default of the West Chester, Kennett & Wilmington Electric Railway in the payment of the coupons of its \$420,000 of 5 per cent bonds dated 1905, which are outstanding. George B. Atlee & Company, Philadelphia, Pa., now state that sufficient bonds have been deposited with the committee, which they represent, to permit foreclosure.

Wilmington, New Castle & Southern Railway, New Castle, Pa.—Solomon Hanford, New York, N. Y., purchased at foreclosure sale, on Dec. 23, 1910, the portion of the Wilmington, New Castle & Southern Railway, between Wilmington and New Castle, covered by the first mortgage of the Wilmington & New Castle Railway, which was dated 1896, and drawn for \$150,000. The purchase price was \$100,000. Mr. Hanford is said to represent E. Clarence Jones & Company, New York, N. Y.

Dividends Declared

Auburn & Syracuse Electric Railroad, Syracuse, N. Y., quarterly, 1½ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Chicago, Ill., quarterly, 1½ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Birmingham Railway, Light & Power Company, Birmingham, Ala., 3 per cent, preferred; 2½ per cent, common.

Boston & Northern Street Railway, Boston, Mass., \$3, preferred.

Boston (Mass.) Suburban Electric Companies, \$1, quarterly.

Cedar Rapids-Iowa City Railway & Light Company, Cedar Rapids, Ia., 3 per cent, preferred.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

Denver & Northwestern Railway, Denver, Col., 2 per cent, quarterly.

Ft. Smith Light & Traction Company, Ft. Smith, Ark., quarterly, 1¾ per cent, preferred.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., 1 per cent.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 4 per cent, common.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred; quarterly, ¾ of 1 per cent, common.

New England Investment & Security Company, Boston, Mass., 2 per cent, preferred.

New Orleans City Railroad, 2½ per cent, preferred; 1 per cent, common.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1¼ per cent, common.

Old Colony Street Railway, Boston, Mass., \$3, preferred.

Ottawa (Ont.) Electric Railway, 2½ per cent; 2 per cent extra.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Philadelphia (Pa.) City Passenger Railway, \$3.75.

Porto Rico Railways, Ltd., San Juan, P. R., quarterly, 1¾ per cent, preferred.

Public Service Corporation of New Jersey, quarterly, 1¼ per cent.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, \$3.

St. Charles Street Railroad, New Orleans, La., 3 per cent.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred and first preferred.

Syracuse (N. Y.) Rapid Transit Company, quarterly, 1½ per cent, preferred.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., quarterly, 1¼ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 1¾ per cent.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred.

Union Railway, Gas & Electric Company, Rockford, Ill., quarterly, 1½ per cent, preferred.

West End Street Railway, Boston, Mass., \$2 preferred.

West India Electric Company, Ltd., Kingston, Jamaica, 1¼ per cent.

Traffic and Transportation

Transfer Talks in Toledo

The Toledo Railways & Light Company, Toledo, Ohio, has placed reading matter on all transfers. For the last few weeks the following has appeared on the transfers:

"If there is any dispute over this transfer, pay your fare, keep the transfer and refer matter to company. Conductors are governed by certain fixed rules, and to avoid disputes take up complaints direct with company.

"We would also consider it a favor to be notified when a conductor is not courteous or polite to our passengers, but don't blame the conductor if it's your own mistake."

The company intends to change the transfer talks at frequent intervals and has prepared a second transfer talk, to read as follows:

"Twenty-five years ago people rode in horse cars. They paid a 5-cent fare, received no transfer and could not ride over two or three miles.

"To-day electric cars take you five times as far, five times as quickly and five times more comfortably. Despite enormous increased operation expense the fare is still 5 cents.

"Doesn't this show the important part electric roads play in contributing to the public welfare?"

Subway Service Order Protested

The Interborough Rapid Transit Company, New York, N. Y., has filed a protest with the Public Service Commission of the First District of New York against the order of the commission dated Dec. 23, 1910, which fixes the conditions of service on the subway lines of the company, and the commission has set Jan. 12, 1911, for a re-hearing on its order. The question of service came before the commission in a series of hearings which were reported in the issues of the ELECTRIC RAILWAY JOURNAL of Dec. 10, 1910, page 1152; Dec. 17, 1910, page 1206, and Dec. 31, 1910, page 1271, in the last of which the order of the commission requiring the company to reduce from 30 minutes to 15 minutes the time within which to supply seats sufficient for all passengers or to operate the maximum service at all hours was referred to. The objections made by the company to the order follow:

"That the terms of said order and the regulations therein attempted to be made are impossible of performance.

"That said order makes no provision for the temporary prevention of this company from complying with said order by accident or other controlling emergency for which it is not responsible, and that in this respect said order and its terms and each of them are unjust and unreasonable.

"That said order deprives this company of the right of ownership and management and protection of its property and the property of others committed to its care.

"That said order illegally substitutes the judgment of the commissioners for the judgment of this company's directors and stockholders with respect to the matters which it attempts to regulate.

"That said order impairs the obligation of contracts to which this company is a party, in violation of the Constitution of the State of New York and in violation of the Constitution of the United States.

"That the law under which said commission purports to act, being Chapter 48 of the Consolidated Laws, known as the public service commissions law, enacted by Chapter 480 of the Laws of 1910, is unconstitutional as not having been duly enacted in accordance with the Constitution of the State of New York and as being contrary to the provisions thereof; that the sections of said law under which the commission acted or purported to act herein are unconstitutional and deprive owners of property of their property without due process of law and discriminate unjustly between classes of property owners.

"That the regulations attempted to be fixed and enforced by the order of the commission hereinabove referred to are not, nor are any of them, just or reasonable.

"That the determination made by the said order and each and every part thereof is against the evidence submitted to the commission and against the weight of such

evidence and is wholly without support or justification on any evidence submitted to the commission.

"The commission is hereby respectfully notified that the terms of the order modifying final order purporting to have been made on Dec. 28, 1910 (excepting paragraphs marked 2, 3 and 4, which are accepted and will be obeyed and are not referred to hereinafter), are not accepted, and that it is a physical impossibility for the Interborough Rapid Transit Company to obey said order."

The paragraphs which the company indicates that it accepts provide for the discontinuance of the expresses which have heretofore skipped all stations between Ninety-sixth Street and 137th Street, and the operation of every other Broadway local train to Dyckman Street instead of their withdrawal at 137th Street, as has been the custom. This change is devised to relieve the crowded condition on the Broadway branch, and was put into effect on Jan. 3, 1911.

Relations of Boston Elevated Railway with Employees

William A. Bancroft, president of the Boston (Mass.) Elevated Railway, refers as follows to the relations of the company with its employees in the annual report of the company, an abstract of which is published on page 47 of this issue of the ELECTRIC RAILWAY JOURNAL:

"The company has continued its liberal policy toward its employees in respect to their wages, as well as in other matters. Compensation for learners during 12 months ending Sept. 30 amounted to \$37,813. There was paid during 12 months ending Sept. 30 the sum of \$6,869, as a guaranteed minimum wage for new or extra men. There was also paid as increased compensation to long-service men the sum of \$71,895. There was paid in pensions, under the provisions recited in former reports, the sum of \$11,260. There was also paid in 'satisfactory service' money, in sums of \$20 or \$25 to each of the employees deemed worthy thereof, the sum of \$74,130. The aggregate sum of increased payments to employees, under the provisions adopted seven years ago, amounted during the year to \$201,969. The provisions of four years ago and this year raising the rate of wages increase this amount by about \$201,012, making a total of about \$402,981."

Pensions for Public Service Employees

The Public Service Corporation of New Jersey and its allied companies will provide, after Jan. 1, 1911, old age pensions, sick and accident benefits and life insurance for all its permanent employees of the various railway, gas and electric companies. The entire cost will be borne by the companies without any expense to the men.

Approximately 10,000 employees will be affected by the benefit scheme. The annual cost to the companies will, it is estimated, be upward of \$50,000.

The Public Service will pay sick or disabled employees \$1 per day for not more than 90 days in any one year; the smallest pension to be paid will be \$240 a year and at the death of an employee \$300 will be paid to his dependents.

Employees who reach the age of 65 years after 25 years of continuous service with the corporation, its allied or predecessor companies will be eligible to retire on pension. Compulsory retirement is provided for when an employee shall have reached the age of 70 years, after 20 years of continuous service. Pensions are to be paid monthly by the employing company and are to be fixed on a basis of percentage of the average compensation of the person pensioned. This is to be for each year of service 1 per cent of the average salary for the 10 years preceding retirement, but with the proviso that no pension shall be less than \$240 a year. It is also provided that if an employee does not voluntarily retire when he reaches the age of 65 years he may, if he likes, do so at any time before reaching the compulsory retirement age.

The insurance feature provides that \$300 will be paid at death to the dependents of permanent employees whose compensation at the time of death does not exceed \$1,800 a year. Those receiving more than \$1,800 a year do not come within the scope of the insurance plan.

In the payment of benefits to sick or injured employees it is stipulated that no money will be given in cases where the disability is due to immoral conduct or the use of intoxicants. Nor will the employees who receive \$1,800 per year or more and those whose regular pay is continued during disability share in the sick benefit fund. All others will, after the first week of disablement, be paid at the rate of \$1 a day for not more than 90 days in any one year. Employees receiving a pension will not be entitled to sick benefits also, but retirement on pension will not deprive any employee of the benefits of insurance.

The administration of the beneficial funds has been placed in the hands of a welfare committee, which consists of the president, the second vice-president, who is chairman, the treasurer and the general claim agent. It is figured that for the first four years at least the companies will have to spend annually for pensions \$12,000; for insurance, \$21,600; for sick benefits, \$17,900, a total of \$51,500. The necessary money will be appropriated annually, properly apportioned among the several companies and charged to operating expenses.

Collision on Oregon Electric Railway.—Sixteen persons were injured in a head-on collision at 9:15 p. m., on Dec. 14, 1910, between a limited car and a local car on the Puget Sound Electric Railway, between Seattle and Tacoma.

Safety Gates in Louisville.—The Louisville (Ky.) Railway is experimenting with safety gates, and will install the gates on all of its cars, if after trial they prove successful. The gates on the Louisville cars will be operated by the conductor.

Increase in Wages by Toledo, Fostoria & Findlay Railway.—On Jan. 1, 1911, the Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, increased the wages of all motormen and conductors who have been in the employ of the company three years 1 cent an hour.

Lehigh Valley Transit Company, Allentown, Pa.—This company has issued a calendar for 1911, accompanied by a circular letter extending the season's greetings and telling of the new rapid transit express service at freight rates between Philadelphia and Allentown, and intermediate points.

Special Attendants in Kansas City, Mo.—The Metropolitan Street Railway, Kansas City, Mo., placed 30 uniformed men at the principal points in the downtown trading district during the holiday season to assist and direct passengers of the company and otherwise promote their comfort.

Near-Side Ordinance in Connersville, Ind.—The city attorney of Connersville has prepared an ordinance for introduction in the City Council of Connersville, Ind., to compel the Indianapolis & Cincinnati Traction Company, which operates through Connersville, to stop its cars on the near side of the street in that city.

Special Transfer for New Year's.—The St. Joseph Railway, Light & Power Company, St. Joseph, Mo., used a special decorated transfer on Jan. 1, 1911, 2¾ by 5 in. in size, and printed in red and green. The upper half of the slip bore a New Year greeting from the company to the passenger. The border design was a reproduction of holly leaves and berries.

Effect of Cold Weather at Akron.—Early on the morning of Dec. 30, 1910, 25 poles carrying the power lines of the Northern Ohio Traction & Light Company, the wires of the two telephone companies and the police and fire wires broke and fell into South Main Street, Akron, Ohio, paralyzing street car service for hours, except in the northern part of the city.

Uniforms as Christmas Presents in Portland, Ore.—The Portland Railway, Light & Power Company, Portland, Ore., has announced that it will present all platform men who have been with the company five years or more, known as "gold stripe men," with Christmas gifts in the form of new uniforms, provided they apply for them within six months. There are about 300 men in the service of the company who are entitled to the new uniforms.

Complaint Against International Railway Closed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of H. H. Glosser and others against the International Railway, Buf-

falo, N. Y., as to service on the Cazenovia, Abbott Road and South Park lines, in Buffalo. The company has expressed its willingness to continue the present service on the Cazenovia line, and this is satisfactory to the complainants.

Transporting Policemen.—The Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, Louisville, Ky., have announced that policemen will no longer be carried free on their lines outside the limits of the towns in which the companies operate. The franchises of the companies require that policemen be given free transportation within the municipal boundaries, but the companies have heretofore allowed policemen to ride anywhere on the lines.

Indiana Commission's Recommendations Observed.—The Ft. Wayne & Wabash Valley Traction Company has transferred its train dispatcher's office from the tower at the interlocking crossing at Bluffton, Ind., to Ft. Wayne, Ind., with authority over the running of trains between Ft. Wayne and Bluffton and Ft. Wayne and Peru. This change is in accordance with the recommendations of the Indiana Railroad Commission that train dispatchers should give their entire time to the movement of interurban trains, without attending to interlocking crossings. The dispatcher's office for the Peru-Lafayette division of the road will be removed from Huntington to Logansport.

Joint Rates in New York.—On Dec. 25, 1910, the Metropolitan Street Railway, New York, and the Central Park, North & East River Railroad established the joint rate for the transportation of passengers provided in the order of the Public Service Commission of the First District of New York as referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 10, 1910, page 1171. The operation of the joint rate as explained to the public in the notices displayed in the cars follows: "Passengers on the avenue cars of the Metropolitan Street Railway may purchase from conductors, for the additional sum of 5 cents, upon request at the time cash fare is paid, a joint rate ticket, valid for fare on the cars of the Fifty-ninth Street Crosstown Line, with the privilege of continuing the journey northward or southward, according to the color of the ticket, on another intersecting line of the Metropolitan Street Railway system, as specified on Coupon 2 of the ticket."

Interurban Railway Replies to Complaint.—The Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., has filed with the Public Service Commission of the Second District of New York its answer to the complaint of the residents of Galen, N. Y. The company states that if it is compelled to increase the number of stops the running time between Rochester and Syracuse will be increased materially. It now takes about 2 hours and 30 minutes to make the run between the cities, and if the time is increased the company will lose the patronage of a large number of persons who daily travel between the two terminals. The company's earnings are derived largely from the limited cars. A number of towns have recently been eliminated from the regular stops of limited cars, but the company claims that the service of these towns is adequate and much better than the service afforded by the steam railroads prior to the construction and operation of the electric railway.

New Schedule on Auburn & Syracuse Electric Railroad.—The Auburn & Syracuse Electric Railroad, Syracuse, N. Y., arranged to put a new schedule in effect on its line on Jan. 3, 1911. Under the new schedule there is a 40-minute instead of a 30-minute service on all days except Saturday, when a 30-minute service, differing from the present one, will be in force. A new feature of the schedule is a limited car service between Syracuse and Skaneateles at 5:20 p. m. every day except Saturday and Sunday. Under the new service the first car leaves Syracuse at 6:30 a. m., the next at 7:20 a. m., and thereafter every 40 minutes up to the last car at midnight. On Saturdays the first car leaves Syracuse at 6:30 a. m., the next at 7 a. m., the next at 8 a. m., and thereafter every 30 minutes until 11 p. m. The last car for Auburn leaves at 11:50 p. m. On the Saturday schedule the first car leaves Auburn at 5:40 a. m., the next at 6:40 a. m., and the next at 7 a. m., and thereafter every 30 minutes up to 9:30 p. m. The last two cars for Syracuse leave at 10:30 p. m. and 11:45 p. m.

Personal Mention.

Mr. D. H. McMichael has been appointed claim agent of the Fort Smith Light & Traction Company, Fort Smith, Ark., to succeed Mr. H. R. Bennett.

Mr. Arthur E. Tweedy has been elected president of the Danbury & Bethel Street Railroad, Danbury, Conn., to succeed the late Samuel C. Holley.

Mr. John Otto has been appointed purchasing agent of the Santa Barbara Consolidated Railroad, Santa Barbara, Cal., to succeed Mr. W. T. Sterling.

Mr. J. M. Thomas has been appointed chief engineer of the power station of the People's Traction Company, Galesburg, Ill., to succeed Mr. E. P. Shanks.

Mr. George L. Colgate has been appointed purchasing agent of the Ontario Light & Traction Company, Canandaigua, N. Y., to succeed Mr. J. B. Eaton.

Mr. Horace R. Hudson, treasurer of the Humboldt Transit Company, Eureka, Cal., has also been elected secretary of the company to succeed Mr. Burke Corbet.

Mr. D. J. McGuire has been appointed roadmaster of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., to succeed Mr. D. Dwyer.

Mr. C. D. Emmons, general manager of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has been elected president of the Railroad Young Men's Christian Association of Fort Wayne.

Mr. B. E. Tabler, formerly traffic agent of the Illinois Traction System at St. Louis, Mo., has been appointed freight and new business manager of the Choctaw Railway & Lighting Company, McAlester, Okla.

Mr. Walter W. Cook has been appointed master mechanic at the shops of the Terre Haute, Indianapolis & Eastern Traction Company at Greenfield, Ind. Mr. Cook was formerly connected with the Pullman Company.

Mr. J. B. Sucece, formerly superintendent of the Chicago, Indianapolis & Louisville Railway, Lafayette, Ind., has been appointed general superintendent of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., effective Feb. 1, 1910, to succeed Mr. M. P. Reed, who will engage in business for himself at South Bend.

Mr. Ralph H. Rice has been appointed division engineer of electrical transmission and distribution, Board of Supervising Engineers, Chicago Traction, vice Mr. E. N. Lake, resigned. Mr. Rice was formerly assistant engineer of this division, having held that position since the organization of the Board of Supervising Engineers. Before becoming connected with the Board of Supervising Engineers Mr. Rice was one of the engineers of The Arnold Company, Chicago, Ill. Mr. W. F. Sims, formerly field engineer of the power department, has been appointed assistant division engineer to succeed Mr. Rice.

Mr. Peter E. Hurley, whose resignation as general manager of the Trenton (N. J.) Street Railway was announced in the *ELECTRIC RAILWAY JOURNAL* of Nov. 5, 1910, was tendered a reception on Dec. 30, 1910, at which all of the employees of the company were present. Mr. Hurley was presented with a gold watch by Mr. C. Howard Gibbs on behalf of the employees, who thanked Mr. Hurley for his courteous treatment of the men. Mr. Oscar T. Crosby, president of the Trenton & Mercer County Traction Company; Mr. Rankin Johnson, vice-president of the company; Mr. John T. Thompson, superintendent of the company, and Mr. Henry C. Moore, former president of the company, all made short addresses.

Mr. E. D. Smith resigned as superintendent of power stations of the United Railways, St. Louis, Mo., effective Jan. 1, 1911, to become chief engineer of the Board of Education of St. Louis. Mr. Smith was born in Galion, Ohio, on March 29, 1877. He was educated in the district schools of Missouri and at Missouri University, from which he was graduated in June, 1901, with the degree of electrical engineer. Immediately after he was graduated from college Mr. Smith entered the employ of the St. Louis Transit Company, the predecessor of the United Railways, as a helper in one of the electrical construction gangs. Subsequently he was employed in various capacities in the different power stations of the company and in the office of the superintendent of power of the company. In 1904 Mr. Smith was appointed superintendent of power stations of the company.

Mr. E. F. Schneider, secretary and general manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, was tendered a dinner by the company on the evening of Dec. 28, 1910, at the conclusion of which the party adjourned to the directors' room, where Mr. A. E. Akins, first vice-president of the company, on behalf of the officers, presented Mr. Schneider with a traveling outfit. Among those present were: Mr. A. E. Akins, first vice-president of the company; Mr. J. O. Wilson, treasurer; Mr. H. B. Cavanaugh, auditor; Mr. J. A. Nestor, superintendent; Mr. W. E. Rolston, superintendent of power and shops; Mr. Ensign Johnson, superintendent; Mr. W. B. Demaline, superintendent of Ohio lines; Mr. G. F. Reidy, traveling passenger agent; Mr. G. McGraw, traveling auditor; Mr. C. G. Taylor, superintendent of lighting, and Mr. C. E. McKisson, claim adjuster.

Mr. W. H. Rushton has recently been appointed master mechanic of the Altoona & Logan Valley Electric Railway, Altoona, Pa., to succeed Mr. W. H. Dickson. Mr. Rushton began his railway career as an apprentice in the electrical department of the Hestonville, Mantua & Fairmont Railway, in 1896, after graduating from the Philadelphia High School. In 1897 Mr. Rushton was appointed foreman with the Union Traction Company, Philadelphia, Pa., and continued with this company and the Philadelphia Rapid Transit Company, its successor, until June, 1904. He then accepted a position as foreman with the Pacific Electric Company, Los Angeles, Cal., and continued with this company until June, 1905, when he contracted with J. G. White & Company, Inc., to act for five years as master mechanic of the Manila Railway & Light Company, Manila, P. I. Mr. Rushton returned to the United States in June, 1910.

Mr. B. R. Stephens, formerly general traffic manager of the Illinois Traction System, Champaign, Ill., has been appointed general superintendent of the Choctaw Railway & Lighting Company, McAlester, Okla. Mr. Stephens has had more than 20 years' experience with railroads. He began his career as a trainman and has at various times been connected with the Toledo, St. Louis & Western Railroad, Ohio Southern Railroad, Cleveland, Akron & Columbus Railroad, New York, Chicago & St. Louis Railroad and the Chicago & Eastern Illinois Railroad. He was connected with the Illinois Traction System for eight years. During the last four years of his connection with the Illinois Traction System Mr. Stephens acted as general traffic manager with headquarters in Springfield. Previous to serving the company in the capacity of traffic manager he was connected with the Indiana interests of the company for two years and served for two years at Champaign, Ill.

Mr. Samuel J. Dill, who has been assistant to the president of the Susquehanna Railway, Light & Power Company, New York, N. Y., has been elected vice-president of the company. Mr. Dill is also president of the United Service Company, which is purchasing agent of the Susquehanna Railway, Light & Power Company. This company controls a number of electric railway, light and power and gas properties in different cities. The principal railway properties are those in Elmira, N. Y., and Lancaster, Pa. Mr. Dill began his railway career with the Metropolitan Street Railway, New York, N. Y. He was promoted by the company to division foreman and was in charge of the Forty-second Street and Crosstown and the Boulevard lines when they were equipped with electricity. In 1901 he became superintendent of the Detroit, Ypsilanti, Ann Arbor & Jackson Railway, and later was appointed general superintendent in charge of the operation of the city lines in Kalamazoo and Battle Creek and the interurban railway connecting the two cities. In 1904 Mr. Dill was appointed general manager of the Youngstown & Southern Railway, and continued in that capacity until he was appointed resident general manager of the Elmira Water, Light & Railroad Company, Elmira, N. Y.

Mr. J. W. Smith has been appointed superintendent of railways of the Chattanooga Railway & Light Company, Chattanooga, Tenn., in charge of transportation, shops and car houses. Mr. Smith was graduated from Cornell University in 1893 as a mechanical and electrical engineer, and immediately after graduation was employed as one of the engineers in charge of converting the lines of the Union Traction Company, Philadelphia, Pa., from horse-power to electricity. After completing this work Mr. Smith took the ex-

pert course of the General Electric Company at Schenectady and Lynn, and in 1896 was one of the engineers on the construction of the system of the Fairmount Park Transportation Company, Philadelphia, Pa. Subsequently he was appointed manager of the Fairmount Park Transportation Company, and continued in that capacity until 1901. From 1901 until 1903 Mr. Smith was superintendent in charge of construction of the Augusta-Aiken Electric Railway, Augusta, Ga.; the Hampton Roads Railway & Electric Company, Newport News, Va., and the Jersey Central Traction Company, Keyport, N. J. From 1903 until February, 1907, Mr. Smith was general manager of the Schuylkill Railway, Girardville, Pa., and from February, 1907, until Dec. 1, 1910, he was general manager of the City Railway and the City & Elm Grove Railway, Wheeling, W. Va.

Mr. F. W. Bacon, whose resignation as general manager of the New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J., followed the purchase of the property of that company in October, 1910, by the Public Service Railway, had been connected with that company and its predecessors for the last 10 years. During this time the road grew from a small single-track suburban property of a few miles to an interurban system 45 miles in length operating 53 cars. Mr. Bacon, who is a brother of Mr. George W. Bacon, of Ford, Bacon & Davis, New York, N. Y., began his railway work in 1895 in the reconstruction of the Canal & Claiborne Railroad, New Orleans, La., where he was engaged in the general engineering department and later was placed in charge of the overhead line construction. Following this, he was engaged in the reconstruction of the New Orleans & Carrollton Railway, of which work he had charge, including the complicated construction on Canal Street. In 1896 these two companies were consolidated and Mr. Bacon served as traffic superintendent until 1900, when he became connected as general superintendent with the Bergen County Traction Company, of Edgewater, N. J. The Riverside & Fort Lee Ferry Company and the Hudson River Traction Company were added to the Bergen County Traction Company, the properties being afterward consolidated under the name of the New Jersey & Hudson Railway & Ferry Company. Mr. Bacon was appointed general manager of this property in 1905.



F. W. Bacon

OBITUARY

R. Winder Johnson, president of Lawrence Johnson & Company, who was also connected with the Abrasive Material Company, died suddenly at Jefferson Hospital, Philadelphia, Pa., on Dec. 27, 1910, from injuries which he had received a short time before.

Sir Charles Scotter, the chairman of the London & Southwestern Railway, London, England, is dead. Born at Hull, in 1835, he entered the service of the Manchester, Sheffield & Lincolnshire Railway, at the age of 18, as a clerk. In 1860 he was appointed passenger superintendent. Twelve years later he became assistant goods manager and goods manager in 1873, under Sir Edward Watkin, who was then chairman of the company; and again 12 years later he left the Manchester, Sheffield & Lincolnshire Railway to become general manager of the London & Southwestern Railway. This position also he held for more than 12 years. Subsequently he was elected director and became first deputy chairman and then, in 1904, chairman, in place of Lieutenant-Colonel H. W. Campbell. The Waterloo & City Railway was added to the Southwestern system through Sir Charles, who advocated the construction of a deep-level electric railway which should virtually prolong the Waterloo & City Railway to the Bank. Another line in which Sir Charles was interested was the Great Northern & City "tube" from Moorgate Street to Finsbury Park, London.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Shreveport & Memphis Railway Company, Shreveport, La.**—Incorporated in Louisiana to build an electric or steam railway to connect El Dorado, Homer and Minden, a distance of 45 miles. Later it is expected to extend this railway to Memphis. Surveys have been completed. Chicago capitalists are said to be backing the project. Incorporators: O. C. Ferguson and A. R. Johnson, Homer, La.

Northern Minnesota Railway, Virginia, Minn.—Incorporated to build an electric railway in Minnesota. Capital stock, \$25,000. Incorporators: Edward Himes, Chicago; S. J. Gusson, Virginia; G. F. Lindsay, Davenport, Iowa; William O'Brien, St. Paul; H. C. Hornby, Cloquet.

Oklahoma-Kansas Railway, Joplin, Mo.—Incorporated in Missouri to build a 23-mile electric railway to connect Columbus, Galena and Baxter Springs, Kan., and Sunny Side, Lincolnville, Hattenville and Miami, Okla. This company was recently incorporated in Kansas as recorded in the *ELECTRIC RAILWAY JOURNAL* for March 12, '10. C. F. Lambert, Kansas City, chief engineer. [E. R. J., July 16, '10.]

***Oklahoma Short Line Electric Railway, Shawnee, Okla.**—Incorporated in Oklahoma for the purpose of connecting the electric and interurban systems of Kansas, Missouri, Texas and Oklahoma. The main line will be 175 miles and will connect Oklahoma City and Joplin, Mo. A branch line of 125 miles will be built from Shawnee, Okla., to Denison, Tex. Construction will begin about Jan. 20. It is the intention to build from Shawnee to Muskogee and Oklahoma City first. It is expected to lay 90-lb. steel and to construct the railway for hauling freight, passengers and mail. Options and right-of-way have been secured through all the counties through which the lines will pass. The power plant and car shops will be located east of Shawnee. Capital stock, \$100,000. Incorporators: C. C. Wright, Ada; M. J. Bentley, Tecumseh; Peroy Paddock, Oklahoma City; Z. V. Sanders, Albermarle; S. C. and Thomas E. Armentrout, Kirkwood, Mo.

FRANCHISES

Montgomery, Ala.—The Montgomery Traction Company has asked the City Council for a franchise to build several extensions to its railway in Montgomery.

***Phoenix, Ariz.**—Selim Michelson, Phoenix, has asked the Board of Supervisors for a franchise to build an electric railway over Center Street bridge in Phoenix to Tempe and Mesa. Dr. H. H. Stone and Charles Goldman have asked for a franchise to build an electric railway from Phoenix to Mesa.

Nanaimo, B. C.—A by-law is being prepared authorizing the Nanaimo Electric Railway to build its railway over certain streets in Nanaimo, B. C.

San Jose, Cal.—The San Jose & Santa Clara County Railroad, San Jose, has asked the Common Council for switch and turn privileges and the use of T-rails in Santa Clara Street. In return the company will lower its tracks and pave streets at once in San Jose.

Danbury, Conn.—The Danbury & Bethel Street Railway will ask the General Assembly for a franchise to extend its lines from the present terminus of its lake division, on Kenosia Avenue, Danbury, to the New York State line. Plans are also being considered to extend this railway between Danbury and Brewster.

Waterbury, Conn.—The Waterbury & Milldale Tramway, Waterbury, has asked the General Assembly for an extension of time to its franchise in which to build its proposed 9-mile electric railway from Milldale to Waterbury over Wolcott Mountain. The company wants the time limit for building the railway extended to July 1, 1915. John H. Cassidy, Waterbury, secretary. [E. R. J., Aug. 13, '10.]

***Oak Park, Ill.**—D. O. Ward has asked the Village Board for a franchise to build an electric railway from Harrison

Street on the south to Chicago Avenue on the north in Oak Park.

Pekin, Ill.—The Pekin & Petersburg Interurban Railway has received a franchise from the City Council to build an electric railway through Pekin. This projected line will connect Pekin and Petersburg. J. E. Melick is interested. [E. R. J., Dec. 10, '10.]

***South Bend, Ind.**—P. E. Hall, representing the South Bend Electric Company, has asked the City Council for a franchise to build an electric railway in South Bend. Jay D. Cray has also asked the City Council for a similar franchise.

Waltham, Mass.—The Boston & Western Electric Railway will file a petition with the Railroad Commissioners asking for a location for tracks in Marlboro, Waltham, Weston, Wayland and Sudbury. [E. R. J., Oct. 1, 1910.]

Worcester, Mass.—The Worcester Consolidated Street Railway has accepted three franchises for short extensions in Worcester.

***Eveleth, Minn.**—The Range Electric Railroad has asked the City Council for a franchise to build its railway through Eveleth.

Virginia, Minn.—The Great Northern Power Company, Duluth, will ask the City Council for a franchise to build an electric railway through Virginia. This proposed 40-mile railway will connect Hibbing, Chisholm, Buhl, Kinney and Gilbert, with a probable extension to Stevenson and Kewatin on the west to Elb, McKinley and Biwabik on the east. [E. R. J., Dec. 10, '10.]

***St. Louis, Mo.**—Benjamin Westhus and associates will ask the City Council for a franchise to build an elevated railway connecting the central business district of St. Louis with South Broadway, and extending to Southampton and the southwestern city limits.

Lambertville, N. J.—The New Jersey & Pennsylvania Traction Company, Trenton, has received a franchise from the City Council to construct a track on Lambert Street in Lambertville to be used for freight purposes.

Corning, N. Y.—The Elmira, Corning & Waverly Railroad, Elmira, has received a franchise from the Town Board to cross the highways of the town at convenient points and also to occupy with its double tracks the new Corning-Caton road at Brown's Crossing. In return the company will provide a subway under the Erie Railroad tracks.

Wilson, N. Y.—The Wilson Railway has asked the City Council for a franchise to build a 2-mile electric railway over certain streets in Wilson. It will connect the railroad station in Wilson with Island Lake Park and Sunset Beach on Lake Ontario. S. M. Conant, Wilson, president. [E. R. J., Oct. 15, '10.]

Memphis, Tenn.—The Clarksdale, Covington & Collierville Interurban Railway has received and accepted the franchise from the City Council to build a railway over certain streets in Memphis.

Seattle, Wash.—The Seattle Electric Company has received a franchise from the City Council to build an electric railway over certain streets in Seattle.

***Tomahawk, Wis.**—John Oelhafer, Andrew Oelhafer, Robert Thielman and W. G. Foss have asked the City Council for a franchise to build an electric railway in Tomahawk.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—This company has decided to extend its railway in Calgary in the spring.

Northern Electric Railway, Chico, Cal.—This company will build an extension of its railway from Del Paso station in Oroville to Fair Oaks and Orangeville during 1911.

Los Angeles-Pacific Railway, Los Angeles, Cal.—This company has awarded to Palmer, McBride & Quayle Company, Pacific Electric Building, Los Angeles, the contract for the construction of a 10-mile extension of its railway from Hollywood to Lankershire and Kester.

***Monrovia, Cal.**—J. M. Holmes, San Diego, and W. R. Stoats, Pasadena, are said to be arranging to build a proposed electric railway to the summit of Mount Wilson.

Chicago, Terre Haute & Southeastern Railway, Chicago, Ill.—This company reports that this proposed railway will

be operated by steam and not by electricity. [E. R. J., Dec. 24, '10.]

Sterling-Moline Traction Company, Sterling, Ill.—The contract awarded the Northwestern Engineering & Construction Company, Milwaukee, has been ratified by the directors of this company and work will begin in the spring on this proposed electric railway to connect Sterling, Morrison, Lynedon, Prophetstown, Erie, Hillsdale and Moline. A. Van Petten, Sterling, general manager. [E. R. J., Nov. 26, '10.]

Evansville (Ind.) Railways.—Plans are being made by this company to build a 15-mile extension of its railway from Mount Vernon to New Harmony. The company has completed and placed in operation a 6½-mile extension from Rockport to Grandview.

***Evansville, Ind.**—J. A. Brown, who is building a new industrial town on the Kentucky side of the Ohio River, opposite Evansville, Ind., to be known as "Mortalies," will build a traction line to connect with Evansville, according to statements credited to him. Cars will be transferred over the river by ferry and work on the construction of the line will begin Feb. 1, 1911.

Kendallville, Ligonier & Goshen Traction Company, Kendallville, Ind.—J. M. Kinney is said to be interested in a plan to build an electric railway to connect Kendallville, Brimfield, Wawaka, Ligonier, Millersburg, Benton and Goshen. [E. R. J., Oct. 3, '08.]

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company has completed and placed in operation its 8-mile extension from Denver Junction to Waverly. The line will be extended from Cedar Falls to Dike in the spring.

***Paducah, Ky.**—S. A. Fowler, secretary of the Commercial Club, Paducah, states that New York promoters have purchased the right-of-way for an electric railway between Wickliffe and Fulton, and it will likely be extended to Paducah.

***Cumberland, Md.**—It is said that engineers are at work on a survey between Meyersdale, Pa., and Frostburg, Md., for a proposed electric railway between the Cumberland & Westernport Electric Railway, Cumberland, and the Pennsylvania & Maryland lines operating through the Meyersdale field. The intention of the promoters is to connect Johnstown, Pa., and Cumberland, Md.

***Columbia Falls, Mont.**—James A. Talbott, Butte, and associates are planning to build an electric railway to extend from Columbia Falls to Polson. Work is scheduled to begin by March. A company is being formed, and will probably file articles of incorporation soon.

Forty-second, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—This company has applied to the Public Service Commission for approval of a change of motive power on its 110th Street line. The company proposes to operate storage battery cars.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—This company is making surveys for an extension from Syracuse to Watertown via Brewerton, Central Square, Mallory, Hastings, Lacona and Adams, a distance of about 73 miles.

North Carolina Traction Company, Danbury, N. C.—At a recent meeting of the incorporators of this company it was decided to award contracts for construction work during January for building a proposed 92-mile electric railway from Winston-Salem, N. C., to Floyd, Va. Twenty miles of this railway are now ready for ties and rails. The First National Bank of Lumberton and H. M. McAlister will be trustees of the \$2,000,000 bond issue authorized by the board of directors. The company was formally organized Dec. 28, '10, by the election of the following officers: A. M. Clark, Southern Pines, president; J. W. Sykes, Raleigh, vice-president; E. L. Kraft, Indianapolis, general manager; H. P. McKnight, general director; T. F. Walker, Cincinnati, secretary; J. W. Kraft, Indianapolis, purchasing agent, and H. M. McAlister, Lumberton, N. C., treasurer. [E. R. J., Sept. 10, '10.]

***Fort Ransom, N. D.**—Plans are being considered to organize a company to build an electric railway to connect Fort Ransom and Enderlin.

***Miami Transit, Light & Power Company, Lebanon,**

Ohio.—This company advises that negotiations are now pending which promise to result in the completion of this proposed railway in the near future. Further information will be given later. Charles A. Hough, president.

Fostoria-Fremont Railway, Lima, Ohio.—This company has completed eight miles of track on the line which will connect the Western Ohio Railway with the Lake Shore Electric Railway at Fremont. The company expects to complete the work in January and to inaugurate limited service between Cleveland and Dayton by April 1. [E. R. J., Oct. 8, '10.]

Muskogee (Okla.) Electric Traction Company.—This company expects to begin work this month on its northern extension of its railway from Fond du Lac Street and Fourth Street in Muskogee to the factory addition. The far ground extension will also be extended as far as the Midland Valley addition and the car shops.

Baker Interurban Railway, Baker City, Ore.—Anthony Mohr, promoter of this company, states that work will begin early in the spring on this proposed 100-mile electric railway to connect Baker City, North Powder and Eagle Valley. [E. R. J., June 25, '10.]

Farmers' Electric Railway, Vale, Ore.—Surveys have been completed by this company for its proposed 16-mile electric railway to connect Vale and Malheur Canyon. It is expected to extend this line to Ontario, Ore. G. W. Thomas, Ontario, Ore., president. [E. R. J., Dec. 17, '10.]

Lehigh Valley Transit Company, Allentown, Pa.—This company will soon begin to extend its line from Slatington to Lehigh Gap and Palmerton and connect with the Carbon Transit Company at Lehigh. This will provide a direct line from Pottsville to Philadelphia via Mauch Chunk.

Lewisburg, Milton & Watsonville Passenger Railway, Milton, Pa.—Plans for building an extension from Watsonville to Montgomery and eventually to Muncy and Montoursville, connecting Sunbury and Williamsport, are being considered by this company. It is negotiating with the commissioners of Northumberland and Union counties with a view of strengthening the Allenwood bridge to be used by its electric railway.

***Philadelphia, Pa.**—J. T. Silverman, Philadelphia, is said to be promoting plans for building a proposed electric railway from Eddystone between the Philadelphia & Reading Railway and the Philadelphia Railroads as far as the old rifle range in Tinicum, from which point it will branch across the marsh lands to West Philadelphia.

Chambersburg, Greencastle & Waynesboro Electric Railway, Waynesboro, Pa.—This company is making considerable progress in the grading for its extension from Pen Mar to Blue Ridge Summit. It is expected to be ready for track laying by Feb. 1.

Montreal (Que.) Street Railway.—This company is ready to begin the construction of a belt line underground railway as soon as the corporation of the city will give them the necessary legislation. The general scheme for the tunnel is to cut through under Côte des Neiges Hill, starting in with the entrance near Guy and Sherbrooke streets and coming out near Shakespeare Road, making a total underground distance of some 5500 ft. Three tunnels have been suggested on this route, a double-track one in the middle for rapid transit service and a wide one on either side, about 30 ft., for vehicular traffic going in alternate directions.

***Franklin, Tenn.**—It is reported that plans are being made to build a proposed electric railway from Franklin to Shelbyville via Fayetteville.

Tennessee Traction Company, Memphis, Tenn.—It is said that this company is planning to begin construction soon on its proposed 210-mile electric railway to connect Memphis, Nashville and Jackson. George E. Busnell, Memphis, general manager. [E. R. J., July 30, '10.]

Tennessee Rapid Transit Company, Nashville, Tenn.—This company announces that work will begin at once on its proposed 110-mile electric railway to connect Nashville, Lewisburg, Clarksville and Springfield. It has secured financial backing. J. M. Gray, Franklin, is interested. [E. R. J., Dec. 17, '10.]

Mount Adams Railway, White Salmon, Wash.—This company will begin work in the spring on its proposed 40-mile electric railway to connect White Salmon, Bingen, Bristol, Pine Flat, Snowden, Timber Valley and Glenwood. It has recently elected the following officers: W. W. Swan, president; T. Wyers, vice-president; T. F. Shepler, secretary, and R. Field, treasurer, all of White Salmon. [E. R. J., July 30, '10.]

***Montgomery, W. Va.**—M. J. Simms, Montgomery, is making arrangements for closing contracts preparatory to the construction of a 3½-mile railway to connect Montgomery and Boomer, via Harewood and Lonacre. An entrance will be made into Montgomery over a new bridge recently completed and equipped for rail and team traffic.

SHOPS AND BUILDINGS

Southern Pacific Railroad, Los Angeles, Cal.—This company is considering plans for building new car shops at Tucson, Ariz. It is said that work will begin in the spring.

Alton, Granite & St. Louis Traction Company, Alton, Ill.—It is reported that this company will soon build a new car house at Granite City. The cost is estimated to be about \$25,000. O. C. Macy, Alton, superintendent.

Illinois Traction Company System, Champaign, Ill.—This company has just opened a new station at Sawyerville.

Otsego & Herkimer Railroad, Hartwick, N. Y.—This company's car house at Oneonta was recently destroyed by fire.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.—C. D. Emmons, general manager of this company, announces that satisfactory progress is being made in arranging for the construction of a joint station by the four traction lines centering in Bluffton.

Metropolitan Street Railway, Kansas City, Mo.—This company has completed plans for erecting a new office building to occupy the northeast corner of Eleventh Street and Main Street in Kansas City.

Galveston-Houston Electric Railway, Houston, Tex.—This company announces that plans and specifications for its new car houses to be built at Broadway and Fifty-first Street in Galveston are ready to be placed in the hands of bidders. Construction will begin as soon as the contract is awarded. The structure is to be built of concrete and steel, and all modern equipment will be installed.

POWER HOUSES AND SUBSTATIONS

San Diego (Cal.) Electric Railway.—This company has awarded to Charles W. Carbaley, Wilcox Building, Los Angeles, the contract for the construction of an intake for its new power plant at San Diego to consist of two 5-ft. conduits leading from the bay at the foot of E Street to the power house, which will be located at Arctic Street and E Street.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—This company has purchased from the General Electric Company one 2750-kw turbo generator with station equipment; one 500-kw motor generator set with step-down transformers and one 300-kw motor generator set with step-down transformers.

Metropolitan Street Railway, Kansas City, Mo.—This company has begun the construction of its two-story fire-proof building at Thirteenth Street and Baltimore Avenue in Kansas City. The foundations and floors of the structure will be of reinforced concrete and the superstructure will be of brick. It will house two engines to be moved in from the Blue River power house. The cost is estimated to be about \$45,000.

Oklahoma Short Line Electric Railway, Shawnee, Okla.—It is said that this company will build a power plant east of Shawnee.

Whatcom County Railway & Light Company, Bellingham, Wash.—This company has completed and placed in operation its new power station on Railroad Avenue and York Street in Bellingham. This station will increase the capacity of the company's power supply by about 3300 hp.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—This company has just installed in its power house a 350-hp boiler, equipped with an automatic stoker.

Manufactures & Supplies.

ROLLING STOCK

Scranton (Pa.) Railway will purchase 10 double-truck cars early in 1911.

Savannah (Ga.) Electric Company, it is reported, will purchase a number of double-truck, semi-convertible cars.

Augusta-Aiken Railway & Electric Company, Augusta, Ga., has purchased five quadruple General Electric motor equipments.

Scranton & Binghamton Traction Company, Scranton, Pa., it is reported, will purchase immediately six 45-ft. passenger cars.

Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., will order three passenger cars and two freight cars.

Rochester & Manitou Railroad, Charlotte, N. Y., will purchase three standard semi-convertible, double-truck passenger cars.

Holmesburg, Frankford & Tacony Electric Railway, Tacony, Pa., will purchase two prepayment, semi-convertible, double-truck cars.

Norfolk & Portsmouth Traction Company, Norfolk, Va., is in the market for eight pay-as-you-enter cars, to be delivered next spring.

Omaha & Council Bluffs Railway, Omaha, Neb., has purchased from the Browning Engineering Company, Cleveland, O., one electric locomotive crane.

Hoboken (N. J.) Manufacturers' Railroad has purchased, through W. J. Wilgus, one 80-ton electric locomotive, from the General Electric Company, Schenectady, N. Y.

TRADE NOTES

Railway Track-Work Company, Philadelphia, Pa., recently organized, has taken over the business of rail grinding formerly conducted by William D. Gherky.

National Brake & Electric Company, Milwaukee, Wis., has received an order from the Westchester Street Railway, White Plains, N. Y., to equip 20 cars with air brakes.

Ackley Brake Company, New York, N. Y., has received an order through R. W. Cameron & Company for 50 Ackley adjustable brakes for the Adelaide (Australia) Tramways.

Thomas F. Fournier has resigned his position with the Taunton & Pawtucket Street Railway, Taunton, Mass., to accept a position as consulting engineer with the United Traction Improvement Company.

William Stevenson, who for five years has been designing engineer for the McGuire-Cummings Manufacturing Company, Chicago, Ill., has been appointed special representative of the Indian Refining Company, Inc., Cincinnati, Ohio.

Root Spring Scraper Company, Kalamazoo, Mich., has received an order from the Boston Elevated Railway for 100 scrapers for its 50 new cars. This company has also received an order from the Michigan United Railways, Lansing, Mich., for 2 four-wheel scrapers.

Murphy Iron Works, Detroit, Mich., will open an office in the Empire Building, Atlanta, Ga., in charge of Roland B. Hall, Jr., who will handle this business in connection with that of the Harrisburg Foundry & Machine Works, which he has represented in the southern territory for some time.

McKeen Motor Car Company, Omaha, Neb., has shipped one 55-ft. 200-hp steel gasoline motor car to the Charles City (Ia.) Western Railway, under its own power. This company has also shipped to the Arizona Eastern Railroad, Globe, Ariz., a 70-ft. steel gasoline motor car under its own power.

Curtain Supply Company, Chicago, Ill., has received an order from the Third Avenue Railroad, New York, N. Y., to furnish curtains with No. 089 protected groove ring fixtures and Rex rollers for 100 cars. This company has also received an order from the Philadelphia Rapid Transit Company to furnish curtains with No. 48 ring fixtures and Rex rollers for 15 cars.

N. W. Harris & Company, New York, N. Y., bankers and brokers, changed their name on Jan. 1 to Harris, Forbes

& Company. The firm membership remains the same. Allen B. Forbes, whose name will appear with that of Mr. Harris in the firm's title, has been associated with N. W. Harris & Company in an important capacity for 20 years, and has been the managing partner of the New York office for the last decade. The other partners resident in New York are Arthur M. Harris, Lloyd W. Smith, Everett B. Sweezy and Charles W. Beall.

H. M. Byllesby & Company, Chicago, Ill., have acquired control of a number of additional public utility properties in California, which include the Stockton Gas & Electric Corporation, the Richmond Gas & Electric Company, the American River Electric Company, which includes service by long-distance transmission lines to the towns of Stockton, Placerville, Florin, Elk Grove, Sheldon, Gault, Lodi and Plymouth, and the Humboldt Electric Company, which includes service to the towns of Arcata, Alton, Ferndale, Fields Landing, Fortune, Hydesville, Loleta and Rohnersville.

Ohmer Fare Register Company, Dayton, Ohio, gave its annual dinner to local employees of the company at the Phillips House, in Dayton, on the evening of Dec. 28, 1910. One hundred dollars in prizes were distributed to 17 employees for valuable suggestions made for the betterment of the various types of Ohmer registers. Speeches were made by president of the company, John F. Ohmer; E. Frank Brewster, vice-president, and J. H. Stedman, secretary. Addresses were also made by Superintendent W. J. Kuhns and by F. G. Colby, E. H. Bridenbaugh, Harry Nelson, C. V. Funk, the heads of various departments. E. B. Grimes, assistant general manager of the company, was the toastmaster of the evening. The music was furnished by the Ohmer Fare Register Company Band, consisting of 20 pieces.

ADVERTISING LITERATURE

Ingersoll-Rand Company, New York, N. Y., has issued form No. 4202, illustrating and describing "Sergeant" rock drills.

General Vehicle Company, Long Island City, N. Y., has issued a catalog describing and illustrating electric commercial vehicles.

Trussed Concrete Steel Company, Detroit, Mich., has issued a very attractive catalog illustrating and describing the united steel sash.

Colorado Portland Cement Company, Denver, Colo., has issued a catalog describing the alkali-proof Portland cement which it manufactures.

Heywood Brothers & Wakefield Company, Wakefield, Mass., has issued a very attractive catalog, illustrating and describing several different styles of Universal car seats.

McGraw-Hill Book Company, New York, N. Y., has recently issued two catalogs, one describing new and standard books on civil engineering, the other describing books on iron and steel.

Whipple Supply Company, New York, N. Y., is issuing a very attractive folder describing the Hedley anti-telescoping and anti-climbing device. A number of illustrations are also contained in this folder, showing the effects of collisions between cars equipped with this device.

Chicago Bearing Metal Company, Chicago, Ill., has issued the *Graphose Age*, dated December, 1910. This publication is distributed occasionally by the company to call attention to its products, among which are brass castings for steam and street railways and general machinery.

Joseph Dixon Crucible Company, Jersey City, N. J., has published the January, 1911, number of "Graphite." In this issue is a short article by John M. Turner, United States commercial agent, on the "Slowness of the United States," and another on "Creative Salesmanship," by E. St. Elmo Lewis, advertising manager of the Burroughs Adding Machine Company.

Goldschmidt Thermit Company, New York, N. Y., publishes in "Reactions," for the last quarter of 1910, the following articles: "Rail Welding in Many Countries," "Rail Welding in Holyoke, Mass.," "Making Semi-Steel by the Thermit Process," "Further Applications of Thermit in Ship Repairs," "The Cruiser Dixie," "Thermit for Locomotive Repairs," "Welding Two Side Rods at One Operation," and "Waterwheel Welded in 1907 Still in Operation."

TABLE OF MONTHLY EARNINGS.

Notice—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit.

Company	Period	Gross Income	Operating Ex- penses	Gross Income Less Operating Expenses	Deductions From Income	Net Income	Company	Period	Gross Income	Operating Ex- penses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	\$189,705 175,743 2,235,453 1,994,729	\$110,718 99,973 1,233,947 1,088,502	\$78,987 75,770 1,001,506 906,227	\$43,367 43,400 476,894 480,856	\$35,620 32,370 524,612 425,371	KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Nov. '10 1 " " '09 6 " " '10 6 " " '09	644,416 607,167 3,829,206 3,551,648	381,402 352,219 2,283,496 2,018,634	263,015 254,948 1,545,710 1,533,014	188,643 171,429 1,132,175 1,037,060	74,355 83,571 413,514 495,983
BANGOR, ME. Ban- gor Ry. & Elec. Co.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	46,346 45,427 282,817 275,477	18,587 18,336 106,125 103,228	27,759 27,091 156,692 152,249	13,222 12,273 68,574 65,429	13,831 14,082 88,118 86,820	LEWISTON, ME. Lewiston, Augusta & Waterville St. Ry.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	37,580 35,985 255,291 256,671	25,143 23,208 141,911 133,320	12,437 12,777 113,380 123,351	13,703 15,093 68,679 74,405	†1,276 †2,316 44,701 48,946
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	37,695 35,672 430,020 401,186	18,142 19,608 239,237 225,640	19,554 16,064 190,782 175,546	9,229 8,469 104,976 100,468	10,325 7,595 85,807 75,078	MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	413,201 383,156 4,329,236 3,919,653	283,391 252,839 3,024,328 2,572,758	129,810 130,317 1,304,908 1,346,895	47,244 48,561 516,217 520,318	82,566 81,757 788,692 826,581
CHAMPAIGN, ILL. Illinois Tr. System	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	614,476 509,171 5,018,865 4,379,325	*338,360 *265,145 *2,966,046 *2,520,562	276,115 244,026 2,052,819 1,858,763	..... ..... ..... .....	..... ..... ..... .....	Milwaukee Lt., Ht. & Trac. Co.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	125,088 118,001 1,487,170 1,353,010	50,101 45,039 593,915 503,191	74,987 72,962 893,255 849,819	55,383 53,044 608,250 566,030	19,604 19,918 285,005 283,789
CHATTANOOGA, TENN. Chattanooga ga Ry. & Lt. Co.	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	77,993 67,570 728,940 642,355	37,591 38,372 371,110 372,844	40,402 29,198 357,830 269,511	23,700 22,218 234,601 215,281	16,702 6,980 123,229 54,230	MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	645,358 596,963 6,265,727 5,773,383	308,743 277,175 2,996,849 2,709,742	336,616 319,788 3,268,877 3,063,645	140,321 140,251 1,401,974 1,388,761	196,295 179,537 1,866,904 1,674,879
CHICAGO, ILL. Aurora, Elgin & Chicago R.R.	1m., Nov. '10 1 " " '09 5 " " '10 5 " " '09	132,508 122,789 809,583 740,805	74,422 69,526 418,471 372,108	58,086 53,263 391,112 368,696	34,603 29,586 167,044 146,663	23,483 23,677 224,069 222,034	MONTREAL, QUE. Montreal St. Ry.	1m., Nov. '10 1 " " '09 2 " " '10 2 " " '09	366,098 334,871 752,786 688,878	227,442 200,138 433,192 374,873	138,656 134,734 319,594 314,006	32,013 30,785 64,011 61,864	106,643 103,949 255,583 252,141
CLEVELAND, O. Cleveland, Paines- ville & Eastern R.R.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	27,037 25,900 328,235 297,573	*15,112 *15,950 *170,555 *161,380	11,925 9,951 157,681 136,193	7,947 7,528 88,638 82,956	3,997 2,423 69,043 53,237	NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	158,739 149,426 1,662,093 1,565,102	85,847 83,181 959,077 919,503	72,892 66,245 703,016 645,599	33,390 33,023 369,036 361,330	39,502 33,222 333,980 284,269
Lake Shore Electric Ry	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	91,802 90,705 1,110,541 1,020,022	*50,792 *48,984 *579,893 *538,429	41,010 41,721 530,648 481,592	34,669 35,393 382,347 379,939	6,341 6,328 148,301 101,653	OTTUMWA, IA. Ottumwa Ry. & Lt. Co.	1m., Oct. '10 1 " " '09 6 " " '10 6 " " '09	22,257 20,003 123,113 111,207	11,934 12,543 66,650 59,683	10,323 9,460 56,463 51,524	....................	....................
DALLAS, TEX. Dallas Electric Cor- poration.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	165,372 147,838 1,443,966 1,291,164	89,152 80,397 943,991 809,900	76,219 67,441 499,975 481,264	23,748 27,471 316,410 338,780	52,471 39,970 183,565 142,484	PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	20,949 18,924 245,521 225,608	11,747 11,764 144,283 132,238	9,202 7,160 101,238 93,370	7,169 6,625 83,921 81,726	2,032 535 17,317 11,644
DETROIT, MICH. Detroit United Ry.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	754,924 687,093 8,718,014 7,483,524	478,304 440,750 5,486,787 4,614,783	276,620 246,343 3,231,227 2,868,741	174,312 157,919 1,863,862 1,723,399	102,308 88,424 1,367,365 1,145,342	PENSACOLA, FLA. Pensacola Elec. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	23,650 21,027 264,701 242,539	13,578 12,379 155,488 139,127	10,072 8,648 109,214 103,412	5,106 4,474 59,452 52,077	4,967 4,174 49,762 51,335
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	209,592 191,775 1,966,354 1,672,853	105,767 93,206 1,032,518 911,212	103,826 98,569 933,836 761,641	..... ..... ..... .....	..... ..... ..... .....	PHILADELPHIA, PA. American Rys. Co.	1m., Nov. '10 1 " " '09 5 " " '10 5 " " '09	307,376 296,087 1,743,688 1,626,519	....................	....................	....................	....................
EL PASO, TEX. El Paso Elec. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	55,172 58,347 631,241 588,012	32,919 35,712 362,528 368,245	22,253 22,653 268,713 219,767	8,224 8,421 101,090 95,691	14,029 14,215 167,623 124,076	PLYMOUTH, MASS. Brockton & Ply- mouth St. Ry.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	9,797 10,253 120,557 130,450	7,337 7,592 84,930 92,311	2,461 2,661 35,626 38,139	1,578 1,756 20,579 22,375	883 905 15,048 15,764
FT. SMITH, ARK. Ft. Smith Lt. & Trac. Co.	1m., Oct. '10 1 " " '09 6 " " '10 6 " " '09	38,022 32,302 210,137 181,100	20,565 17,550 121,317 101,978	17,457 14,752 88,820 79,122	..... ..... ..... .....	..... ..... ..... .....	PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	498,953 411,001 5,108,927 4,385,356	222,581 174,270 2,214,968 2,014,219	276,372 236,731 2,893,959 2,371,137	151,217 125,019 1,550,411 1,363,227	125,155 111,712 1,343,548 1,007,910
FT. WAYNE, IND. Ft. Wayne & Wab- ash Valley Trac. Co.	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	131,360 122,805 1,266,085 1,161,156	67,366 70,386 706,280 678,925	63,994 52,420 559,806 482,231	45,829 42,285 451,383 423,729	18,165 10,135 108,423 58,501	ROCKFORD, ILL. Union Ry., Gas & Elec. Co.	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	284,293 266,263 2,421,889 2,282,987	139,652 136,286 1,336,821 1,166,937	144,641 129,977 1,085,068 1,116,050	66,845 52,739 660,301 643,218	77,796 77,238 424,767 472,732
FT. WORTH, TEX. Northern Texas Electric Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	154,007 1,350,697 1,409,311 1,236,545	71,123 64,595 753,871 684,563	82,884 71,102 655,440 551,982	20,290 16,190 228,011 200,973	62,594 54,913 427,429 351,009	ST. JOSEPH, MO. St. Joseph Ry., Lt., Ht. & Pwr. Co.	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	87,613 82,362 854,363 805,170	44,446 43,167 458,896 417,697	43,167 39,195 395,467 387,473	23,297 21,521 227,056 213,602	19,870 17,674 168,411 162,951
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	113,476 102,014 1,289,537 1,189,064	65,937 64,652 777,563 703,830	47,539 37,362 511,975 494,234	25,565 22,486 284,599 259,492	21,974 14,877 227,376 234,743	SAVANNAH, GA. Savannah Elec. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	53,795 50,618 623,355 611,387	35,518 32,973 407,071 394,081	18,277 17,646 216,285 217,306	18,220 17,621 215,251 209,181	57 25 16,033 1,125
GRAND RAPIDS, MICH. Common- wealth Pwr., Ry. & Lt. Co.	1m., Oct. '10 1 " " '09 10 " " '10 10 " " '09	425,742 389,368 4,081,714 4,560,631	224,373 202,296 2,104,066 1,829,016	201,369 187,072 1,977,648 1,731,615	122,033 118,735 1,231,698 1,183,301	79,366 68,377 745,907 548,314	SEATTLE, WASH. Seattle Elec. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	469,033 544,077 5,558,439 5,734,623	239,639 326,201 3,249,493 3,330,894	229,393 217,877 2,308,946 2,403,729	109,914 102,169 1,301,744 1,225,881	119,480 115,708 1,007,201 1,177,848
Grand Rapids Ry.	1m., Nov. '10 1 " " '09 11 " " '10 11 " " '09	88,376 80,327 1,036,304 938,868	46,365 43,201 508,292 447,670	42,011 37,126 528,012 491,198	19,475 18,590 218,406 208,676	22,536 18,536 309,606 282,522	SYDNEY, C.B. Cape Breton Elec Co., Ltd.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	30,496 27,253 320,975 281,104	13,447 14,047 170,322 167,332	17,049 13,206 150,654 113,772	6,160 6,199 73,933 74,195	10,889 7,007 76,720 39,577
HOUGHTON, MICH. Houghton Co. Trac. Co.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	26,192 26,543 314,642 315,393	12,819 13,070 166,160 170,131	13,373 13,473 148,481 145,262	6,637 6,215 77,821 71,645	6,736 7,258 70,660 73,617	TACOMA, WASH. Puget Sound Elec. Ry.	1m., Oct. '10 1 " " '09 12 " " '10 12 " " '09	161,760 170,199 1,895,045 1,850,012	101,079 110,590 1,248,589 1,227,270	60,6		

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CONTENTS.

The Syracuse Conference.....	59
Other Coming Conventions.....	59
Using Pits for Storage.....	60
The Maintenance of Car Circuit Breakers.....	60
Need for Training Trainmen.....	60
The Metropolitan Plan of Reorganization.....	61
The Electrical Equipment of the Detroit River Tunnel.....	62
Proposed Standards Discussed by Central Electric Railway Committee	70
Circular on Associate Membership.....	72
Report of New York Public Service Commission, First District.....	73
Annual Report of New Jersey Commission.....	74
Third Conference on Interurban Operating Methods in Indiana.....	75
Messages of the Governors.....	75
Track Construction in Atlanta, Ga.....	78
The Men to Employ for Interurban Service and Their Training....	79
Joint Rate Tickets in New York.....	80
1200-volt Equipment for the Ft. Dodge, Des Moines & Southern Rail-	
road	81
Rail Specifications of the Interborough Rapid Transit Company.....	82
Integral Oil Cups in Brooklyn.....	83
A 3000-kw Rotary Converter.....	83
Ideal Trolley Wheel.....	84
Electric Signals for the Indianapolis & Cincinnati Traction Company	84
Insulated Tap Cover and Stud.....	84
Single Truck Prepayment Cars for New Orleans.....	84
Electric Railway Legal Decisions.....	85
News of Electric Railways.....	88
Financial and Corporate.....	91
Traffic and Transportation.....	94
Personal Mention.....	96
Construction News.....	97
Manufactures and Supplies.....	100

The Syracuse Conference

The conference of interurban officers in New York State which is to be held Jan. 19, in Syracuse, at the suggestion of the Public Service Commission, Second District, constitutes quite a departure from any meeting which has previously been held in the State. It is not a hearing in the sense in which that term has been used previously by the commission. It is more in the nature of a joint convention of the commission and of the operating officials of the State to study the question of safety of interurban railway operation. The program includes papers on interurban railway dispatching, block signals and cognate subjects by three well-known railway men and an expert signal engineer, and the commission urges a full and free discussion by all present upon the points brought out in these papers. In calling the conference the commission has evinced a desire to learn whether the operating officials of the State consider that any changes are necessary in their present operating methods, and, if so, what they are. After the conference and in the light of the evidence there obtained the commission may be prepared to make recommendations of its own, but at present the burden of criticising existing methods and of making suggestions for improvement has been delegated to those operators who have been invited to prepare the papers and to discuss them. The railway companies in no sense are being placed in a defensive position, and frank and free expressions of opinion should result. The benefits which the companies of the State will derive from the conference are in direct proportion to the amount of fair criticism evoked, and to its open-minded reception on the part of those against whose methods it is directed.

Other Coming Conventions

The next two weeks will be very important so far as railway conventions are concerned. Several others besides that at Syracuse are scheduled for Jan. 19. One of these is the annual convention of the Central Electric Railway Association, which is to be held at Indianapolis and will be of especial importance this year because a number of important reports are to be presented, as well as papers on three interesting subjects. The convention of the Wisconsin Electrical Association, which includes in its membership a number of electric railway companies, will be held in Milwaukee Jan. 18 and 19, and the organization meeting of the Interstate Railway Association will be held in Chicago on the latter date. During the following week there comes the mid-year meeting of the American Electric Railway Association, which is to be held in New York on Jan. 27. This meeting is to be preceded by meetings on Jan. 25 and 26 of various committees of the association and its affiliated organizations. These committees will report to the several organizations of which they are parts and any important subjects which require special attention can be submitted to the main association.

Using Pits for Storage

One of the objections raised against open pits in car houses is the temptation offered to workmen to leave or store oily waste and miscellaneous junk in the free spaces under the floors and between the tracks. The force of this objection is weakened by the fact that walled pits are subject to exactly the same abuse, and even in greater degree. In one recently visited shop where closed pits are used one-half of them were out of commission because they were filled to the brims with discarded gears and pinions, worn brake shoes, smashed fenders and the like. Yet the master mechanic at this location complained bitterly that lack of pit room hampered his truck repairs! A thorough house-cleaning from time to time in a shop like this would do wonders in enlarging the facilities and decreasing the danger from fire. It cannot be gainsaid that open-pit construction offers a great convenience in allowing brake shoes and other truck fittings to be stored under the devil strips, where they are readily accessible for application. Otherwise it would be necessary for the workmen requiring material to make many wearisome and time-wasting trips to the storeroom or at best to some inconveniently located portion of the car house. There can be no reasonable objection to taking advantage of this increase in storage capacity provided the sub-floor areas are not used for inflammable or discarded material. At any rate this practice is preferable to leaving these same articles to clutter up the car-house floor.

The Maintenance of Car Circuit Breakers

No device used on modern rolling stock is of more importance in relation to the maintenance of schedule time than the circuit-breaker equipment, with the single exception of the motors themselves. Under the pressure of heavy traffic the time required to replace a fuse is too great to permit the exclusive use of that device as the electrical safety valve of the system. A thorough inspection of the adjustment and finish of the fittings of the circuit-breaker before it is placed on the car well repays the time required. In some cases the omission of periodical examinations of the apparatus leads to the sticking of the breaker armature through the rusting of the pins or to improper operation of the tripping device. The wear of brass stops set into the armature to prevent binding against the magnet coils on account of residual magnetism may lead to a "freeze" unless the stops are renewed at the proper time. The cleanliness of the arc chute is often neglected, with resulting danger of a heavy short-circuit on account of the arc defectors having been badly burned and carbonized. An important point in the operation and maintenance of circuit breakers is the insurance of plenty of interchangeable parts at the repair shop, and the instruction of inspectors and car house employees to avoid attempts to make poorly fitting parts go into place by filing or bending. The usefulness of the equipment is easily destroyed by attempting to obtain forced fits of movable parts. In following up the inspection of car circuit breakers it is an excellent plan to go over them with an ammeter for the purpose of checking the adjustment. Whenever a car is frequently reported for fuse blowing it is a good idea to make a thorough examination of the condition and setting of the circuit breaker before concluding that the motor or control equipment is at fault. The breakers are so accessible and readily examined for defects that time will often be saved by looking first into their condition.

NEED FOR TRAINING TRAINMEN

The hearings which have been conducted by the authorities of several of the Central States during the past few weeks on the subject of the safety of interurban service have been directed principally to the discussion of three subjects: the desirability of the use of block signals, the training of transportation employees, and the adoption of certain rules for the government of the men. The conference at Indianapolis last week was given up largely to the latter two subjects.

At certain of these hearings a great deal of stress has been laid by the authorities upon the shortness of the time taken by some companies for breaking in a new man as compared with that taken in steam railroad work before a man is appointed to the position of engineer or conductor. No one will deny that the instruction of a new employee during the breaking-in period should be thorough, and also that a great deal of care should be exercised in selecting new employees. Nevertheless, the larger number of serious accidents on interurban electric railways have been caused by men who had been in the service more than one year's time. It might be said that this situation arises because the number of new men is small compared with the number of older men. But many managers have also found that a new man is apt to give a great deal more serious attention to the road than the man who has been running over the same track for three or four years. It is human nature for one who has exercised caution day after day and met with no occurrences requiring such caution to relax his vigilance sooner or later. This tendency emphasizes the need for the operators of a road repeatedly to take steps to instil a feeling of the need for vigilance into the minds of the train crews. On steam roads with block signals this is sometimes done by "surprise" checking, effected by purposely setting signals in positions contrary to those that might be expected. On interurban roads without signals, and, in fact, on any road, the most valuable aid to safety and perfect train operation is a series of examinations on rules. Too little attention is sometimes given to this subject on small properties. The superintendents of smaller roads feel that they know their men so well as to be able to judge whether or not a trainman is fully conversant with the rules. This may be true in certain cases, but as a general proposition there is no way by which the men's knowledge of the rules and of what they should do in emergencies can be so well gaged as by oral and written examinations at frequent intervals.

Interurban trainmen have also been criticised quite severely at times for not looking at their timetables and watches more frequently. This criticism brings to mind the arguments, pro and con, on operating trains out of terminals on the even hour. When a man runs a train day after day, always leaving terminals on the even hour and arriving at meeting points at a certain fraction of the hour, it is claimed that he can easily, and very often does, get into the habit of "memory running." Then, when a train is off time and a minute or more has to be added to the schedule time because of the lateness of the train, the practice of "memory running" is apt to be dangerous. Such mental calculations require the attention of the brain and may bring about forgetfulness with regard to train orders, or miscalculations may be made and accepted as correct with complete confidence. For these reasons the practice of operating trains at irregular intervals is held by some to introduce a factor of safety because it requires every man to be on the

alert at all times, and it is a well-known fact that practically all the serious accidents in recent years have come about from the lack of alertness rather than from wrong orders or wilful disobedience of orders.

In this connection the discussion of the qualifications of trainmen in interurban service written by an interurban railway manager and published elsewhere in this issue is pertinent. This article describes the duties of the employees in giving good service and also the duties of the company. The men should have certain natural qualifications, both mental and physical, without which they cannot do their work properly. The railway company should establish a thorough course of instruction and should see that discipline and an interest in their work are maintained by the men.

THE METROPOLITAN PLAN OF REORGANIZATION

Under the proposed plan for reorganization of the Metropolitan Street Railway of New York, which is now before the Public Service Commission of the First District, a total of \$66,305,500 securities would be issued upon a property whose cost is placed by the joint committee of bondholders at more than \$120,000,000. The plan of financing is a radical departure from the involved scheme upon which the old system was developed. It is simple and understandable, whereas the old plan was a criticisable complication of railway and holding company control which obscured the real operations of the property.

As the commission which is to pass upon these securities had indicated so strongly its belief that the law permits it to compel substantial equality between value and capitalization in a reorganization, the margin upon which the committee bases its petition is of particular interest. The published plan did not analyze the elements which compose the cost of \$120,000,000 stated. The committee states, however, that it has been advised by expert engineers and accountants that this sum "has been expended in construction, reconstruction, extension, improvement, betterment and equipment" of the system. It is understood that the valuation that developed this investment was made on behalf of the company, while in the Third Avenue case, previously decided by the commission, the valuation was made primarily by the commission. In each case the figures placed upon the present elements of value were determined after the preparation of inventories of the physical property. Of course, the leading questions involved are not so much those of the inventory of present physical property as those of the reasonable investment in the non-existing physical property which disappeared with the progress of the system from one form of motive power to another and of the fair allowances and reasonable outlay for intangible elements which absorb capital and leave little or nothing to show for it. These matters will be brought out during the hearings to be held by the commission.

The most prominent feature of the plan for the readjustment of securities is the elimination of the equities, if any, of the New York City Railway Company and the Metropolitan Securities Company. The former company had at last reports \$1,761,000 notes and \$13,000,000 outstanding stock. This stock was owned by the Securities company, which in turn had outstanding \$30,000,000 of capital stock on which \$75 per share

was paid in. Of the stock of the Securities company \$29,392,000 was owned by the Interborough-Metropolitan Company. The reorganization plan disposes of over \$40,000,000 of capitalization of the Metropolitan Securities Company and New York City Railway, partly duplicated, and of nearly \$40,000,000 additional securities, or a total of \$80,000,000. Provision is made in the plan whereby, in the readjustment, certain special items shall be met. These include \$4,000,000 improvement notes made by the Metropolitan Street Railway to the Metropolitan Securities Company (which may participate on payment of an assessment) and a possible claim of an additional \$4,000,000 notes; \$1,875,000 allowances to tort claimants; \$10,000,000 cash requirements to meet the outstanding \$6,500,000 receivers' certificates and receivership expenses, reorganization expenses, etc.; and accrued and defaulted interest as of Oct. 1, 1910, \$4,383,250.78. An abstract of the plan of reorganization giving the principal details presented, was published in the issue of the ELECTRIC RAILWAY JOURNAL of Jan. 7, 1911, page 48.

As the plan now drafted provides for the present issue of \$64,851,500 new securities, the net amount of securities held by the public which will remain undisturbed is \$31,454,000. Of the total proposed new securities, plus the undisturbed securities, \$72,647,500 will be of bonds and \$23,658,000 will be stock. That is to say, the proportion of bonds to stock would be about three to one. However, nearly \$40,000,000 of the new bonds would be income securities, bearing interest up to 5 per cent, only when earned, so that the fixed charges would not be mandatory in so large a proportion as this ratio indicates.

For the year ended June 30, 1910, the receivers of the Metropolitan Street Railway reported 159.48 miles of track and total street railway operating revenue of \$13,217,117, of which nearly \$13,000,000 was derived from passenger traffic. In that year the operating ratio was 70 per cent. There was devoted to maintenance, including \$72,000 equipment depreciation reserve, 24 per cent of the total street railway operating revenue. To the other operating expense accounts the following percentages of gross were applied: Power, 6 per cent; injuries and damages, 9.9 per cent; operation of cars, 26.1 per cent; traffic and other general expenses, 4 per cent. The allowances for maintenance are probably greater than those that would be made directly after a period of receivership and upbuilding of the physical property. The report of the receivers showed the following deductions from gross income: Operating rents, \$202,449; miscellaneous contractual deductions, \$5,009; interest, \$590,000, and lease of other roads, \$1,810,661; total, \$2,608,119. The items of interest and lease of other roads show the general bond and dividend payments on securities of underlying companies which have been met during the receiverships. Some of the payments made by the Metropolitan receivers under lease agreements have been withheld by underlying companies in order that their treasuries might be provided with cash surpluses.

With the readjustment suggested under the reorganization it has been estimated by Guy E. Tripp, chairman of the joint committee of bondholders, that the initial earnings will be equal under the plan to between 2½ per cent and 3 per cent on the proposed new adjustment mortgage income bonds.

The financial rehabilitation of the property is an end that is greatly to be desired, and it is to be hoped that the reorganization will be completed without undue delay.

THE ELECTRICAL EQUIPMENT OF THE DETROIT RIVER TUNNEL—I.

The tunnel which has been constructed under the Detroit River to connect the tracks of the Michigan Central Railroad in the United States with those in Canada has now been in continuous operation for some months for the use of both passenger and freight trains. The electrical equipment of this

capacity of each boat was 18 freight cars, so that three and often four ferry boats were required for many of the trains. This involved many delays. Again, in winter a very considerable amount of time was lost owing to the presence of heavy ice in the river. Under the new conditions a train of any practical length and weight can be hauled through the tunnel in less than 6 minutes.

The scheme of improvements at Detroit comprises the construction of two new depots for the Michigan Central Railway,

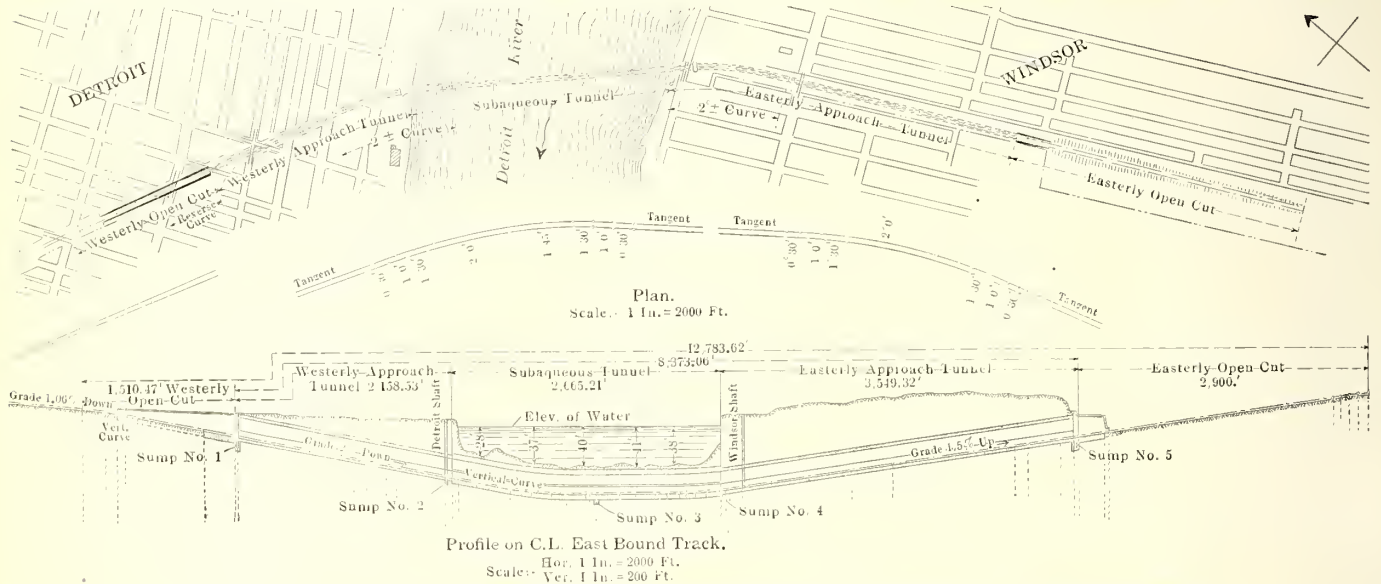


Fig. 1—Detroit Tunnel—Plan of Tunnel and Approaches, with Profile of Eastbound Track

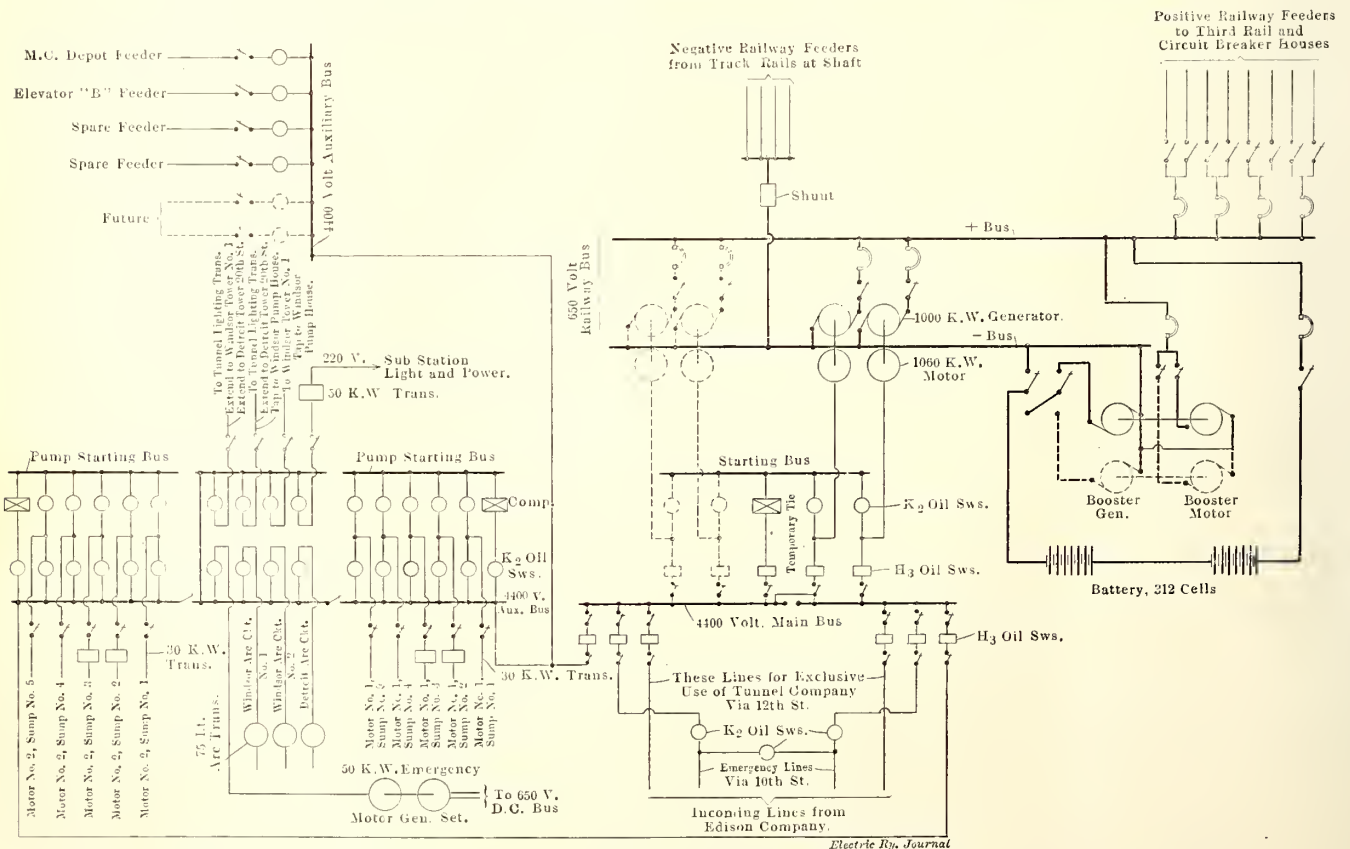


Fig. 2—Detroit Tunnel—Substation Wiring Diagram, Showing Principal Connections

tunnel forms a part of a very comprehensive scheme for improving the railroad facilities in and around Detroit, Mich. The most striking advantage secured is the elimination of the ferries that were formerly depended upon to transfer all passenger and freight trains between Windsor and Detroit.

Under the old conditions each ferry boat took about 30 minutes to load, unload and make the crossing. The average

one at Windsor and the other at Detroit, both conveniently located. The extensive yards on both sides of the river have been reconstructed and electrified, the third-rail layout being of a most extensive nature. These improvements provide for the direct passage of passenger trains between Canada and the United States, with none of the switching which was formerly necessary.

The entire scheme involved the building of a double-track tunnel, the two new depots referred to, a substation, two inspection sheds for the electric locomotives, five signal towers (also used as circuit breaker houses for the third-rail feeders), the reconstruction of the yards on both sides of the river and the electrification of the whole.

It is probable that this electrification will not affect the

the above into consideration, it is of great interest to note the estimated capacity of the tunnel.

The present schedule is for Michigan Central trains only. The average freight car movement per day is about 1100 cars and there are 16 passenger trains. If the foreign roads should desire to use the tunnel and have all their business that is now floated across the river taken through the tunnel it will approxi-

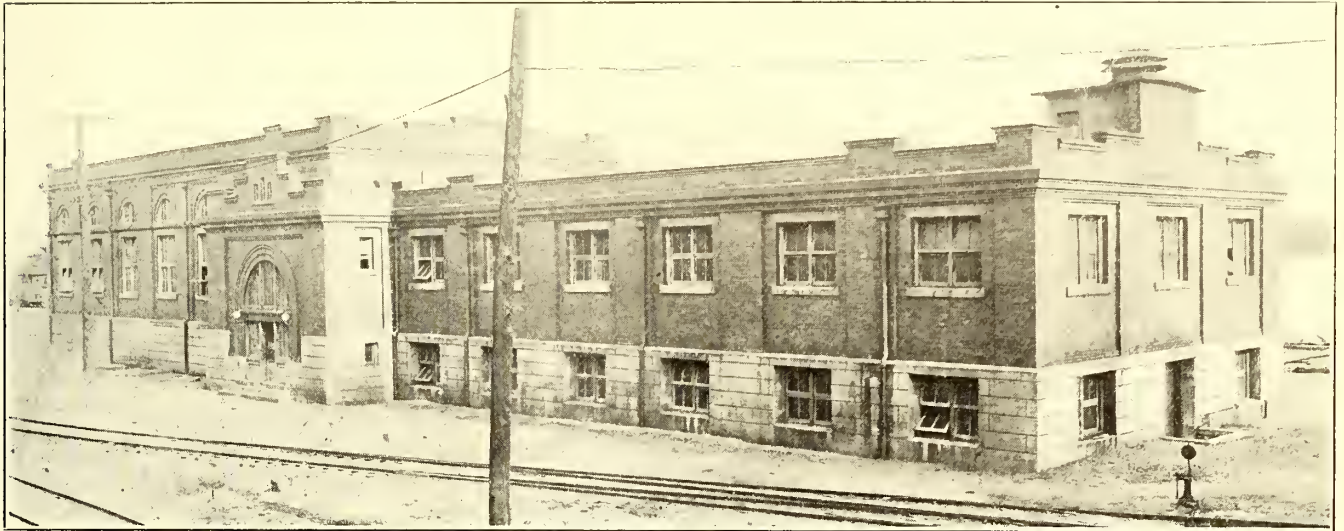


Fig. 3—Detroit Tunnel—View of the Converter Station



Fig. 4—Detroit Tunnel—Interior of Converter Station, Showing the Motor-Generator Sets

Michigan Central Railway alone, as it seems likely that the other roads entering the United States from Canada and vice versa at this point, including the Canadian Pacific, Grand Trunk, Wabash and Père Marquette, will ultimately make use of the tunnel to expedite the handling of the traffic at this point and to eliminate the serious delays incident to ferrying. Taking

mately double the present schedule in number of trains and tonnage. The total estimated capacity of both tunnels taken together amounts to the enormous figure of 247,200 tons per 24 hours. The tunnel portion is shown in Fig. 1, which gives the principal lengths and grades as well as the localities of the approaches, portals, sumps, etc. The magnitude of the general

layout can best be appreciated by a study of Fig. 2, in which only the more important electric circuits are given.

The broader features of the electrical scheme considered above are of a very simple nature, there being only the one substation. This substation is supplied with three-phase, 60-cycle

installed all of the electrical apparatus in the substation, yards and tunnels, with the exception of the storage battery and the apparatus for regulating the battery.

SUBSTATION

The substation is a very substantial building of concrete and steel faced with red brick. Fig. 3 gives a good idea of its external appearance. It is located close to the Detroit shaft and is only 125 ft. from the center line of the tunnel. It is built on made ground and for this reason is supported on wooden piles. The interior view (Fig. 4), the three sectional elevations (Figs. 5, 6 and 8), the plan of the first floor (Fig. 7) and the longitudinal section (Fig. 9) show very clearly the general arrangement of the building.

The more important items of apparatus installed for traction purposes only are: Two horizontal 1000-kw, 514-r.p.m. synchronous-motor motor-generator sets; one 50-kw motor-generator set, and a storage battery of 312 cells Gould type "U" 1543 and type "U" 1559 L L tanks, with a present capacity of 630 amp for eight hours.

The railway switchboard consists of the following:

- 1 swinging bracket for voltmeters and ammeter.
- 1 control battery panel.
- 1 substation light and power panel.
- 2 blank panels for future railway feeders.
- 4 d.c. railway feeder panels with a capacity 1000 amp at 650 volts each.
- 3 battery panels for switching main battery and booster leads together with necessary switching of battery regulating devices.
- 2 d.c. railway generator panels each with a capacity of 1000 kw at 650 volts.
- 2 combination exciter and 3-phase synchronous-motor panels with a capacity of 1000 kw at 440 volts and 15 kw at 125 volts.
- 1 starting compensator and 2 circuit feeder panels for auxiliary buses with a capacity of 400 kw at 4400 volts for each tie switch circuit.
- 2 blank panels for future synchronous motors.
- 1 swinging bracket for synchronizing instruments.

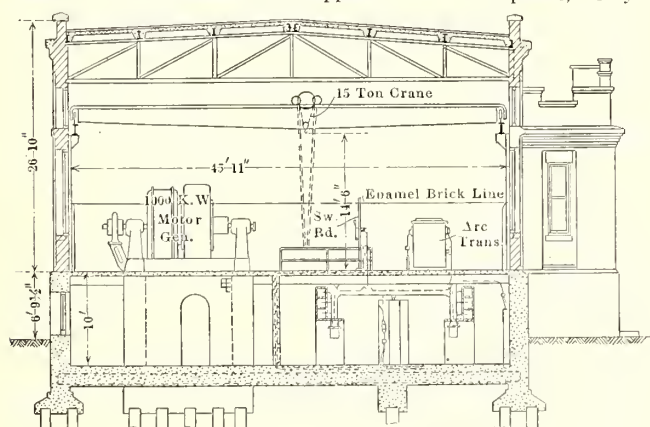


Fig. 5—Detroit Tunnel—Cross-Section of Substation Along Line E-E Shown on Plan

energy at 4400 volts from the Detroit Edison Company. Two feeders are installed between the Delray power house and the substation for the exclusive use of the tunnel company. In addition a third feeder from the Delray power house supplies

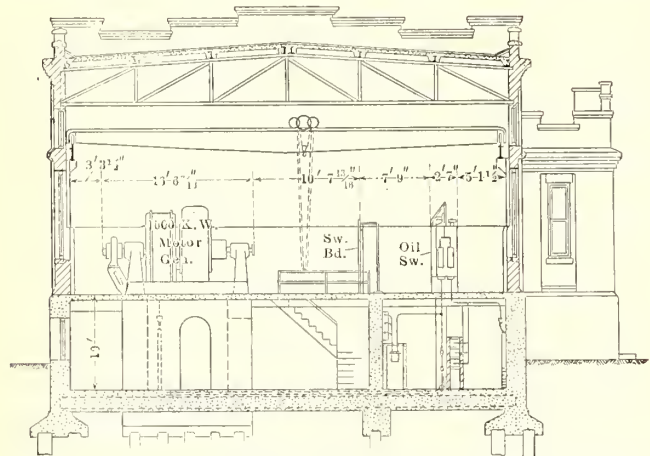


Fig. 6—Detroit Tunnel—Cross-Section of Substation Along Line F-F Shown on Plan

the Washington Street substation of the Edison Company through oil switches in the tunnel substation, so that in case of trouble on the two lines for the exclusive use of the tunnel

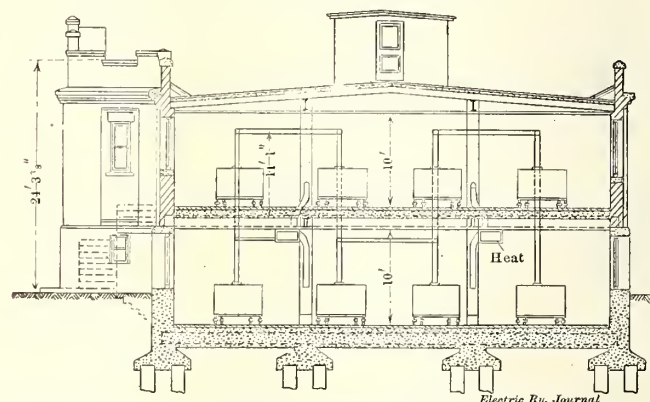


Fig. 8—Detroit Tunnel—Cross-Section of Substation Along Line G-G Shown on Plan

Fig. 10 is an illustration of the railway switchboard and the lighting and auxiliary board can be seen to the right of the same illustration, while Figs. 11 and 12 show the back of the board.

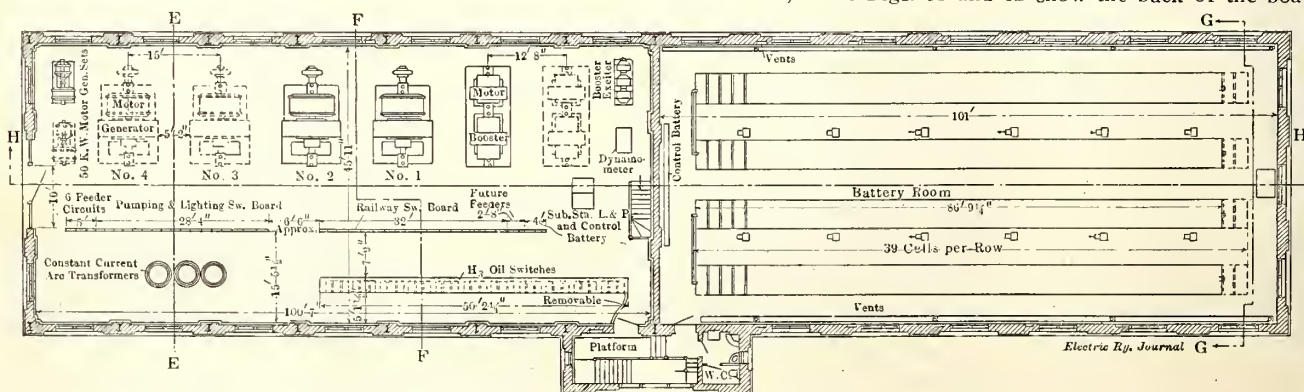


Fig. 7—Detroit Tunnel—Plan of First Floor of Substation

company either or both of the other lines can be switched so as to give the tunnel company a direct feeder from Delray and a back feed from the Washington Street substation. These feeders are run in separate ducts.

The General Electric Company designed, manufactured and

The constant-current transformers used for the arc lighting of the yards are shown in the latter view.

The motor-generator sets each consist of a General Electric alternating-current, three-phase, 14-pole, 1060-kw, 4400-volt synchronous motor, direct-connected to a 1000-kw, 8-pole, 650-volt

direct-current generator. The pair of machines forming a two-bearing set, are mounted on a common base and run at a speed of 514 r.p.m. The shaft is extended at the motor end to accom-

three-phase generator. The two machines are on a common base and form a three-bearing set. This unit is installed to provide a small amount of 4400-volt alternating current by



Fig. 9—Detroit Tunnel—Longitudinal Section Along the Line H-H on the Plan of Substation

modate a direct-connected exciter. Tests show that the synchronous motors of these sets will come up to synchronism in about 45 seconds on the 35 per cent tap of the compensator. The guarantees provide that these machines shall operate continuously with a temperature rise not exceeding 35 deg. C. at unity power-factor and that they shall carry an overload of 50 per cent for two hours with a temperature rise not exceeding 55 deg. C. The efficiencies are as follows:

	Half Load.	Three-quarter Load.	Full Load.
Guaranteed	91	93	94
Test	92	94.1	95.3

The direct-current machines are shunt-wound units designed to operate in parallel with the storage battery. They have commutating poles and also auxiliary shunt fields which are separately excited from the storage battery booster and play an important part in the scheme for regulating the load. The auxiliary winding is of such strength that when the generator is operating under normal load at 650 volts the voltage can be raised to 700 or reduced to 575, so that it can be used for either charging or discharging the battery. The regulating devices will be considered in fuller detail in the latter part of the present article. These motor-generator sets are seen

driving the set from the main storage battery in case of total shut-down of the Edison lines. In this manner one-half of the tunnel lighting, a small amount of pumping, signal lights and

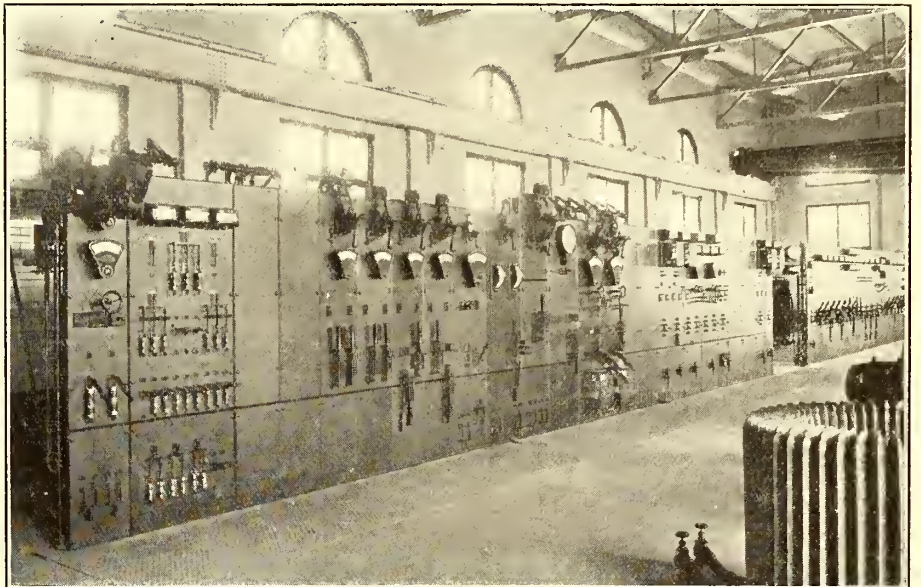


Fig. 10—Detroit Tunnel—Main Switchboard

signal track transformers can be operated, while the railway load would be carried on the main battery.

The main items of interest in the auxiliary apparatus are:

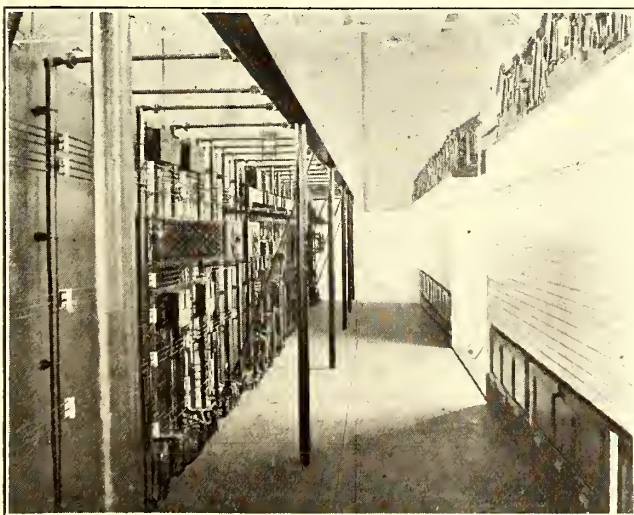


Fig. 11—Detroit Tunnel—Rear of the Main Switchboard in Substation

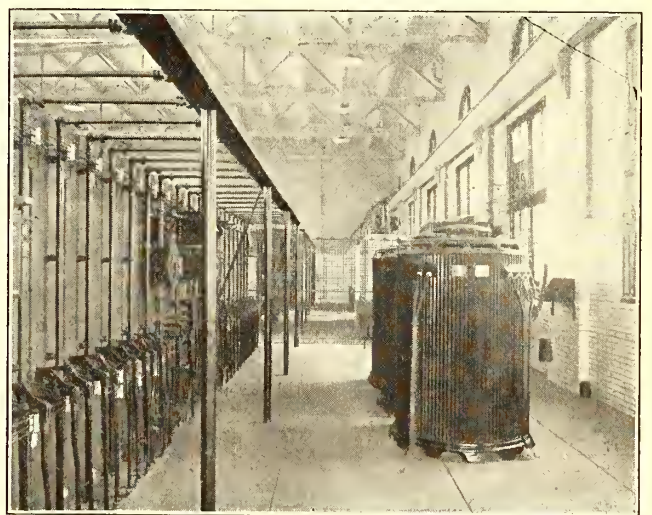


Fig. 12—Detroit Tunnel—Constant-Current Transformers Back of Main Switchboard

in the general view of the interior of the station (Fig. 4).

The 50-kw motor-generator set consists of a 75-hp, 650-volt shunt-wound d.c. motor direct connected to a 50-kw, 4400-volt,

Three 75-light constant-current transformers for yard lighting, one substation lighting transformer and the switchboard for controlling the auxiliaries in the substation yards and tunnel.

Each of the four three-phase incoming lines is of 200,000 circ. mil capacity, and delivers the energy to the substation at 4400 volts, 60 cycles, each lead passing through an H-3 oil switch to the 4400-volt main substation bus, which is sectionalized so that either half can be made dead when necessary for inspection or repairs.

It should be noted that the starting bus is fed from the main bus through an H-3 oil switch and a compensator, thus giving a lower voltage for starting. The leads from the main bus to the starting bus pass through both H-3 and K-2 oil switches,

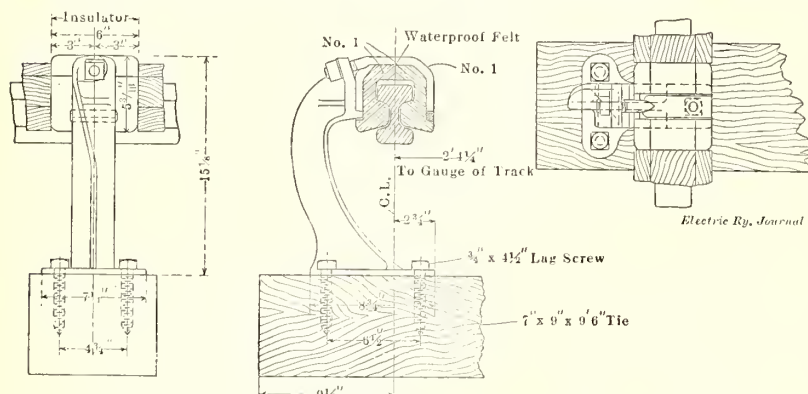


Fig. 13—Detroit Tunnel—Under-running Third Rail

while the leads to the machines are taken from a point between these two switches. Hence, in starting when the K-2 switch is closed a lower voltage is impressed on the machines, and when speed is attained the K-2 switch is opened and the H-3 switch closed, giving full voltage at the machine. These switches are inter-connected to eliminate improper operation.

From the d.c. end of the machines the energy is fed directly through circuit breakers to the 650-volt d.c. bus, passing through recording wattmeters en route. The negative feeders from the track rails to the negative bus and the different third-rail feeders pass through circuit breakers and switches to the respective feeding points. The most essential details of the booster and battery connections will be dealt with in greater detail in the second article.

There are four auxiliary buses, two for the sump pump equipment, one for lighting and the fourth auxiliary bus for miscellaneous purposes. The two sump pump buses are duplicates, the second being installed to insure continuous operation under

station and in all other cases high-tension feeders are taken from the substation to the sump chambers.

The lighting bus is of a simple nature, each lighting feeder simply passing through a K-2 oil switch to its respective field of duty. In the case of the yard lighting the 75-light constant current transformers are located in the substation, while the feeders for the incandescent lighting of the tunnel, etc., are taken to transformers located at convenient points. A 50-kw transformer located in the substation reduces the potential to 220 volts for the substation lighting and power. The 50-kw emergency motor generator set already described feeds into this lighting bus.

The auxiliary bus for miscellaneous purposes provides for the lighting of the Michigan Central Depot, grain elevators in the railway yards, the necessary light and power for both the Detroit and Windsor yards, as well as providing for future requirements.

The substation is equipped with an overhead travelling crane built by the Northern Engineering Works.

THIRD RAIL

The entire third-rail layout has a very neat appearance and is complete in every detail. The length of the third rail installed in the tunnel approaches and yards when reduced to a single track basis exceeds 19 miles. The third rail employed is of the bullhead form and weighs 70 lb. a yard. It was supplied by the Lackawanna Steel Company and its chemical composition is as follows:

Carbon	0.10
Manganese	0.40
Silicon	0.05 or less
Phosphorus	Not to exceed 0.10 and as much less as possible.
Sulphur	Not to exceed 0.08 and as much less as possible.

It is rolled in lengths of 30 ft. and 33 feet. It is of the under-running type, and in this and in other details it is similar to the third rail of the New York Central Terminal electrification. The wood protection is of Georgia and Carolina long-leaf yellow pine, made in lengths of 10 ft. and 12 ft.. The form and dimensions for both straight work and special work, such as inclines, etc., will be seen in Figs. 13 and 14. The brackets for supporting the third rail are of malleable iron.

The third-rail insulators are of the vitrified and glazed porcelain. The specifications call for an insulation resistance of

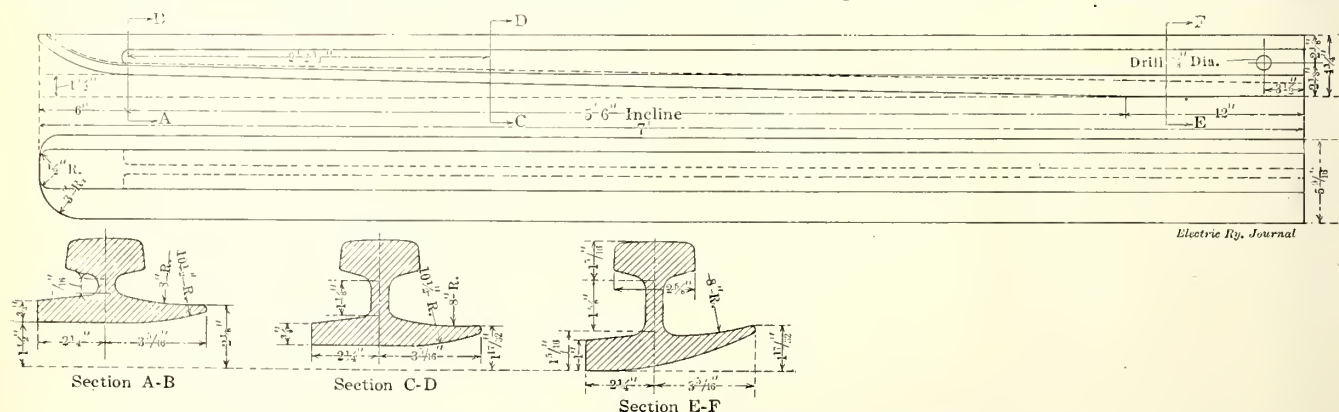


Fig. 14—Detroit Tunnel—Plan and Section of Third-Rail Incline

all circumstances. These two pumping buses and the lighting bus are at a potential of 4400 volts and are provided with connecting switches. They are fed from the main substation bus through H-3 oil switches. The starting bus for the pump motors is fed through a K-2 oil switch and compensator and the arrangements are so similar to those already described for the main machine buses that further description is unnecessary, the only exception being that in this case both of the oil switches in each lead between the bus and the starting bus are of the K-2 type. It should be noted that in the case of Sump No. 2 and Sump No. 3 the transformers are located in the sub-

10 megohms from hook-bolt slot to rail slot after immersion in water for 72 hours, and an insulation resistance of not less than 0.20 megohms when subjected to a precipitation of 3/8 in. of water per minute. A compression test of 85,000 lb. and a tensile strength of 1400 lb. are also called for, in addition to an impact test. The latter consists of dropping a 3/4-lb. steel ball from a height of 30 in. The insulator standing 100 such blows is rated as 100, and others according to the number of blows withstood. Test insulators are taken from each delivery, and none are accepted that show fracture after less than 40 blows. The insulators are of Ohio Brass manufacture.

The third-rail jumpers are inclosed in lengths of iron pipes buried in the ground with the ends brought above the surface by a curvature which will permit of drawing the cables with ease. This pipe is held in position against wooden anchor posts by means of U-bolts. A cast-iron flange screwed to the end of the pipe furnishes a steady and level support for the lower half of the semi-porcelain cover. The end of the cable is insulated and held in position and moisture is excluded by a split bushing made of hard maple and by filling the annular space between the cable and porcelain with an insulating compound. Finally this compound is retained and the cable held in a central position by a metal flange screwed to the copper terminals soldered to the end of the cable. The whole is protected from mechanical damage and weather by the upper half of the semi-porcelain cap. All these details will be seen by reference to Fig. 15, part of which also shows the cable terminal details between the jumpers and third rail.

The clearances of the third rail are as follows: On tangents and curves of over 800 ft. radius the distance between the center line of the third rail to the inner edge of the nearest track rail is 2 ft. 4¼ in., while on curves of 800-ft. radius and less it is 2 ft. 6¼ in., while the distance between the under surface of the third rail and the upper surface of the track rails is 2¾ in.

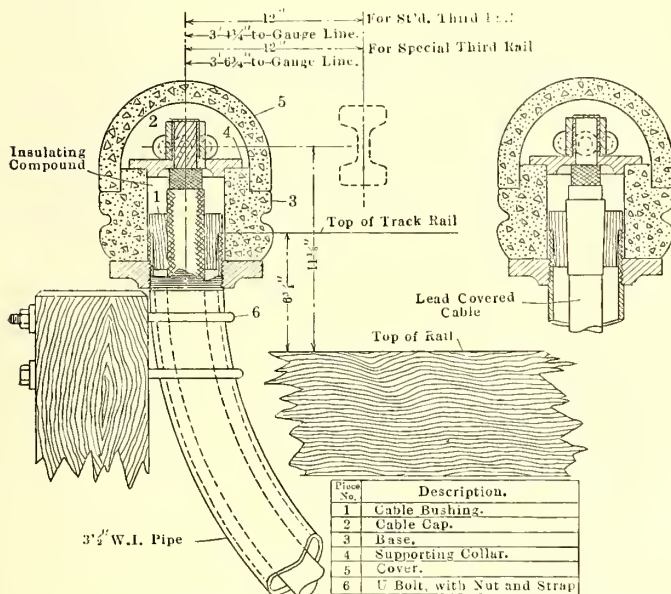
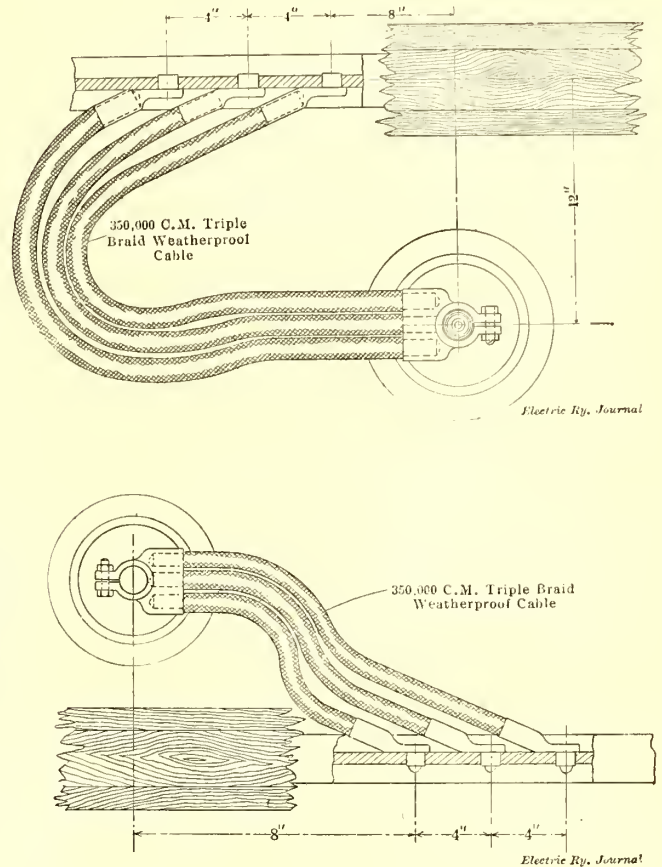


Fig. 15—Detroit Tunnel—Terminal Insulation and Other Details of Third-Rail Cables

LOCOMOTIVES

At present there are six electric locomotives in service. They were designed and manufactured by the General Electric Company, and the Schenectady Works of the American Locomotive Company built the mechanical equipment. These locomotives have attracted general attention owing to the fact that they

June 19, 1909, page 1125. The specifications call for units capable of handling an 1800-ton trailing load from one yard to the other and negotiating a 2 per cent grade when two locomotives are operated in multiple unit, and of performing this service continuously with a 15-minute lay-over at each end. It is of interest to note that the locomotives are performing this service in a most satisfactory manner. The actual grades on which they are operating are 2 per cent on the Detroit side, extending



for a distance of 4000 ft.; 1½ per cent on the Windsor side for a distance of 7500 ft., and an approximately level extension into the yards. Fig. 17 shows the appearance of these locomotives, and Fig. 19 shows the principal dimensions.

The GE-209 motors are standard box frame commutating pole units rated at approximately 300 hp each. Single reduction

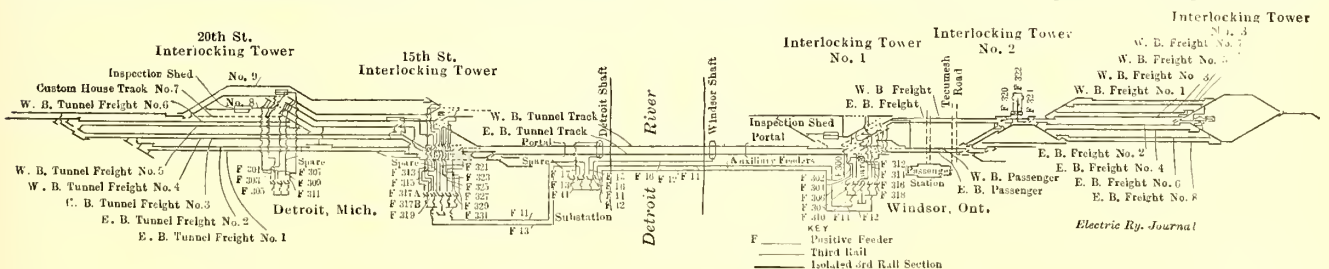


Fig. 16—Detroit Tunnel—Layout of Third-Rail Feed and Jumper Connections

are the most powerful direct-current machines ever constructed, so far as tractive effort is concerned. They were designed for hauling both freight and passenger trains through the tunnel, and also for switching service in the yards. They are of an articulated design of the 0-4-4-0 type, weigh 200,000 lb., and are equipped with four GE-209 motors. Full particulars of them were published in the ELECTRIC RAILWAY JOURNAL for

gearing is used, the gear ratio being 4.37 and the driving wheels 48 in. in diameter. This type of motor is illustrated in Fig. 20. When working at a maximum capacity the motors are capable of slipping the driving wheels and at the slipping point of the wheels the locomotive develops an instantaneous tractive effort of from 50,000 to 60,000 lb. When developing a tractive effort of 50,000 lb. the locomotive develops 1450 hp,

and its speed is 11 m.p.h. The maximum speed of the locomotive when running light on level track is about 35 m.p.h.

A point of interest in these locomotives is that they are provided with two gears and pinions per motor, one at each end

cab and the motor contractors in the auxiliary cab. The master controllers are of the General Electric Company's new design, especially developed for handling four GE-209 commutating pole motors. Each controller has 24 points, 9 for use when the motors are all in series, 8 when the motors are two in series (the pairs in parallel) and 7 when all four motors are in parallel. The ninth, seventeenth and twenty-fourth points are running points. A diagram of the motor connections is given in Fig. 21.

This large number of steps and the fine subdivision of the rheostat enable the torque on the first running point to be reduced to a low value, which is a very desirable factor in handling long, heavy freight trains, where it is necessary first to take up the slack in the drawbars. It also gives a smooth acceleration over the bridging points on the control; further, it reduces the increase of torque between each successive step to such a low value as to enable the locomotive to work up to a high tractive effort while accelerating a train under adverse conditions without exceeding the slipping point of the wheels in the transition from point to point.

A centrifugal governor brake makes it impossible to throw the controller from the "off position" to the full "on position" in less than a predetermined time.

The braking equipment is mechanically independent on each



Fig. 17—Detroit Tunnel—Standard Locomotive of the shaft. This construction was adopted owing to the unusually heavy overloads that the motors will be called upon to carry. This form of construction maintains the armature

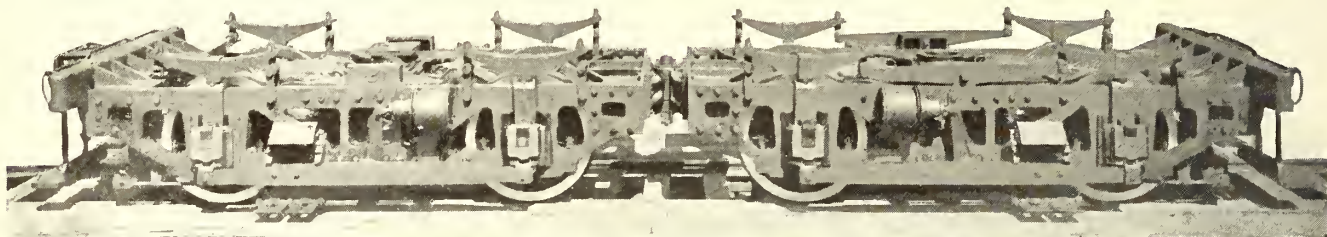


Fig. 18—Detroit Tunnel—Assembly of Locomotive Trucks and Motors

shafts and axles absolutely parallel with one another and to a very great extent eliminates the wear and breakage of pinions.

The motors are operated under forced ventilation, air being delivered to the motor frame at the end remote from the com-

mutator. The air passes between the field coils and armature, and then escapes through suitable discharge openings over the commutator. The blower employed has a capacity of 2000 cu. ft. of air per minute, at a pressure of 2½ in. of water. It is driven by a direct-current, series-wound motor.

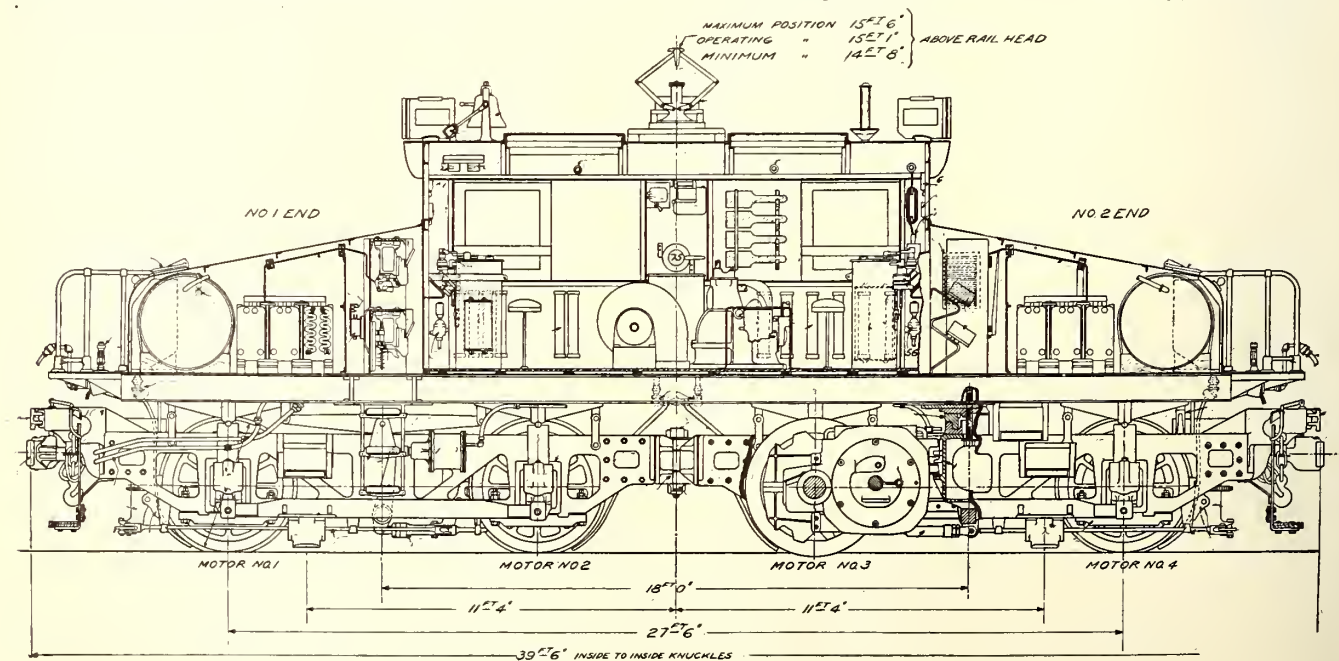


Fig. 19—Detroit Tunnel—Location of Apparatus on Locomotive

mutator. The air passes between the field coils and armature, and then escapes through suitable discharge openings over the commutator. The blower employed has a capacity of 2000 cu. ft. of air per minute, at a pressure of 2½ in. of water. It is driven by a direct-current, series-wound motor.

The control is of the well-known Sprague-General-Electric multiple unit type with the two master controllers in the main

the center of the main cab. It is a two-stage, four-cylinder compressor geared direct to a 600 volt d.c. series motor, and has two low and two high pressure cylinders arranged in such a manner as to divide the work of compression into four equally distributed impulses per revolution. The capacity is 100 cu. ft. piston displacement per minute when pumping against a back pressure of 135 lb. per sq. in.

Maximum height, trolley retracted.....	14 ft. 8 in.
Maximum width.....	10 ft. 2 5/8 in.
Width of cab.....	10 ft. 1 5/6 in.
Total weight.....	199,000 lb.

NOTE.

The second article on the electrification of the Detroit River tunnel will contain descriptions of different auxiliary features, such as the pumping equipment, the lighting system, tunnel construction details and the method of regulating the load by means of booster sets, storage batteries, permutator, etc.

The hearings in regard to commutation rates on the railroads operating out of New York which are being held by

Only those who were directly interested in the case were in attendance. The testimony presented was practically a repetition of evidence introduced at previous hearings. The most important evidence offered at the session on Jan. 4, 1911, was presented by Howard Ingersoll, assistant general manager of the New York Central & Hudson River Railroad. He stated that the cost per car mile in the commutation zone of the Harlem and Hudson divisions was 18.586 cents in the last fiscal year. Earnings per mile were 22.6 cents. Electrification on both divisions north of Mott Haven Junction had cost the company \$9,050,000. This amount did not include elimination of

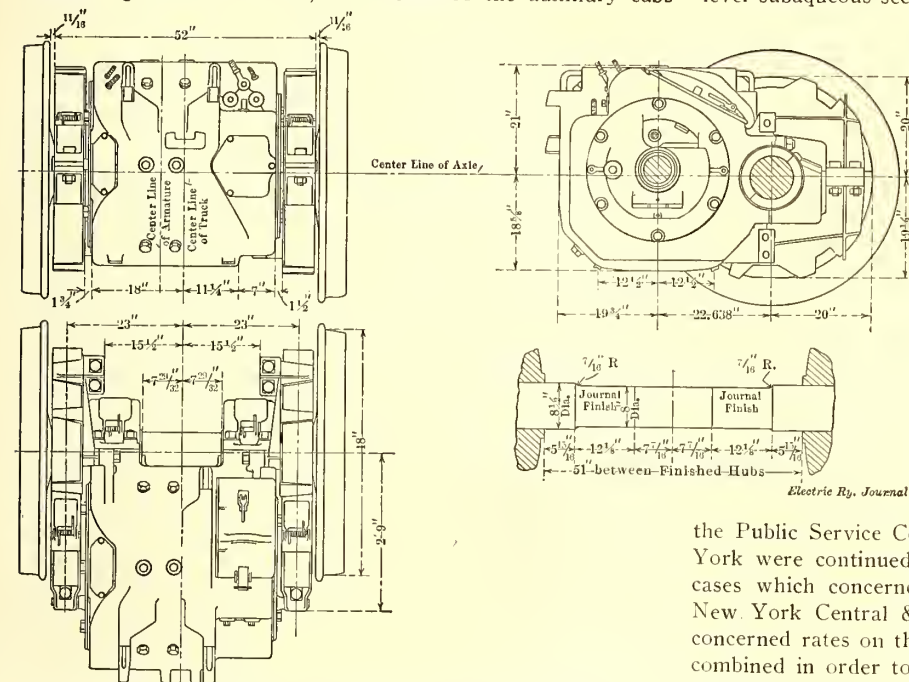


Fig. 20—Detroit Tunnel—GE-209-A Railway Motor

In addition to the third-rail shoes these locomotives are equipped with an overhead current collector which is raised or

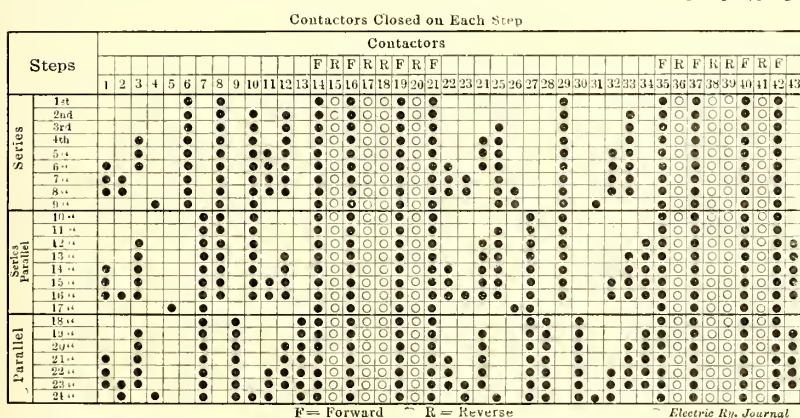
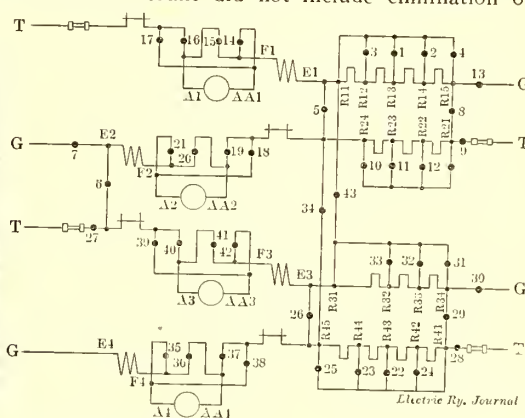


Fig. 21—Detroit Tunnel—Diagram of Controller Connections



Number of motors.....	4
Gear ratio.....	4.37
Number of drive wheels.....	8
Diameter of driving wheels.....	48 in.
Total wheel base.....	27 ft. 6 in.
Rigid wheel base.....	9 ft. 6 in.
Length, inside knuckles.....	39 ft. 6 in.
Length of main cab.....	13 ft. 6 in.
Height of cab.....	12 ft. 6 in.
Maximum height, trolley up.....	15 ft. 6 in.

grade crossings nor of other work not directly associated with the change of motive power. The total cost of electrification to Croton on the Hudson and to North White Plains on the Harlem division would be \$23,550,000. This would be actual outlay of cash for labor and material. The train revenue in the suburban service was 118 per cent of the operating expense. The increases in wages on the electric division last April represented an annual outlay of \$110,000.

At the conclusion of the examination of Mr. Ingersoll the hearing was adjourned.

PROPOSED STANDARDS DISCUSSED BY CENTRAL ELECTRIC RAILWAY COMMITTEE

The standardization committee of the Central Electric Railway Association held two sessions at Indianapolis on Jan. 6, at which the following members of the committee were present: H. H. Buckman, chairman; R. M. Hemming, W. H. Evans, L. W. Jacques and W. P. Graydon. The sessions were attended also by representatives of manufacturing concerns.

STANDARD AIR BRAKES

Mr. Buckman announced the desire of the committee and the association for the adoption of one type (single or automatic) of air brake. Mr. Graydon favored the use of automatic air-brake equipments for single units as well as train operation. It was easier to teach a man how to make proper stops with straight air brakes, but automatic brakes gave several additional benefits and might be operated just as smoothly on single cars when the motorman became accustomed to handling them. Mr. Jacques said that automatic air brakes had been used on some of the Fort Wayne & Wabash Valley cars for three or four years. At first, and when these equipments were operated singly, there was some trouble from jerky stops, but now little criticism could be made, except when the cars were handled by new men. These automatic brakes would interoperate with those on steam roads. S. D. Hutchins, Westinghouse Traction Brake Company, stated, on request, that the standard sizes for brake pipes on steam railroad passenger cars were 1 in. and on freight cars were 1¼ in. One member of the committee said that a steam road had refused to accept one of his freight cars because it had 1-in. air hose.

On invitation of the chairman Mr. Hutchins outlined some of the features controlling the choice of automatic air brakes for electric cars. Probably the most important reason leading to their adoption, other than that of safety, was the desire and need for interchange of equipment with other interurban railways or steam railroads. The word "automatic" designated the brake as self-acting, and thus meant increased safety of operation, even though the cars were handled by new men. It was impossible with automatic air to render the brakes inoperative by the loss of the supply pressure. The triple valve now used in electric car service was a refinement of that used on steam roads to permit the comfortable handling of single-car service. When Mr. Hutchins first took up work in the electric field he installed on some electric cars automatic air brakes which had proved satisfactory for steam railroad service. Service showed, however, that these brakes lacked the flexibility so necessary for interurban conditions, hence they had to be replaced by straight air-brake equipment, pending the development of the later type of triple valves. Mr. Hutchins said that about 70 per cent of the interurban roads in Ohio had equipped or were equipping cars with automatic air brakes.

A. L. Neereamer pointed out the trend of public sentiment toward greater safety in railway operation. He read the following sections from House Bill No. 145, passed on May 10, 1910, by the General Assembly of the State of Ohio:

"Be it enacted by the General Assembly of the State of Ohio:

"Section 1. That from and after Jan. 1, 1913, it shall be unlawful in the State of Ohio for any corporation, company, person or persons owning or controlling the same, to operate, use or run, or permit to be run, used or operated for carrying passengers or freight on an urban or interurban railroad or street car line any car propelled by electricity not equipped, in addition to the hand brake in use on such car, with an air or electric power brake or apparatus capable of applying to all the brake shoes or wheels of such car a maximum permissible braking pressure and of automatically reducing such braking pressure as the speed of the car decreases. Fifty per cent of such cars to be equipped prior to Jan. 1, 1911, and 75 per cent prior to Jan. 1, 1912. It shall be the duty of the Railroad Commission of Ohio to enforce this act.

"Section 2. Any corporation, company, person or persons operating, using or running any car, or permitting any car to

be operated, used or run, in violation of any of the provisions of this act shall be liable to a penalty of \$100 for each such violation, to be recovered in a suit or suits which it shall be the duty of the prosecuting attorney of any county where such violations shall have been committed to prosecute, such suit or suits to be brought by such prosecuting attorney upon verified information being lodged with him of such violation having occurred."

H. S. Ransom, General Electric Company, stated that only one or two electric roads in New York State regularly operated single cars with automatic air brakes. There it was the practice to use straight air equipments with the emergency features for trains up to three cars. This practice had been brought about, no doubt, because the automatic equipments were more complicated and cost somewhat more to maintain. Certain features, also, like release, were slow. With the straight air a motorman could handle a train more easily and the emergency feature gave assurance of safety. Such brakes, however, were not interchangeable with those on steam trains.

Mr. Hutchins pointed out that the steam railroads have found it advisable to install straight air brakes on all heavy locomotives so that they may be handled easily when switching and so that the driver brakes may be released to prevent skidding.

Mr. Buckman spoke of air-brake troubles caused by freezing. Last winter such troubles had at times caused interference with the operation of about 20 cars. The probability of freezing troubles seemed to have been removed by the installation of a 36-ft. coil of 1-in. pipe placed between the two reservoirs. Mr. Jacques said that his automatic brakes had the feed valves installed inside the cars. He recalled but one failure of automatic brakes on his road and that, while not serious, was caused by the knocking off of an auxiliary valve while the car was in operation.

Mr. Hemming summed up the discussion on straight and automatic air-brake equipment and expressed his views on the need for adopting braking equipments which would provide for full interchange between electric and steam roads. He thought that automatic air brakes should be recommended for adoption. The committee then discussed the proper form of recommendation that it should make to the association. The following wording, proposed by Mr. Evans, met with the approval of the committee:

"The committee recommends the adoption of the automatic system of air-brake equipment for electric interurban railway service. In all essential features of detail this system should conform so far as possible to the standards and operating practices of the steam railroad equipments."

The discussion leading up to this recommendation showed that the consensus of opinion was that all interurban cars conforming to M. C. B. standards should have 1¼-in. train pipes and hose on freight cars and 1-in. on passenger and baggage cars; also that the passenger and baggage cars should be equipped with conductors' emergency valves with operating cords extending the full length of each car.

CONDUCTOR'S EMERGENCY VALVE

Mr. Buckman described the conductors' emergency valves which were used on all cars on the Louisville & Northern. The valves were installed in an out-of-the-way place and were operated by a cord extending from end to end of each car. This cord was installed close to the deck rail so that it might not be pulled accidentally. Only once in three years had he known of a car having been stopped by a passenger with the conductor's emergency valve and, in contrast, the valve and cord had saved a considerable number of minor accidents. The valve was used by the conductors in some instances when they were in the middle of a car and observed that some excited or incompetent passenger was about to jump from the rear platform. The use of the emergency valve also had saved the splitting of several switches because the conductor riding on the rear step could quickly set the brakes by pulling the cord and thus prevent a car from splitting a switch.

Mr. Hutchins did not think that the possibility of passengers mistaking the conductor's emergency cord for the bell cord should outweigh the many advantages which the conductor's valve offered. Mr. Buckman thought that the committee should recommend the more general use of these valves, and he favored the type which locked itself open and required the attention of the crew before it could be closed.

SAFETY CUT-OUT COCK

Some members favored the addition of a cut-out cock back of the flexible hose in the train line, this cock to be provided with means for operating from the side of the car. It would be an addition to the angle cock. Mr. Evans argued against cut-out cocks from the standpoint of decreased safety. Mr. Hutchins told of the former practice on one steam road of placing cut-out cocks for the front hose back of the cylinder saddle. If a locomotive did not happen to get into double-header service for six months the unions between the cut-out cock and the hose might become loose and cause trouble when two locomotives were coupled. This experience resulted in an order for the installation of cut-out cocks at the front end. Mr. Hutchins spoke of the reasons calling for the design of the present form of angle cock which hardly could be closed when accidentally struck by flying stones, as had been the experience with the older forms of valves having handles in the vertical position.

Mr. Jacques said that the addition of cut-out cocks back of the flexible hose might be advisable because with them it still would be possible to use the brakes on a motor car even though the hose had burst.

PLANS FOR COMMITTEE WORK ON AIR BRAKES

Mr. Evans thought that the committee should lay down the principal requirements of an air-brake system rather than spend time on details that might be governed largely by local conditions. The committee also should endeavor to induce the manufacturing companies to standardize individual parts in so far as possible, and should take up the standardization of location and supports, with due regard to the experience of the steam roads. Mr. Evans also suggested that the chairman communicate with all the air-brake manufacturers outlining to them what the committee was desirous of accomplishing and suggesting their co-operation. After a general discussion on the need for closer attention to the engineering principles of air brakes by those who install and operate them, Mr. Evans moved that the committee take up with all air-brake manufacturers the question of submitting recommendations for details of electric railway air-brake equipment later to be recommended for adoption by the association. Preferably, the information to be obtained from the manufacturers would include discussions and prints on the subject of leverages, brake arrangements, location of piping, sizes of cylinders, etc.

DESTINATION SIGNS

Mr. Hemming said he had been prompted to introduce the subject of destination signs on account of the dissimilar practices throughout the country. Furthermore, many of the signs used could not be read clearly at night and they frequently caused confusion. Mr. Evans described the illuminated destination and train-number signs used by the Indiana Union Traction Company. These signs were also illustrated and described in the *ELECTRIC RAILWAY JOURNAL* for April 30, 1910, page 788. The committee as a whole favored illuminated signs. Mr. Evans stated that the Indiana Union Traction Company largely had got rid of interference with reading signs by installing the headlight in the roof of the car, rather than on the dash. In the elevated position better track illumination was provided and the eyes of pedestrians and automobile drivers were not blinded by the arc.

CONDUCTOR'S CONTROL PIPE

A general discussion was held over the best methods available for signaling the motorman when more than one car was operated in a train. The customary bell signals were objected to because frequently they could not be heard unless the vestibule windows were left open. Similarly an air signal would require the addition of another connection from car to car.

Mr. Ransom mentioned an electro-pneumatic signal manufactured by the General Electric Company. Mr. Evans stated that the Indiana Union Traction Company was planning to try that signal. It would avoid the addition of another set of connectors from car to car by using a two-wire connector with one conductor for the electro-pneumatic signal and the other conductor for the light circuit to the trailer. On motion, the subject of conductor's control pipe and other car-to-car signal systems was tabled.

ANTI-CLIMBING DEVICES

Mr. Buckman spoke of the need for devices to prevent one car passing over another in collisions. Whatever device might be installed for this purpose should be connected to a strong platform or underframe structure. At the invitation of the committee A. L. Whipple, of the Whipple Supply Company, New York, presented a paper on the subject of prevention of over-riding cars. This device was described and illustrated on page 425 in the *ELECTRIC RAILWAY JOURNAL* for March 14, 1908, and its value in a collision was illustrated in an article on page 1523 of the *ELECTRIC RAILWAY JOURNAL* for Dec. 5, 1908. An abstract of Mr. Whipple's paper follows:

"It can be safely stated from experience that the only maximum safety device to employ in accidental collisions is one designed to interlock the car sills, thus at once employing the most formidable and strongest portion of the car structure to resist colliding forces. Since most electric car equipments have no adequate vertical structures to assist in preventing telescoping, an external device can be applied to interlock the car sills and prevent car platforms from climbing in collision. This device is commercially known as the Hedley 'Anti-climber.' It consists of sections of rolled steel having corrugations which form grooves or recesses. When applied to the ends of car platforms these anti-climbers interlock to prevent one car structure from climbing over the other. Thus they eliminate telescoping. The rolled-steel sections are now made in two sizes, namely, 2 in. x 5½ in., weighing 16½ lb. per foot, and 1 in. x 7 in., weighing approximately 10½ lb. per foot. The device is also made as a steel casting in the form of an anti-climbing draw head for emergency service. The latter design gives the car platform the interlocking feature, but it is not so effective as the anti-climber.

"While an anti-climbing device is of unquestionable value in train service the benefit obtained from its use on singly operated cars should also appeal to all railroad men because it reduces accidents and damage claims. Of course, it is impracticable to build an urban or interurban car of sufficient strength to withstand the force of collisions because the construction requirements of car platforms often prevent the continuation of the car sills to the platform buffer timber. In such cases a drop type or underhung design must be adopted—a construction which is very frail from the collision-resisting standpoint.

"If the car sills could be continued to a platform buffer timber of equal height and supplied with an interlocking feature, both damage to cars and injury to passengers would be greatly decreased. However, many of the car platform buffer timber structures now employed are not strong enough to resist even the slightest colliding shocks. In the case of the drop platform additional stiffening should be introduced by increasing the number of bolts or by auxiliary structures, such as angle-iron connections or sections designed of cast iron. In either instance, the next most desirable construction to employ is to introduce some platform interlocking device.

"There are several ways in which the 'anti-climber' can be installed to effect the desired protection with cars of different lengths. Thus, as shown in the illustration on page 72, the car with the lower platform has the anti-climber bolted to the front of the buffer, while the car with the higher platform has it attached to the lower end of a properly braced plate.

"When building new equipment the standard 2-in. x 5½-in. anti-climber rolled-steel section can be used in place of the usual angle-iron or channel buffer. In that case it should extend from side to side of the platform and be securely connected to the platform members. The standard section, 1 in. x

7 in., can be employed on new equipment in place of the steel plate commonly used on the face of wooden buffers. In equipment now in service a short length of either of these rolled-steel sections can be bolted to the face of the standard buffer installed."

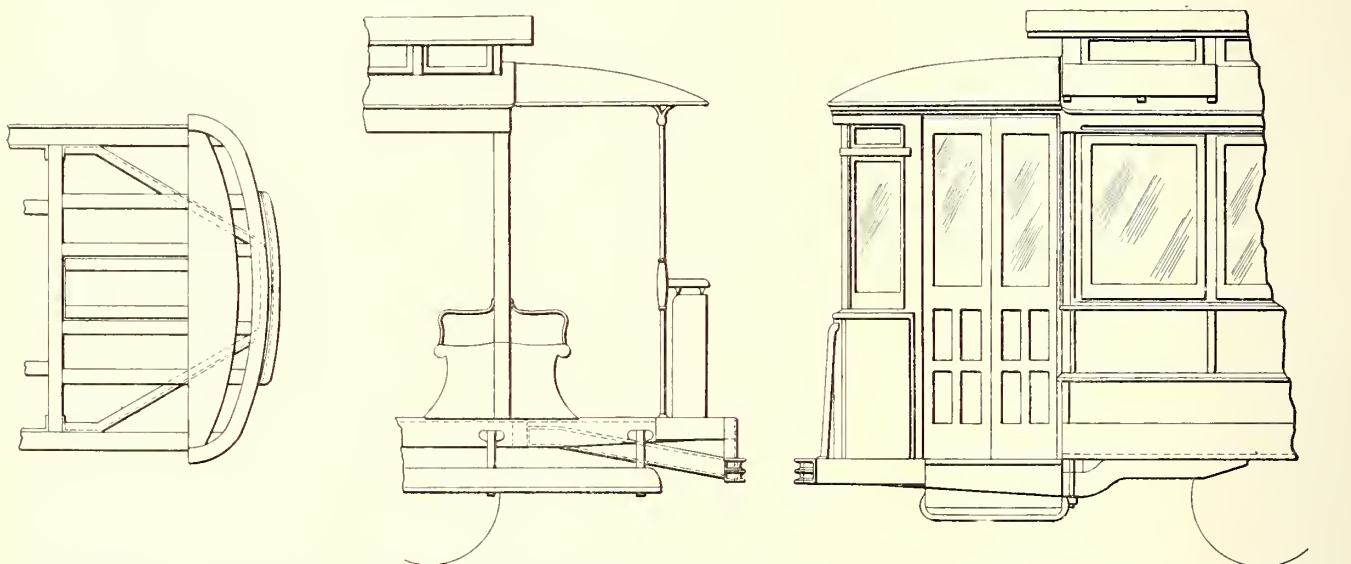
In answering questions regarding the Hedley anti-climber Mr. Whipple said that this device was now used on more than 5000 cars. Some companies installed the anti-climber in 28-in. lengths on old cars, and usually in lengths of 4 ft. on new cars. The interurban equipments required a heavier section than city equipments. The material of which the anti-climbers were manufactured was open-hearth steel rolled by the Lackawanna Steel Company and furnished in mill lengths or cut and shaped to size. Mr. Whipple also said that his company shortly would place on the market an anti-climber suitable for steam railroad cars with spring-buffer platforms. The ridges or corrugations now exposed on the present anti-climbers would be covered with rubbing plates.

Discussions followed on the need for the installation of strong supports for buffer beams and anti-climbing devices. Mr. Evans spoke a word of caution, however, against de-

CIRCULAR ON ASSOCIATE MEMBERSHIP IN THE MAIN AND AFFILIATED ASSOCIATIONS

The secretary of the American Electric Railway Association has just issued a circular to all associate members explaining the new plan of associate membership. Under the old plan associate members were permitted to attend the open meetings of the American Association and the meetings of the Engineering Association and the Transportation & Traffic Association, and received bound volumes of the proceedings of each of the latter associations. Recently those associates who have especially allied themselves with the Engineering Association have also been provided with copies of the advance convention papers and committee reports of that association.

Under the new plan an associate member may ally himself either directly with the American or with one of three affiliated organizations (Engineering, Claim Agents' or Transportation & Traffic Association). Only those eligible to attend the executive sessions of the American Association conventions, as determined by its executive committee, may be allied directly with the American Association; and claim agents or persons



Anti-Climbers as Applied to Interlock with One Another on Open and Closed Cars Having Platforms of Different Heights and Designs

signing the car platforms so that in event of collision there might be liability of so transferring the stresses as to cause breakage of the sills in the center of the car. The following motion, as submitted by Mr. Evans, was approved by the committee:

"The standardization committee respectfully urges that all electric railway companies in the Central Electric Railway territory adopt the policy of arranging all electric railway cars with bumpers of the standard heights as adopted by the American Electric Railway Association as rapidly as possible. We would further recommend the application on the face of the bumper of a corrugated channel section for the purpose of preventing as far as possible the bumpers from passing over."

The meeting was then adjourned.

Johannes H. Cuntz, formerly professor at Stevens Institute, Hoboken, N. J., has recently taken out a patent for an electric cable in which electrostatic capacity on an alternating-current system is counteracted by means of inductance. The invention is particularly applicable to long-distance telephone and submarine telegraph circuits. Professor Cuntz secures this result by winding the conductor in the form of a long helix around a supporting core which in most cases would be made of thin iron wires. The length and therefore the resistance of the conductor is somewhat increased by thus winding it, but this disadvantage is far outweighed by the greatly increased inductance.

connected with the claim departments of operating companies are the only ones eligible to associate membership in the Claim Agents' Association. There is no restriction on associate membership in either the Engineering or the Transportation association.

A member allying with the American Association will receive a cloth-bound copy of the proceedings of that association, will be permitted to attend all its convention meetings whether in open or executive session, and will receive copies of all convention papers and committee reports distributed by that association in advance of the annual meeting, as well as such other communications of a general nature as may be distributed from time to time throughout the year. Those allying with the other associations named will receive from the respective association benefits similar to those outlined for members of the American Association. The Accountants' Association has no associate membership.

The association has also sent to each associate member a blank on which he can indicate the alliance which he wishes to make. The blank also contains a brief classification of the subjects discussed by each association and the class of men to which these subjects would presumably be of most interest. Those desiring to ally themselves with more than one association may do so on payment of additional dues, provided no question of eligibility arises, in accordance with the conditions outlined in the second paragraph.

REPORT OF NEW YORK PUBLIC SERVICE COMMISSION, FIRST DISTRICT

A preliminary chapter of the report to the Legislature by the New York Public Service Commission of the First District, covering the year ended Dec. 31, 1910, has been made public. About one-half of the chapter is devoted to a statement reviewing the progress in rapid transit matters. An abstract of the report follows:

"The commission has held 134 meetings for the formal consideration of matters. The commission has continued the practice of holding informal meetings for the preliminary consideration of matters requiring formal action by the commission, as well as to pass on many matters of detail. There have been 185 such informal meetings.

"Other than those relating to rapid transit, the commission has during the year considered 2711 matters. Of these 194 were formal cases and 2517 informal cases. Of the formal cases 53 remained undetermined at the end of the year. In the formal cases there were during the year 527 hearings, generally held before one commissioner, as provided by law.

"The commission has increased the handling of complaints as informal cases. Such cases relate chiefly to minor questions of service, the conduct of employees and minor defects in equipment and track. Questions involving such matters as that of the service on an entire division or route continue to be handled as formal cases. During the year 1910 informal cases relating to railroads and street railroads have been handled, of which 148 were not determined at the end of the year.

"In the matter of arbitration under Contract No. 1, where claims amounting to more than \$6,000,000 were presented by the Interborough Rapid Transit Company and counterclaims amounting to more than \$2,000,000 were presented by the commission, it was agreed that the company should receive \$1,684,109. Under the terms of the protocol under which the conferences were held it was understood that whatever may be paid to the Interborough company will be expended by it for additional facilities.

"In all 386 street railroad companies, of which 36 are now operating, have been organized for the purpose of carrying on public service within the city. The total gross capitalization of street railways subject to the jurisdiction of the commission is \$733,635,000 and for all companies it is \$1,125,858,000. Owing to intercompany holdings in the street railway properties, certain securities are virtually duplicated, but these figures purport to give only the amount of securities issued and not formally retired. The following table shows the results of operations of street and electric railways:

OPERATIONS OF STREET AND ELECTRIC RAILWAYS IN NEW YORK CITY.

Year ending June 30	1908	1909	1910*
Operating companies	29	33	34
Miles of track	1,543	1,501	1,504
Passenger car miles	271,924,024	270,394,605	280,153,150
Passengers (paid fares)	1,358,000,407	1,402,417,642	1,529,421,244
Daily average	3,710,384	3,842,240	4,190,195
Transfers	359,827,602	314,340,221	327,410,218
Transportation revenue	\$67,579,182	\$69,979,693	\$76,360,952
Total st. ry. operating revenue	\$69,026,613	\$72,282,014	\$79,420,911
Total st. ry. operating exp....	\$42,348,236	\$42,778,270	\$43,451,147
Net revenue	\$26,678,377	\$29,503,744	\$35,969,764
Taxes	\$4,340,228	\$4,992,677	\$5,254,037
Operating income	\$22,479,524	\$25,216,280	\$30,715,727
Non-operating income	\$1,573,225	\$1,246,220	\$2,036,694
Gross income applicable to corporate and leased properties	\$24,052,749	\$26,462,580	\$32,752,421
Operating ratio	61.35	59.18	54.71
Per car mile:			
Operating revenue	25.31 cts.	26.67 cts.	27.88 cts.
Operating expenses	15.52 cts.	15.78 cts.	15.25 cts.
Net revenue	9.79 cts.	10.89 cts.	12.63 cts.

*Provisional figures, subject to correction.

"The total amount of securities for which approval was asked from July 1, 1907, to Dec. 31, 1910, was \$361,138,940, of which \$208,829,300 were disapproved, \$82,458,400 approved, \$390,000 withdrawn and \$69,461,240 remained pending at the close of the last year.

"Although there are over 400 grade crossings in New York City, up to 1910 only \$9,000 of State appropriation had been

used in the city on elimination of grade crossings. In 1910 the Legislature appropriated \$250,000 and for 1911 this commission has requested \$600,000. This amount is not for administrative expenses, but to help pay the cost of a substantial start in elimination in New York City of the grade crossings of steam railroads, at which in three years 60 were killed and 108 injured.

"The commission has continued to require the companies to keep their equipment in good sanitary and operating condition. The proper condition of equipment has a close relation to the number of accidents of certain classes. At the end of the year all of the cars operated on the surface lines in the City of New York were equipped with fenders and wheel guards, of types approved by the commission. Investigations by the inspectors of the commission show that these improved safety devices have aided in the substantial reduction of fatal accidents. The following table shows a comparison of accidents during three years:

	1908	1909	*1910
Total number of accidents on street, "L" and subway	56,481	52,808	59,515
Number of persons killed	444	329	379
Number of persons and vehicles struck by cars	11,405	11,447	14,484

*Estimated in part for December, 1910.

\$This figure includes 12 killed in New York Central explosion at sub-station.

Note.—The figures on the Metropolitan Street Railway show nearly 400 per month increase for the last four months due to including vehicles struck in which no injuries were claimed. Other companies have reported in this manner for the past two years, but not the Metropolitan Street Railway.

"The question of service remains a serious one, for it is not possible to secure adequate service, particularly during the rush periods, with the present facilities. The following table shows the magnitude of the problem confronting the public authorities in the furnishing of proper facilities for the travel that presents itself in New York City:

GROWTH OF STREET RAILWAY TRAVEL IN NEW YORK CITY SINCE 1898.

Year.	Population.	Fare Passengers.	Rides per Capita.
1898	3,251,244	741,329,885	228.0
1899	3,344,223	773,351,232	231.2
1900	3,437,202	846,353,058	246.2
1901	3,549,843	881,344,801	248.2
1902	3,662,483	938,089,064	256.3
1903	3,775,123	1,000,767,483	265.0
1904	3,887,763	1,065,984,910	274.1
1905	4,000,403	1,130,982,696	282.7
1906	4,153,699	1,251,841,175	301.3
1907	4,306,995	1,315,381,388	305.4
1908	4,460,291	1,358,000,407	304.4
1909	4,613,587	1,402,417,642	303.9
1910	4,766,883	1,530,000,000	320.9

"There has been a constant increase in the number of rides per capita ever since the introduction of street railway transportation in New York City. Statistics prepared by Frank R. Ford (see STREET RAILWAY JOURNAL, Oct. 5, 1901) show that in the territory now occupied by the Boroughs of Manhattan, Brooklyn, Bronx and Queens there were 45 rides per capita per year in 1860, 104 in 1870 and 155 in 1880. These statistics are based on number of passengers, including transfers, while the statistics given in the comparative table are based on fare passengers only. The number of transfers was, however, small in early years and the statistics indicate clearly the enormous development of street railway travel and its increasing importance to each individual. If children under five years of age are excluded from our population figures, as they are not included in the travel statistics since fares are not charged for them, the number of rides per capita is now approximately equal to one ride each day in the year for each person. It should be noted that the above statistics do not include travel upon the ferries over the North and East Rivers and to Richmond, nor the large suburban traffic of the Long Island, New York Central and New Haven railroads.

"Owing to the consolidation of companies and changes in population and conditions, a considerable amount of car tracks has for many years been unused by the operating street railroads. In the Borough of Manhattan there are about 25 miles of such unused track.

"The commission has been actively engaged in collecting

evidence for presentation in these suits and in others proposed, and to that end has caused a thorough inspection to be made of the whole abandoned trackage in the city and has taken some 800 photographs, showing in graphic form the exact situation upon the streets involved.

"The abandoned track situation is well in hand and the speedy removal of all abandoned tracks is confidently expected. This is particularly important, for the unused tracks present unnecessary obstructions and causes of damage to vehicular traffic."

ANNUAL REPORT OF NEW JERSEY COMMISSION

The first annual report of the State Board of Public Utility Commissioners of New Jersey relates to the business transacted under the law of 1910 and to recommendations for changes in the law. An abstract of the parts of the report which are of interest to the electric railway companies follows:

"The experience of the board has been that most of the things accomplished are done through negotiations with the companies and in compliance with recommendations rather than by the issuance of orders. The recommendations of this board have been generally adopted by the companies in interest, and in no case where the board has issued an order has it been necessary for it to institute proceedings for the collection of a penalty for wilful default of compliance.

"A law giving the board power to order the abolishment of dangerous grade crossings and providing for an equitable division of the cost between the companies, the State and the municipality should be enacted.

"The provision of the law requiring the approval by the board of grants to public utilities has been criticised as an unwarranted interference with the principle of 'home rule,' in that it may prevent a municipality making such terms as it chooses with a public utility corporation in return for a privilege granted. Such criticisms are not well founded. Valuable franchises have been granted by local governing bodies without proper protection of the public interest and the result of this has given force to the demand for State regulation. With perhaps a few exceptions, these franchises have been granted by municipal officials in good faith with the belief that the terms of the grant were reasonable, and that the exercise of the privilege, as granted, would be in the public interest. The occasion is, however, exceptional when members of township committees, common councils or other governing bodies, particularly of the less populous municipalities, are called upon to consider franchise grants to public utility corporations. When these occasions arise the local governing body seldom employs expert advisers competent to pass upon technical problems which should be considered. If the franchise is to be submitted to a State board for its approval, greater care is naturally exercised by those seeking it to have the terms of the grant of such a nature that they will pass the scrutiny, without adverse criticism, of an impartial tribunal. The legitimate interests of both the public and the corporations are better protected by the policy of requiring local grants of privileges to public utility corporations to be approved by a commission having at its command the services of expert advisers, with special knowledge of the subject of franchise grants to such corporations.

"With the aim of having established uniform systems of accounting, conferences have been called with representatives of street railway, gas, electric light, telephone and water companies. Numerous suggestions have been made to the board and this matter is now under consideration. The limited amount of the board's appropriation has restricted it in the employment of accountants, whose advice would be of material assistance, and the problem of uniform accounting has not been solved as expeditiously as is desirable. It is hoped that the progress the board is making with the means at its command will enable it to settle this matter at an early date.

"In the administration of the additional powers conferred by the law of 1910, serious questions have been raised which put the jurisdiction of the board, and the extent thereof, in doubt.

These doubts should be promptly set at rest by further legislation.

"The statute of 1910 does not in terms confer on the board power to require notice of an accident. If such power exists it must be derived by implication. This consideration may lead to a denial by the courts of implied power in the board to require the companies to which the act of 1910 extends to give such notice, and so leaves the power of the board in this respect in grave doubt.

"It has been suggested that the provision relating to the issue of securities limits the function of the board to ascertaining the facts essential to determining the legality of the proposed issue; that it may consider whether the proposed issue is authorized as to amount, character and terms and other facts bearing upon the legality or illegality thereof, but that if in these particulars it finds no lack of authority for, or illegality in, the proposed issue, it must grant its certificate of approval and cannot impose limitations nor determine the purposes for or terms or conditions upon which the securities are to be issued. The suggestion raises a grave question as to the power of the board under this section.

"In 1909 a provision was inserted in the law imposing a 'penalty not exceeding \$100 per day' to be recovered in an action of debt at the suit of the board upon failure to comply with an order of the board. This provision has been criticised upon two grounds: (1) that the words 'not exceeding' rendered the action of debt unavailable, and (2) that it precluded the possibility of enforcement of the orders of the board by mandamus. Because of these criticisms it may be well to excise from the provision the words 'not exceeding' and to supplement the statute by a further enactment clearly declaring that it was not the legislative purpose to preclude the enforcement of the orders of the board by resort to the appropriate processes of the courts.

"It would be advisable to give the board the right to adopt and fix by general orders standards of service supplied by electric lighting, street railway, water, telephone and other public utility corporations.

"The questions which enter into the operation of public utilities frequently give rise to problems that cannot be solved without the exercise of a high degree of technical training, combined with knowledge gained from practical experience. It is the theory of regulation by the State that such technical training and practical experience can, under the control of a commission, be employed directly in the service of the public.

"It is intended that the work of the commission shall be performed so as to bring fair treatment to the public without injustice to the corporations. To do this intelligently and to determine what may be considered fair with respect to rates, the standards of service which may be reasonably insisted upon, or the conditions that may be properly imposed in municipal grants, and to decide the many other problems which must confront the commission, necessarily requires the employment of engineers and other expert assistants, who should be fully equal in technical training and practical experience to those employed by the utility corporations. Such engineers and experts command good salaries in the employ of the corporations, and the State must pay salaries large enough to make employment in the service of the State attractive. For this reason the board strongly urges that, in the consideration of any changes in the law, and particularly such changes as will tend to place additional duties involving a consideration of technical problems upon the board, a sufficient appropriation be allowed to provide for the employment of such assistance as will be required to make the law effective."

Progress is being made with the Lancashire & Yorkshire Railway's electric "belt" scheme from Liverpool to Southport, via Ormskirk, work having been started recently on the section between Maghull and Town Green. It is hoped to complete this route by February, 1911. The extension to Maghull, opened at the beginning of 1910, has resulted in extensive building operations in that rural district.

THIRD CONFERENCE ON INTERURBAN OPERATING METHODS IN INDIANA

On Jan. 5 the Railroad Commission of Indiana held a conference at Indianapolis with the committees of interurban managers which were appointed on Dec. 23 to study and report upon three subjects connected with interurban electric railway operation. The committees were as follows:

Committee on conditions of employment and service: C. L. Henry, president Indianapolis & Cincinnati Traction Company; W. G. Irwin, vice-president Indianapolis, Columbus & Southern Traction Company; H. A. Nicholl, general manager Indiana Union Traction Company; C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company.

Committee on block signals: Arthur W. Brady, president Indiana Union Traction Company; C. N. Wilcoxon, general manager Chicago, Lake Shore & South Bend Railway; R. I. Todd, general manager Terre Haute, Indianapolis & Eastern Traction Company; C. D. Emmons, general manager Fort Wayne & Wabash Valley Traction Company.

Committee on delivery of train orders: A. Shane, general manager Indianapolis, Columbus & Southern Traction Company; George S. Henry, traffic manager Indianapolis & Cincinnati Traction Company; G. K. Jeffries, superintendent Terre Haute, Indianapolis & Eastern Traction Company.

The sessions, like those of Dec. 23, were not open to the public.

At the meeting on Jan. 5 the commission considered the reports of the committees separately. The report of the committee on conditions of employment and service was taken up first and is said to have been devoted largely to a discussion of the suggestions of the commission that all interurban motormen should have had one year's steam or electric service before being appointed and that motormen should be prohibited from handling baggage and express matter. It is understood that no conclusions were reached on these two subjects between the committee and the commission.

The committee on signals asked for more time. It stated that so far it had not been able to obtain sufficient information on which to base definite statements, and that it desired to make a complete investigation of the different kinds of block signals in use on electric roads outside of the State. The commission granted a postponement of this committee's report until Jan. 24.

The committee on methods of delivering orders presented a rule which it had prepared prescribing the manner of obtaining orders. This rule was approved by the commission. It is as follows:

To obtain orders the motorman or conductor, whichever is more convenient, will call the dispatcher and give his serial order blank number, which will be requested by the dispatcher, who will then give such orders as are necessary. The one taking the order will write the same plainly, without abbreviating, with carbon copy on the blank provided for the purpose. When he has finished writing the order he will repeat it to the dispatcher. If correct the dispatcher will O. K. the same. The one taking the order will then give his name to the dispatcher and at the same time sign the order. The one who has not taken the order will repeat the order without abbreviation to the dispatcher and give his name and at the same time sign the order. If correct, the dispatcher will then give the initials of the superintendent or other designated authority and the train order number, which must be repeated back to the dispatcher by the one then at the phone. If correct, the dispatcher will say "Complete at" (giving the time), which completes the order and places it in full force and effect. If for any reason the dispatcher does not complete the order, it is of no effect and must be treated as if it had not been given. After the order is completed the motorman and conductor each will take a copy of the same.

Where it is not practicable for both members of the crew to leave the car at the same time, at important places designated by bulletins, or in emergencies at other places, after authority has been given by the train dispatcher on duty at the time, one member of the crew may receive and complete the order, the second member being required to read the order aloud to the one who has taken and repeated it, before the train is started, the dispatcher making a full record of the facts and reasons on his record book for every order completed by his instructions in this manner.

Subsequent to the conference, it was stated, the committee on length of employment reached an agreement with the commission. The basis of this agreement was that the companies would accept one year's qualification for motormen provided they should be permitted to employ men having less than one year's experience in cases of urgent necessity. Where this was done the reason or necessity of each case would be filed with the commission. The commission, it is stated, has notified the committee that this provision is reasonable and will be agreed to.

MESSAGES OF THE GOVERNORS

The Legislatures of nearly all of the States are scheduled to meet in 1911, and a number of legislative sessions have already been entered upon. The following abstracts have been made of the messages of the Governors which have already been presented so far as they relate to public utility enterprises and other matters of interest to the railroad and allied industries:

GOVERNOR EUGENE N. FOSS OF MASSACHUSETTS

I see nothing inimical in the mere size of a corporation, provided, of course, it is suitably regulated. On the other hand, a holding company is in theory wholly at variance with the common law and with the statutes of the State. It is therefore indefensible. I would also call attention to the voluntary associations which issue shares evidencing a participating ownership, but which, under existing laws, are subject to none of the regulations as to publicity and taxation that apply to both business and public-service corporations. I do not recommend the appointment of a special commission to consider this subject, but I believe that the tax commissioner may well be directed to investigate the further regulation by the Commonwealth of such voluntary associations, and to report thereon to the next General Court, with specific recommendations.

I also think there should be a change of method on the part of the public service corporations in seeking legislation from the General Court. The corporation before coming to the Legislature should put its case before the people themselves, through the press and by public meetings, if necessary, and in this way enlighten the people fully and frankly as to just what it wants and what it proposes to give in return. My own experience in corporate management is that when the people thoroughly understand a proposition they act with intelligence and fairness. These methods will command the confidence and enlist the capital of the people for these enterprises. This procedure on the part of the corporations will forever end the lobby and its attendant train, and it will inevitably give the corporation all that it is entitled to.

I am not in favor of commissions as a means of transacting public business, unless they are appointed subject to recall, for I believe their tendency is not in accord with popular or representative government. Therefore, I shall doubtless recommend the elimination of some and the consolidation of other commissions. I advise the abolition of the following commissions which relate to quasi-public corporations, namely, the Railroad Commission, the Gas and Electric Light Commission, the Boston Transit Commission, and the Highway Commission, which includes the supervision of the telephone and telegraph companies. And in their place I recommend the creation of a Public Utilities Board, which should consolidate the functions of these commissions, with the stipulation that the tax-collecting function of the Highway Commission shall revert to the State Treasurer's department. This board should be composed of five members, whose terms should be for 10 years, subject to the recall of any member at any State election. The chairman should be a lawyer. This board should have the right to employ and hear counsel; its decisions should be in writing, with the vote of each member recorded, and it should have the power of initiative.

Our first duty, as I see it, is to create a greater Boston by the confederation of all the towns and cities within a radius of at least 10 miles, and possibly more. I maintain that our suburban

citizens, whose business interests bring them to Boston daily, who enjoy the protection of her police and the use of her high-ways, and who are included within her 5-cent fare limit, have no right to stamp the dust from their feet at 5 o'clock and assume that they have no further responsibility for the good government of the very city in which they earn their livelihood and where their commercial and financial interests are centered. For example, the rapid transit system that Boston maintains is far more in the interest of these suburban communities than in the interest of the City of Boston. I contend that it is the duty of these suburban towns and cities which are already part of the metropolitan district to unite with the city itself in the creation of a great metropolis. This union should be not merely a commercial but also a political one.

GOVERNOR JOHN A. DIX OF NEW YORK

During the last fiscal year the new public-service commissions cost the State \$897,372.66. For the ensuing year the public-service commissions ask the State to appropriate \$1,984,537.50. These sums are in addition to the very large sums charged by the Public Service Commission of the First District to the City of New York. I refer to these facts to show the abnormal rate of increase in the expenditures for these purposes, and to point out the absolute necessity of the most drastic retrenchment. If this is not done a direct tax must be imposed upon the people for the reason that although our predecessors exhausted every reasonable source of indirect taxation, nevertheless the expenditures during each of the last three years exceeded the revenues, thereby very greatly depleting the treasury. We believe that such retrenchment can be made without impairing the efficiency of the State service. Unnecessary boards and commissions should be abolished, useless employees removed and every demand for appropriation carefully scrutinized to the end that the expenditures of the State be brought within our income, and that the total amount of appropriations be limited to the estimated amount of revenues from which they are to be paid. I am giving careful and special attention to these public service commissions and hope in the near future to address to you some recommendations on this subject.

GOVERNOR ARAM J. POTHIER OF RHODE ISLAND

The public utilities are owned and operated in this State by private corporations, except that most water-works systems are under city or town control. These corporations are doing business under the protection of the State by legislative permission. They have rights both under the law and under the Constitution, which must be respected as fully as the rights of any individual. But they also are charged with responsibilities to the public and to the government under whose protection and laws they exist which must be fulfilled. I believe there should be created in this State a board of commissioners of public utilities to act as referee in the adjustment of all differences between such corporations and the public as to the character, quality and quantity of the service rendered and the rate or fee exacted in return therefor. Its recommendations for the improvement or extension of the service rendered should carry the power of enforcement, subject only to reversal by the courts. It should have the right to investigate every cause of complaint, either by the corporations or by the people, to examine and inspect equipment, determine the method used in fixing rates of compensation, and whether the patron or consumer is receiving that to which he is entitled and for which he is paying. I recommend that this General Assembly enter upon a thorough and serious consideration of this matter, looking to the enactment of a law creating a State board of public utilities with proper powers of supervision over the activities of all railroad, steamboat and other transportation companies, pipe line, gas, electric light and power companies, telephone and telegraph companies, water distributing companies, and other public service corporations operated by private interests. I recommend also that the section of the law under which the sum required annually for the salary and office expenses of the railroad commissioner and his deputy is contributed to the State by the railroad companies operating here be repealed forthwith, and that an

annual appropriation out of the public funds sufficient for this purpose be authorized.

I recommend that the committee on labor legislation confer with the Rhode Island board of commissioners for the promotion of uniformity of legislation, for the purpose of considering the advisability of proposing a workmen's compensation law for this State.

GOVERNOR SIMEON E. BALDWIN OF CONNECTICUT

In 1907 a special commission was appointed by the General Assembly to consider the laws with respect to public service corporations and to recommend any legislation regarding them which it might think expedient. This commission agreed unanimously in reporting to the General Assembly in 1909 in favor of certain legislation creating a public utilities commission, in which the present Board of Railroad Commissioners should be merged. A draft of a bill for such legislation accompanied this report. I recommend the enactment of a bill in general conformity to the scheme thus reported. A few, however, of the provisions of the bill so reported seem to me objectionable. I will mention at this time but three.

1. Section 1 is open to the interpretation that it would apply to municipal corporations owning water-works for the supply of the municipality. If so construed, it would be an unnecessary invasion of the privilege of local self-government.

2. Section 98 might be construed to require the commission to make investigations as to certain matters which would involve a cost that could hardly be warranted by the results.

3. Section 7 makes the annual salary of each commissioner \$7,500.

In my judgment this is too large a sum. It is greater than that paid to any State official, except the justices of the Supreme Court of Errors and the judges of the Superior Court. When they retire from office their former clientele will have disappeared. The members of the public utilities commission, on the other hand, under the bill as reported, serve for terms comparatively short, and need no special form or course of training to qualify them for their position.

I should regard it as likely that the time of the commissioners would by no means be fully occupied by their official duties, and that to some extent each would pursue what had been his former occupation in life. An annual salary of \$5,000 would seem quite sufficient. I understand that a bill will be presented for your consideration which varies from that recommended by the special commission in 1909 in enlarging the number of the members of the public utilities commission from three to five. In my opinion three are enough to secure the proper performance of the work intrusted to it. The bill reported by the special commission gives an appeal to the Superior Court, such as is now afforded from orders of the railroad commissioners. I think this is a proper safeguard against possible injustice. It might, however, be sufficient were it given only when the decision appealed from was not a unanimous one.

It is generally agreed that our present employers' liability statute is too favorable to the employer. If so, it ought to be amended, whatever other legislation may be had in different directions.

GOVERNOR CHASE S. OSBORN OF MICHIGAN

Employers of labor, as a general thing, carry casualty liability insurance. The fees they pay are made to cover the expense of the agent of the company who solicits the policy, to pay the overhead expenses of the insurance company, to pay the dividends of the insurance company, to make a surplus fund for the insurance company, to pay the attorneys for both the insurance companies and the injured person and finally to pay the injured person if he gets any pay. It all makes for injustice, friction, bad feeling and encouragement of ambulance chasers and illegitimate litigation. The right laws for the proper system could insure more to the injured person and at a less cost to the employer. The saving in court expenses alone would be great. In the circuit court of large cities fully a quarter of the time is taken up by the trial of personal injury and kindred cases. The present laws are an abomination and must sooner or later be improved. I hope that this Legislature will start

the good work. New York recently passed a workingmen's compensation act, framed by a special commission appointed by the Legislature to advise it. The rights of both employer and employee should be respected. You, gentlemen, will know best how to handle this matter and I am confident you will address yourselves to it.

A consistent and persistent policy of grade separation of steam railroads, electric railways and street crossings, if inaugurated under wise laws, would result in a great saving of life and property. Such a policy, reasonably pursued, would not inflict impossible hardships upon either the railroad companies or the public. In my opinion, legislation in this direction should take more definite and compulsory form.

Great good could be accomplished by a reasonable law defining the nature and strength of railroad carriages. As fast as flimsy rolling stock now in use is worn out and condemned it should be replaced by steel carriages complying with a safety standard fixed by the State.

GOVERNOR T. R. MARSHALL OF INDIANA

I recommend that you revise the corporation laws of Indiana so that no corporation can issue a dollar's worth of stock without a dollar in money or a dollar's worth of property going into the corporation to the satisfaction and approval of the State Board of Tax Commissioners. And I recommend that all transportation lines be prevented from issuing bonds without the consent of the State Railroad Commission first being obtained by showing that the funds raised from the issue are to be actually used for corporate purposes, and that the sale of such bonds for less than 95 cents on the dollar be forbidden. I recommend that no bonds be issued by any other public utility without like consent being obtained from the State Board of Tax Commissioners so that public utilities may not only be controlled, but ratably and reasonably taxed by this board, which should have exclusive powers of taxation over all public utilities.

The right of eminent domain should be given interurban railroads, however, without purchasing the real estate, for the removal of obstructions at curves which prevent approaching cars from sighting each other, and such railroads should be compelled to exercise that right.

Should loss of life occur because of the failure of a corporation to comply with an order of any constituted authority in Indiana to repair and safeguard its equipment, prior to determination by the courts that the order is reasonable, and should a board of directors declare a dividend during the time that the order is being considered by the courts, each director voting for the dividend should, if the order is subsequently held by the courts to be reasonable, be punished as for involuntary manslaughter, and the State should not be compelled to prove intent. The violation of an order or rule of any corporation in Indiana whereby death occurs should likewise render an offending employee liable for punishment as for involuntary manslaughter and the State again should not be required to prove intent.

GOVERNOR CHARLES S. DENEEN OF ILLINOIS

In my judgment authority should be given to the Railroad and Warehouse Commission, or to a commission created for this specific purpose, to gather and publish all facts regarding the cost of construction, maintenance and operation of public utility corporations, with power to require service adequate for the public needs and to fix rates which will be fair to the public, will assure to investors a reasonable return upon their investment and will offer inducements for the investment of private capital in public-service corporations to stimulate their growth as the public needs may require. If comprehensive legislation of the character suggested were provided the subject of corporate control would be removed to a greater extent than at present from the field of politics in which it has often exercised a disturbing influence.

I call your attention to the fact that the National Civic Federation, which has given the subject of employers' liability and workmen's compensation thorough investigation and discussion, has framed a bill upon these subjects which is now in print and

available for use in your deliberations. The bill has been recommended for submission to all State legislatures.

GOVERNOR A. O. EBERHART OF MINNESOTA

In regard to taxation of railroads whenever it is ascertained that railroad property, under the present tax rate, is not carrying its just and full share of the State tax burden, the tax should be increased to a basis of equality with other property. With the approval of the auditor and treasurer, I therefore recommend semi-annual payment of railroad taxes as a means of avoiding revenue deficits and the resulting loans and interest charges.

The building of suburban electric lines opens up another field of regulation. These electric railways will soon become active factors in the transportation business, and their operation should, therefore, be subject to the Railroad and Warehouse Commission, similarly with the railroads.

The last Legislature authorized the appointment of a commission to report to this Legislature a workmen's compensation act. This commission has labored diligently and will unquestionably make a thorough and comprehensive report. In accordance therewith, I recommend the enactment of such a law, believing it to be for the best interests of both employees and employers, as well as the State at large.

GOVERNOR R. S. VESSEY OF SOUTH DAKOTA

Your attention is called to the report of the Railroad Commission, from which it is apparent that many complaints from time to time have been adjudicated, and it is evident that the commission, in its wisdom, has accomplished much good. I would recommend that the commission be given more power and believe that through this medium we shall be more quickly relieved from the evils of unjust discrimination which now abound within the State.

GOVERNOR ROBERT P. BASS OF NEW HAMPSHIRE

The platforms of both parties call for the abolition of the present Railroad Commission. The functions of the commission as now constituted are limited in scope. There is a lack of precision in the statutes by which the powers of the board are granted and an absence of proper means to enforce its findings. I recommend that you create a public service commission to take the place of the present Railroad Commission. It should have authority fully to regulate rates, service and capitalization of all public service companies. For this most important and difficult service the highest grade of men should be granted. Appointments should also be made for terms of substantial length, to the end that the commissioners may be removed as far as possible from political influences.

A well-adjusted and equitable workmen's compensation law would, on the one hand, relieve the employer of the expense of fighting all his accident cases and, on the other hand, insure to the employee prompt and reasonable payment without litigation, without delay and without expense. The drafting and enactment of such a law, although difficult, is to my mind of paramount importance to a large percentage of the people of our State. The change which it would bring about would be in line with the progress and the betterment of conditions for which we are all striving.

GOVERNOR PLAISTED OF MAINE

Many of the contests between new companies desiring to do business and old companies occupying in whole or in part the field which attracts the newcomer might be settled outside of the Legislature if we had in Maine a public utilities commission, and I suggest that you consider the advisability of establishing one. The present Railroad Commission could be abolished and its powers conferred upon the new board in addition to such other powers as would be granted it.

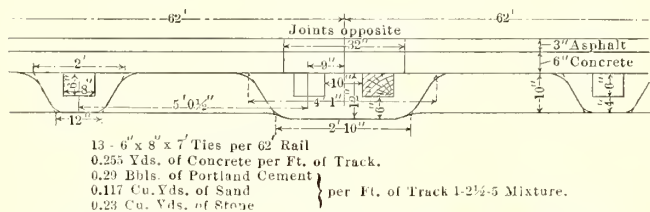
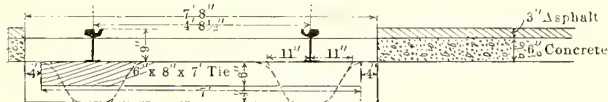
The United Electric Tramway Company, of Montevideo, which was formed and registered as a British company in 1904, now operates 82 miles of lines in Montevideo, with 195 motor passenger cars and 68 trailers. The system adopted is the overhead single trolley, and by the terms of the franchise at least two-thirds of the employees must be citizens of the country.

TRACK CONSTRUCTION STANDARDS IN ATLANTA, GA.

The Georgia Railway & Electric Company operates about 177 miles of track in and about the City of Atlanta. This property is a consolidation of several railways, each of which had different types of track construction. In recent years, however, most of the mileage has been changed over for some one of the four types of standard track construction described in the following paragraphs.

CONSTRUCTION ON PRIVATE RIGHT OF WAY

For construction on private right of way the standard is the A. S. C. E. 70-lb. rail in 33-ft. lengths. The joints are the 26-in. Continuous type drilled 2 in., 4 in. and 5 in. with $\frac{7}{8}$ -in.



Atlanta Track Construction for Asphalt Pavement

Harvey grip bolts. The 12-in. No. 0000 bonds are carried under each joint plate. The rails are laid on 8-ft. white oak ties in 10 in. to 12 in. of broken stone balast. The standard width of fills is 16 ft. and of cuts 28 ft. at the bottom. The passing tracks and turnouts are made with split switches and spring frogs. All curves over 6 deg. have rail braces every fourth tie and are spiraled. All culverts and waterways are of concrete and all bridges are of steel.

CONSTRUCTION ON HIGHWAYS WITH CHERT, MACADAM OR SIMILAR PAVING

The standard construction for highways where the paving is of chert (rock flint), macadam or similar material calls for a T-rail weighing 80 lb. per yard. This rail is 7 in. deep, $2\frac{1}{2}$ in. wide at the head, 6 in. wide at the base and has a web $\frac{7}{16}$ in. thick. The rails are 60 ft. long and are laid on creosoted ties 6 in. x 8 in. x $7\frac{1}{2}$ ft., spaced 2 ft. center to center and tamped up on 6 in. of broken stone. To maintain the gage and laterally brace this high rail a 2-in. x $\frac{3}{8}$ -in. tie rod is installed every $7\frac{1}{2}$ ft. The center of the tie rod is $3\frac{3}{4}$ in. from the base of the rail. The rod is secured on each side of the web by a jamb nut. The joint plates are 27 in. long and $\frac{5}{8}$ in. thick and put on with eight 1-in. bolts. These joints are bonded with two No. 0000 bonds and a No. 0000 cross bond every sixth joint, counting on one side. In 1907 this class of construction cost per mile as follows:

Rails, \$5,304.60; ties, \$1,848; spikes, \$150; bonds, \$135; tie rods, \$245; stone, \$800; joint plates, \$230; labor, \$3,168; a total of \$11,880.60. It will be seen from the foregoing that the cost of construction was \$2.25 per running foot. The labor item does not include any grading except 19 in. of trenching or sub-grading on highways the surface of which had already been graded.

Although the rail for this class of construction is specifically designed for chert and macadam streets, it has been found so nearly ideal that the company endeavors to use it wherever it is possible and expedient to do so. It cannot be used in streets with deep granite blocks or asphalt, but it is used in streets paved with vitrified brick. To secure a passageway for the wheel flanges in vitrified brick construction, the company uses a special brick. This brick has one upper corner beveled off with a reverse curve so that the brick will fit in the head of the rail. The beveled construction forms a flangeway, while the top of the brick comes flush with the top of the rail. These bricks are made in halves and wholes so as to break the joints in the paving, and as they are placed under the head of the

rail it is impossible for them to work up. The bricks are laid on concrete with a sand cushion in accordance with the usual construction for this class of work.

CONSTRUCTION IN STREETS PAVED WITH GRANITE BLOCKS

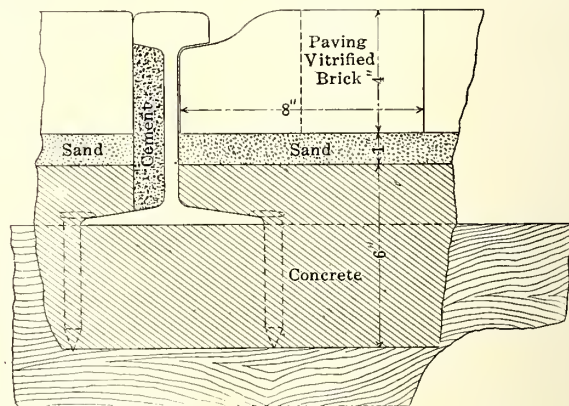
The construction in streets paved with granite blocks differs from that for chert and macadam paving only in the type of rail. By using a rail 9 in. deep there is secured a sand cushion of 2 in. to 3 in. between the ties and the blocks. The rail, which is of the semi-grooved type, weighs 89 lb. per yard. The joint plates are 32 in. long and are put on with 12 in. diameter bolts.

The cost of this type of construction per mile is as follows: Rails, \$5,894; ties, \$1,848; spikes, \$150; tie rods, \$245; joint plates, \$352; bonds, \$140.80; stone, \$800; labor, \$3,696; total, \$13,125.80. This makes the cost \$2.48 per linear foot.

STANDARD CONSTRUCTION IN ASPHALT PAVING

The standard construction in asphalt paving includes the use of 9-in. Trilby rail weighing 109 lb. per yard. The concrete base used under the 3 in. of asphalt is 6 in. deep, making a total depth of 9 in. from the finished surface of the street to the bottom of the concrete, which is just the depth of the rail. The bed is graded for this depth and then treated with a 10-ton roller. A trench 24 in. wide x 10 in. deep is then dug immediately under the position of the rails and running the entire length of the rails. At intervals of 5 ft. cross trenches 22 in. wide x 10 in. deep are dug for the ties. These trenches are 4 in. under the tie when it is in position. An additional excavation of 2 in. is made under the joint ties. These cross trenches are 7 ft. 8 in. long, or 8 in. longer than the tie.

When the trench is completed a 6-in. x 8-in. x 7-ft. creosoted tie is placed under each cross trench and two ties in the joint trench which occurs every 60 ft. The rails are 60 ft. long and are laid on the ties with opposite joints. The rails are bonded with two No. 0000 bonds 8 in. long and then the joint plates are put on. These joints are of the Continuous type 32 in. long and are held by 12 $1\frac{1}{8}$ -in. bolts. The tie rods, 2 in. x $\frac{3}{8}$ in., are installed every 5 ft. half way between each tie. The track is then jacked up and blocked to the proper line and graded by means of oak wedges. Portland cement concrete proportioned 1:2 $\frac{1}{2}$:5 is then placed in and rammed so that its finished sur-



Atlanta City Railway Construction with 7-in. T-Rail and Vitrified Paving Block

face is 3 in. below the top of the rail. This gives a continuous stringer of concrete under the rail 10 in. deep x 24 in. wide and under the ties 4 in. deep x 22 in. wide, all tied into one mass which comes 6 in. over the top of the ties. It will be seen from this that the construction is of such monolithic character that the ties are used more as a matter of convenience in surfacing the line than for anything else. This rigid and durable construction costs about \$3.88 per linear foot of single track or \$7.76 per foot of street. These figures do not include the cost of replacing the asphalt, which in one instance amounted to \$1.53 per linear foot of street.

MISCELLANEOUS TRACK FEATURES

All curves installed in Atlanta, some of which have a center radius of 35 ft., are spiraled on each end. All frogs and cross-

ings are made with hardened steel centers. The standard rail for curves weighs 117 lb. per yard and the guard is rolled solid with the rail.

One of the most interesting features of the company's track work is the extensive use of creosoted ties. The first ties creosoted by the company were laid down in 1895. Original ties which have been taken up on account of changes to heavier track construction have been found to be apparently as sound as the day they were put in. The great saving is not so much in the cost of the ties themselves but in not having to tear up the streets for tie renewals. In Atlanta the best oak tie would not give more than seven years' life, while 21 years' life can be expected from creosoted ties. A comparison of cost would work out something like the following: Initial cost of treated ties, 80 cents; untreated ties at 40 cents each, renewed every seven years, \$1.20, plus 50 cents per foot of track for labor to tear out the paving and renew the ties every seven years. This, with ties placed 2 ft. centers, would make each tie cost, at \$1 for labor, \$2 for the two renewals in 21 years. The added cost of the ties themselves makes a total of \$3.20 per tie for untreated oak for 21 years against 80 cents for the creosoted ties. Of course, the initial capital invested in the creosoted tie is twice that for the oak tie, but even if this is taken into account, with interest at 6 per cent compounded for seven years, the creosoted ties would not cost more than \$1 for 21 years' use. A great deal of the Atlanta tracks is cast-welded, but in the last eight years the company has done very little work along this line.

Acknowledgments are due to W. H. Glenn, secretary and manager of railways, of the Georgia Railway & Electric Company, for the material upon which this article is based.

THE MEN TO EMPLOY FOR INTERURBAN SERVICE AND THEIR TRAINING

BY A MANAGER

I find it a difficult task to comply with your request to write you on the subject of what men to employ and how to train them. Personally, I do not believe it to be a matter where any hard and fast rules would apply. If it were possible always to secure competent, reliable, experienced and tried men of good record, it would not be necessary to discuss the question. Such men are always preferable, especially if they have been employed in interurban service, but such men are seldom out of employment. If men are taken from any other system, a very careful investigation must be made, for other systems may not exercise the care that should be taken in employing men for this work. They must be especially fitted for it, if they are to make desirable men. If they had been compelled to leave the service of another company, there must be some objection to them; they must have some faults that would render them wholly unfit. Men will seldom leave the service of a company after having been in its employ for any considerable length of time, since the standing they have is a valuable asset; so I conclude that an experienced man seeking employment is out of a position for cause, and when such is the case the facts are hard to obtain. There are exceptions, but I hold that this will be the case as a rule and the exceptions will not be material; and since it is impossible to secure the experienced man, I shall consider only the employment of the inexperienced man.

This work should be done in a thorough, systematic manner by one person on each system, and he should be a good judge of human nature. He should be experienced in train operation and conversant with all the duties that the employee selected will have to perform.

The applicant should have a clean record, whatever his vocation may have been. He must be honest, since he will possibly have to handle the company's money, honest in his intentions in executing every duty; truthful—that all his statements may be relied upon; temperate—that he may be de-

pended upon to have a clear head at all times and to operate his train properly and understand all the instructions given him; intelligent—that he may be able to exercise his best judgment under all circumstances and in case of doubt to take the safe side. If he does not have a full appreciation of the duties that rest upon him he can hardly be expected to discharge them fully, and, failing to realize the importance of literal compliance with all of his instructions, he will not only be lax as to details, but negligent in some cases in important matters. He must be in good physical condition; if he is not he will fail at inopportune times and be unreliable, causing many changes on short notice, which will often place his superiors in an embarrassing position and possibly cause him to be suddenly incapacitated. He must be gentlemanly in his deportment, for, coming continually in contact as he does with the public and those representing the company, it is important that he be courteous and civil always. It is needless for me to add that his eyesight must be good, but I want to emphasize the importance of having acute hearing, since all instructions, particularly in relation to train movement, are given over the telephone. It is necessary that he understand correctly and, since at times the telephones do not work in the most satisfactory manner, it is important that his hearing be good.

Having secured such a man, we must assume that he has no knowledge of the work before him, and, as men are creatures of habit, care must be exercised that he is not spoiled in his training. In order to avoid this he should be placed with the most reliable men in the employ of the company.

Having served his apprenticeship satisfactorily, the employee should be required to pass a creditable examination on the rules and be instructed in regard to the time card. He must be impressed with the fact that he must consult the time card in regard to meeting points and that he is not expected to commit it to memory, but must refer to it often enough to be assured that he is running on the correct time and particularly not ahead of time. He must be instructed properly in regard to his acts in case of accident and his duty toward the public. In addition to any printed rules or instructions, lessons on these subjects should be given, as they will make a stronger impression if given by the proper person and in the right manner. If the applicant is to be a motorman, he should serve a time in the shop under a competent instructor; if a conductor, in addition to such instruction as he receives while substituting, he should be instructed in regard to accident reports by the claim agent and as to tickets and other reports by the auditor or an assistant, and if reports indicate that the man does not quite understand his work lessons should be given from time to time until the results are satisfactory.

We will assume that the employee is now fully equipped for the position he is to fill, except as to experience, and we have reached a period that is of still greater importance, since he is now subject to discipline. To exercise discipline properly one must be very careful, using his best judgment, remembering that the man is yet a novice and that there are various degrees and kinds of offenses, and that there are errors voluntary and involuntary; also wilful disobedience and various degrees of punishment; and, while we are considering these matters with a view to securing safety, the commercial side must not be overlooked. Nor must we forget that heretofore the employee, having been a student, has always been directed and possibly never asserted himself. His characteristics will now begin to appear, and, as they present themselves from time to time, you will be better enabled to judge the man. He should now be observed closely for the next three to six months, for by such observation serious faults may be discovered that should be corrected, if possible, and it may be that up to this time one has been mistaken in the man.

Human nature is peculiar and shows itself in many ways; sometimes it is indifference caused by lack of energy, possibly a vicious vein that has been latent. After a sufficient period and a thorough schooling, careful watching, competent coaching and sufficient time given and experience had, faults may be corrected, and yet you have but a human being subject to

"This coupon will be redeemed for two (2) cents by a conductor of the Fifty-ninth Street crosstown line of the Central Park, North & East River Railroad Company, if coupon 1 is attached hereto and both coupons are presented at point of intersection specified on coupon 1 before time canceled. It will not be redeemed if coupon 1 is detached.

"If detached from coupon 1 this coupon will be valid for a continuous trip on a southbound car of any one of the following Metropolitan lines if presented at point indicated before time

[illegible]

Joint Rate Transfer Ticket Issued on the Fifty-ninth Street
Crosstown Line

canceled: At Fifty-ninth Street and Lexington Avenue south on Lexington Avenue cars; at Fifty-ninth Street and Sixth Avenue south on Sixth Avenue cars; at Fifty-ninth Street and Seventh Avenue south on Seventh Avenue or Broadway cars; at Fifty-ninth Street and Eighth Avenue south on Eighth Avenue cars; at Fifty-ninth Street and Columbus Avenue south on Columbus Avenue or Amsterdam Avenue cars.

"If passenger desires to use this coupon on Ninth Avenue line he will so advise conductor of southbound Broadway-Columbus, Broadway-Amsterdam or Sixth and Amsterdam Avenue car at time of presenting coupon at Fifty-ninth Street

1200-VOLT EQUIPMENT FOR THE FORT DODGE, DES MOINES & SOUTHERN RAILROAD

A short note was published on page 1192 of the *ELECTRIC RAILWAY JOURNAL* for Dec. 17 saying that the engineers of the Fort Dodge, Des Moines & Southern Railroad were making studies of the possibility of the electrification of the road with 1200-volt equipment. The announcement was made this week that this order had been placed with the General Electric Company. The line is now equipped with 600 volts for the operation of passenger trains of the company and for part of the freight service. The longer freight trains are hauled with steam locomotives. Under the new plan all the business will be done electrically.

The contract includes the changing of over 70 miles of track from 600 to 1200 volts and the installation of a new substation, which will be equipped with one 300-kw, 1200-volt rotary. There will also be a change in the existing substations, which will be consolidated into two. Each of these substations will be equipped with two 400-kw, 600-volt rotaries. In these substations two rotaries will be operated in series. The new rolling stock equipment will consist of six 1200-volt, four-motor equipments with the GE-205 motors; one two-motor equipment with GE-217 motors for a work car; two new 1200-volt, 40-ton locomotives with four GE-206 motors, and two similar motor equipments to be installed on the present 600-volt locomotives of the company. Homer Loring, of Boston, is the receiver for the company.

REDUCTION OF CAR FAILURES IN RICHMOND

In an article entitled "Shop Records in Richmond, Va.," published on pages 988 and 989 of the *ELECTRIC RAILWAY JOURNAL* of Nov. 12, 1910, a description was presented of some of the various forms used by the Virginia Railway & Power Company. In addition to the blanks shown in that article it may be interesting to present the accompanying cut, which is a reproduction of part of the monthly car failure statement for December, 1908 and 1909. At the end of the former year the company

[illegible]

Comparative Car Failure Record, Virginia Railway & Power Company

and Columbus Avenue. Conductor will then punch in space indicated and return to passenger. Coupon so punched will be received in payment of fare on southbound Ninth Avenue cars at Fifty-third Street and Ninth Avenue.

"In consideration of the reduced rate at which joint rate tickets are sold, the privilege is limited to a single ride for this coupon, except as provided in preceding paragraph.

"Adrian H. Joline, Douglas Robinson, receivers,

"Metropolitan Street Railway Company."

had been inspecting its cars on a mileage basis for not more than nine months, but by the following December the benefits from continued mileage inspection had proved so successful that the reliability of service was increased from 1636 to 2887 car-miles per failure. It will be observed from the headings of the accompanying report that they cover a great many minor items. It is the practice to list as a "car failure" any trouble which requires attention in the shop, regardless of whether or not it is serious enough to cause the pulling in of the car.

INTERBOROUGH RAILS FOR TANGENTS AND CURVES

The Interborough Rapid Transit Company, New York, has recently modified its specifications for open-hearth steel rails for service on tangents, by raising the minimum carbon content from 0.70 per cent to 0.75 per cent and the maximum carbon content from 0.85 per cent to 0.90 per cent. It also has been determined to use a manganese steel rail for curves. The following paragraphs cover the principal points of both specifications drawn up by George H. Pegram, chief engineer Interborough Rapid Transit Company.

SPECIFICATIONS FOR STEEL RAILS FOR CURVES

1. The steel for the rails shall have the following chemical composition, to be determined by chemical tests of each melt:

Carbon.....	Not less than 1.00 per cent
Manganese.....	11 to 14 per cent
Phosphorus.....	Not over 0.10 per cent

2. Sufficient metal shall be sheared from the tops of ingots to insure sound steel in the finished rails.

3. The number of the melt and the place and year of manufacture shall be marked in plain raised letters on the side of the web of each rail.

4. The rails shall be of the 100-lb. Interborough Rapid Transit Company's section, shown on drawing No. 9702 (not reproduced).

The section of rails rolled shall correspond as closely as possible with the standard drawings furnished by the Interborough Rapid Transit Company, and any excess of weight, due to variation from the standard section, shall not exceed 1 per cent.

5. An allowance in height of $1/64$ in. under and $1/32$ in. over, and in width $1/16$ in., is permitted and perfect fit of the splice bars shall be maintained.

6. The circular holes, $1 1/16$ in. diameter, shall be punched through the web of the rails at each end for the splice bar connections, and, in addition thereto, one-half of the total number of rails shall have circular holes $1 1/16$ in. in diameter punched through the web beginning 1 ft. 6 in. from the end of the rail and spaced 3 ft. apart for use in bolting the check rail on the inner side of curves.

In addition thereto, four circular holes, $9/32$ in. in diameter and $1 1/2$ in. apart and $13 3/4$ in. from the end of the rail to the first hole, shall be drilled through the web at each end of all rails. The punching and drilling above explained is shown on drawing No. 9702 (not reproduced).

7. The rails shall be sawed off square to their longitudinal axes, and the lengths of the rails at 60 deg. Fahr. shall be kept within $1/4$ in. of the standard lengths of 33 ft. Ten per cent of the entire order will be accepted in shorter lengths varying by even feet down to 24 ft.

8. The rails are to be straightened cold, to be smooth on the head, sawed square at the ends, and shall have the burrs occasioned by cutting and punching removed before shipment, and the rail shall be free from all injurious defects. The ends of short-length rails to be painted green before shipment.

9. An inspector will be detailed by the company to examine the material and workmanship. The contractor will supply him with facilities free of charge for testing the material and examining the workmanship as per these specifications.

SPECIFICATIONS FOR STEEL RAILS

1. The steel used for the rails shall be made by the open-hearth process, and have the following chemical composition, to be determined by chemical tests of each melt:

Carbon, 0.75 to 0.90 per cent; average not less than 0.80 per cent.

Manganese, 0.60 to 0.90 per cent.

Silicon, not over 0.20 per cent.

Phosphorus, not over 0.04 per cent.

Paragraphs 2 and 3 are similar to those for curved rails.

4. From each melt of steel a test specimen taken from the top end of top rail rolled from ingot shall be tested under a drop weight of 2000 lb. falling 16 ft. upon the center of test

piece resting on supports 3 ft. apart. The permanent set after the blow shall be noted, and together with the chemical test shall form the record of each melt to be kept by the inspector.

5. If the test piece breaks under the first blow of the drop test, the melt shall be rejected unless two additional specimens of metal from the top of the ingot are tested and both withstand the test, in which case the melt may be accepted.

6. After the test specimen has been given one blow under the drop test, it shall be nicked and broken, and if the fracture indicates piping, the top rail from each ingot of the melt represented by the test shall be rejected, unless two additional specimens from the tops of the ingots withstand the test, in which case the top rails shall be accepted.

7. If during the process of straightening a rail shall crack, it shall be taken as a sign that the steel is too hard, and the whole melt shall be rejected unless repeated tests of crop ends of the heat establish the fact that the cracking was accidental.

8. The sections of the rails rolled shall correspond as closely as practicable with the standard drawings furnished by the Interborough Rapid Transit Company, and any excess of weight due to variations from the standard section shall not exceed 1 per cent.

9. An allowance in height of $1/64$ in. under and $1/32$ in. over, and in width $1/16$ in. shall be permitted, and perfect fit of the splice bars shall be maintained.

10. Six circular holes of $1 1/16$ in. diameter shall be drilled through the web of the 90-lb. section, as shown on drawing No. 4797 (not reproduced).

11. The rails of 90-lb. section shall be sawed off square to their longitudinal axes, and the lengths of the rails at 60 deg. Fahr. shall be kept within $3/8$ in. of the standard lengths, which shall be 30 ft., 27 ft. and 24 ft., and not more than 10 per cent of the rails of the two shorter lengths shall be received.

12. The end of all short-length rails shall be painted green.

13. Four circular holes of $1 1/16$ in. diameter shall be drilled through the web of the 90-lb. section, as shown on drawing No. 8761 (not reproduced).

14. The rails of 100-lb. section shall be sawed off square to their longitudinal axes, and the lengths of the rails at 60 deg. Fahr. shall be kept within $3/8$ in. of the standard lengths, which shall be 33 ft., 32 ft., 31 ft., 30 ft., 29 ft., 28 ft., 27 ft., 26 ft., 25 ft. and 24 ft., and not more than 10 per cent of the rails of the nine shorter lengths will be received.

15. The rough edges produced by the saw at the rail ends shall be well trimmed off and filed.

16. The rails shall be perfectly straightened, and the skin or surface smooth and free from flaws or cracks.

17. Inspection clause as in curved rail specification.

MEETING OF THE INTERURBAN RULES COMMITTEE

The first meeting of the interurban rules committee of the Transportation & Traffic Association will be held in New York, Wednesday, Jan. 25, at the headquarters of the American Electric Railway Association, 29 West Thirty-ninth Street.

The committee is now complete and consists of the following gentlemen:

J. W. Brown, superintendent of transportation Aurora, Elgin & Chicago Railroad, Wheaton, Ill., chairman.

F. A. Boutelle, superintendent Tacoma Railway, Tacoma, Wash.

W. R. W. Griffin, general manager Steubenville & East Liverpool Traction & Light Company, East Liverpool, Ohio.

C. F. Handshy, general superintendent Illinois Traction System, Springfield, Ill.

A. S. Shane, general manager Indianapolis, Columbus & Southern Traction Company, Indianapolis, Ind.

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

F. M. Durbin, assistant operating manager J. G. White & Company, New York.

INTEGRAL OIL CUPS IN BROOKLYN

The Brooklyn Rapid Transit Company still uses a large number of motors which originally were made for grease lubrication. The attempt to use oil cups in these motors has not been entirely successful, as the grease cavities in the frames

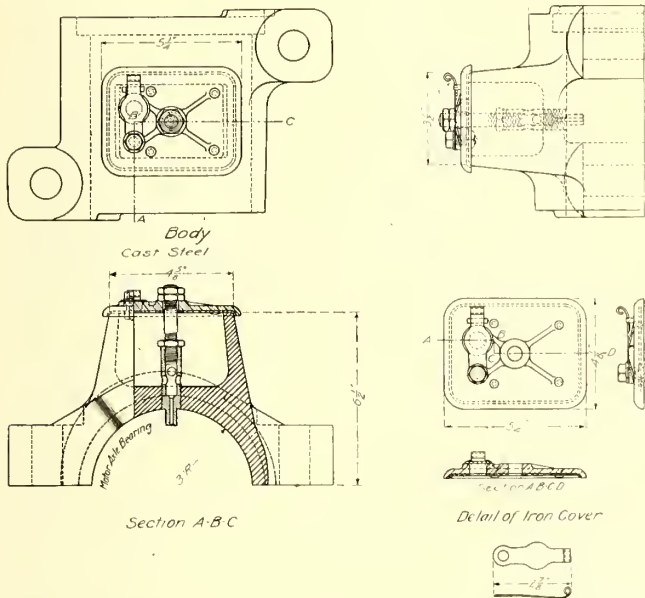


Fig. 1—Oil Cup for Axle Cap, Commutator End, Westinghouse No. 81 Motor

were too irregular to allow a tight fit. Hence many cups were lost by being thrown out of the frame when the trucks passed over special work or rough spots in the line. Another difficulty

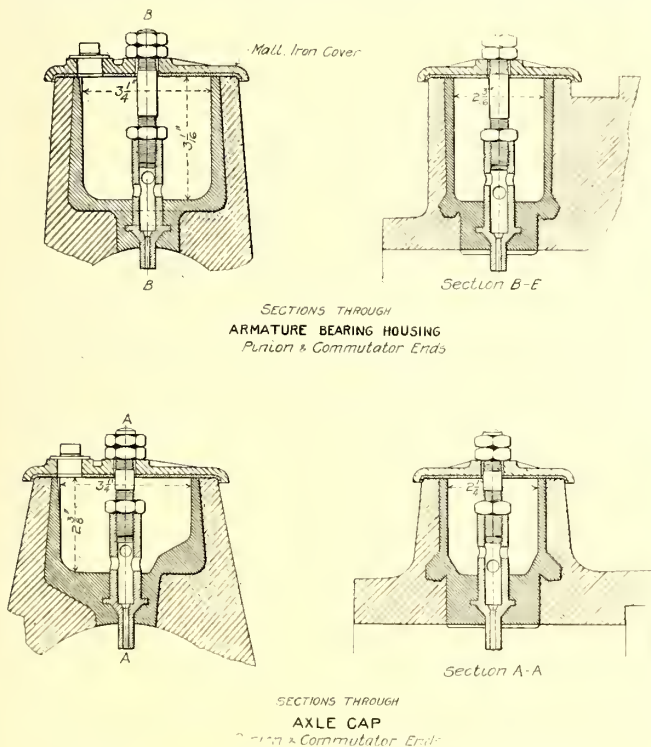


Fig. 2—Babbitted Oil Cups for No. 81 Motor

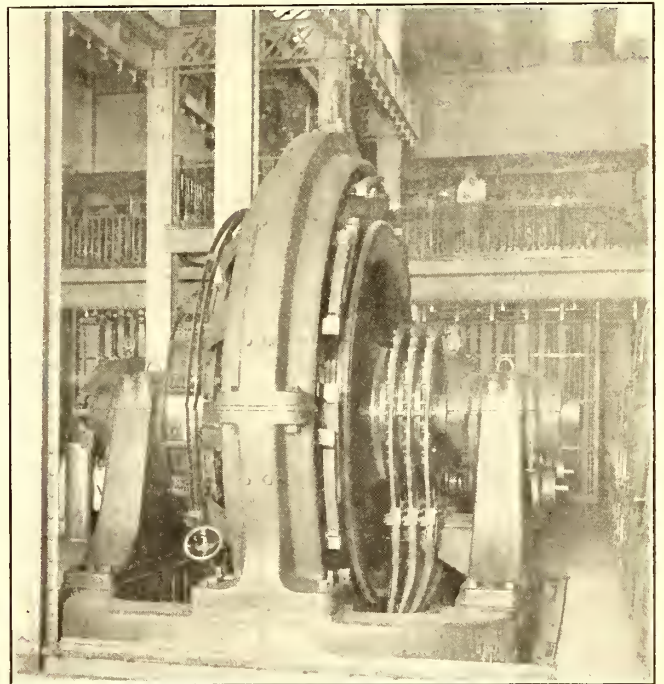
with the cups was the fact that they had a needle valve to control the feed. Frequently these valves would stick and thereby cause the loss of armatures. To overcome these troubles the mechanical department of this company has adopted an oil receptacle which is a part of the motor frame. It is made in two forms as shown in the accompanying drawings. Fig. 1

shows the construction when the oiling method is embodied in a new axle cap casting, while Fig. 2 shows how armature bearing and axle castings can be turned into oiling cups by babbitting. In both patterns the oil is fed through a wick-filled spindle. The covers of all boxes are also similar, being made of malleable iron with a leather gasket to insure the exclusion of dust when the jam nut is tightened. The receptacles are filled with oil after raising a 1-in. flat spring in the cover. These oil boxes will replace the independent oil cups in use on the G. E. 57, G. E. 64, Westinghouse 68 and Westinghouse 81 motors operated under the surface passenger cars.

A 3000-KW ROTARY CONVERTER

Late in 1909 the Interborough Rapid Transit Company, New York, found that the load on its system was rapidly outgrowing the capacity of its substation equipment. Excessive overhead charges made it imperative that the maximum possible output per square foot of floor space be obtained from the substations already erected. It was finally decided to secure bids, on the basis of maximum output per unit of floor area, on two rotary converters to replace two 1500-kw machines in substation No. 14, the load having increased beyond their capacity for economic operation. The 1500-kw machines were subsequently transferred to other substations which were in need of additional capacity.

The contract for two 3000-kw rotary converters was awarded to the Westinghouse Electric & Manufacturing Company. With the same available floor space the normal capacity of the old substations was doubled. It is interesting to note that the horizontal construction was chosen in preference to the ver-



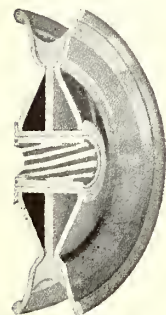
3000-kw Rotary Converter in New York

tical. The result of competitive design clearly showed that no material saving could be effected by the vertical arrangement; in fact, on the basis of kilowatts per square foot of floor space occupied, the capacity of the horizontal units selected exceeded by more than 20 per cent the capacity of machines of the vertical type.

The new rotaries, which have by far the largest capacity of any built up to the present time, are designed for six-phase operation on a 25-cycle a.c., 600-volt d.c. system, and are rated 3000 kw each at 187½ r.p.m. The first was installed in November, 1909, and the second one month later. Both have been in continuous service ever since. The weight of each of these rotary converters is 150,000 lb.

"IDEAL" TROLLEY WHEEL

A new type of the "Ideal" trolley wheel has recently been put on the market by the Lumen Bearing Company, Buffalo, N. Y. It is made in the 4½-in. size for city service and the 6-in. for high-speed interurban service. The construction of the wheel, as will be noticed by the cut, tends to keep it perfectly balanced. The side flanges are of stamped soft steel and the contact ring and hub are in one piece. In this way, it is claimed, the electrical resistance and the weight of the wheel are kept low, while the life of the wheel is increased.



"Ideal" Wheel

The wheel is fitted with a graphite bushing in which the slots for the graphite are wedge shaped. This gives a more secure seat for the graphite and reduces the chances of sand or grit getting into the bearing.

The R. D. Nuttall Company, Pittsburgh, is the exclusive agent of the Lumen Bearing Company for the sale of this wheel.

SELECTOR SIGNALS FOR THE INDIANAPOLIS & CINCINNATI TRACTION COMPANY

The Indianapolis & Cincinnati Traction Company, C. L. Henry, president, has arranged with the United States Electric Company and the Hall Signal Company to make a trial installation of selector signals on the Indianapolis & Cincinnati Traction Company's single-phase road. The lines of this company extend from Indianapolis east through Rushville to Connersville and southeast through Shelbyville to Greensburg. The new installation will include four agents' call bells and two semaphores, all arranged for direct control by the dispatcher through the medium of Gill selectors connected to the present telephone circuit. The dispatcher for both divisions of this road is located at the junction of the two lines just east of Indianapolis. Semaphore installations will be made at Greensburg and Connersville, the eastern extremities of the two branches. The ringing sets will be installed in the depots at these two termini and at Shelbyville and Rushville.

The railroad company has two telephone circuits, one for train operation and one for business use. The selector sets will be connected to the business circuit. As stated, selectors in the four most important offices on this road will be arranged to operate bells for calling the agent to the telephones. Two other selectors will serve to operate the electric slots of semaphores, furnished by the Hall Signal Company. These will be placed at sidings and serve to block trains when the dispatcher wishes to have the crews call him on the telephone. The purpose of the present limited installation is to determine the applicability of the apparatus to conditions surrounding high-voltage single-phase train operation.

The official tramway traffic returns of 64 of the principal undertakings of the United Kingdom for the week ending Dec. 17, 1910, amounted to £200,220, or £16,510 more than for the corresponding week of 1909, while the track mileage was 2505, or 191 more than for the corresponding week. The receipts were at the rate of £79 18s. 7d. per track mile, an increase of 10s. 9d. per mile as compared with the year 1909. The receipts from the London County Council and Liverpool Corporation tramways, which are included in the above statistics, are for a preceding week, as these two corporations issue their returns later than the others.

TAP COVER AND STUD

The insulated tap cover shown in the accompanying cut is manufactured by Dossert & Company, New York, for use in place of the taped joint commonly employed. It can be put on or taken off in less than a minute, and may be used on cables ranging in size from No. 6 to 300,000 circ. mil. It is said to be especially adapted to switchboard work, as it makes a better insulated joint than tape. It is smoother and offers less opportunity for collection of dust and dirt. The upper cut, showing the stud connector, Style F, is used to connect a wire or a cable to a stud



Stud



Tap Cover

or threaded rod. It consists of a nipple, one end of which is equipped with a regular tapered nut and compression sleeve to take a certain size wire, while the other end is tapped and threaded to receive the stud.

SINGLE-TRUCK PREPAYMENT CARS FOR NEW ORLEANS

The St. Louis Car Company has just completed 50 single-truck cars for the New Orleans Railway & Light Company. These cars have round-end vestibules, monitor deck roof with detachable hoods, straight side paneling, and are arranged for double-end operation and prepayment fare collection.

The car body is 22 ft. 1 in. over the corner posts, and 32 ft. 8 in. over the buffers. It is 8 ft. 4 in. wide over all and 8 ft. 2½ in. wide over the side posts.

The bottom construction is the car builder's Robertson steel channel design. The side sills consist of two 6-in. channels placed back to back with wrought-iron spaces between to receive the posts. The subsills consist of angle iron riveted



Single-Truck Cars for New Orleans

together and bolted to all cross and end sills. The end sills and cross timbers are all of white oak. The cross timbers are securely fastened to the channel sills with ⅝-in. corner irons bolted through to the outside channels. The draft timbers are of white oak. The outside draft timbers are reinforced with 6-in. x ½-in. iron plate. The flooring is of 13-16-in. yellow pine. Maple strip floor mats are used.

The body framing is of the straight panel type for 10 windows on each side and two at each end. The doors in the bulkheads are of the double sliding type. The interior finish, including all doors, end and side linings, is of mahogany. The cars are equipped with the car builder's latest walk-over seats with corner grip handle. The trimmings throughout are nickel plated and are of the car builder's patterns.

The cars are further equipped with the St. Louis Car Company's standard 14-in. brake handle and drawbars.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Missouri.—Eminent Domain—Condemnation for Railroads—Prerequisites to Right—Right to Question.

A railway company organized under Rev. St. 1899, chap. 12, art. 2 (Ann. St. 1906, p. 804), derives from the State authority to condemn lands for railroad purposes, and not from a city or other municipality in which it may desire to enter, and it need not first procure consent of a municipality to use its streets as a prerequisite to its legal right to condemn private property for such purposes.

The power of a regularly organized and chartered railroad company chartered to construct and operate a railroad for public use in the conveyance of persons or property to run freight trains over its track cannot be questioned in a condemnation proceeding. (State ex rel. Greffet et al. v. Williams, Judge, et al., 127 S. W. Rep., 52.)

Missouri.—Eminent Domain—Taking of Property—Easements—Instructions.

The owner of real estate abutting on a public street has an easement therein of light, air and access, which is property, of which he cannot be deprived without compensation.

When an elevated street railroad, constructed and operated on permanent structures along a public street pursuant to permission from the city, deprived an abutting owner of his easement in the street of light, air and access, he could recover the damages sustained.

In an action for damages caused by the construction and operation of an elevated street railroad, an instruction that the measure of damages was the difference between the market value of the property immediately before the "construction, maintenance and operation" of the road and immediately after was not in conflict with an instruction that if the market value of the property immediately after the "building and operation" of the road was equal to or greater than it was immediately before there could be no recovery, and that the burden rested on the abutting owner to prove that he had been damaged by reason of the "construction" of the road, since they fixed the measure of damages at the difference, if any, between the market value of the property immediately before and immediately after the construction and operation of the road, as the omission of the word "maintenance" in the second instructions could not have misled the jury. (Rourke et al. v. Holmes St. Ry. Co. et al., 119 S. W. Rep., 1094.)

New York.—Eminent Domain—Action for Compensation—Judgment—Award of Damages.

In an action by an abutting owner for damages caused by the construction and operation of a street railroad, defendants are entitled to have the judgment against them distinguish between the rental and fee damages, and it was reversible error to render a judgment awarding a single sum for both. (Duncan v. Nassau Electric R. Co., 91 N. E. Rep., 787.)

New York.—Eminent Domain—Compensation—Additional Servitude.

Where an abutter does not own the fee in the street, damages from the construction of a street railroad may be restricted to injury to light, air and access, his only easements; but if he owns the fee subject to the public easement he may recover additional damages which proper operation of the road entails. (Rasch v. Nassau Electric R. Co. et al., 91 N. E. Rep., 785.)

New York.—Judgment—Conclusiveness—Parties.

That a village intervened after judgment in foreclosure proceedings against a street railroad company as a creditor at the foot of the judgment to establish claims against the property in the hands of the railroad company's receiver did not render the judgment conclusive as against the village in so far as it authorized the purchaser to reject any contracts, franchises, rights, etc., purchased at the sale which it did not desire to assume on its assigning the same to the receiver. (Knickerbocker Trust Co. v. Tarrytown, W. P. & M. Ry. Co. et al., 123 N. Y. Sup., 954.)

New York.—Foreclosure of Mortgages—Debts Entitled to Priority.

The surety on an appeal bond given by a street railroad

company on appeal from a judgment recovered by the city of New York for car license fees, which has paid the judgment and taken an assignment thereof, is subrogated only to the rights given by the judgment; and, there being no statute giving such judgment any lien or preference, it is not entitled to priority of payment over a prior mortgage on a sale of the company's property in foreclosure proceedings. (Central Trust Co. of New York v. Third Ave. R. Co. et al., 180 Federal Rep., 710.)

New York.—Foreclosure of Mortgages—Receivership—Improvement of Property.

A court of equity which through its receivers is operating an extensive system of street railroads pending the foreclosure of mortgages and liens on its various parts has power in its discretion to authorize the expenditure of money by the receivers in the completion of car houses, which are being rebuilt or enlarged on certain of the lines, where in its judgment such expenditure is necessary to meet the requirements of the system and render adequate service to the public, leaving the question of the distribution of the expense as between the different mortgagees to be determined on a final accounting. (Pennsylvania Steel Co. et al. v. New York City Ry. Co. et al., 180 Federal Rep., 704.)

New York.—Rights in Streets.

The rights of an electric railway company in a highway are subject to the right of the public authorities to improve the highway as the public interest requires, and to the liability of being required to change its location, grade, etc., to conform to the requirements of such public improvements, at its own expense, without recourse against those lawfully engaged in improving the highway for any damage that might be done to the railroad property, when no reckless or negligent act causes any damage; and where proceedings authorizing the improvement of a highway as a state road were regularly had, an electric railway company occupying the highway could not recover for damages resulting from the careful construction of the road. (Malone, Ft. C. & H. P. Ry. Co. v. Spuyten Duyvil Const. Co. et al., 121 N. Y. Sup., 656.)

New York.—Nuisance—Injunction—Partial Defense.

Where there is a technical nuisance, if plaintiff's damage is small, or only occasional, or easily compensated for in money, and injunctive interference with defendant would work great public mischief and inconvenience, equity will seek to protect plaintiff's right by other means.

In a suit to restrain a nuisance, consisting of defendant's maintenance of an electric power plant in the vicinity of plaintiff's residence, a partial separate defense, alleging that defendant's business was maintained to supply electricity to operate the various trolley and elevated railroads in the borough of Brooklyn, that defendant had complied with all the municipal ordinances, used the best appliances and materials, and exercised great care, and could not carry on its business in any other manner, was not demurrable. (Raymond v. Transit Development Co., 119 N. Y. Sup., 655.)

Oklahoma.—Municipal Corporations—Grant of Right to Use Street—Exclusive Grant.

An ordinance of a municipal corporation granting to a corporation authority to use the streets, alleys and public grounds of a city for the purpose of constructing and operating an electric light and power plant to furnish light and power to a city and its inhabitants confers privileges which are exclusive in their nature against all persons upon whom similar rights have not been conferred; and any person or corporation attempting to exercise such right, without legislative authority or sanction, invades the private property rights of the corporation to whom such franchise has been granted, and may be restrained at the instance of the owner of the franchise. (Bartlesville Electric Light & Power Co. v. Bartlesville Interurban Ry. Co., 109 Pac. Rep., 228.)

Pennsylvania.—Rights in Streets—Right to Cross—Corporations—Implied Powers.

That a city does not properly maintain a street for public use does not affect its right to prevent a railroad company from occupying the street.

A railroad company to cross a city street without municipal consent must possess such charter power, though it owns the land on both sides of the street.

That a lessee railroad company under its charter has power to cross city streets without municipal consent would not authorize it to extend a leased road over a street without such consent where the charter of the leased road requires such consent.

The doctrine of implied power of corporations will not be extended to permit that to be done by a corporation which the Legislature has previously said shall not be done, even if without such implied power the grant of some particular franchise would be valueless. (*Pittsburgh Rys. Co. v. City of Pittsburgh*, 75 Alt. Rep., 681.)

Pennsylvania.—Municipal Corporations—Taxation—Liability of Property—Public or Quasi Public Corporations.

The real estate of a public or quasi public corporation essential to the exercise of its corporate franchises is not subject to taxation for local purposes, in the absence of legislative authority imposing such taxes. (*Federal St. & P. V. Pass. Ry. Co. et al. v. City of Pittsburgh et al.*, 75 Atl. Rep., 662.)

South Carolina.—Baggage—Refusal to Transport.

If a street car company waived its rule prohibiting passengers from bringing large and unwieldy articles into the car by permitting a passenger to bring a graphophone horn into the car with him, it will be liable to punitive damages for afterward refusing to allow plaintiff to become a passenger with a graphophone horn. (*Vlasservitch v. Augusta & A. Ry. Co.*, 67 S. E. Rep., 306.)

Texas.—Stopping of Cars to Permit Passengers to Alight—Ordinances.

Under an ordinance requiring a street railroad to stop at street crossings where passengers request it, where the conductor received the fare and was then informed that the passenger wanted to alight at a particular street, he must stop the car there to permit the passenger to alight. (*Texas Traction Co. v. Hanson*, 124 S. W. Rep., 494.)

Vermont.—Carriers—Rebates—Intrastate Shipment.

A contract between the receiver of a railroad company and a shipper for payment of a rebate on an intrastate shipment is not illegal. (*Bibber-White Co. v. White River Valley Electric Ry. Co.*, 175 Federal Rep., 470.)

West Virginia.—Crossing with Other Roads—Suit to Determine—Parties.

In a suit pursuant to Code 1906, c. 52, sect. 11, for decree fixing the crossing of one railroad by another, the holders of the mortgage bonds of the defendant railroad are not necessary parties when the trustees in the mortgage are made parties.

An electric railroad may be decreed the right to cross a steam railroad. The physical character of the railroad seeking the crossing, or that of the railroad proposed to be crossed, has nothing to do with the applicability of the statute.

Grade crossings are not prohibited but are authorized by the law of this State. Where the facts warrant a crossing at grade, its construction and operation may be decreed. (*Tri-State Traction Co. v. Pittsburgh, W. & K. R. Co. et al.*, 68 S. E. Rep., 25.)

Wisconsin.—Right to Street—Injunction—Alternative Legal Relief.

The operation of interurban cars being unlawful, both as against the adjoining landowners, being an additional burden on the public easement in the street, and as against the public, the company's charter not authorizing such operation, a court of equity could not, in consideration of money paid to the adjoining owners in satisfaction of their private wrongs, refuse to enjoin the company's unlawful act, though the adjoining owners' property be of insignificant value to them as compared with the advantages that would accrue to the company from the use of the street. (*Schuster et al. v. Milwaukee Electric Ry. & Light Co. et al.*, 126 N. W. Rep., 26.)

LIABILITY FOR NEGLIGENCE

Delaware.—Street Railroads—Collision of Car and Team—Due Care—Concurrent Negligence.

The proper care required to be exercised both by the motorman of a street car and the driver of a team in approaching a crossing, to avoid a collision, depends on the facts and circumstances of each case.

Where, in case of the collision of a street car and team, both the motorman and the driver were negligent, there can be no recovery for injury to the team and driver, unless, after the driver got in the place of danger, the motorman saw, or by the exercise of reasonable care could have seen, him in time to avoid the accident. (*Clay v. People's Ry. Co.*, 76 Atl. Rep., 319.)

Illinois.—Injury to Person on Track—Care Required.

Where decedent was killed after alighting from a car, by a car passing in the opposite direction as he was going around the end of the car from which he alighted, he was only bound to the exercise of reasonable care under all the circumstances, and was not bound "to ascertain" whether there was a car approaching on the other track from the opposite direction. (*Stack v. East St. Louis & S. Ry. Co.*, 92 N. E. Rep., 241.)

Indiana.—Street Railroads—Crossing Accident—Care Required.

The driver of an interurban electric car over a city street crossing is bound to have his car under control to avoid collision with other travelers on the streets, so that, while the operation of a train on a steam railroad over a country crossing at from 30 to 60 miles an hour may not be negligent, the operation of an electric car over a street crossing at anything like such rate of speed would constitute gross negligence. (*Union Traction Co. v. Howard* (No. 6324), 86 N. E. Rep., 967.)

Indiana.—Street Railroads—Injuries to Travelers—Frightening Horses—Negligence—Imputed Negligence.

Where plaintiff when she was injured was riding with her son, 20 years of age, able to manage horses under any ordinary circumstances, and, when the team was frightened by the approach of defendant's car, he did what he could to avert the accident, instructions that the son's negligence could not be imputed to plaintiff if she was free from fault, and the passive guest of the son, without any authority to direct or control his movements in managing the team, were proper. (*Cincinnati, L. & A. Electric St. R. Co. v. Cook* (No. 6695), 88 N. E. Rep., 76.)

Kentucky.—Master and Servant—Injuries to Servant—Fellow Servants—Motorman.

A street railway motorman is not the fellow servant of the motorman of another car running on the same line and employed by the same company. (*Louisville Ry. Co. v. Hibbitt*, 129 S. W. Rep., 319.)

Louisiana.—Care Required—Noises.

Where a street railroad company had created a confusion of noises and car tracks at a crossing, it was bound to use extraordinary care in handling its cars there to prevent injuries to pedestrians. (*Hanna v. New Orleans Ry. & Light Co.* (No. 17,571), 52 S. Rep., 856.)

Louisiana.—Street Railroads—Operation—Duty—Rate of Speed—Street Car.

The necessity of being careful about the speed of a street car is not as urgent at 12 o'clock at night as it is during the active business hours of the day, when there are many persons and vehicles on the street. (*Dubose v. New Orleans Ry. & Light Co.*, 49 S. Rep., 696.)

Louisiana.—Collisions—Negligence—Evidence.

A child about six years old suddenly started from the sidewalk to run across a street on which street cars were operated, when a car was approaching. The car according to some witnesses was near, and according to others 10 ft. or 15 ft. away. The motorman saw the child start across the street and endeavored to stop the car, which was running at half speed; but he failed to do so, and the car struck the child. The car was stopped within 46 ft. Experienced men testified that a stop of the car within 30 or 50 ft. was a good stop. Held, as a matter of law, that the accident did not result from the negligence of the motorman. (*Litoff v. New Orleans Ry. & Light Co.*, 50 S. Rep., 105.)

Massachusetts.—Street Railroads—Injuries to Travelers—Instructions.

In an action for injuries in a collision with a street car, a request for rulings on the question of liability, excluding the question of plaintiff's due care, was properly refused.

In an action for injuries to a traveler in a street car

collision, a request for a ruling, excluding the distinction between negligence and a mere error of judgment on the part of the motorman, was properly refused. *Blackburn vs. Boston & N. St. Ry. Co.*; *Knowlton vs. same*, 87 N. E. Rep., 579.)

New Jersey.—Death—Excessive Damages.

Where, in an action for wrongful death, it appeared: That decedent was 50 years old; that he was earning \$10 a week; that, though at one time when running a farm with the aid of his family he earned a much larger income, he had quit farming and was working as a farm laborer; that in three months' time he had contributed only \$40 to the support of his family; that all but four of his children were married; and that the unmarried children were aged 14, 20, 22 and 24 years of age, respectively—a verdict for \$6,000 was excessive. (*Settemeyer vs. Public Service Ry. Co.*, 73 Atl. Rep., 50.)

New York.—Street Railroads—Actions—Instructions—Standard of Care.

An instruction that when a pedestrian attempts to cross a street car track at such a distance from an approaching car that he has reasonable ground to suppose that he will be able to cross it is the driver's duty to give him a reasonable opportunity to cross made the pedestrian's reasonable ground for belief, and not his supposition, the standard of his care. (*Sperry v. Union Ry. Co. of New York City*, 114 N. Y. Sup., 286.)

New York.—Master and Servant—Electricity—Death of Employee—Employer's Failure to Report Defect.

In an action against an employer for the death of an employee claimed to have been caused by electricity passing through a rubber glove furnished him, it was improper to submit to the jury the question of the employer's negligence in furnishing improper gloves, where the employee had the better opportunity to ascertain whether the gloves were defective.

As to an employee, an employer is not chargeable with notice of a defect which it is the employee's duty to report, but which he fails to do. (*Gardner v. Schenectady Ry. Co.*, 112 N. Y. Sup., 369.)

New York.—Negligence—"Res Ipsa Loquitur"—Burden of Proof—Carriers—Street Railroads—Injuries to Passengers—Negligence—Nominal Damages.

While the doctrine of "res ipsa loquitur" does not permit a recovery without some proof of negligence, yet, if proof of the occurrence shows that the accident could not have happened without negligence according to the ordinary experience of mankind, the doctrine is applicable, though the precise omission or act of negligence is not specified.

Where a street car passenger was thrown to the floor in a collision, the cause of which was not shown, and there was no suggestion that plaintiff was negligent, he was at least entitled to recover nominal damages, regardless of the extent of his injuries. (*Levine v. Brooklyn, Q. C. & S. R. Co.*, 119 N. Y. Sup., 315.)

Pennsylvania.—Carriers—Setting Down Passengers—Negligence.

Passengers on a street railway could alight on either side of the car, and in alighting step down on a level macadam road on one side, or on a receding gutter on the other side. A passenger in an open summer car with a running board on each side stepped off on the gutter side, and in so doing, the step being a little high, she lost her balance and fell and was injured. The accident occurred in the twilight. The gutter was made by grading the highway under municipal regulation, and was of the general character of gutters alongside country roads. Held, that such passenger was not entitled to recover for the injuries sustained. (*Sligo et al. v. Philadelphia Rapid Transit Co.*, 73 Atl. Rep., 211.)

Pennsylvania.—Carriers—Street Railways—Collisions at Steam Railroad Crossing—Accident to Passenger.

The trolley wheel of a car left the wire when the car was passing over a steam railroad crossing without negligence on the part of the street railway company, and the car was run into by a locomotive. There was nothing to show that the parting of the trolley was due to any defect in the construction or to lack of care. Held, that the passenger could not recover. (*Gaines et al. v. Chester Traction Co.*, 73 Atl. Rep., 7.)

Texas.—Railroads—Killing Persons on Track—Negligence—Burden of Proof—Use of Track—Licenses.

Trainmen discovering an object on the track in front of the train must at least exercise ordinary care to ascertain what it is, and where, by failure to do so, a person lying on the track is killed the company is liable.

One suing for the death of a person struck by a train because of the failure of the trainmen to exercise ordinary care, after discovering decedent's peril, has the burden of proving that the discovery of the peril of decedent was made in time to enable the trainmen by the exercise of proper care to avoid the collision.

A license to use a railroad track for a footpath does not include the right to use it as a place whereon to lie or sit. (*Caldwell et al. v. Houston & T. C. Ry. Co.*, 117 S. W. Rep., 488.)

Texas.—Carriers—Injuries to Passengers—Care Required.

In an action for injuries sustained by falling from a street car step while alighting, because the steps were worn and slanting, and were slippery from mud, and because of the conductor's failure to warn plaintiff of their condition and assist her to alight, the court, after instructing that it was the company's duty to use such means to enable passengers to alight safely as persons of the greatest care and prudence would use, which was the care a very prudent, careful and competent person would use under similar circumstances, instructed that it was the conductor's duty to be prudent and skilful to see that passengers were not injured in alighting, and he was negligent if he failed to use the greatest degree of care as defined, and that it was the company's duty to exercise the greatest degree of care as defined to construct and maintain proper steps for its cars so as not to injure passengers, and, in the next instruction, left it to the jury whether the conductor's failure to assist and the slippery condition of the steps, etc., was negligence, and also gave a proper charge on contributory negligence. Held, that the charge as a whole fairly and fully presented the issues, and was not misleading, as instructing that it was the conductor's duty to use care in aiding plaintiff to alight. (*Northern Texas Traction Co. v. Danforth*, 116 S. W. Rep., 147.)

Virginia.—Street Railroads—Injuries to Travelers—Liability—Instructions.

A traveler on a street on which a street car is operated may go on or near the track in passing a wagon standing near the curb, and the motorman must warn her of the approach of the car, where there is danger of running her down, and must slow down his car so as to avoid injuring her, if he can do so in the exercise of reasonable care after he ought to have seen her peril.

Where, in an action for injuries to a bicycle rider struck by a street car, the evidence showed that the rider went on or near the track in passing a wagon standing near the curb, and the proof was conflicting whether the accident occurred before or after the car had passed the wagon, an instruction that the car had the right of way at the point at which the accident occurred, and that if the motorman was proceeding at a lawful rate of speed, and plaintiff was not approaching a place of obvious danger, the motorman owed no duty to slow down his car, covered both phases of the case and left the jury to determine at what point plaintiff was injured, rendering it proper to refuse instructions assuming that the accident did not occur until after the car had passed the wagon. (*Norfolk & P. Traction Co. v. O'Neill*, 64 S. E. Rep., 948.)

Washington.—Death—Damages—Excessiveness.

Decedent, a stone mason by trade, 47 years old and in good health, with ability to earn wages at from \$6 to \$6.50 per day, was killed while attempting to alight from defendant's moving electric car. He was a kind, affectionate father and devoted most of his earnings to the support of his family. There was no evidence as to his habits of industry or sobriety, except that on the day he was killed there was evidence that he had spent the afternoon with a companion in a saloon playing cards and pool, and that, after they boarded the train, they were seen by fellow passengers drinking from a bottle. Held, that a verdict for \$10,000 was excessive and should be reduced to \$6,000. (*Felt et al. v. Puget Sound Electric Ry.*, 175 Federal Rep., 477.)

News of Electric Railways

Program of Mid-Year Meeting

The last week of this month will be an active one for the American Electric Railway Association and its affiliated organizations.

On Wednesday, Jan. 25, a meeting will be held in New York of the executive committee of the American Electric Railway Claim Agents' Association. On the same day meetings will be held by a number of committees of the Transportation & Traffic Association. Several of these will be held in New York, including that of the committee on interurban rules. Others will be held elsewhere when, in the opinion of the chairman of the committee, a larger attendance of the members of the committee will be secured than if New York was selected as the place of meeting. On Wednesday and Thursday the classification committee of the Accountants' Association will meet in New York.

On Thursday, Jan. 26, beginning at 10 a. m., a great many committee meetings are scheduled to be held in New York City. These include meetings of the executive committees of the Accountants' Association and of the Transportation & Traffic Association and of the following committees of the American Association: Public relations, compensation for carrying United States mail, rates and fares, taxation, insurance and public relations. In the afternoon of the same day a meeting will be held of the executive committee of the American Electric Railway Association.

As already announced in this paper, the annual mid-year meeting of the American Electric Railway Association will be held on Friday, Jan. 27, and will consist of two sessions, one in the morning beginning at 10 o'clock, and the other in the afternoon beginning at 2 o'clock. The program of this convention, so far as it is now determined, is as follows:

Address on "Return on Investment," by Thomas N. McCarter, president Public Service Railway, Newark, N. J.

Address on "The Adjustment of American Street Railway Rates to the Expansion of City Areas," by George H. Davis, Ford, Bacon & Davis, New Orleans, La.

Address on "Discount on Securities," by Bentley W. Warren, general counsel Boston & Northern Street Railway and Old Colony Street Railway, Boston, Mass.

Address on "Railway Arbitration, with an Example," by Clarence Deming, associate editor *Railway Age-Gazette*, New Haven, Conn.

In the evening the Manufacturers' Association will entertain at a banquet the officials of the member companies of the association in attendance at the meeting. This dinner will be given at the Hotel Astor at 7 p. m. and will be followed by addresses by prominent speakers.

The notices of the annual meeting, which were sent out by the secretary some time ago, were accompanied by a card upon which the companies were requested to advise the secretary of the name of the official who would probably attend this annual mid-year meeting. These cards are now being received by the secretary in large numbers and indicate that the attendance at the meetings will be very representative as regards both number of companies and individuals.

Conference on Interurban Operating Methods in New York

The following official call has been made by the Public Service Commission of the Second District of New York through J. S. Kennedy, secretary of the commission, for the conference of general managers, division superintendents, chief train dispatchers and master mechanics of the interurban electric railways under the jurisdiction of the commission in Syracuse on Jan. 19, 1911, of which brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of Dec. 31, 1910, page 1283:

"The following resolution has been adopted by this commission:

"Whereas, There have occurred during the past few months a number of serious accidents on interurban electric railroads (nearly all outside the State of New York

but involving conditions existing in this State), and the same are of frequent occurrence; and

"Whereas, Nearly all of these accidents were caused by defective methods of operation, defects in block signals or violation of rules or orders; now

"Resolved, That a conference of the general managers, division superintendents, chief train dispatchers and master mechanics of the interurban electric street railroads under the jurisdiction of this commission be called and held in Syracuse, N. Y., on Jan. 19, 1911, at 10 a. m., for a discussion of all questions affecting the safety of operation by said railroad companies.

"C. R. Barnes, the electric railroad inspector of this commission, has been instructed to arrange the details of this conference, and he has suggested the following program, which has been approved by the commission.

"In view of the limited time which can be devoted to this conference, we believe that the best results will be obtained by limiting the discussion to four important subjects which have a direct bearing on collisions and their causes.

"With the view of facilitating the work of the conference and to effect the purpose indicated above, the commission has invited the following-named gentlemen to prepare and read papers on the indicated subjects:

"Methods of Employment, Instruction and Discipline of Motormen and Conductors on Interurban Roads," by J. K. Choate, general manager of the Otsego & Herkimer Railroad.

"Collisions on Interurban Roads and Their Causes," by E. F. Peck, general manager of the Schenectady Railway.

"Train Dispatching on Interurban Roads," by C. E. Lewis, chief train dispatcher of the New York State Railways.

"Block Signals on Interurban Roads," by W. K. Howe, signal engineer.

"These men, by reason of their experience, are ably qualified to point out defects in present-day methods of operation, and the ideas expressed in their papers, followed by a full and free discussion by all present, it is hoped will form the basis for suggestions for greater safety of operation.

"You, and the members of your operating force designated in the above resolution, are respectfully requested to attend the conference, which will be called to order at the Onondaga Hotel in Syracuse on the above-mentioned date and hour, and which will continue for two days if necessary."

Program of Central Electric Railway Association

The following program has been announced for the annual meeting of the Central Electric Railway Association, which is to be held in the palm room of the Claypool Hotel, Indianapolis, Ind., on Jan. 19, 1911:

MORNING SESSION, 9:30 A. M.

Business session and reports of special committees.

Paper, "Logical Basis for Valuations of Interurban Street Railways," by C. G. Young, engineer, New York, N. Y.

Discussion.

Paper, "Relation of Common Carriers to the Public," by Joseph A. McGowan, secretary and treasurer of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Discussion.

Adjournment for lunch.

AFTERNOON SESSION, 1 P. M.

Paper, "Automatic Signaling for Electric Railways," by W. K. Howe, engineer of the General Railway Signal Company, Rochester, N. Y.

Discussion.

Reports of standing committees.

Annual report of secretary-treasurer.

Annual address of the president.

Election of officers.

The executive committee will meet immediately after the adjournment of the association.

The official call for the meeting, signed by George Whysall, president of the association, and A. L. Neereamer, secretary, is dated Jan. 6, 1911. It contains the following suggestions:

"In view of the fact that this is the annual meeting and that the officers for the ensuing year are to be elected as well as reports from the standing committees read, it is sincerely hoped that every member of the association will be present and make it one of intense interest.

"It is suggested to those members living at a distance that the trip be made in special interurban cars, which will tend not only to increase the interest but make the trip one of immense value by personal observation.

"Members have the privilege of bringing their wives and inviting any friends they wish to have present at this meeting. It is also urged that all operating, traffic and mechanical officers be present.

"The attention of managing officers is called to the fact that some of their subordinate officers are on important committees which should make report at this meeting."

Transit Affairs in New York

The Brooklyn Rapid Transit Company made a proposition to the Public Service Commission on Jan. 10, 1911, which involves the expenditure of \$30,000,000 for the operation of the Fourth Avenue subway in Brooklyn and certain extensions of its own existing system which, with a proposed subway across Manhattan Island connecting with Brooklyn by way of the Manhattan Bridge, would give the company a through route, for the most part four-tracked, from the North River to the Atlantic Ocean. It is stipulated in the proposition that the fare to Coney Island shall be 10 cents, although the city is given the right to reduce the fare to 5 cents provided the city assumes any deficit resulting from the operation at that fare.

The company offers to divide the net profits equally with the city for the Fourth Avenue subway, but stipulates that the city bind itself to stand any losses should the profit not be sufficient to meet the sinking fund costs and the cost of construction. For the line into Manhattan the company offers only to stand interest on the cost of construction and the sinking fund charge, the city still to be liable for any deficit. The company proposes also to extend the four-track system of the Brighton Beach line north of Church Avenue and to connect that line with the Fourth Avenue subway, which is now under construction by the city as far as Forty-third Street. The company also proposes to operate trains across the Manhattan Bridge and across Manhattan Island in a subway to be laid out along some route that may seem feasible. The offer includes the extension of the Brooklyn Fifth Avenue line from Third Avenue and Sixty-fifth Street to Fort Hamilton. This would not interfere with the previous proposition of the company to use the Centre and Delancey Street subway from the Williamsburg Bridge for surface cars, as well as for elevated trains.

The letter of the Public Service Commission of the First District of New York favoring the proposal of the Interborough Rapid Transit Company for the construction and operation of new subway lines in New York was considered by the Board of Estimate and Apportionment of New York on Dec. 30, 1910, and referred by that body to its transit committee, consisting of Mayor Gaynor, Comptroller Prendergast and President Mitchel, of the Board of Aldermen. At the meeting of the board on Jan. 5, 1911, Messrs. Prendergast and Mitchel, as a majority of the transit committee, presented a report in which they assailed the Interborough Rapid Transit Company and declared in favor of an independent subway as the only solution of the city's transit problem. In connection with their report Messrs. Prendergast and Mitchel sought to obtain the adoption of the following resolutions:

"Resolved, First—That the available credit of the city be devoted to the construction of an independent municipally owned and controlled subway system, whose integrity as an operating unit can be forever maintained.

"Second—That the present or future available credit of the city shall not be lent, in whole or in part, to any existing system of subways until such independent system shall be completed and put in operation."

When put before the board this resolution to commit the city at this time to an independent subway system and to deny municipal credit to the Interborough Rapid Transit Company for its extensions was defeated by a vote of 10 to 6. The question was raised whether the meetings of the Board of Estimate in committee of the whole for the consideration of the subway matter should be open or private. Mr. Mitchel offered a resolution to the effect that all such meetings, with the exception of the conference with the Public Service Commission, should be public, but withdrew his resolution on the understanding that the board would meet publicly when important action on the matter was to be taken or discussed in a formal way. The vote for the resolution referring the matter to the committee of the whole was unanimous.

The Public Service Commission has adopted a resolution providing for a public hearing on the proposition for a subway and tunnel from Fourth Avenue and Sixty-fifth Street, Brooklyn, under various streets and private property and New York Harbor to St. George, Staten Island. This would connect with the Fourth Avenue subway, although that has been contracted for only as far as Forty-third Street. A resolution requesting the commission to lay out such a rapid transit route has been passed by the Board of Estimate and Apportionment on motion of Borough President George Cromwell, of the Borough of Richmond. The hearing is set for Jan. 18, 1911.

Suit Heard to Compel Annulment of Agreement Between Company and City of Philadelphia

The suit of Elmer E. Brode, as a taxpayer of Philadelphia, to annul the agreement executed on July 1, 1907, between the City of Philadelphia and the Philadelphia Rapid Transit Company was before the Supreme Court in Philadelphia on Jan. 3, 1911, for argument on appeal from the decision of Judge Kinsey in Common Pleas Court No. 1 sustaining the validity of the agreement. John McClintock, Jr., represented Mr. Brode, and James G. Gordon and Ellis Ames Ballard appeared for the city and the company. This is the last of the several suits arising from the adoption of this agreement and the withdrawal of the six-for-a-quarter tickets.

Mr. McClintock's principal contention was that the act of April 15, 1907, under which the agreement was made between the city and the company, was unconstitutional, in that "it violates Article IX, Section 7, of the Constitution of Pennsylvania, in attempting to authorize cities to acquire the property of motor-power companies which are holding companies, and thereby become stockholders in such companies, and in attempting to authorize cities to loan their credit to private corporations by attempting to authorize such cities to enter into the management of such companies by the appointment of directors."

In replying Mr. Gordon, after giving a synopsis of the agreement between the city and the company and the purposes of the agreement, said in part:

"It is indeed magnifying the letter and killing the spirit of the Constitution to argue that the provision of this agreement which enables the city to resume at a fair price certain functions which the most progressive school of political economy now says should never have been granted to private corporations should be blocked by a constitutional provision intended solely to put a stop to a diversion of public funds in aid of private promotions.

"Reverting to *Wheeler vs. Philadelphia*, we may say in the language of this court: 'We may be very sure that a purpose so unreasonable was never entertained by the framers of the Constitution.'

"As a corollary to his main proposition, the appellant argues at great length that credit has been lent to the Philadelphia Rapid Transit Company by reason of the fact that a partnership has been effected. It is an abuse of terms to speak of the city and the company as being or becoming partners. There can be no partnership between them. The company was, is and will continue to be a corporation, transacting its business as such, and that business cannot become a partnership in any sense. The prohibition of the Constitution is not against a partnership, but against a lending of credit. Credit in this sense must be money credit, and not merely the assurance of stability, which arises when the relations between a corporation and a municipality

are amicably and equitably fixed and determined on an enduring basis."

Mr. Kinsey briefly held that the contract was not a complete partnership because the city is not obliged to assume any financial losses of the company, but merely to share in certain earnings. He also held that the right of the city to hold and operate a public utility was not involved in the proceeding, as the city did not contemplate any such action. The court reserved decision.

Cleveland Traction Situation

At the regular meeting of the City Council of Cleveland on the evening of Jan. 3, 1911, a letter, formulated by Mayor Baehr and G. M. Dahl, street railway commissioner, was adopted as a reply to the communication of the Cleveland Railway asking for a conference on the changes in the Tayler grant under which the Cleveland Railway operates suggested by N. W. Harris & Company and recommended by Harris & Company to be made. The reply refuses to grant a conference and the Council places itself on record as opposed to the changes suggested. The letter suggests, however, that the administration might consider the idea of allowing bonds to be sold at a discount.

When asked for a statement in regard to the action of the Council, J. J. Stanley, president of the company, said that he hoped the Mayor, the street railway commissioner and the Council would do nothing to prevent the company from giving good service and improving its system. Mr. Stanley said further that it was the avowed intention of the framers of the franchise to protect the stockholders in the values allowed them and pay a dividend of 6 per cent on the investment, as well as the return of the principal. He also said that the action of the Council indicated that the city does not wish to treat with the company upon its recommendations, one of which was to amortize the franchise value given to the stock, to insure the stockholders the full amount allowed them in the settlement.

By some it is thought that the company will do the best it can with the power and equipment it has until the city authorities see fit to aid in securing funds with which to meet its needs. Others have concluded that the city officials are playing politics and do not wish to make a move that would injure their interests.

Railway Affairs in Detroit

The committee on franchise of the Detroit City Council had no report to make to that body on the evening of Dec. 28, 1910, regarding the proposed negotiations with the Detroit (Mich.) United Railway on the franchise question. The committee met and discussed the matter earlier in the day, but reached no conclusion.

F. T. Barcroft, who appraised the property of the company for the committee of fifty, was present at the meeting on Dec. 28, 1910, and again stated that he was ready to discuss his work under "proper conditions." Several members of the committee are in favor of allowing him to proceed, provided he does not consume unnecessary time.

The committee seems to be divided over the necessity of having another appraisal until an agreement is made which will insure the acceptance of the new appraisal by both sides. Some of the members felt that the Webster ordinance has in a way met with the approval of the people, and that the company has verbally agreed to accept it if enacted, provided a valuation fixed by a competent board of arbitration is embodied in it.

Judge Connelly has given the company another week in which to make tests and prepare plans for ventilating its cars. Attorney Donnelly, for the company, stated that a ventilating system made by a local company is perhaps the best, but that it requires a change in the heating system of the cars which will entail too heavy an expense at this time. He said this system would be installed as rapidly as the heaters wore out or need repairs, but that plans for immediate improvements will be presented at the time specified by the court.

Suit to Set Aside Chicago Settlement Dismissed.—The Supreme Court of the United States has dismissed an appeal from the decision of the Supreme Court of Illinois,

which had dismissed a suit brought by Clarence H. Venner as a stockholder of the Chicago City Railway to set aside the street railway settlement ordinance of Chicago which was approved in 1907.

Dedication of Mechanical Engineering Laboratories, University of Nebraska.—On Jan. 9 the new Mechanical Engineering Laboratories of the University of Nebraska at Lincoln were formally opened. Invitations to the ceremony were issued in the name of the Board of Regents, the Chancellor and the Faculty of the College of Engineering of the University.

Bion J. Arnold to Report on Service in Providence.—Bion J. Arnold, Chicago, Ill., who has been in conference recently with the special committee on railroad franchises of City Council of Providence, R. I., is to be retained by the City Council to study traffic conditions in Providence, with a view to making recommendations as to how the Rhode Island Company can improve its service.

Two Technical Papers Combine.—Announcement has recently been made of the consolidation of the *Electric Trunk Line Age* and the *Railway Electrical Engineer*. C. L. de Muralt, of the firm of Muralt & Company, engineers, and professor of electrical engineering at the University of Michigan, has been retained as editor. He was formerly editor of the *Electric Trunk Line Age*.

Test of Storage Battery Car in San Francisco.—The public utilities committee of the Board of Supervisors of San Francisco, Cal., has decided to recommend that the board accept the offer of the Federal Storage Battery Car Company, New York, N. Y., to furnish a storage battery car for experiment on the Geary Street Park & Ocean Railroad, which is being equipped for operation by the city, to determine the possibilities of the car for use on the road.

Railways Sustained in Their Contentions Against the Ohio State Tax Commission.—On Jan. 3, 1911, Judge Kinkead, sitting at Columbus, Ohio, ruled, in the injunction cases of the Cincinnati, Georgetown & Portsmouth Railway and the Felicity & Bethel Railway against the Ohio State Tax Commission, that the character of the business rather than the charter is the vital point of difference between steam railroads and interurban railways. The companies mentioned had brought suit to prevent the commission from certifying them to the state auditor as steam railroads or on the tax basis of steam railroads, and the restraining order is continued in force by the court. Both these roads were formerly operated as steam railroads, but several years ago they changed their motive power to electricity and the character of the business to interurban work. Had they been certified as steam railroads they would have been compelled to pay an excise tax of 4 per cent on their gross earnings. Under the interurban rule they will pay 1.2 per cent. Owing to the failure of the company to state its causes of action properly Judge Kinkead sustained the demurrer of Attorney General Denman against the petition filed by the Youngstown & Ohio River Railway in a case similar to those above, but the same general ruling was made.

Meeting of National Civic Federation.—The invitations have been issued for the eleventh annual meeting of the National Civic Federation, which was called for Jan. 12, 13 and 14, 1911, at the Hotel Astor, New York. The discussion of the subject of industrial efficiency, including consideration of the piecework, bonus and premium system of payment for labor, occurred on Jan. 12, 1911. The proposed uniform State measure on compensation for industrial accidents was presented and discussed on Jan. 13. The other subjects for consideration, to wit, "The Regulation of Combinations and Corporations" and "Methods of Preventing Industrial Disturbances," are likewise of interest to all employers. The speakers on the subject of "Efficiency" were Harrington Emerson, of the Emerson Company, New York City; H. L. Gantt, industrial expert, New York City; Warren S. Stone, grand chief of the International Brotherhood of Locomotive Engineers, Cleveland, Ohio; James O'Connell, president of the International Association of Machinists, Washington, D. C. The program of the meeting of the federation on Jan. 12, 13 and 14, 1911, was given briefly in the *ELECTRIC RAILWAY JOURNAL* of Dec. 17, 1910, page 1213, and the meeting of the sub-committee of the federation to discuss means of preventing strikes by employees

of public service corporations was referred to in the same issue, page 1205.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Massachusetts.—The Legislature of 1911 convened on Jan. 4. Speaker Joseph Walker of the House, and President Allen T. Treadway of the Senate, were re-elected. In accordance with the ideas advanced by Governor Foss, a bill has been introduced to abolish the Railroad Commission, the Gas & Electric Light Commission, the Highway Commission and the Boston Transit Commission, and create a new public utilities board to assume the functions of the existing commissions in the main. The bill as drawn would provide two commissions of three members each, one with jurisdiction in Boston and the other with jurisdiction in the rest of the State. Many special reports to the Legislature by various commissions are expected. Among these are the studies of the Railroad, Harbor and Land, Metropolitan Park and Boston Transit Commissions of the electrification of railroads, inter-terminal tunnel, Boston & Eastern Elevated Railroad project, consolidation of the Boston Elevated Railway and West End Street Railway, acquisition of control of suburban traction systems by the Boston Elevated Railway and the construction of additional subways and tunnels for rapid transit service in Boston.

New Jersey.—The Legislature convened on Jan. 10. John Franklin Fort's term as Governor will end on Jan. 16, 1911. Dr. Woodrow Wilson, his Democratic successor, will be inaugurated on Jan. 17. Governor Fort in his message recommended that the Legislature should enact a law abolishing the rule which makes the negligence of a fellow-servant a defense in personal injury cases, but he made no reference to the work of the new Board of Public Utility Commissioners. The Senate is Republican and the House is Democratic, and a flood of bills was introduced in the Senate at once which are in keeping with Republican pledges. One of these measures would confer rate-making powers on the Board of Public Utility Commissioners. Both branches have adjourned until the evening of Jan. 16.

New York.—The Legislature convened on Jan. 4 and continued in session for two days, when it adjourned to reconvene on the evening of Jan. 12. During the preliminaries incident to organizing for business Senator Stilwell, a Democrat from the Bronx, introduced a bill abolishing the Public Service Commissions and establishing in their place two new commissions to be known as corporations commissions, one with jurisdiction outside of New York City and the other with jurisdiction in New York City. The commission with jurisdiction in the State would consist of five members, as at present, with a salary of \$10,000 each, the new commissioners to be appointed by Governor Dix. It is proposed to substitute a corporation commission of five members for the present commission of the First District, one member to be elected from each borough, and the salary to be \$10,000 each. The same powers are proposed for the new commissions as are vested in the Public Service Commissions, except that the telegraph and telephone supervision would be divided territorially between the two corporation commissions instead of being lodged with the Public Service Commission of the Second District as at present.

Rhode Island.—The Legislature convened on Jan. 3, 1911, and before the committees were appointed a bill to create a public service commission in accordance with the recommendations of Governor Pothier in his annual message was introduced by Senator Pierce, of Cranston. Accompanying the act was a resolution calling for the appointment of a special joint committee to consider the subject and all other matters of the same nature. The act provides for a service commission of five members, to be appointed by the Governor, by and with the advice and consent of the Senate, with full control over fares, freight rates, price of gas and electricity and telephone rates. The commission would be vested with power to fix the wages and regulate the hours of labor and conditions of employment of conductors, motormen, engineers, brakemen, linemen, operators, clerks and other employees in any of the public services regulated by the act. The bill provides that no motorman or conductor of any street railway shall be required to work more than 10 hours in any one day.

Financial and Corporate

New York Stock and Money Market

Jan. 10, 1911.

Sharp selling of practically all of the active issues during the closing hour of trading to-day carried prices below yesterday's levels. The net losses were not large, but they were recorded in almost every issue. The earlier hours of the day had developed much the same conditions that had characterized the market for the last week. Trading was confined largely to the professionals. The industrials were weaker than the railroads, although there was no apparent reason for this.

The bond market continues to be encouraging and the money market easy. Quotations for money to-day were: Call, 3@4 per cent; 90 days, 3½@3¾ per cent.

Other Markets

Traction shares have been fairly active in the Philadelphia market during the week, but not sufficiently so to indicate that any particular buying sentiment has developed.

Railways certificates have been much less active during the week in the Chicago market than they were before the close of the old year. Series 2 has been far more active than the others, but there has been little change in price. There has been a small movement in Metropolitan Elevated with some advance in the selling-price of both issues.

Massachusetts Electric issues and Boston Elevated have been traded in to a limited extent in the Boston market during the week, but there have been no particular price changes. Other tractions are inactive.

There has been very little trading in United Railways stock on the Baltimore market within the past week. The bonds of the same company have been fairly active at former prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 3.	Jan. 10.
American Railways Company.....	a42½	a42
Aurora, Elgin & Chicago Railroad (common).....	a43	a40¾
Aurora, Elgin & Chicago Railroad (preferred).....	83½	a85½
Boston Elevated Railway.....	129	129¼
Boston Suburban Electric Companies (common).....	a16	a15½
Boston Suburban Electric Companies (preferred).....	a72	a71
Boston & Worcester Electric Companies (common).....	a10	a10½
Boston & Worcester Electric Companies (preferred).....	a39½	a40
Brooklyn Rapid Transit.....	75¾	75¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83¾	83
Capital Traction Company, Washington.....	a129	*129
Chicago City Railway.....	165	a200
Chicago & Oak Park Elevated Railroad (common).....	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred).....	*7¼	*7¼
Chicago Railways, ptctg., ctf. 1.....	a100	a109
Chicago Railways, ptctg., ctf. 2.....	a25¼	a25
Chicago Railways, ptctg., ctf. 3.....	a11¼	a11
Chicago Railways, ptctg., ctf. 4.....	a6½	a6½
Cleveland Railway.....	*91½	*91½
Consolidated Traction of New Jersey.....	a72	a72½
Consolidated Traction of N. J., 5 per cent bonds.....	a104	a104½
Detroit United Railway.....	*69¾	a67½
General Electric Company.....	a151½	a152
Georgia Railway & Electric Company (common).....	117¾	118
Georgia Railway & Electric Company (preferred).....	87¼	88¼
Interborough-Metropolitan Company (common).....	19¾	19¼
Interborough-Metropolitan Company (preferred).....	54¼	53¾
Interborough-Metropolitan Company (4½s).....	79¾	79¾
Kansas City Railway & Light Company (common).....	a22¼	a22
Kansas City Railway & Light Company (preferred).....	a72	a71
Manhattan Railway.....	a140	a140
Massachusetts Electric Company (common).....	*18½	a19
Massachusetts Electric Companies (preferred).....	a85	a85
Metropolitan West Side, Chicago (common).....	a22½	a22½
Metropolitan West Side, Chicago (preferred).....	a70	a69½
Metropolitan Street Railway, New York.....	*19½	*19½
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	65¾	64
Northwestern Elevated Railroad (common).....	a22	a22
Northwestern Elevated Railroad (preferred).....	a65	a62
Philadelphia Company, Pittsburg (common).....	50½	a52
Philadelphia Company, Pittsburg (preferred).....	43	a44¼
Philadelphia Rapid Transit Company.....	a18½	a19¾
Philadelphia Traction Company.....	a84	a84½
Public Service Corporation, 5 per cent col. notes.....	a96	a96
Public Service Corporation, cts.....	a100½	a100½
Seattle Electric Company (common).....	a106½	a106½
Seattle Electric Company (preferred).....	a102½	a103
South Side Elevated Railroad (Chicago).....	a72	a68
Third Avenue Railroad, New York.....	10	a11½
Toledo Railways & Light Company.....	a8	a8
Twin City Rapid Transit, Minneapolis (common).....	a109	a109
Union Traction Company, Philadelphia.....	a43½	a45¼
United Rys. & Electric Company, Baltimore.....	*14½	a17
United Rys. Inv. Co. (common).....	31¾	a43¼
United Rys. Inv. Co. (preferred).....	60	65
Washington Ry. & Electric Company (common).....	a33¾	*33¼
Washington Ry. & Electric Company (preferred).....	86½	*86½
West End Street Railway, Boston (common).....	a91	a92¾
West End Street Railway, Boston (preferred).....	a103	a104¾
Westinghouse Elec. & Mfg. Co.....	66	66½
Westinghouse Elec. & Mfg. Company (1st pref.).....	*124	*124

a Asked. *Last sale.

Annual Report of the Boston & Worcester Electric Companies

A statement of the results of operations of the Boston & Worcester Electric Companies for the year ended Sept. 30, 1910, shows total income of \$55,710, of which \$30,375 was received as dividends on Boston & Worcester Street Railway shares owned and \$25,335 was interest on notes and other miscellaneous income. Total disbursements were \$54,549, divided as follows: Dividend of \$1 per share on preferred shares, payable on Jan. 1, 1910, \$33,936; interest on \$300,000 of 3-year notes, \$18,000; miscellaneous expense, \$2,613. The surplus for the year was \$1,161 and the accumulated surplus \$4,296, making a total surplus of Oct. 1, 1910, of \$5,457. The report of the Boston & Worcester Street Railway for the year ending Sept. 30, 1910, follows:

INCOME:	
Passenger receipts.....	\$576,154
Transportation library books.....	200
United States mail.....	451
Track and power rental.....	1,031
Rent of buildings, equipment, advertising, etc.....	5,048
Total income.....	\$582,884
OPERATING EXPENSES:	
Maintenance of track and line.....	\$35,915
Maintenance of buildings.....	410
Maintenance of equipment.....	71,184
Transportation labor.....	83,399
Electric motive power, including power plant repairs..	81,568
Other transportation expenses.....	10,728
Salaries of treasurer, superintendents, auditors and clerks	16,598
Fuel for buildings.....	475
Printing, tickets and stationery.....	3,641
Removal of snow and ice.....	2,220
Track rental.....	710
Insurance	10,500
Advertising	3,733
Damages	17,782
Other general expenses.....	4,482
Total operating expenses.....	\$343,345
Net above operation.....	\$239,539
Interest charges.....	\$130,231
Taxes	40,077
Surplus for year.....	\$69,231
Dividend 1½ per cent. paid during year.....	30,375
Net surplus for year.....	\$38,856
Surplus Oct. 1, 1909.....	2,873
	\$41,729
Less deductions for adjustment of old accounts.....	6,188
Total surplus Oct. 1, 1910.....	\$35,541

William M. Butler, president of the Boston & Worcester Electric Companies, says in his report:

"Passenger receipts of the street railway company increased about \$24,000 over the previous year, approximately 4½ per cent, which compares favorably with the increase of passenger revenue of other street railways throughout the State. It will be remembered that the company during the year ending Sept. 30, 1909, received an unusual income of about \$19,000 for the sale of power to other street railways on account of temporary disability of power plants. No such unusual income has been received the past year, but the passenger receipts have so increased that this amount has been more than made good and the total gross income has increased \$5,300 more than the year before.

"The operating expenses were \$22,000 in excess of the previous year, a large part of which is accounted for by the increased amounts charged to the maintenance of track, line and equipment.

"The fixed charges for the year were somewhat less than last year, as a portion of the floating debt of the previous year was converted into capital stock.

"The profit and loss surplus has increased during the year from \$2,873 to \$35,541.

"The street railway company has now no floating debt, except that owed to the Boston & Worcester Electric Companies and its current accounts, and has a good supply of cash on hand for its requirements.

"While the net earnings of the operating company for the past two years have been disappointing, the shareholders may be assured that the management is making every effort to increase its revenue and to operate the property in a most economical manner, always having in mind, however, the necessity of keeping its roadbed, equipment and other property in a high state of efficiency.

"The passenger express service between Boston and Worcester, inaugurated in the early part of this year, has proven popular and successful and will undoubtedly continue to stimulate our through travel between Boston and Worcester, and the natural growth of the cities and towns through which we operate should continually produce a healthy increase in local travel.

"The trustees, after most careful consideration of the dividend question, unanimously decided that no action relative to a dividend be taken at this time.

"The financial condition of the company is excellent, but it seems wise to defer dividend action for the present, so that when dividends are resumed they may be expected to continue without interruption."

United Properties Company of California

The United Properties Company of California was incorporated at Dover, Del., with a capital stock of \$200,000, on Dec. 30, 1910, to merge all the public utilities companies of Oakland and Berkeley, Cal., including the ferry line that connects those places, with San Francisco. The directors of the company are F. M. Smith, W. S. Tevis, R. G. Hanford, Gavin McNab, C. B. Zabriskie, W. A. Alberger, Dennis Searles and Harry W. Davis. The operating offices will be in San Francisco and Oakland. Mr. Zabriskie is manager in New York of the Pacific Coast Borax Company, of which Mr. Smith is president. In addition to public utilities, the promoters will establish a steamship line. F. M. Smith, speaking of the company's plans, said:

"The company will organize, finance and create many new enterprises, as well as increase and develop others already in existence, and means a great deal to California. Most of the activity will be on the Oakland side of San Francisco Bay, and immense sums of money will be expended in the elaboration of carefully worked out plans, of wide scope, for the gradual development of public utilities, the completion of which will be fully consummated as rapidly as possible. Among the plans so far decided on are those for the development of the Key Route basin, embracing projects of great value to the industrial, manufacturing and commercial interests of Oakland. While outside capital has taken advantage of the situation, the composition of this new company is strictly Californian, and the management will be in the hands of local men familiar with the conditions who have been the principal factors in the origin of the properties now to be fully developed."

Report on Assets of New York, New Haven & Hartford Railroad

The special committee, consisting of Walter Perley Hall, George W. Bishop, Clinton White, William D. T. Trefry and A. B. Chapin, appointed by the Legislature of Massachusetts to appraise the property of the New York, New Haven & Hartford Railroad with a view to ascertaining if the assets of the company exceeded its outstanding capital stock and indebtedness, filed the following report on Dec. 31, 1910:

"The commission created under Acts of 1910, Chapter 652, 'An act to validate the present outstanding securities of the New York, New Haven & Hartford Railroad and to provide for an examination of its property,' now files a certificate of its finding with the secretary of the Commonwealth. This is to certify that the outstanding capital stock and indebtedness of the New York, New Haven & Hartford Railroad as of June 30, 1910, which it finds to be the only practical date of ascertaining this indebtedness, were as follows:

Outstanding capital stock.....	\$104,435,600
Indebtedness	289,711,863

"And it further certifies that the outstanding capital stock as of June 15, 1910, was \$104,435,600, and its indebtedness as of said June 15 was not in excess of \$289,711,863.

"And it further certifies that the aggregate corporate assets of said corporation were sufficient as of June 15, 1910, to secure its said outstanding capital stock and indebtedness to the said amount hereinbefore stated."

In an explanatory note the commission adds:

"June 30, 1910, was the date of the close of the financial

year of the New York, New Haven & Hartford Railroad, and all its subsidiary companies, and is identical in time with the financial year for which a return is required by the interstate commerce commission and the Massachusetts railroad commission.

"The return of the New York, New Haven & Hartford Railroad, as of said June 30, disclosed capital stock of \$121,878,100. One hundred and seventy-two thousand nine hundred and forty-six shares of said capital stock were on said date in the treasury of the New England Navigation Company, and 1,479 shares in the treasury of the Rhode Island Company. By virtue of stock ownership of said companies by the New York, New Haven & Hartford Railroad Company, certificates of said amounts have been treated as treasury stock of the New York, New Haven & Hartford Railroad and not as outstanding capital stock.

"All payments to the New York, New Haven & Hartford Railroad on account of the stock subscriptions and premiums thereon have been taken as indebtedness and not as capital. Payments for the New England Navigation Company have been deducted therefrom by virtue of the stock ownership by the New York, New Haven & Hartford Railroad."

On or before Feb. 15, 1911, the commission is expected to file a detailed report of the results of its work, in accordance with the provisions of the validating act.

Chicago (Ill.) Railways.—In the account which was published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, about the sale of the property of the Chicago Consolidated Traction Company to the Chicago Railways and the County Traction Company mention was made of the controversy over the question of fares which arose as the result of the separate operation of the lines within the city and those outside the city. These difficulties still remain unsettled, although the compromise is still in effect which provides for a 5-cent fare until Feb. 12, 1911. A number of conferences have been held and indications point to an arrangement which will provide for one fare across the city limit line within prescribed zones.

Columbus, Marion & Bucyrus Railway, Delaware, Ohio.—The stockholders of the Columbus, Marion & Bucyrus Railway have voted to increase the capital stock of the company to \$600,000 by an issue of \$100,000 of preferred stock, with a view to ending the receivership.

Detroit (Mich.) United Railway.—It is stated that negotiations are pending for the purchase or underwriting by a Montreal syndicate headed by J. W. McConnell, of Johnston, McConnell & Allison, of a block of \$1,500,000 of first consolidated mortgage 4½ per cent bonds, to provide for the floating debt and the resumption of dividends.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad under foreclosure has been further postponed by Judge Lacombe of the United States Circuit Court to March 17, 1911.

Louisville & Eastern Railroad, Louisville, Ky.—T. J. Minary, president of the Louisville & Interurban Railroad, has announced that the Louisville & Eastern Railroad, which was purchased by the Louisville & Interurban Railroad at receiver's sale on Jan. 3, 1911, as announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, page 50, will be consolidated with the Louisville & Interurban Railroad under that name. The Louisville & Interurban Railroad is incorporated with a capital stock of \$1,500,000, which will be increased by \$2,000,000. No changes will be made in the officers or organization of the Louisville & Interurban Railroad. Notice of the sale has been filed with the court, and Henry Glover, as receiver, will be discharged within the next 30 days. The Louisville Railway held claims against the Louisville & Eastern Railroad which amounted to \$1,717,500. These claims consisted of mechanics' lien amounting to \$57,000; \$700,000 of bonds; \$500,000 of construction notes, and most of the receiver's certificates, amounting to \$460,000, issued to complete the Shelbyville extension.

Metropolitan Street Railway, New York, N. Y.—The sale of the property of the Metropolitan Street Railway under foreclosure, which was scheduled for Jan. 5, 1911, has been postponed until Feb. 16, 1911, upon the petition of the reorganization committee.

Somerset Water, Light & Traction Company, Somerset, Ky.—The property of the Somerset Water, Light & Traction Company will be sold under foreclosure on Jan. 16, 1911, at Somerset, Ky., by the Master Commissioner of the Pulaski Circuit Court. The company has been in the hands of J. L. Waddy as receiver for two years.

South Shore Traction Company, Patchogue, N. Y.—It is stated that Joseph G. Robin, the indicted president of the Northern Bank of New York, which suspended recently, owns \$569,100 of the \$600,000 stock of the South Shore Traction Company, which was placed in the hands of Paul T. Brady and Willard V. King as receivers on Dec. 31, 1910, as noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, page 50. Notes of \$95,820 are due or about to fall due, and the application for the appointment of receivers was granted on the ground of insolvency.

Susquehanna Railway, Light & Power Company, Lancaster, Pa.—The Susquehanna Railway, Light & Power Company is negotiating with the United Traction Company, Reading, Pa., to lease the properties in Reading which are controlled by that company.

Third Avenue Railroad, New York, N. Y.—Robert A. Chesebrough, as holder of \$112,000 of the bonds of the Third Avenue Railroad, which are represented by the bondholders' reorganization committee, and the Chesebrough Building Company, as the owner of \$55,000 of these bonds, have brought suit in the Supreme Court against the reorganization committee as individuals, seeking an injunction restraining the committee from attempting further to carry into effect the so-called second plan of reorganization for the Third Avenue Railroad.

Dividends Declared

Boston (Mass.) Elevated Railway, 3 per cent.
Brooklyn (N. Y.) City Railroad quarterly, 2 per cent.
London (Ont.) Street Railway, 3 per cent.
Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1¼ per cent, preferred; ½ of 1 per cent, preferred, extra.
Stark Electric Railroad, Alliance, Ohio, quarterly, 75 cents.
Thirteenth & Fifteenth Streets Passenger Railway, Philadelphia, Pa., \$6.
Western Ohio Railway, Lima, Ohio, quarterly, 1½ per cent, second preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

CHATTANOOGA RAILWAY & LIGHT CO.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Nov. '10		\$70,840	\$36,326	\$34,514	\$24,120	\$10,034
1 " " '09		65,171	30,342	28,469	22,237	6,232
11 " " '10		799,419	407,431	391,985	258,722	133,263
11 " " '09		707,165	405,084	297,981	237,519	60,462
COMMONWEALTH POWER, RAILWAY & LIGHT CO.						
1m., Nov. '10		\$431,851	\$219,742	\$212,109	\$120,862	\$91,247
1 " " '09		401,219	201,115	199,804	117,495	82,309
11 " " '10		4,513,565	2,323,808	2,189,757	1,352,559	837,198
11 " " '09		3,961,850	2,030,431	1,931,119	1,300,795	630,624
EAST ST. LOUIS RAILWAY.						
1m., Nov. '10		\$194,974	\$101,661	\$93,313	\$50,347	\$42,966
1 " " '09		177,712	89,839	87,873	49,941	37,932
11 " " '10		2,161,328	1,134,179	1,027,149	551,402	475,747
11 " " '09		1,850,565	1,091,059	849,515	544,544	304,971
FORT WAYNE & WABASH VALLEY TRACTION CO.						
1m., Nov. '10		\$123,554	\$66,666	\$56,888	\$45,384	\$11,504
1 " " '09		123,051	69,779	53,880	45,213	8,667
11 " " '10		1,389,649	772,946	616,694	496,767	119,927
11 " " '09		1,284,806	748,696	536,111	468,943	67,168
ILLINOIS TRACTION SYSTEM.						
1m., Nov. '10		\$578,769	\$335,255	\$243,514	.....	.....
1 " " '09		479,820	253,678	226,142	.....	.....
11 " " '10		5,597,934	3,391,351	2,206,333	.....	.....
11 " " '09		4,859,145	2,774,240	2,084,905	.....	.....
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER CO.						
1m., Nov. '10		\$87,644	\$43,961	\$43,683	\$23,308	\$20,375
1 " " '09		82,296	42,334	39,962	21,608	18,354
11 " " '10		948,007	502,857	439,150	250,364	188,786
11 " " '09		893,466	460,031	427,435	235,210	183,347
TWIN CITY RAPID TRANSIT CO.						
1m., Nov. '10		\$510,149	\$319,732	\$290,417	\$137,912	\$161,505
1 " " '09		580,795	273,044	307,751	140,251	167,500
11 " " '10		6,884,875	3,310,581	3,568,294	1,539,886	2,028,408
11 " " '09		6,354,177	2,987,286	3,371,391	1,529,012	1,842,379
UNION RAILWAY, GAS & ELECTRIC CO.						
1m., Nov. '10		\$265,668	\$138,840	\$126,828	\$67,762	\$59,066
1 " " '09		251,351	134,712	116,639	65,026	51,613
11 " " '10		2,687,557	1,475,061	1,211,896	728,063	483,833
11 " " '09		2,534,338	1,391,649	1,232,689	708,344	524,345

Traffic and Transportation

Insufficiency of Present Street Railway Fares

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., published the following advertisement recently in the daily papers of Milwaukee under the heading "Insufficiency of Present Street Railway Fares":

"Street railway fares in many cities must be increased in the near future, or some limit must be placed upon the service to be furnished for one fare.

"This is the unanimous judgment of street railway men and all others who have thoroughly studied traction conditions as they exist throughout the country.

"Financial statements of individual companies and statistics compiled by the United Census Bureau for the whole country show clearly that the companies will be unable to meet the constantly increasing demands for service and the increasing cost of production and still continue to carry passengers at present unremunerative rates of fare.

"Reduction of operating costs has reached its limit. For years experts all over the country have studied every little detail in every branch of street railway operation to reduce its cost. Every economy that practical experience and scientific skill could devise has been applied.

"Much money has been saved in this manner, but the saving has been more than offset by the higher cost of materials, labor, fuel and the other items of expense. In spite of all economy, the cost of service has become steadily greater and is constantly increasing.

"Street railway men of long experience and experts are convinced that there can be no further reduction of operating costs except by cutting wages. Therefore they feel that relief must be found in higher fares or limitation of service.

"Among those who have studied the subject seriously it is agreed that unless present conditions are changed the cities will be obliged in time to provide their own street railway service by municipal ownership and operation. Under this plan all deficits would be made good from the public funds. Losses from street railway operation would fall upon the taxpayers.

"It is considered reasonably certain that if the companies continue to operate one or more of the following changes of method must be put into practice:

"(a) Abolishment of free transfers.

"(b) Adoption of the European zone system of fares.

"(c) Increase in rate of fare.

"(d) Reduction or abolishment of taxes.

"The taxes of the Milwaukee Electric Railway & Light Company in 14 years increased 481 per cent. In the same period the operating revenue increased 242 per cent."

An Interurban Creed

E. F. Schneider, secretary and general manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, as a part of the campaign against accidents which he has carried on for three years, has presented each employee of the company with a copy of "The Southwestern Creed," printed in colors. As it is a creed to which all employees of electric railways, no matter where they are located, might well subscribe, it is appended in full:

"I believe in the Southwestern of to-day and in that glorious and harmonious spirit of its employees which will surely build up the Greater Southwestern of to-morrow.

"I believe in the territory and community through which it runs and in the future development of its business.

"I believe in my passengers and in the public, and know they will co-operate with us when they understand what we are trying to do and what we are trying to accomplish, i. e., to make the Southwestern an absolutely safe railroad to ride upon.

"I believe in man, and most thoroughly believe in my fellow employee, through whom we will be able to do away with the disastrous and dangerous part of this business, and run a railroad without any accidents whatsoever.

"I will help my fellow employee and ask my fellow employee to help me to attain that end so that we may truly say we have caused no pain, we have caused no suffering, we have caused no death.

"Believing all these things as I do, and steadfastly looking forward to the dawn of the new day which will make the Southwestern greater on account of the personal interest of the employees, the one to the other, and the personal interest of the employees to the passenger and to the public, and the personal interest of the public to the company, I heartily subscribe to the above tenets, and will use my utmost endeavors to live up to this creed."

United Board Investigating Railway Service in Baltimore.—The Public Service Commission of Maryland has commenced an investigation into possible methods of relieving the street railway congestion in Baltimore during rush hours.

Fare Case in Reading Argued.—Judge Endlich, in the District Court at Reading, Pa., has reserved decision after hearing the argument on the application for a permanent injunction to restrain the United Traction Company, Reading, Pa., from discontinuing the sale of six-for-a-quarter tickets in Reading.

Service in Richmond, Ind.—Certain members of the Board of Public Works of Richmond, Ind., have been delegated to visit the officers of the Terre Haute, Indianapolis & Eastern Traction Company in Indianapolis and confer with them regarding the improvement of the service of the company in Richmond.

Increase in Fare by Southern Pennsylvania Traction Company.—The Southern Pennsylvania Traction Company has increased the fare between Angora and Media, on its Media-Philadelphia line, from 5 cents to 10 cents, and has increased the fare for the through trip between Media and Philadelphia from 15 cents to 20 cents.

Railways to Increase Pay of Employees.—S. F. Hazelrigg, who is president of the Staten Island Midland Railway and the Atlantic Coast Electric Railway and vice-president and general manager of the Richmond Light & Railroad Company, recently issued a notice to motormen and conductors that on Jan. 1, 1911, these railways would increase the rate of pay 12½ per cent.

New Agreement Between Railways.—The agreement between the St. Joseph Valley Traction Company and the Chicago, South Bend & Northern Indiana Railway concerning the operation of cars between Elkhart, Ind., and Bristol, Ind., went into effect Jan. 1, 1911, by which the St. Joseph Valley Traction Company will use the tracks of the Chicago, South Bend & Northern Indiana Railway.

Service in Sea Cliff, N. Y.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of the residents of Sea Cliff, L. I., against the Nassau County Railway, Sea Cliff, as to condition of roadbed, stations, paving, etc. After service of the complaint a conference was held between the officials of the village and the company and satisfactory adjustment was made.

Service in Fishkill, N. Y.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of the residents of Glenheim, Dutchess County, against the Fishkill (N. Y.) Electric Railway, as to additional passenger service between Fishkill Village and Fishkill Landing, changes in operation having been made which removed the cause of complaint without the necessity of an order by the commission.

Front Platforms Will Be Cleared.—John B. Gorman, superintendent of transportation of the Worcester (Mass.) Consolidated Street Railway, has issued instructions that no passenger shall ride on the front platform of a car unless he has a permit to do so. In the past it has been customary to allow passengers to occupy the front platform during rush hours, but owing to an accident that recently occurred because the motorman was crowded and distracted by the passengers, it was felt best by the company to keep the platform clear.

Plan Proposed by Company to Improve Service in Springfield, Mass.—L. S. Storrs, president of the Springfield Street Railway, has recently signified the willingness of his company to contribute \$10,000 toward the expense of opening a new street south of Mill River, provided the company is given a location grant on the street. The com-

pany also wants to re-route and lay extra tracks on some of its lines during 1911. Petitions for these changes have been made at different times, but have been rejected by the Board of Aldermen. The company has now renewed its petition in a letter sent by Mr. Storrs to Claud C. Margerum, chairman Board of Public Works, Springfield.

Decision in Regard to Fares to Coney Island on Saturdays, Sundays and Holidays.—The Public Service Commission of the First District of New York handed down a decision on Jan. 10, 1911, dismissing the complaint of Jonas Monheimer against the Coney Island & Brooklyn Railroad asking that this company should be required to re-establish a 5-cent fare to Coney Island on days other than Saturdays, Sundays and holidays. The proceeding followed a previous decision of the commission in which it was decided that the Coney Island & Brooklyn Railroad could not be obliged to establish a 5-cent fare on Saturdays, Sundays and holidays, but might be required to do so on other days.

United Railways Entertains Employees and Their Families.—The United Railways Company, St. Louis, Mo., gave a Christmas entertainment on Dec. 23, 1910, to its employees and their families in the company's hall, at Grand Avenue and Park Avenue. The company issued hundreds of free car tickets to and from the hall, so that all of the employees and their families would feel able to attend. Arrangements had been made for a vaudeville and moving picture show, which was greatly enjoyed by all the 2500 people present. During the evening several numbers were played by the company band, which is made up entirely of employees. Before closing the program the company gave a box of candy to every child present.

Passes Abolished in Trenton.—The Trenton & Mercer Traction Company has abolished all passes, and transports free only employees of the road and policemen and firemen in uniform. The company's formal announcement in regard to the abolition of passes, which was signed by Rankin Johnson, vice-president of the company, follows: "The Trenton & Mercer County Traction Corporation has, effective Jan. 7, 1911, decided to discontinue issuing free transportation, except to employees and to policemen and firemen in uniform. This step has been taken after careful consideration, and in recognition of what we believe to be a modern tendency in the changing relations between public utility corporations and the people, to which we desire to conform."

Railway to Have Ventilation Inspectors.—E. G. Buckland, vice-president of the Connecticut Company, who has taken over the personal supervision of the trolley traffic difficulties in Bridgeport, Conn., announced after a conference with Mayor Buckingham, of Bridgeport, that a special force of inspectors will be placed on the different lines, who will give their whole attention to the proper ventilation and heating of cars. As to the crowding of cars during rush hours, when two or three cars follow each other on the same line, a red sign will be used when necessary on which will be inscribed "Car following." Passengers seeing this sign will know that the car is crowded and that the crew has placed the sign on the car to notify them that they will be better accommodated in the next car. Should a car carrying one of these signs empty its load before reaching its destination the sign will be removed.

Police Must Stand in Cars.—Mayor Gaynor and Police Commissioner Cropsey, of New York, have recently been receiving numerous complaints that policemen monopolize seats in the street cars and in the subway and elevated trains, while revenue passengers are standing. The police manual contains a rule forbidding policemen who are enjoying free transportation to occupy seats which revenue passengers should have. To emphasize this Commissioner Cropsey has issued the following order: "No member of the police force riding free upon any surface car, subway, elevated, or steam railroad train, whether so riding because of being in uniform or upon the presentation of a transportation card or pass, shall occupy any seat in such conveyance if any other passenger is standing, but shall immediately arise and tender his seat to such other passenger and remain standing so long as any other passengers are not seated."

Terms of Settlement of Winnipeg Strike.—As stated in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, page 46, the

strike of the conductors and motormen of the Winnipeg (Man.) Electric Railway was terminated on the afternoon of Dec. 31, 1910. The company offered to take back 300 of the men who went on strike, giving the married men the preference and reserving the right to retain certain men hired during the strike. After a conference lasting several hours the men voted to accept the offer of the company. On Jan. 1, 1911, a number of the men applied to the company for reinstatement and were given their former positions. The company refused, however, to take back the three men whose discharge for drinking while in uniform caused the strike. The company has placed an old employee and one of the men engaged during the strike on each car. The full terms of the settlement were not made public.

Physical Examination of Brooklyn Employees.—The annual physical examination of the surface car motormen of the Brooklyn Rapid Transit Company has been completed by Dr. Edward T. Gibson, the examining physician for the system. The examinations were made at the depots, the terminals and on the forward platforms of the cars themselves. It consisted of a thorough examination of the heart and a general inspection of the motorman's face and body. When a man's face indicated that he was not well Dr. Gibson ordered him to the medical examination room, at the main office of the company, for a complete examination so that he could satisfy himself as to the condition of the man's health. In these inspections particular attention is given to the heart, the lungs, the hearing and eyesight. Under the eyesight test great care is used to detect color blindness. Men who wear glasses are not admitted to the company's uniformed service. When a conductor who has been in the service for many years has a reputable oculist certify that his glasses are of minor strength and that he will not be helpless if they are broken, he is given a special permit for their use, but these cases are the exceptions. A feature of Dr. Gibson's recent examination, which is, of course, supplemental to entrance and preceding annual physical examinations and is intended to show any defects that may have developed in a twelvemonth, was the remarkable freedom from tuberculosis and other lung complaints among the motormen. The annual tests will now be extended to the motormen on the elevated trains. In cases where men cannot pass the tests they are removed at once to some other department of the railroad, where the safety of its passengers does not depend upon the physical fitness of the employee.

Complaint Against Operation of Hoboken Terminal Dismissed.—The Board of Public Utility Commissioners of New Jersey has dismissed the complaint brought by the City of Hoboken against the Public Service Railway in regard to the facilities of the company at its Hoboken terminal. The board recommends that the company place in operation at least one, and if practicable two, additional turnstiles during the rush hours. It also recommends that cars be stopped for transfer at the crossing of Washington Street nearest to the terminal. The board says: "The board would not be justified in finding that the company does not, in the particular complained of, furnish adequate service. Investigation of the conditions prevailing at the Hoboken terminal of the company makes it clear that to permit the desired transfer to be made would interfere with the plan of operation in force at that point. Such interference would present no ground for the dismissal of the complaint if the board in fact found that such plan clearly inconvenienced a considerable part of the traveling public or resulted in furnishing them with inadequate facilities. This fact the board has, however, not found. On the contrary, it finds that the plan of operation of the terminal is well designed to meet the needs of the traveling public as a whole. It serves to separate the incoming and outgoing travel, prevents confusion and delay in loading and unloading, dispenses with the delay in collection of the fares of passengers entering cars, enables adherence to schedule and observance of headway and so facilitates the ready and regular movement of traffic. The ends so accomplished by this plan are important to the traveling public, as a whole, employing the several lines passing through the terminal. To grant the request of the complainant would require changes to some extent destroying the advantageous results attained through the present plan of terminal operation."

Personal Mention.

Mr. Frank Arnold has resigned as superintendent of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia.

Mr. John Y. Boyd, Harrisburg, Pa., has declined reappointment as a member of the Pennsylvania State Railroad Commission.

Mr. H. W. Ellicott, purchasing agent of the Northwestern Pacific Railroad, San Francisco, Cal., has also been elected treasurer of the company to succeed Mr. C. H. Redington.

Mr. C. H. Robertson, superintendent of the East Shore & Suburban Railway, Richmond, Cal., will hereafter act as purchasing agent of the company as well as superintendent.

Mr. Van Dusen Rickert, who is purchasing agent of the Eastern Pennsylvania Railways, Pottsville, Pa., was also made claim adjuster of the company, effective on Jan. 1, 1911.

Mr. J. C. Bell, who was division superintendent of the Eastern Pennsylvania Railways, at Lansford, Pa., has been made division superintendent of the company, with headquarters at Pottsville, Pa.

Mr. E. N. Lake, formerly division engineer of electrical transmission and distribution, Board of Supervising Engineers, Chicago Traction, has resigned and entered the engineering department of Stone & Webster, Boston, Mass.

Mr. Ralph S. Powley has resigned as auditor and general passenger agent of the Toledo, Fostoria & Findlay Traction Company, Fostoria, Ohio, to become district agent of the Northwestern Mutual Life Insurance Company, Fostoria, Ohio.

Mr. A. G. H. Jenssen, district passenger and freight agent of the Ohio Electric Railway, had his jurisdiction extended over the entire Lima-Toledo Division on Jan. 1, 1911, not including Lima. Mr. Jenssen's headquarters are in the passenger station of the company at Toledo.

Mr. J. L. Blake has resigned as general manager and purchasing agent of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., to engage in farming. Mr. Blake was closely identified with the building of the Fort Dodge, Des Moines & Southern Railroad and he will remain with the company until the construction of the extensions is finished.

Mr. Charles Remelius, who resigned in November last as superintendent of rolling equipment of the Public Service Railway, Newark, N. J., has become connected with the Pay-As-You-Enter Car Corporation, for which he will co-operate with railway companies and manufacturers of pay-as-you-enter cars in improving the details of design and construction, so as to make the equipment suitable for different classes of service. A biography of Mr. Remelius was published in the personal column of this paper for Dec. 3, 1910.

Mr. Charles F. Propst, formerly president of the Denver & Inter-Mountain Railroad, Denver, Col., has been appointed local manager of the Michigan United Railways in Battle Creek. Before being elected president of the Denver & Inter-Mountain Railroad Mr. Propst was second vice-president and purchasing agent of the company, serving in those capacities during the work of equipping the line with electricity. He was formerly in the lumber business with his father in Paris, Ill., and later was manager of the Paris (Ill.) Traction Company.

Mr. Walter H. Acker has resigned as engineer of power stations of the West Penn Railways, Connellsville, Pa., to become chief engineer of the Newport News & Old Point Railway & Electric Company, Newport News, Va. Mr. Acker entered the service of the West Penn Railways about four years ago as construction foreman at Charleroi. About three years ago he succeeded Mr. L. O. Vesper as assistant to Mr. J. S. Jenks, superintendent of power. This position he held until about two years ago, when he was promoted to the position of chief engineer.

Mr. H. A. Benedict, who resigned recently as mechanical and electrical engineer of the United Traction Company, Albany, N. Y., to become mechanical engineer of the Public Service Railway, Newark, N. J., as announced in the ELECTRIC RAILWAY JOURNAL of Dec. 17, 1910, was tendered an informal dinner at the Hotel Ten Eyck, Albany, on the

evening of Dec. 31, 1910, by some of his associates in Central New York. Among those at the dinner were Mr. J. P. Barnes, electrical engineer of the Syracuse Rapid Transit Railway; Mr. W. J. Harvie, chief engineer of the Utica & Mohawk Valley Railway; Mr. F. J. Doyle, master mechanic of the Schenectady Railway; Mr. E. S. Fassett, general manager of the United Traction Company; Mr. Charles H. Smith, general superintendent of the United Traction Company; Mr. M. C. Carpenter, master mechanic of the United Traction Company, and Messrs. H. N. Ransom, C. F. Scott and C. E. Barry, of the General Electric Company.

Mr. A. T. Bushong has recently been appointed superintendent of the Green Bay (Wis.) Traction Company, to succeed Mr. J. M. Carl. Mr. Bushong began his railway career in 1895 as a lineman with the Consolidated Traction Company, Pittsburgh, Pa. After being connected with the Consolidated Traction Company about a year and a half Mr. Bushong served successively the Metropolitan Street Railway, New York; Columbia Railway, Washington, D. C.; International Traction Company, Buffalo, N. Y., and the Lima Electric Railway & Light Company, Lima, Ohio, in various capacities from foreman to superintendent of construction in charge of track and electric line construction. In 1902 Mr. Bushong accepted the position of roadmaster with the Elgin, Aurora & Southern Traction Company, Aurora, Ill., but resigned from the company in 1906, shortly after the property was merged with the Aurora, Elgin & Chicago Railroad, to become engineer of maintenance of way with the Michigan United Railways, with headquarters in Kalamazoo. He resigned from the Michigan United Railways in 1908, and entered the employ of the Hudson & Manhattan Railroad, which operates under the Hudson River between New York and New Jersey. Mr. Bushong resigned from the Hudson & Manhattan Railroad to spend a year on his farm near Washington, D. C., for the benefit of his health.

Mr. Paul Shoup, who was recently elected vice-president of the reorganized Pacific Electric Company, Los Angeles, Cal., has assumed the active management of the system, which comprises all of the electric railways out of Los Angeles, and extends from the seashore at a dozen different points eastward to Redlands and Riverside. Prior to undertaking his present work Mr. Shoup was assistant general manager of the Southern Pacific Company in charge of its electric lines in California, which included the Los Angeles-Pacific Company and the Peninsular Railway at San José. Inasmuch as the Los Angeles-Pacific Company is now merged in the Pacific Electric Company, Mr. Shoup's duties at San José are only incidental. He is the active representative of the Southern Pacific Company in the Pacific Electric Company, and since the withdrawal of Mr. Henry E. Huntington Mr. Shoup has been in charge. For many years Mr. Shoup was assistant general passenger agent of the Southern Pacific Company at San Francisco. He entered the service of the Southern Pacific Company in 1891 as a station clerk in the office at San Bernardino. When the old narrow-gauge road between Riverside and San Bernardino went into the hands of a receiver Mr. Shoup was practically in charge, and he is said to have been largely responsible for converting the road into a paying investment. Next Mr. Shoup entered the passenger department of the Southern Pacific Company. Soon thereafter he was assigned to San José as district freight and passenger agent of the company. Later he went to Portland, Ore., and reorganized the freight department of the Southern Pacific Company in that city. Since December, 1908, Mr. Shoup has given his time to the interests of the late E. H. Harriman in California not directly related to the Southern Pacific Company. He will still remain at the head of this department, but his new duties make it necessary more minutely to classify and organize its work. Mr. Shoup's headquarters are in the Pacific Electric Building, Los Angeles, Cal.

OBITUARY

William H. Martin, a retired capitalist of San Francisco, is dead. Mr. Martin organized the Powell Street Cable Railway, San Francisco, and constructed the cable railway from Market Street, San Francisco, to North Beach. This road is now controlled by the United Railroads of San Francisco.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Alberta (Alta.) Electric Railway.—Application for a charter will be made by this company at the present session of the Dominion Parliament to build electric railways, telegraph and telephone lines throughout the province. The members of this proposed company are said to be an English firm of electric railway builders, and it is their intention to proceed with the work as soon as the charter is granted. One of the branches of this line is proposed to extend from Calgary to McLeod, through Southern Alberta. [E. R. J., Nov. 12, '10.]

United Properties Company of California, San Francisco, Cal.—Incorporated in Delaware to build and operate electric and steam railroads, electric light and power lines, etc. Capital stock, \$200,000,000. Operating offices, San Francisco and Oakland, Cal. Directors: H. W. Davies, Wilmington, Del., of the United Traction Company, Albany, N. Y.; F. M. Smith, president of the Oklahoma, Kansas & Missouri Interurban Railway, Miami, Okla.; W. S. Tevis, vice-president of the Power, Transit & Light Company, Bakersfield, Cal.; R. G. Hanford, Gavin McNab, C. B. Zabriskie, W. R. Alberger and Dennis Searles.

Lake Erie & Northern Railway, Brantford, Ont.—Application has lately been made by this company to the Dominion Parliament for a charter to build a radial electric railway from Brantford to Port Dover. Capital stock, \$1,000,000. Incorporators: Hal Donley, M. P., Somcoe; W. S. Brewster, R. E. Ryerson, John Muir and W. D. Schultz, Brantford. [E. R. J., May 29, '09.]

***Port Bolivar Iron Ore Railway, Longview, Tex.**—Chartered in Texas to build a 50-mile electric or steam railway from Longview, Gregg County, through Gregg, Upshur, Harrison, Marion and Cass Counties to a point in Cass County about 10 miles north of Hughes Springs. Capital stock, \$50,000. Headquarters, Longview. Incorporators: L. P. Featherstone, Fox Winnie, L. C. Luckel, W. D. Myers, W. C. Brothers, Eugene A. Wilson, Lewis A. Featherstone, Murrell L. Buckner and T. B. Stinchcomb.

FRANCHISES

Montgomery, Ala.—The Montgomery Traction Company has received a franchise from the City Council to build several extensions in Montgomery. C. G. Abercrombie, Montgomery, general manager. [E. R. J., Jan. 7, '10.]

Modesto, Cal.—The San Joaquin Valley Electric Railway, Stockton, has received a franchise from the City Council to build its railway over certain streets in Modesto. Morris L. Brackett is interested. [E. R. J., Dec. 24, '10.]

Sacramento, Cal.—The Northern Electric Railway, Chico, has asked the City Trustees for a renewal of its franchise to build a line on Front Street and on M Street, from its intersection with M Street, in Sacramento, to the Sacramento River.

Hartford, Conn.—The Connecticut Company has asked for another franchise from the Council to double track some of its lines in Hartford.

Moodus, Conn.—The Moodus & East Hampton Electric Railway, Swansea Centre, will ask the Council for a franchise to build an electric railway in Moodus. [E. R. J., Dec. 24, '10.]

***Chicago, Ill.**—The Chicago Subway, Arcade & Traction Company has announced that it will ask the City Council for a franchise to construct passenger and freight subways in Chicago. Dwight H. Perkins is interested.

Ludlow, Mass.—The Springfield Street Railway, Springfield, has received a franchise to build its railway over certain streets in Ludlow.

Swansea, Mass.—The Providence & Fall River Street Railway, Swansea Centre, will ask the Council for a franchise to extend its line in Swansea for about a mile to North Swansea.

Worcester, Mass.—The Worcester & Northern Street Railway, Worcester, has received a year's extension of

time of its franchise from the Massachusetts Railroad Commission in which to construct its proposed electric railway to connect Fitchburg, Princeton and Worcester via Wachusett Mountain. There is a provision in the grant stating that work must be begun within a year. All rights-of-way have been secured. [E. R. J., Jan. 15, '10.]

Middletown, Ohio.—The Ohio Electric Railway, Cincinnati, is negotiating with the authorities of Middletown for a 25-year franchise to build an electric railway in Middletown. The company proposes to build three lines, one of which involves the construction of a bridge by the municipality in order to reach the large plant of the American Rolling Mill Company.

Toledo, Ohio.—The Toledo Railways & Light Company has asked the City Council for a franchise to extend its street railway south of Fassett Street, including the territory reached by Owens Street, Oakdale Street and Prentice Street and that occupied by the Stillman Brown addition in Toledo.

Hamlin, Tex.—The Hamlin Street Railway has received a franchise to build its railway to the Central Nazarene University.

***Aberdeen, Wash.**—The Citizens' Lighting & Power Company, Aberdeen, will ask the City Council for a franchise to build an electric railway in Aberdeen.

Bellingham, Wash.—The Nooksack Valley Traction Company, Bellingham, has received a year's extension of its franchise to complete its proposed electric railway in Bellingham. The line will connect Bellingham, Ferndale, Blaine, Lynden and Sumas. J. S. Wheeler, Seattle, general manager. [E. R. J., Oct. 29, '10.]

***Seattle, Wash.**—George W. White and associates have asked the City Council for a franchise to operate an electric railway from the intersection of First Avenue south to the city limits in Seattle.

***South Bend, Wash.**—J. D. Creary has asked the City Council for a franchise to build an electric railway in South Bend and extend it to Raymond. Work will be begun in the spring.

***Tacoma, Wash.**—The Island Railway & Navigation Company has asked the City Commissioners for a franchise to build a proposed 3-mile electric railway on Sixth Avenue, from Proctor Street, Tacoma, to the Narrows.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—This company will build 2 miles of new track during 1911. D. A. Hegarty, general manager.

Fresno (Cal.) Traction Company.—During 1911 this company will build 30 miles of single track. F. A. Caslin, superintendent.

Uncompahgre & Gunnison Valley, Montrose, Col.—It is reported that this company has awarded the contract to M. L. Paret, Kansas City, Mo., for the engineering work for building its proposed 20-mile electric railway to connect Montrose and Delta via the west side of the Uncompahgre River, along Spring Creek mesa and California mesa to Olathe and through Sharano and Coal Creek Valley. J. M. Pepper, Montrose, is interested. [E. R. J., Oct. 15, '10.]

Norwich, Colchester & Hartford Traction Company, Norwich, Conn.—It is reported that this company will petition the General Assembly for an amendment to its charter, thus gaining another entrance to Norwich. H. M. Pollock, secretary. [E. R. J., Dec. 31, '10.]

Connecticut Company, Waterbury, Conn.—This company has filed a petition with the Secretary of State, asking the General Assembly to grant a charter right to build a loop line through Pearl Lake Road, connecting the Baldwin Street and South Main Street lines, in Waterbury.

Georgia Railway & Electric Company, Atlanta, Ga.—This company will double-track its Forrest Avenue line in Atlanta from Peachtree Street to Jackson Street. Work will begin in the spring.

***Wendal, Idaho.**—Mayor J. Calhoun, Boise, representing Eastern capital, it is said, is promoting the construction of an electric railway from Wendell to Hagerman.

Charleston, Westfield, Marshall & Terre Haute Electric Railway, Charleston, Ill.—Interest has again been revived

in this proposed 12-mile electric railway. Surveys have been completed and rights-of-way secured. The railway will connect Charleston, Marshall and Westfield, Ill., and Terre Haute, Ind. W. R. Patton, Charleston, president. [E. R. J., June 19, '09.]

Springfield & Central Illinois Traction Company, Springfield, Ill.—This company has surveyed 45 miles of its line from Springfield to St. Louis. This proposed 110-mile electric railway will connect Pawnee, Morrisonville, Hillsboro, Coffeen, Durley, Greenville, Carlyle, Hoffman and Centralia. The following officers have been elected: Isaac Smith, St. Louis, president; George W. White, vice-president; Noble E. McMillan, treasurer, and James W. Gullett, secretary.

Evansville, Mt. Carmel & Olney Electric Railway, Evansville, Ind.—This company has begun the construction of its 14-mile line from Mt. Carmel to Lancaster. The line will be extended later to Evansville. This proposed 65-mile railway will connect Mt. Carmel, Highland, Darmstadt, Cynthiana, Owensville, Friendsville, Lancaster, Berryville and Olney. E. Q. Lockyear secretary. [E. R. J., Oct. 29, '10.]

Charles City & Western Railway, Charles City, Ia.—This company intends to build during 1911 about 20 miles of new track. C. W. Hart, president. [E. R. J., Sept. 10, '10.]

Iowa City, Ottumwa & Southwestern Electric Railway, Iowa City, Ia.—It is said that this company will let several contracts in the spring for building its proposed 70-mile electric railway to connect Iowa City and Ottumwa via Sharon Center, Trytown, Amish, Wellman, Keota and Ollie. Frank Tanner, Iowa City, general manager. [E. R. J., Aug. 27, '10.]

Oklahoma-Kansas Railway, Baxter Springs, Kan.—This company has completed surveys and has partly secured capital for construction work. It will award contracts this spring. The railway will connect Columbus, Galena, Hattonville, Miami, Sunny Side and Lincolnville. C. F. Lambert, Kansas City, chief engineer. [E. R. J., Jan. 7, '11.]

Manhattan City & Interurban Railway, Manhattan, Kan.—A 15-mile extension from Manhattan to Fort Riley will be constructed by this company during the year 1911. Joseph T. West, Manhattan, purchasing agent.

Twin City General Electric Company, Ironwood, Mich.—This company expects to build 5½ miles of single track from Ironwood to Bessemer during 1911.

Lincoln (Neb.) Traction Company.—About 5 miles of new track will be built by this company in Lincoln during 1911.

Brooklyn & Jamaica Bay Railroad, Brooklyn, N. Y.—Commissioner Bassett, of the Public Service Commission, will recommend the commission to grant the certificate of convenience and necessity to this company for building a 2½-mile electric railway from Liberty Avenue and Montauk Avenue, Brooklyn, down Montauk Avenue to Railroad Avenue and Old Mill Creek, Jamaica. Horace J. Subers, 25 Broad Street, New York, president. [E. R. J., June 25, '10.]

Cleveland, Alliance & Mahoning Valley Railway, Alliance, Ohio.—It is announced that construction will be commenced on this line between Ravenna and Alliance early in the spring and cars will be running by fall. This section will be operated in connection with the Stark Electric Railroad, whose owners are also largely interested in the new company. It is estimated that the line between Cleveland and Ravenna will be in operation two years. The railway will connect Cleveland, Alliance and Mahoning. [E. R. J., Nov. 5, '10.]

Illinois Central Electric Railway, Canton, Ohio.—This company expects to build a 6½-mile extension from Norris to Farmington during 1911. Geo. W. Chandler, chief engineer.

Columbus, Urbana & Western Railway, Columbus, Ohio.—In order that it may extend its tracks to Dublin at once, and later on to Plain City, this company has asked the city of Columbus to waive its rights across the McLaughlin place and allow it to construct its tracks along the Ohio River banks near the storage dam. The land was deeded to the city on condition that the grant become void in case any public service corporation was granted the right to build on the land or east of it.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.—This company is considering plans for building an extension to Prairie Depot.

Tri-State Traction Company, Steubenville, Ohio.—This company is considering plans to extend its railway to Weirton.

Ottawa, Rideau Valley & Brockville Railway, Ottawa, Ont.—This company has completed preliminary arrangements and will begin construction in the spring on its proposed 60-mile electric railway which is to connect Ottawa and Brockville. Andrew Haydon, president. [E. R. J., Nov. 19, '10.]

Salem, Ore.—It is reported that J. J. Hill has closed a deal for the Salem, Falls City & Western Railroad, which terminates at Salem. The newly acquired railway will be electrified and added to the Oregon Electric Railway.

Sutherland, Ore.—M. M. Valerius, Sutherland, and G. E. Fosbroke, St. Paul, are promoting plans to build an electric railway in Sutherland. It is also planned to build a power plant.

Clarion & East Brady Electric Railway, Clarion, Pa.—This company has awarded the contract to the Carnegie Steel Company for 1500 tons of rails. G. E. Arnold, Clarion, president. [E. R. J., Dec. 3, '10.]

West Penn Railways, Pittsburgh, Pa.—This company will soon build a 20-mile extension to connect Bitner, Vance Mill, West Newton and Hunkers.

Wilkes-Barre & Wyoming Valley Traction Company, Wilkes-Barre, Pa.—This company has placed in operation its 8-mile extension from Miller Hill to West Avoca.

Sherbrooke (Que.) Street Railway.—During 1911 this company will rebuild 5 miles of track and build a 2-mile extension. Material has been ordered.

Aberdeen (S. D.) Street Railway.—This company has finished and placed in operation its 5-mile electric railway in Aberdeen. Charles N. Herried, Aberdeen, president. [E. R. J., May 21, '10.]

Chattanooga Railway & Light Company, Chattanooga, Tenn.—During 1911 this company will extend its line for a distance of about 5 miles.

Cleburne (Tex.) Street Railway.—This company has begun work on its 6-mile electric railway in Cleburne. Power will be purchased from the Cleburne Electric & Gas Company, and the company will operate 5 cars. Capital stock, \$65,000. Officers: Daniel Hewitt, Cleburne, president and general manager; A. M. Morgan, vice-president; Perry E. Coon, secretary and treasurer, and T. Bushon, electrical engineer. [E. R. J., Dec. 13, '10.]

Haskell (Tex.) Traction Company.—An 11-mile extension from Haskell to Rule will be constructed by this company during 1911.

Houston (Tex.) Electric Company.—This company will expend \$400,000 during 1911 for improvements to its railway. The Washington Street line will be extended to the Southern Pacific Company's tracks, and a bridge will be built across Buffalo bayou at the foot of Texas Avenue, leading to the Grand Central Station.

Rutland Railway, Light & Power Company, Rutland, Vt.—During 1911 this company will build a 9-mile extension from Poultney, Vt., to Granville, N. Y.

Seattle-Tacoma Short Line Railway, Tacoma, Wash.—This company expects to compete its 65-mile railway between Seattle and Tacoma during 1911. A. E. Rothermel, Tacoma, secretary.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company is considering plans for building a new station at Edmonds, which is situated just on the city limits in Burnaby. The structure will be similar to the one at Chilliwack.

Connecticut Company, New Haven, Conn.—This company has completed plans for building an additional building adjoining its present car house on Midland Avenue, Port Chester. The structure will be 180 ft. x 225 ft. and of brick, steel and reinforced concrete construction with slag roof. It will afford space for 58 cars, also paint, truck repair and pump rooms. The present machine shop will

be enlarged 50 ft. x 160 ft., in similar style, and another addition will enlarge the office building 20 ft. x 50 ft., in duplication of its present two stories.

Boise & Interurban Railroad, Boise, Idaho.—This company has completed and is now occupying its new depot on Seventh Street and Bannock Street in Boise.

Illinois Traction System, Champaign, Ill.—This company has started condemnation proceedings to secure certain property necessary to complete the site for its new terminal station at Twelfth and Linden streets in St. Louis.

Detroit (Mich.) United Railway.—This company will begin work in the spring on a new depot, freight and car house on Saginaw Street, in Pontiac. When the work is completed the car houses at Birmingham will be abandoned by the company.

Michigan United Railways, Lansing, Mich.—This company completed and placed in service on Jan. 2 its new interurban terminal.

Public Service Railway, Newark, N. J.—This company will soon build new car houses in South Orange on Springfield Avenue, between Forty-third Street and Boyden Avenue, Hilton. The structure is to be one story high, except at its easterly end, where it will be two stories high. It will be 362 ft. x 200 ft. and of steel, brick and concrete construction. It will be built in accordance with the standard type of car houses adopted by this company. It will have a storage capacity of 120 cars, also an office, a recreation room for the employees of the division, and an assembly hall with dressing-room and a well-equipped kitchen. The cost is estimated to be about \$150,000.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—Plans are being considered by this company for building a new union station in Rochester.

Oklahoma (Okla.) Railway.—This company expects to build a repair shop at Olie Avenue and Second Street in Oklahoma City. The cost is estimated to be about \$75,000.

POWER HOUSES AND SUBSTATIONS

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company will build two new power stations during 1911. One will be at Iowa City and the other at North Liberty.

Lexington & Interurban Railways, Lexington, Ky.—This company, which is planning the construction of a large power house and which had indicated that the structure would be erected at Valley View, on the Kentucky River, has decided to build the power house at Lexington instead.

Berkshire Street Railway, Pittsfield, Mass.—This company is now building a new power house at Zylonite which will furnish power for the electrification of the Hoosac tunnel in North Adams. The cost is estimated to be about \$200,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company, in order to supply additional power until the new power station at Cuyahoga Falls is completed, has placed orders for a 2500-kw turbine and a 1000-kw generator, both to be installed in the Akron station.

Oklahoma City (Okla.) Railway.—This company will double the capacity of its present power plant at Oklahoma City. It will also build an addition to its present power plant at Belle Isle, which will double its present capacity, increasing the hp from 2500 to 5000.

Mt. Hood Railway & Power Company, Portland, Ore.—This company has begun the construction of a water power plant in Portland.

Lehigh Valley Transit Company, Allentown, Pa.—This company has placed an order with the Westinghouse Machine Company, Pittsburg, Pa., for one 4000-kva turbo-generator set. The turbine is to operate between 175 lb., 100 deg. superheat and a 28-in. vacuum. The generator is designed for 3-phase, 25-cycle operation at 13,300 volts.

Utah Light & Railway Company, Salt Lake City, Utah.—This company has finished and put in operation its new power station at Murray.

Seattle (Wash.) Electric Company.—This company will build a new power house at Tenth Avenue and Madison Street in Seattle.

Manufactures & Supplies

ROLLING STOCK

Lincoln (Neb.) Traction Company will order four or six passenger cars.

Springfield (Mo.) Traction Company will purchase six double-truck motor cars.

Inter-State Traction Company, Duluth, Minn., will purchase two double-truck motor passenger cars.

Norfolk City & Suburban Railway, Norfolk, Va., has purchased two passenger cars from The J. G. Brill Company.

Washington Water-Power Company, Spokane, Wash., has ordered 25 pay-as-you-enter cars from The J. G. Brill Company.

Charleston (S. C.) Consolidated Railway & Lighting Company will order six single-truck cars with complete equipment.

Fort Dodge, Des Moines & Southern Railway, Fort Dodge, Ia., has purchased one electric locomotive crane from the Browning Engineering Company, Cleveland, Ohio.

Municipal Street Railway, Regina, Sask., has placed an order with the Ottawa Car Company for four single-truck and two double-truck cars, delivery to be made by July 5, 1911.

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, has ordered from the Westinghouse Electric & Manufacturing Company 150 No. 304 interpole motors.

Oklahoma Railway, Oklahoma City, Okla., has purchased through J. G. White & Company, from the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., two quadruple equipments of No. 101-B motors.

Boston (Mass.) Elevated Railway has ordered from the Westinghouse Electric & Manufacturing Company 50 quadruple motor equipments, which include hand-operated unit-switch control and No. 306 interpole motors.

Quebec (Que.) Railway, Light, Heat & Power Company will purchase eight pay-as-you-enter, double-truck steel motor cars, eight double-truck trailer cars, 10 single-truck open car bodies and 25 closed box cars, including trucks.

Northern Ohio Traction & Light Company, Akron, Ohio, has ordered 25 cars from the G. C. Kuhlman Car Company, Cleveland, Ohio. Eight of these cars will be for interurban service and 17 will be for city and suburban service. The contract calls for the cars to be delivered early in the spring.

Detroit (Mich.) United Railways has ordered 50 new cars, which will be built under license from the Pay-As-You-Enter Car Corporation. Thirty-five of these cars are to be built by the G. C. Kuhlman Company, Cleveland, Ohio, and 15 by the Niles Car & Manufacturing Company, Niles, Ohio.

TRADE NOTES

Wendell & MacDuffie Company, New York, N. Y., have received the contract to cover the roof of the new express and freight building of the Dartmouth & Westport Street Railway, Fall River, Mass., with asbestos corrugated sheathing.

McKeen Motor Car Company, Omaha, Neb., has received an order from the North Coast Railroad for a 70-ft. gaso-line motor car, which will be delivered in March. This company also reports that it is operating two 55-ft. motor cars in the vicinity of Keniwick, Wash.

Dossert & Company, New York, N. Y., report a large increase in their export business during the year 1910. Among other orders they have recently shipped to South Africa through the Western Electric Company an order for over 2500 connectors of various types and sizes.

Pressed Steel Car Company, Pittsburgh, Pa., is building five additions to its works at McKee's Rocks, to accommodate the new department it will start shortly for the building of all-steel passenger and traction cars. The new department will give employment to at least 500 skilled mechanics.

Michel-Kurze Company, New York, N. Y., has been organized to do photo retouching and illustrating of machinery subjects. The business will be managed by A. E. Michel, and the staff of artists will be in charge of Wm. F. Kurze, who for several years has been art director of the Scientific Engraving Company.

Lord Manufacturing Company, New York, N. Y., which succeeded to the business of the manufacturing department of the Lord Electric Company on June 1, 1910, reports a better record for the year just ended than the manufacturing or railway department of the Lord Electric Company ever made. The company begins the year 1911 with sufficient business in hand and contracts for future delivery to keep the manufacturing department busy for several months.

George C. Wing and Frederick W. Hempy, Cleveland, Ohio, have just been granted another patent covering the construction of maximum standing capacity cars in which the seats may be folded or unfolded in accordance with traffic demands. The original design was described on page 409 of the *ELECTRIC RAILWAY JOURNAL* for July 9, 1910. In the second patent the usual cross seats are arranged between transverse handrests so that they may be folded back or collapsed at will.

James A. Farrell, president of the United States Steel Products Company, has been named as president of the United States Steel Corporation, to succeed William Ellis Corey, who has tendered his resignation. This announcement was made known by Judge Elbert H. Gary, chairman of the finance committee and the board of directors of the corporation. Mr. Farrell before becoming president of the United States Steel Products Company had been an official of the American Steel & Wire Company.

F. G. Bolles, who recently resigned as commercial engineer of the Allis-Chalmers Company, is the principal stockholder in the Alliance Engineering & Sales Company, incorporated for \$50,000, which has purchased the patents and taken over the exclusive sales agencies of the Reliance Engineering & Equipment Company. The consulting work carried on by the latter will be retained by it, under the management of C. A. Tupper. The offices of both companies are in suite 415-417 Engineering Building, Milwaukee.

Allis-Chalmers Company, Milwaukee, Wis., has elected D. W. Call president, to succeed W. H. Whiteside, resigned. Mr. Call is of Scotch descent, and was born on a farm near Cleveland, Ohio. At the age of 17 years he commenced his business career in Cleveland, and later entered the employ of the National Malleable Castings Company, manufacturer of car couplers and railroad castings. He was appointed general manager of sales of this company in 1900, from which position he resigned in 1904 to accept the position of assistant to the president of the American Steel Foundries Company, with headquarters in New York City. Mr. Call's



D. W. Call

wide experience in the sales department in the railroad supply field and in the executive management of large manufacturing corporations will be invaluable to him in his new position at the head of the Allis-Chalmers Company, which has such a large and diversified output of mechanical, electrical and mining machinery.

Western Electric Company, New York, N. Y., has this year changed the fiscal year to end Dec. 31, instead of Nov. 30. For the 13 months ending Dec. 31, 1910, its sales were approximately \$66,000,000, as compared with \$45,000,000 for the 12 months of last year. The best year in the history of the company was in 1906, when its sales amounted to \$69,000,000. The increase over the past year has been well distributed over the various lines which the company manufactures. In the latter part of 1910 the company authorized the construction of several new buildings at Hawthorne to cost \$1,000,000, which will still further in-

crease the capacity of the plant. The company now employs in all departments nearly 24,000 men.

Ackley Brake Company, New York, N. Y., manufacturer and exporter of the Ackley adjustable brakes, has just completed the first year of business devoted entirely to the export or foreign trade in these brakes. That it has been successful can be attested by the fact that the brake has been introduced into every important country of the world in that time. Throughout Continental Europe it is becoming widely used and hundreds of Ackley brakes have been shipped into Japan, China, Australasia and the Philippines during the year. The roads in the British Empire are supplied through the British Ackley Brake Company of London. Ackley brakes are in use in Egypt, Tunis, Algiers, Morocco, Greece, Turkey, Roumania and Russia. Trondhjem, Norway, is the city farthest north, and Dunedin, New Zealand, is the city farthest south whose cars are equipped with these brakes. G. S. Ackley, patentee and inventor of the brake, is at present making a tour of the principal cities of South America in the interests of his company, and has cabled to the New York office of the company orders aggregating 800 Ackley brakes for various tramways in the South. During the past year the brake has received meritorious awards at various exhibitions abroad, the principal one being the silver medal award at the International Exposition at Brussels.

ADVERTISING LITERATURE

American Blower Company, Detroit, Mich., has recently issued bulletin No. 266 on steam traps.

Frank Ridlon Company, Boston, Mass., has issued a catalogue giving a list of second-hand electrical machinery for January, 1911.

Wendell & MacDuffie Company, New York, N. Y., have issued a postal card describing the different features of the Russell snow plow.

Rogers, Printz & Company, Warren, Pa., have recently issued several folders illustrating and describing the different types of "Arpeco" wrenches.

N. W. Halsey & Company, New York, N. Y., are distributing gratuitously a vest pocket card containing 1911 calendar and bond interest table, which will be found very useful to bond buyers.

Trussed Concrete Steel Company, Detroit, Mich., has issued a catalog illustrating and describing the standard types of United steel sash. The catalog also contains complete tables of dimensions and full-sized details of the lintels, sills and jambs.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has recently issued a very attractive catalogue illustrating and describing the different styles of Hess-Bright ball bearings and also containing a number of tables on sizes, dimensions and sustaining capacity of the bearings. In connection with the catalogue the company has issued a small folder for convenient ready reference, duplicating the different tables on bearings.

Westinghouse Machine Company, Pittsburgh, Pa., has reprinted a paper on "Present Steam Turbine Progress" presented by Edwin D. Dreyfus before the Railway Club of Pittsburgh on May 20, 1910. Mr. Dreyfus' paper showed by both illustrations and figures wherein the present steam turbine excels the original forms in requiring less space, adjustment and oil; in giving better steam economy, and in costing less to maintain. The paper also referred to turbines for low-pressure service and other special applications.

Walpole Rubber Company, Walpole, Mass., has had printed in pamphlet form under the title "A Visit to Walpole" the story of its growth from a small factory established under the name of the Massachusetts Chemical Company in South Boston in 1892 for the manufacture of liquid electrical insulating compounds. In 1900 the company moved to a new plant at Walpole, which has been enlarged several times to provide additional space to care for the increased output, which includes insulating compounds, tapes and cloths, molded rubber goods and pneumatic tires. To handle the company's Canadian business a large factory was built at Granby, Que., in 1909. The pamphlet is a very handsome piece of printing and is illustrated with numerous views of the company's factories at different periods to show the steady growth of the business.

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CONTENTS.

A Startling Opinion on Public Utility Boards.....	101
Shortening Business Trips by Interurban Patronage.....	101
Standardizing Air Brakes.....	102
Another Decision in Fare Collection.....	102
Arbitration in Industrial Disputes.....	103
The Electrical Equipment of the Detroit River Tunnel—II.....	104
Electric Club of Chicago.....	108
Portable Erector for Ornamenting Iron Poles in San Francisco.....	109
Patents—What They Are, and How to Read and Understand Them.....	110
Report of the Chairman of the Central Electric Traffic Association.....	113
Extension of Engineering Force of McKinley Properties.....	113
Train Dispatching on Interurban Roads.....	114
Report of the Secretary and Treasurer of the Central Electric Railway Association.....	114
Logical Basis for Valuations of Interurban Street Railways.....	115
Committees of American Electric Railway Engineering Association.....	118
Methods of Employment, Instruction and Discipline of Motormen and Conductors on Interurban Lines.....	120
Electric Railway Repair Shop Practice.....	122
Hearing on Plan of Reorganization of Metropolitan Street Railway.....	123
Increased Pay for Individual Employees Adopted by Bradford (Eng.) Corporation Tramways.....	124
Messages of the Governors.....	125
Electric Railway Transportation.....	126
Hearing on Service in Trenton.....	127
Meeting of the National Civic Federation.....	127
Proposed Duplex Transfer Ticket.....	128
Railroad Date Stamp.....	128
Coasting Clocks for the Third Avenue Railroad, New York.....	129
Trolley Frog.....	129
A New Sleet Cutter.....	129
News of Electric Railways.....	130
Financial and Corporate.....	134
Traffic and Transportation.....	136
Personal Mention.....	139
Construction News.....	140
Manufactures and Supplies.....	143

A Startling Opinion on Public Utility Boards

The air is rife with many ideas about government by commission in general and by State public service boards in particular. We do not believe, however, that many hold the view on commissionership duties which was expressed by Governor Baldwin in his inaugural address to the Legislature of Connecticut. In this document, which was abstracted in the Jan. 14 issue of the *ELECTRIC RAILWAY JOURNAL*, the Governor approves a proposed bill to create a public utilities board but objects to paying each commissioner \$7,500 on the startling ground "that the time of the commissioners would by no means be fully occupied by their official duties and that to some extent each would pursue what had been his former occupation in life. An annual salary of \$5,000 would seem quite sufficient." While we have no quarrel with the Governor as to what is or is not an ample salary for the office in question, we take most decided exception to his attitude which implies that a public service commissioner's duties are not onerous enough to require all of his working time. Political hacks may be the right timber for figurehead commissions. It should be otherwise when a State creates a board with sweeping judicial and executive powers over properties of enormous value. In the latter case it is absolutely essential for the well-being both of the people and the corporations that the commissioners should have talents commensurate with their responsibilities and that they should receive salaries which will enable them to give their whole-hearted attention to the complex problems before them for solution. Their decisions often have a direct effect on the prosperity of the railway companies and of the State and even upon the lives of the people who travel by the railways. Should such labors as these be intrusted to men of mediocre abilities? In short, if a State undertakes at all to regulate closely any of its important industries, its representatives should be as free from material cares and as broad-minded as the judge who sits on a Supreme Court bench. Unlike the proverbial loaf of bread, half a commissioner is worse than none.

Shortening Business Trips by Interurban Patronage

The value of a well-appointed electric interurban railway service is probably better known to traveling men than to almost any other class of transportation patrons. It is difficult to gage the benefit of a fast and frequent trolley service through a district formerly served only by a few daily steam trains on a rigid schedule. Perhaps no other agency has done so much as the electric railway to modernize communities that without superior transportation connections with the larger and distant centers of population would soon "lapse back into aboriginal social haphazardism," to quote the words of an eminent divine. Many of these benefits, such as the opportunities for social intercourse and the advantages to be derived from better schools and other educational facilities, have been

mentioned before. These follow as the means are improved of reaching the city from the country. But the reflex gain to the country resident when the suburban town becomes more accessible to the city resident and to commercial travelers has not been so thoroughly discussed. The influx of the permanent resident from the city, the more frequent receipt of mails and of magazines and the more prompt delivery of the daily papers must keep the old-time country resident more in touch with outside events. Even the fact that the traditional village store is modernized by having added to its stock the latest patterns of salable articles should have a beneficial influence compared with the condition when so much time was lost by traveling men in going from place to place that often only the largest centers were profitably visited.

Standardizing Air Brakes

Up to the present time there has been little necessity or even opportunity for the general interchange and joint operation of interurban railway rolling stock equipment, and for this reason a wide diversity of types of couplers, control apparatus and air brakes is to be found on the cars which are now in service. The standardization committee of the Central Electric Railway Association has been endeavoring for the past two years to determine upon standards for such parts of interurban cars as affect their interchange and joint operation in trains. The committee has already recommended the M. C. B. type of automatic coupler without the complication of a self-centering radial attachment, and at its last meeting held in Indianapolis on Jan. 6 it took up the question of standards for air brakes. In line with its policy of recommending standards consistent so far as possible with those of steam railroads the committee decided to recommend the adoption of automatic air brake equipment conforming to the standards and operating practices of the steam railroad brake equipment. The automatic air brake is a very delicate piece of apparatus and it is difficult to make the various essential parts work properly together unless each detail is proportioned and built especially to operate with all the other details which go to make up a complete car or train equipment. This fact has led to the creation of a practical monopoly in the manufacture of brake apparatus for steam railroads. Obnoxious as a commercial monopoly may be in the abstract, the great progress which has been made in steam railroad air brake equipment has been due largely to the fact that each successive step in advance has been worked out by a single manufacturing company which has devoted millions of dollars to development work and has had at its command from the beginning every opportunity for experimenting and improving its devices. In the electric railway field a number of manufacturers have made and sold air-brake apparatus, but unless care is taken to maintain standard connections it will be impossible satisfactorily to operate together in trains cars equipped with brakes of different makes. The work of the standardization committee of the Central Electric Railway Association has not terminated with the general recommendation of the adoption of automatic air brakes. It will be necessary in the future to go even farther and determine upon certain requirements of operation which will insure that the brakes on any car will operate satisfactorily in conjunction with brakes on any other car. The Master Car Builders' Association adopted standards of this kind some years ago, and the essential parts of the brake equipment for all freight and passenger

cars must conform to these standards. Needless to say, such recommendations should not be made without full consultation with and co-operation from all of the manufacturers who are to-day engaged in making and selling air brakes for electric cars.

ANOTHER DECISION IN FARE COLLECTION

The subject of reasonable regulations in fare payment was discussed editorially in our issue of Sept. 3, 1910, in connection with a recent decision by the New York Supreme Court according to which passengers on pay-as-you-enter cars must deposit their fares in a fare box when requested by the company to do so. The increasing use of prepayment cars renders of special interest all further legal decisions of this character, and one involving some new points was rendered last week by the Supreme Court of Rhode Island. This decision upheld the right of the Rhode Island Company to require a passenger to deposit his fare in the form of a nickel in the Rooke fare registers used on the lines of that company.

The case was that of Joseph Martin vs. the Rhode Island Company. It seems that the plaintiff was ejected twice from the cars of the company. On one occasion he tendered a nickel in payment of his fare, but the conductor refused to accept it and asked him to insert it in the automatic registering device which the conductor held in his hand. This the plaintiff declined to do and his ejection followed. On another occasion he gave the conductor five pennies, which the conductor took and tendered him a nickel, asking him to insert it in the registering device. This the plaintiff again refused to do and was again put off the car. The court considered the subject from two points of view. The first was whether a passenger could be compelled to pay his fare and also insert it in an automatic registering device. The most closely allied cases were several which had been adjudicated in connection with the use of the "coffee pot" fare box in Michigan, but the court also reviewed other regulations, such as that requiring passengers to purchase and deposit tickets in a fare box, as on the elevated and subway lines in New York. The New York case already mentioned was also cited. From these cases the court concluded, and we think properly, that the regulation of the Rhode Island Company was entirely reasonable, even to the extent of declining to allow the passenger to put five pennies in the register. The court held that the advantages to the company of the registering device which it used in simplifying its accounts and in securing accuracy in the collection of its fares should be approved rather than condemned and that they more than counterbalanced any slight degree of annoyance to the passenger incident to the use of the device.

The final legal point involved was whether the company violated the statute of the United States which provides that minor coins of the United States shall be a legal tender, at their nominal value, for any amount not exceeding 25 cents in any one payment. This statute undoubtedly makes the tender of five separate cents legal tender for a debt of 5 cents. On this point also the court upheld the company, because it held that the conductor did not refuse the five separate cents on the ground that their purchasing power was not equivalent to a nickel and not sufficient for the full payment of a fare. On the contrary, the conductor accepted them and tendered a nickel in exchange for them, so that the case became analogous to those

in which the passenger is required to purchase a ticket and deposit it in a box.

The decision as a whole emphasizes the extent to which the courts will allow companies to go in enforcing regulations for their own protection in the mode in which passengers must pay their fares. Statutes which specify the amount of fare to be charged for transportation are simply to protect travelers from demands for excessive amounts of fare and are not intended to interfere with any reasonable rule which a railway company may find necessary to make in regard to time, place and mode of making the payment.

ARBITRATION IN INDUSTRIAL DISPUTES

At the annual meeting of the National Civic Federation, which ended last Saturday, one entire session was given up to the subject of arbitration of labor disputes. The discussion centered principally upon the practical results secured in Canada with the Industrial Disputes Investigation Act and in this country with the Erdman federal act, which provides for the investigation of the causes of labor troubles on interstate railroads in the United States. It was stated that in the three years during which the Canadian law has been in force 82 boards of arbitration had been appointed, that in 76 of these cases the decisions of these boards have been accepted and that the other six ended in strikes which were failures. The law provides simply for an investigation of the causes of the dispute and is compulsory only in cases of mining and public service corporations, but labor difficulties in industrial enterprises are investigated in the same manner, where both parties agree. Acceptance of the findings of the board is not obligatory, but the inauguration of a lock-out or strike during the investigation is punishable by fines of from \$100 to \$1,000 a day for the employer, of from \$10 to \$50 a day for the employee and of from \$50 to \$1,000 a day for any strike organizer or lockout inciter. The board is made up of three persons, one recommended by each of the parties to the dispute and a third recommended by the Deputy Minister of Labor. Originally the act prescribed that 30 days' notice should be given in the case of either employer or employee before any change affecting wages or general conditions of work could go into effect. Later this provision was amended to provide that such changes may not take place until the dispute has been finally dealt with by a board. Under the Erdman investigation act both parties must agree to arbitration, but it was stated that in only one case has mediation been refused where the other side applied for arbitration. This was in the case of the switchmen's strike in the Northwest in 1909, and this strike failed.

At present nearly every State in the Union has boards of arbitration, but the composition of the boards and their powers vary greatly. Their practical utility, moreover, in cases of serious trouble is questionable. Their great weakness is the tendency of boards of this kind to recommend a compromise, independent of the merits of the question under consideration. The reason for this is obvious. The services of the board are not usually requested until matters have reached an acute stage. At that time each side submits its maximum demands. The board can see its way more easily to bring pressure upon the employer than upon the employees to accept its decision, so that its efforts have usually been directed toward determining the extent to which the employees would modify their demands rather than judicially to consider the merits of the case. This fact explains the reluctance of most employers

to submit their cases to arbitration. If the principle of arbitration is to be successful, the method followed must be different from that usually employed.

From the many suggestions, based on the practice of other countries, to reduce strikes in this country we can eliminate at the beginning that of compulsory arbitration, known as the New Zealand system. This is contrary to our idea of individual freedom and, in fact, to that of most other civilized countries, and, according to reports, is not working out satisfactorily in the place of its origin. Unless the workmen of an industry are placed practically under military law, as is now proposed on the railway systems in France, it is difficult to understand how they can be coerced to work, nor has it been found possible even in New Zealand to require employers to continue a business at a loss.

One step toward reform in decisions of boards of arbitration would be to forbid compromise decisions, as is done under the arbitration law of Great Britain. There the arbitrators must decide directly in favor of or against the claim of each side. Such a plan has discouraged the making of excessive demands, because the board must select of the two propositions before it without modification the more reasonable.

The discussion at the meeting of the National Civic Federation, however, also developed the value of an examination of the merits of the questions involved in labor disputes before a strike begins. This is the chief feature and also the chief merit of the Canadian act. During an investigation under this act work must be continued under existing conditions until the board renders its decision. The penalties have already been mentioned. The hearings before the board are open, and the public can learn through the testimony presented at them the merits of the controversy. It is true that some of the labor representatives at the Civic Federation meeting expressed a belief that an enforced delay of a strike during the course of the arbitration proceedings, as required by the Canadian law, was detrimental to labor because it gave the employer long warning of a proposed strike; but the point was made that if there was immediate advantage from a sudden strike the advantage was temporary only. Another suggestion made at the meeting was that all arbitration boards should consist of six members rather than of three, the usual number. Two would represent each side and two be the judges. The theory of this plan is that the two representatives for each side would be more apt to agree to a reasonable proposition than one because each would receive the moral support of the other and there would be fewer charges of weak judgment or of "selling out" with two representatives on each side than with one.

The subject is not an easy one to settle. We believe, however, that there would be far fewer industrial strikes if the public knew the facts in regard to matters in dispute in advance of the beginning of the strike. It is notorious that the public press in cases of this kind does not properly present the case of the employer, especially after a strike has been called and the passions of the employees, and possibly of both sides, are inflamed by open hostilities. Perhaps this attitude of the press is unavoidable and will continue just as long as the proprietors of these papers think that the public is more interested in a distorted story than in the facts. But if all the points at issue were brought out thoroughly and analyzed impartially at a public hearing so that the facts would be a matter of record there could not be the same excuse for public ignorance or bias. Experience has shown that publicity is the strongest weapon for peace.

THE ELECTRICAL EQUIPMENT OF THE DETROIT RIVER TUNNEL—II

The article published in last week's issue of the *ELECTRIC RAILWAY JOURNAL* described the general scope of the Detroit River Tunnel electrification and presented details of the substation, the third-rail construction and the locomotives. This article will conclude the description with data concerning different miscellaneous features.

PUMPING EQUIPMENT

The arrangements provided for keeping the tunnel free from water are of interest. The capacity of the machinery installed for this purpose was based on the heaviest rainfall for 35 years and the addition of an ample margin of safety. Five pumping

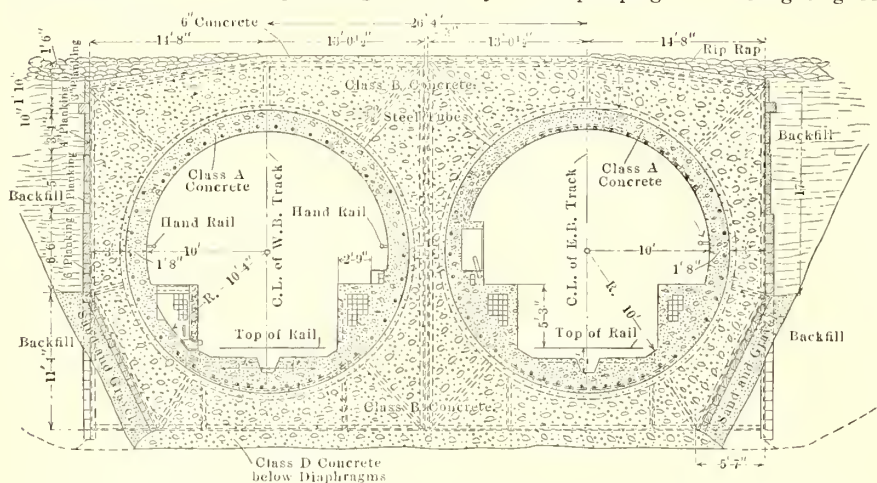


Fig. 1—Detroit Tunnel—Cross-Section of Tunnel and Longitudinal Section of East-Bound Track

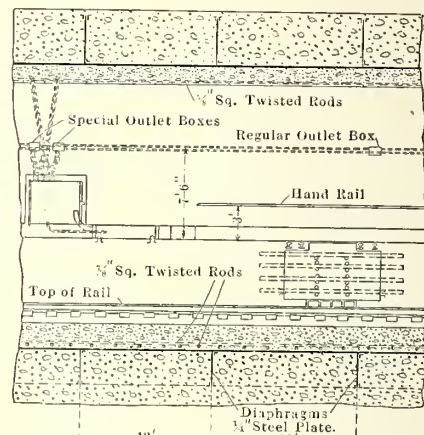
stations or sumps have been constructed. One is situated at each portal, there is one at each shaft and the fifth is in the center of the subaqueous section.

The pump motors range from 15 hp to 30 hp in size, and are operated from the substation. An annunciator system, installed for each sump, rings a bell and lights a red pilot lamp in the substation when the water in either sump reaches the high-water setting for the float equipment. The bell alarm is cut

and are provided with aluminum shades so as to reflect the light in the direction of travel and thus avoid glare in the eyes of trainmen.

Transformers are placed in niches at suitable points to both tunnels and the primaries are fed by 440-volt feeders from the substation, while the 104-volt secondary side of the transformers is fed directly to the lamps. There is a lighting cabinet in each transformer niche to control the lighting in its immediate vicinity, and each cabinet controls eight local lighting circuits and in some cases signal track transformers have a primary feed from the lighting cabinets. These transformers are single phase, of $7\frac{1}{2}$ -kw capacity, and are connected alternately to the different legs of the three-phase feeders in such a manner as to balance the load.

The lighting of the yards is accomplished by 100 $7\frac{3}{8}$ -amp.



Electric Ry. Journal

490-watt, series a.c. arc lamps. Each lamp is supported on a cast-iron pole of neat design. This lighting system is fed from the constant-current transformers already mentioned.

The motor-generator room of the substation is lighted by 21 clusters of tungsten 40-watt lamps. Two of the clusters in the center of the station are fed from the main storage battery for emergency lighting. The other clusters are fed from the substation light and power transformer equipment.

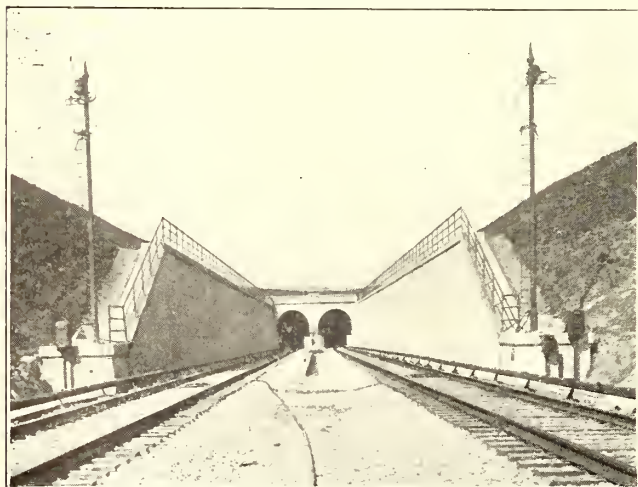


Fig. 2—Detroit Tunnel—Windsor Approach



Fig. 3—Detroit Tunnel—Locomotive at Detroit Approach

off when the operator starts either pump set located in the sump from which the alarm was received, and when the water in the sump is pumped to the low-water level for which the float equipment is set a green pilot lamp is lighted on the sump control panel and the pump is shut down.

LIGHTING SYSTEM

The tunnel is lighted by approximately 860 incandescent lamps, which are spaced 40 ft. apart on both side walls of either tunnel. The lamps have carbon filaments, are of 16 cp each,

TUNNEL DETAILS

In this article it would be interesting to deal at some length with the tunnels themselves, as undoubtedly their construction is one of the most interesting pieces of engineering work accomplished in recent years, but as this part of the subject has already been covered in other articles only a few of the most important facts bearing on the scheme of electrification will be mentioned.

Fig. 1 shows a section through the tunnel and Fig. 5 is the

reproduction of a view in the tunnel showing the third rail.

The subaqueous portion of the tunnels was built up in 11 different sections on land and afterward sunk in position on a concrete bench placed on the bottom of a trench dredge in the river bed. These sections when in place were bolted together, gaskets being used to insure the waterproofing of the joints. With this form of construction it was questionable whether stray current would not lead to electrolysis at these joints. Therefore copper bonds were employed to make the metallic portion of the tunnel a continuous conductor with the Detroit end tied in with the negative return feeders.

The running rails are of special composition; they weigh 100 lb. per yard, and are of the A. S. C. E. standard section. Each joint is bonded with two bonds General Electric, each of 500,000 circ. mil capacity. The drainage scheme of the tunnels calls for a continuous open gutter for the entire length of each tunnel, which made necessary a special form of ties for the track rails. Fig. 5 shows the construction adopted. The ties are embedded in concrete, protruding only about 3 in. above the surface. Dowels were placed in the concrete between each tie to prevent any possibility of slipping, and to make the road-bed a thoroughly homogeneous mass. These ties have a section of 8 in. x 11 in. and are 4 ft. long. They are of Louisiana long-leaf yellow pine. The long ties for supporting the third rail brackets are of the same section and are 6 ft. long. They are spaced with 10-ft. centers. The distance from center line to center line of the tracks in the tunnel is 20 ft. 6 in. on tangent and 26 ft. 4 in. on maximum curves.

Fig. 2 shows the Windsor approach, while Fig. 3 is a view of the Detroit approach. The latter picture was taken with the locomotive in the portal to show the ample clearances provided in the tunnel. It also shows the point where the ordinary yard track construction gives way to the special construction for the tunnel.

Referring back to Fig. 1, the conduits provided in the tunnel for the different electric cables will be noticed. Those on the extreme right are reserved for future power requirements. The telephone, telegraph and signal cables are carried in the large nest of ducts in the base of the dividing wall between the two tunnels, while the cables for tunnel lighting are taken in the three ducts shown under the left bench wall on the right-hand tunnel. The power cables for the operation of the tunnel and Windsor yards are carried in the ducts shown in the

The splicing chambers are spaced approximately 400 ft. apart on straight work and are all properly drained and ventilated. In the tunnel their width and height is necessarily small on account of the limited space, but is sufficient for all the requirements. They are each 8 ft. in length.

The lead-covered cables are supported in the manholes from malleable iron cable racks hung from vertical tee irons secured to the walls of the splicing chambers. These tee irons are



Fig. 5—Detroit Tunnel—Track Construction in the Tunnel

provided with holes for practically their entire length to facilitate the adjustment of the cable supports and for the better accommodation of the cables. In many places double cable supports have been used to reduce the amount of fanning necessary from the cable ducts to the splicing sleeves. Ground connections are provided in the manholes for grounding the lead covers of all cables.

As the substation is located near the Detroit shaft this shaft is employed as the cable run instead of the Detroit portal. There are three vertical wells in this shaft for the exclusive use of the cables, the concrete surfaces of each well consisting of a series of shallow grooves each large enough for a single cable of the largest size; thus there is a barrier on each side of every cable. The weight of the lead cable is taken by wooden clamps held by U-bolts set in the concrete. These are spaced approximately 4 ft. apart.

The total amount of cable installed was 229,000 ft., of which by far the greater portion is multiple conductor. Most of this cable has varnished cambric insulation of a thickness depending upon the voltage of the circuit on which it is used, and a lead covering is used on all cables except the 110-volt lighting cable, which is located in the iron conduit, where there is no possibility of water accumulating.

In the splicing chambers the lead covering is protected by a covering of asbestos felt $\frac{1}{8}$ in. thick, applied with a one-half lap and coated with silicate of soda. This precaution was taken to prevent communication of fire from one cable to another, where,

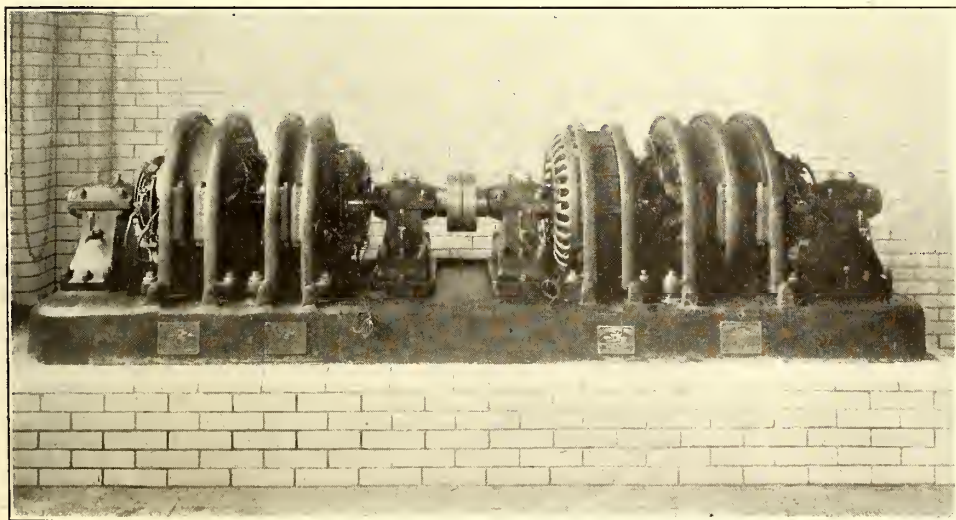


Fig. 4—Detroit Tunnel—Exciter Set for Booster

extreme right of the drawing presented on the preceding page.

To avoid the use of poles throughout the yards all cables are carried in ducts underground. Vitrified clay ducts are employed in the tunnel and throughout the yards, and iron conduits are used for the secondary wiring for the lighting of the tunnel. This lighting conduit is built in the concrete lining of the tunnel and runs directly into the junction boxes holding the incandescent lamps.

on account of the somewhat limited space, it was impossible to separate the cables properly with barriers or split ducts.

REGULATION OF LOAD

The nature of the load and the mode of regulation are such as to warrant a somewhat detailed account.

The energy is purchased on a maximum demand basis, which makes it necessary for economical operation to eliminate as far as possible excessive peaks from the incoming lines. A Gould

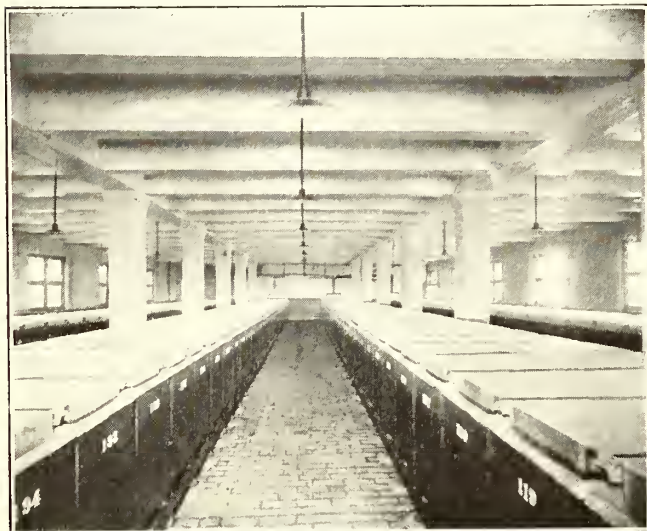


Fig. 6—Detroit Tunnel—Lower Battery Room

storage battery has been installed to take care of the fluctuations of load and the regulation devices are such that the first 800 amp are taken from the motor-generator sets; then the battery takes care of the load from 800 amp up to 8360 amp; that is, the battery takes 7560 amp. Anything above this figure is again taken from the motor generators. The maximum load is 9100 amp. When this load is being carried the motor-generator sets would be delivering 1540 amp (their full-load rating), and the battery would be supplying 7560 amp.

The battery consists of 312 cells, type U-43 plate elements in 59 plate tanks. These plates are 18½ in. square, and each element has a capacity of 630 amp for 8 hours, 1260 amp for 3 hours, 2520 amp for 1 hour, or 5040 amp for 20 minutes, and is capable of withstanding discharges up to 8000 amp capacity.

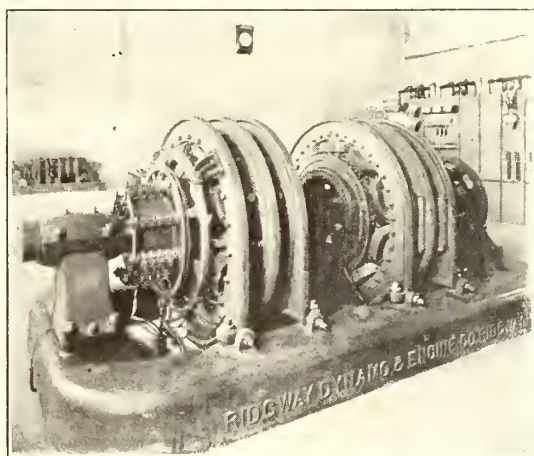


Fig. 7—Detroit Tunnel—Booster Set

When a total of 59 plates is installed in the tanks each element will have a capacity of 870 amp for 8 hours, 1740 amp for 3 hours, 3480 amp for 1 hour, or 6960 amp for 20 minutes, and will be capable of withstanding discharges up to 11,000 amp.

The battery installation is for the purpose of removing the fluctuations from the load and insuring a practically constant input from the Detroit Edison Company. It consists of the battery, a motor-driven booster, an exciter set for the booster

and a small rectifier set for obtaining current for regulating purposes, which varies according to the ampere times the power factor on the incoming supply. One floor of the battery house is shown in Fig. 6, while the exciter set, the motor-driven booster and the small regulating rectifier set are illustrated respectively in Figs. 4, 7 and 8. The load requirements are such that, taken in connection with the relatively low average demand, a practically instantaneous response to load changes must be obtained from the battery and booster, and to accomplish this result a special Gould high-voltage exciter has been provided, which upon the change of load occurring impresses an abnormal voltage on the booster field. This voltage is maintained until the proper current flows through the booster field circuit to cause the booster to respond and so compel the battery to charge or discharge in accordance with the load changes.

To reduce the size of the battery required to accomplish the work and also the size of the booster necessary, it is desirable to have the station voltage changed inversely according to the demand on the station; that is, to have a high station voltage when the load is light and a low station voltage when the load is heavy. It is, however, not desirable that the variations in station voltage should occur at times other than times of maximums and minimums. To accomplish this a load-limit device (see Fig. 10) has been installed, which changes the excitation of the direct-current end of the motor-generator sets either when the booster voltage capacity is reached or when the booster current capacity is reached, but at all other times permits normal excitation of the motor-generator set. This causes the motor-generator set voltage to be increased when the booster voltage reaches the limit in a charge direction or when the booster current reaches the limit in a charge direction, and decreases the voltage of the motor-generator set when either the booster voltage or current capacity in a discharge direction is exceeded.

Inasmuch as the energy is purchased on a kilowatt-hour basis, it is desirable that when the voltage is decreased on the motor-generator sets the current be increased, and to accomplish this a booster load limit device has been installed. This apparatus, in the event of a load carrying beyond the capacity of the battery and booster, automatically shifts the excess load from it to the motor-generator set, thus preventing the opening of the battery circuit breaker and the consequent transference of the total load to the motor-generator set, which would result in the opening of the motor-generator circuit breakers. This load-

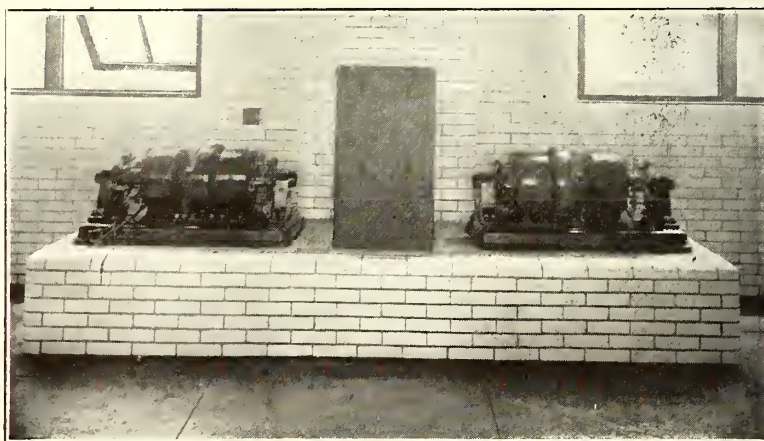


Fig. 8—Detroit Tunnel—Rectifier or Permutator Sets

limit device is actuated by battery discharge current and battery charge current, and by booster voltage in a charge direction and in a discharge direction. When the battery is discharging and this load-limit device is actuated, additional load is thrown on the motor-generator sets, and when the battery is charging and the load-limit device is actuated the load is removed from the motor-generator sets, but this device, like the load-limit control of the motor-generator sets, does not come into opera-

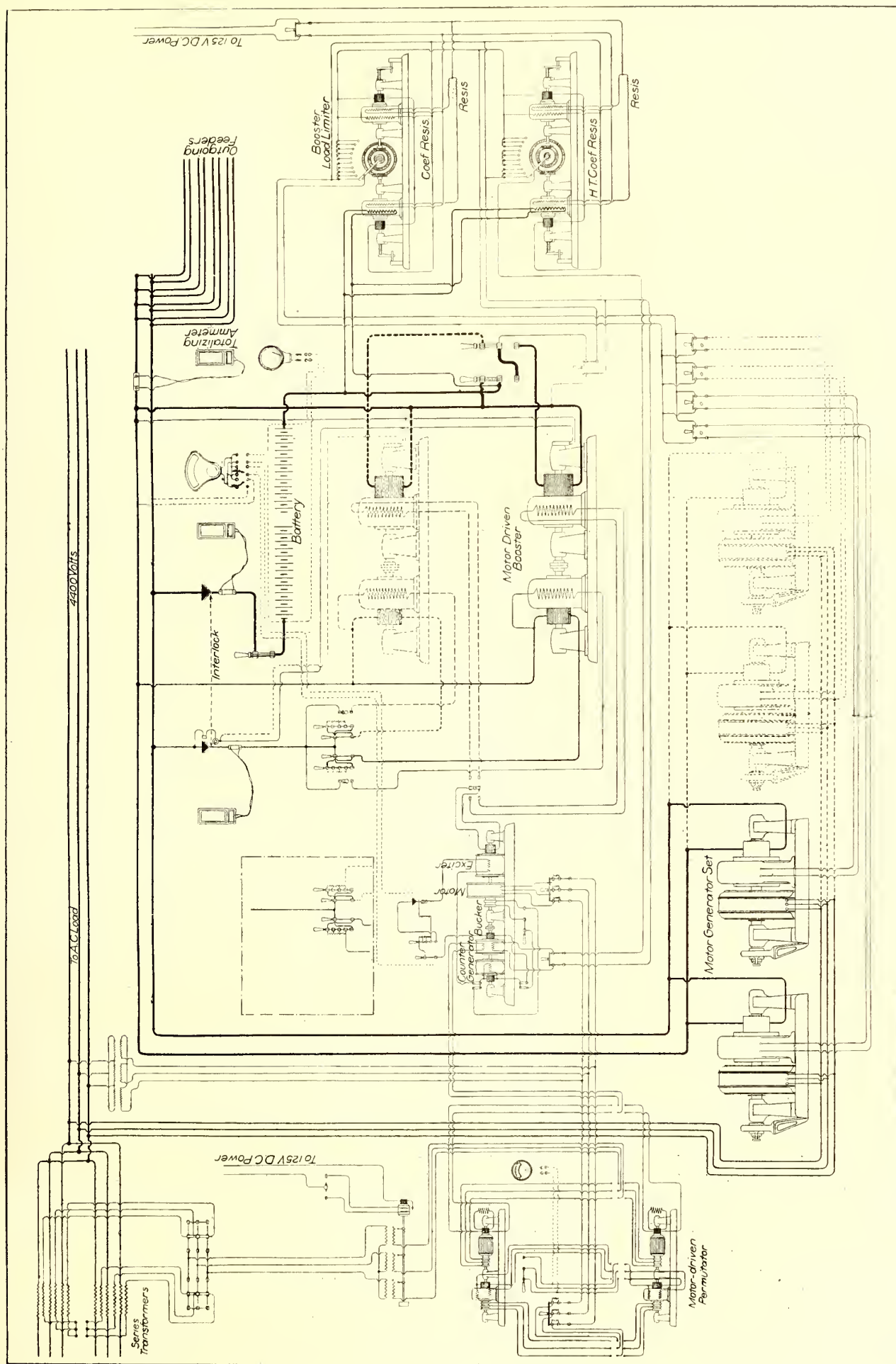


Fig. 9—Detroit Tunnel—Wiring Diagram, Showing the Present and Future Connections of the Apparatus in the Converter Station

tion until certain limits have been reached. At all other times the regulating apparatus and the battery preserve practically constant load on the lines from the Detroit Edison Company.

It is thought that the following details of the apparatus may be of interest: In the incoming lines from the Detroit Edison Company series transformers are inserted and from these series transformers current is led to a small rectifier set which consists of a synchronous motor and a small permutator. The synchronous motor drives the permutator in synchronism with the voltage, but in a reverse direction to the direction of the field set up by the current from the series transformers. This results in a field which is fixed in space so long as the power factor is unchanged. The permutator is provided with two sets of brushes, one practically at 90 electrical degrees to the other, one set being connected to the field of the counter machine and the other set connected to a by-pass circuit. The brushes are so set that with the normal current flowing from one set of brushes through the field of the counter machine no current flows through the by-pass circuit when the power on the incoming lines from the Edison Company is at 100 per cent power factor. When set in this way a change in power factor on the incoming lines without a shift of current will cause the current supply from the permutator to the field of the counter machine

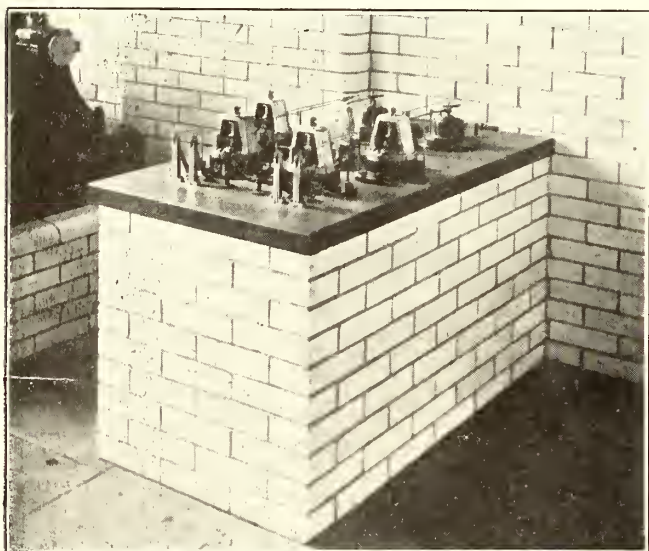


Fig. 10—Detroit Tunnel—Quadruple Load Limit Device

to be reduced and the current to flow in the by-pass circuit, and by proper adjustment of the resistance of the two paths the current flowing through the counter machine field is at all times proportional to the current times the power factor on the incoming lines from the Edison Company.

From the counter machine armature a circuit extends to and includes one field of the exciter and the armature of the buckor, this buckor being a machine designed to generate constant voltage irrespective of the direction and amount of current through its armature and provided to furnish a constant opposing force for the regulation to work against. The voltage of this buckor is equal to the voltage of the counter machine when the normal load is on the incoming lines, and any change in load on the incoming lines will cause current to flow from the counter machine or to the counter machine through the exciter field, depending on whether the load is increased or decreased. From the exciter armature a circuit extends to the booster field and includes a reverse series winding on the exciter. This winding cuts down the exciter voltage when current flows to the booster field, thus permitting an abnormal voltage to be obtained from the exciter and applied to the booster field as long as required, or until current begins to flow through the booster field circuit, when this voltage is cut down in proportion to the current flow to the booster field. The wiring details of this apparatus are shown in Fig. 9.

In this plant the time which is required to reverse the

booster from approximately 80 volts in one direction to approximately 80 volts in the other direction, with normal voltage applied to its terminals, is approximately $4\frac{1}{2}$ seconds. By using the differential exciter voltage as high as 300 volts can be impressed on the booster field, which is wound for approximately 20 volts. The result is that the response of the booster is enormously quickened, and this excess voltage is cut down exactly as desired, so that at no time does an excessive or abnormal current flow through the booster field. Means are provided whereby the average load supplied by the Detroit Edison Company can be changed at will to accommodate this system to different schedule conditions. Means are also provided whereby the regulation can be changed from $7\frac{1}{2}$ per cent to 33.1-3 per cent; that is to say, the incoming power from the Detroit Edison can be kept constant within the limits of plus or minus $7\frac{1}{2}$ per cent, or can be permitted to vary plus or minus 33.1-3 per cent from any desired average.

ELECTRIC CLUB OF CHICAGO

A well-attended meeting of the Electric Club of Chicago was held on Jan. 11 in the Coliseum during the Electrical Show, by the courtesy of Homer E. Niesz, who is general manager of the Electrical Show, as well as vice-president of the club. H. H. Cudmore, president of the Electrical League of Cleveland, was the principal speaker, as the result of an interchange of courtesies between the Cleveland and Chicago clubs, Mr. Vose, the president of the latter organization, having previously addressed the Cleveland League. Mr. Cudmore said that the association in Cleveland is conducted on lines similar to those followed by the Electric Club of Chicago. Meetings are held twice a month, although it is expected that the plan of holding weekly meetings as in Chicago will be adopted at some future time. One feature of the Cleveland meetings is the chorus singing, which has proved an enjoyable diversion. Mr. Cudmore spoke particularly of the plan of co-operative newspaper advertising adopted by the electrical interests of Cleveland and he caused to be distributed sample pages of the newspaper publishing these advertisements. An arrangement was made with the *Cleveland News*, an afternoon paper, by which on every Saturday there is published what is called "the People's Electrical Page." In the center of this page there is a collection of items of electrical information of general interest, and surrounding it are the advertisements of local electrical dealers, contractors and central-station interests. The idea is that the electrical advertising of Cleveland is thus massed in one broadside, as it were, and is, therefore, more effective. The work is in charge of M. E. Turner, of the Cleveland Electric Illuminating Company, who is also an officer of the league. Mr. Cudmore closed with a cordial invitation to the members of the Electric Club of Chicago to visit the Electrical League of Cleveland.

J. S. Badger, general manager and chief engineer of the Brisbane Tramways, of Brisbane, Australia, who has been spending some time in the United States investigating the management of street railways in American cities, was a visitor, and spoke briefly by invitation. He said that all the trunk railroads and many of the street railway and electric light plants in Australia are owned by the government or by municipalities. He believes, however, that the electrical industry does not reach its highest development under government ownership. Public ownership has many good features, but it is undoubtedly true that private enterprise supplies that initiative which makes for the greatest degree of enterprise and development. Mr. Badger spoke of the remarkable progress in street-railway service in Chicago since he visited that city 15 years ago. The street railway systems of Australia are small compared with those of the United States, and the speaker gracefully expressed a sense of obligation in being permitted to study freely many examples of American development.

George H. Porter and Thomas C. Ringgold spoke briefly. The treasurer's statement was submitted, showing that on Jan. 1 the Electric Club of Chicago had \$3,222.35 in its treasury.

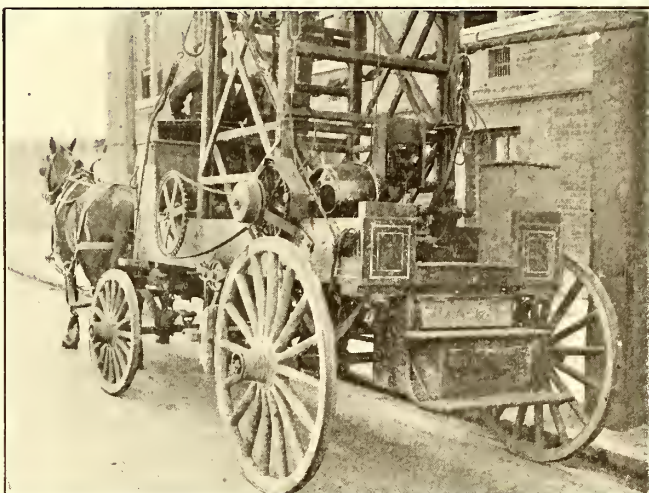
PORTABLE ERECTOR FOR ORNAMENTING IRON POLES IN SAN FRANCISCO

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

In San Francisco the United Railroads is at present engaged in installing about 600 iron poles with ornamental castings of an unusual design on three of the principal streets of the city—Market, Valencia and Sutter. These poles were modeled after the very ornate columns on the Alexandria bridge in

being lowered into place, some device outside of the linemen's usual resourceful list of tools had to be provided. As the erection of 600 sets of these castings was a large piece of work, it justified considerable expense in constructing the apparatus so as to make it as labor-saving as possible and also to insure that this saving should more than repay the cost of building the hoist.

The illustrations tell the story. An ordinary swinging-leaf, telescope tower wagon was equipped with a guyed rigid square 5-in. x 5-in. Oregon pine lower mast and a $3\frac{3}{8}$ -in. x $3\frac{3}{8}$ -in. pine top mast hinged to the former and tapering to $3\frac{3}{8}$ in.

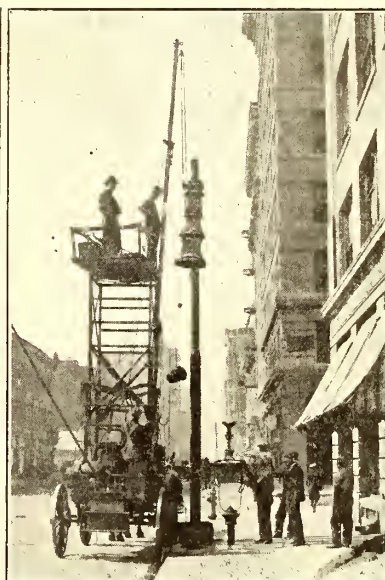
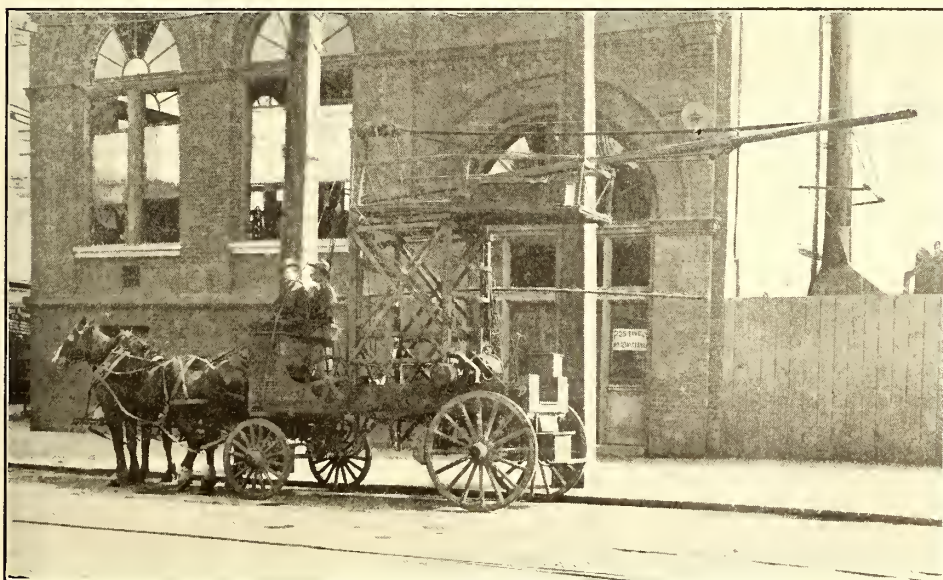


San Francisco Poles—View on Market Street and Rear View of Erector

Paris and carry on the base many figures in bas relief representing typical scenes from early California history. This article does not deal with the artistic design of the pole so much as with the practical task of installing the heavy ornamental iron castings on the already set poles.

The poles are of the usual steel tubular three-part construction—6 in., 7 in. and 8 in. in trade diameter. On Market Street, where there are four trolley wires and the distance

octagonal at the end. When erect this top mast reaches to a height of 32 ft. above the sidewalk, but when lowered it lies on the top of the tower at the ordinary height so as to pass under span wires, etc. When erect the leaning top mast is locked at the hinge and back-guyed against the strain of the hoisting rope. The top is provided with an iron cap carrying the necessary eyebolts for the attachment of the guys and pulley blocks and so designed as to bring the strain flatly on



San Francisco Poles—Portable Erector Closed and in Action

between curbstones is 85 ft., "extra strong" pipe is used, but on the other streets, where there is but 42 ft. or 48 ft. between opposite poles, the "standard" pipe poles are used. To maintain the continuity of the figures and produce the most completely artistic effect each casting was made in one piece and had to be threaded over the pole.

As the base was nearly 6 ft. high and weighed 500 lb. and had to be swung in the clear above the 24-ft.-high pole before

the top of the mast. This gin pole is leaned so that the top is perpendicularly above a point enough beyond the side of the wagon to allow the 27-in. diameter sub-base to be hoisted clear of the tower.

For the actual work of hoisting the half-ton of parts per pole expeditiously, a 2 hp, 500-volt shunt motor is used. This motor's pinion runs at 1200 r.p.m. and is geared by a double gear and sprocket chain reduction to a drum to which the rope

from the blocks is attached. On this 6-in. drum the 1-in. rope is wound as it comes off the combination of single block above and single block below.

The connection to the trolley wire is made by a long light "fishpole" and to the "ground" through the iron pole that is being ornamented. The speed of hoisting the heaviest piece, the base, weighing 500 lb., is 45 seconds. The lighter collars are hauled up by hand with a "whip" or single block, while the slings are being rigged on the heavier pieces.

The span and anchor wires have to be cast off and the strains temporarily taken care of from the top of the tower, while the sub-base, base and ornamental rings are being slipped over the pole. Under favorable conditions 25 sets can be put in place in a day with this device. Before the ornamentations are put on the pole it is bored at the base for the arc-light conductors to connect the underground lines with the lamp in the ornamental top. Every fifth pole on one side of the street has also been bored for the accommodation of the feed-in cable for



San Francisco Poles—Ornamental Bases

feeding the trolley wire from the underground feeders and each pole has been equipped with a roomy maple oil-impregnated switchboard for the attachment of switches and cut-outs to be located in the double-doored sub-base.

The iron castings as received from the makers have been painted with one coat of red lead on the outside. The core sand is scraped or blown out by compressed air and the inside given a coat of pole paint by the company before erection. The pole is painted again where it is to be covered by the castings.

After the installation of the ornamentations the pole is pulled or jacked plumb. The sub-base is then leveled up, cemented in and provided with drainage for water of condensation or leakage, the cracks are puttied up over oakum and the whole pole is repainted.

As the operator of the mechanism sits at his work he has the handle of the motor-starting resistance box conveniently before him and a foot lever below him for throwing a dog into the teeth of a gear on the end of the rope drum for emergency use in case both hoisting motor clutch and band brake should fail. A lever is at his right side for controlling a band brake on the drum on which the hoisting rope is wound and a

lever at his left side for throwing into or out of contact an 8-in. diameter cone friction head clutch coupling for use in connecting the motor mechanism to the hoisting rope mechanism. The band brake is used to control the speed of lowering the castings after being threaded over the top of the pole.

To a street railway man visiting San Francisco the fine appearance of these ornamented poles is a striking feature of the rebuilding of the recently burned city.

PATENTS—WHAT THEY ARE, AND HOW TO READ AND UNDERSTAND THEM

BY S. E. DARBY, ATTORNEY-AT-LAW, NEW YORK

Although the government has been granting patents for inventions for more than 100 years, they are, perhaps, the least understood of the various forms of property. In the popular mind they are regarded with more or less mystery and are frequently associated with visions of wealth, or else with vagaries of a diseased mentality. It is true that instances are common where patents for inventions have formed a basis for the accumulation of fortunes of greater or less degree, but the vast majority of patents have brought little or no return to the inventors who have given their time, efforts and patient toil in the creation of new ideas in the advancement of the useful arts.

Perhaps herein lies the other popular fallacy referred to. It is often difficult to understand why any one in a normal state of mind should go on with experiment and development without reaping some benefit or advantage from the efforts, and often the expense, devoted to this work. It would be too much to say that in such cases the reward comes from the knowledge that mankind has benefited by the production of the invention. The making of inventions is not, as a general rule, founded on any such high and disinterested motive. There is always the hope of remuneration of some sort. At the same time the public does benefit, to some degree at least, by each invention made, and we owe our present stage of perfection in every line of industry and in every direction to the steps of advancement brought about by the exercise of the creative faculties which we call invention.

To understand what a patent is we must not lose sight of the underlying basis of its grant. Among the powers conferred on Congress by the Constitution, which forms the basis for all our federal laws, is the power "to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

This is the foundation on which the entire structure of our patent laws is erected. The invention or discovery which promotes the progress of a useful art is to be secured to the inventor for a limited time. It is secured by the grant of a patent. The limited time has been fixed as 17 years. During this period the patent secures to the inventor the exclusive right to the invention. At the expiration of this period it terminates and the invention becomes available to the free use of the public. The term of exclusive right which the grant secures to the inventor is known as the life of the patent. During this term the exclusive right to the invention is a property right. It can be owned, enjoyed, used and transferred like any other property. There is nothing peculiar or difficult in the application of the ordinary rules to the property right secured by a patent.

A patent has sometimes been referred to as a contract between the inventor on the one hand and the government on the other. Being a contract it is based on mutual considerations passing between the contracting parties. The inventor, on his part, having made an invention, agrees that if he be granted the exclusive right to the invention for 17 years the public may have the free use of it thereafter. The government, on its part, agrees that if the inventor has made an invention it will secure to him the exclusive right thereto for 17 years, by

the grant of a patent, provided the public may have the free right to the use of the invention at the expiration of that term. This is the contract. The inducement to the inventor is the knowledge that for 17 years he shall have exclusive right to his invention, that during this time he can do with it as he pleases and that no one else can use or enjoy it without his consent. The inducement to the government is that of promoting the progress of the useful arts and securing to the public at the end of the exclusive period the right to the free use of the patented invention.

Every patent consists of two principal parts: first, the specifications, including drawings, where the nature of the invention is such as to be capable of illustration by drawings, and, second, the claims. Since the invention is the exclusive property of the patentee for 17 years and is to become public property at the expiration of that time, it is necessary that the public may know exactly what the patented invention is. Therefore the specifications must include a written description of the thing patented and in such clear and concise terms as to enable any one skilled in the particular art to which the patented device relates to construct, compound or use the device, by following the written description and the drawings forming part of the patent. The thing patented, the invention, may be a new method of operation, a new machine, a new article of manufacture, a new composition of matter, a new combination of elements, or a new improvement on an old method, machine, manufacture, composition or combination.

To define the exact scope and breadth of the invention, and of the grant which secures it for the limited period to the inventor, the claims of the patent are necessary. It is the claims which particularly point out and make clear the part, improvement or combination which the inventor claims as his invention or discovery. In securing a patent, therefore, the inquiry is: (1) Is the device sought to be secured by the inventor an invention; that is, is it the result of the exercise of the creative faculties? (2) Do the specifications, including the drawings, describe it with such particularity, fulness and clearness as to enable any one skilled in the art to which it relates to make, construct and use it? (3) Do the claims sufficiently define the invention and distinguish what is new from what is old?

Of these inquiries the last is the one which gives rise to the greatest conflict between the examiners in the Patent Office, whose duty it is to pass on the application for the patent, and the applicant for the patent. In this action there must be taken into account everything that has been done before in the particular art to which the invention relates. The examiners, while, of course, not infallible, devote careful, conscientious and trained intelligence to their examination of each application for patent they are required to pass on and allow the patent only after being thoroughly satisfied that the invention is one worthy of being secured exclusively to the inventor and is a promotion of the useful arts. In the large majority of cases the conclusions and findings of the expert Patent Office examiners are sustained when finally tested in the courts.

Many stand in great awe of a patent, and believe that all patents are good. To a certain extent this is as it should be. The grant of a patent carries with it the presumption that it is good. Indeed, so strong is this presumption that it requires proof to defeat it of the same order that, in the criminal law, is required to convict of murder, namely, proof that does not admit of a reasonable doubt. On the other hand, there are many who seem to believe that a patent is not good and is without value until it has been passed on by the courts and held to be good and valid. This view is too frequently held by those who find themselves unlawfully appropriating that which has been exclusively secured by a patent to another. A very small minority bring a really intelligent understanding to bear on the subject when presented to them before venturing to declare a particular patent under consideration to be good or bad.

A patent grant may be revoked and set aside by the courts on proper application based on fraud in connection with its

grant, but this course is very rarely invoked and is still more rarely effective. In the vast majority of cases where patent grants are held invalid, either wholly or in part, it is in suits brought on the patents for their infringement. This situation arises where the owner of the exclusive right secured by a patent grant finds that the exclusive right is being appropriated by another without his consent. To enforce his right to exclude others from the use of the patented invention the owner of the patent sues the unauthorized user for remuneration and damages for the unauthorized use and for an injunction against the continued use of the patent grant. The usual defense to such a suit is that the patent is invalid and void because it does not cover a patentable invention, having been anticipated by something which existed in the art prior to the date of the inventive act creating the patented invention. It then becomes the duty of the court to consider and pass on the questions whether the patent is valid and whether the one charged with its infringement really does appropriate and use the patented invention, giving, as a general rule, the patentee the benefit of any doubts that may exist. Unfortunately patent infringement litigation is expensive to the parties engaged in it. To this may be due, in large part, the terror and awe in which patent rights are held by a large part of the public. But this is a fault of the practice that has grown up in connection with patent litigation, rather than of the patent system itself.

It is usually difficult for the public at large to comprehend the difference between an invention and the machine, article, combination or thing into which the invention is incorporated. We very frequently hear one charged with infringement of a patent say: "I am not infringing because I have a patent myself for the machine or article I am using. The Patent Office would not grant me a patent for something which infringes a patent previously granted to someone else." On its face this reasoning appears plausible, and to understand its fallacy it is necessary to go back to first principles. The invention which a patent grant secures exclusively to the inventor must be defined and particularly pointed out in the claims, which thus become the measure by which the scope of the exclusive right is gaged. Therefore, in granting a patent the Patent Office considers in this connection only the question of whether the claims properly distinguish the new idea from what was old. It has no right or power to consider whether or not the machine, article or combination shown and described in the drawings and specifications contains the invention or inventive idea of some prior patent. That question is solely for the courts to consider. The duty of the Patent Office is to see whether or not the claims of the application for the patent can be allowed over what is shown or described in prior patents. It does not consider what is claimed in the prior patents. If what an applicant for a patent defines in his claims to be his invention is found to be old in a prior patent the applicant's claims are refused. If what is defined in the claims of the application is found to be new the claims are allowed, but their allowance and the issuance of the patent grant thereon do not give the patentee any right to use what has been exclusively secured in the claims of a prior patent. This can possibly be made clearer by illustrations.

Let us suppose ourselves back at the dawn of civilization and that our present patent laws were then in force. Now suppose "A" to be the first to invent and build a house—a log cabin, as distinguished from a tent or a cave—and that he provided the house with a doorway through one of its walls, and a door for the doorway, the door being suspended by leather thongs from a horizontal pole arranged above the doorway so that the door could be shifted along the pole into open or closed position. "A" becomes so impressed with the value of being able to employ a door which is movable into open position to let the light of the sun shine into his habitation, or into closed position to shut out the cold winds and the rains, that he decides to secure the exclusive right to the invention he has made in the promotion of the useful arts. He thereupon makes application for a patent and makes the door the important feature of the invention, which he defines in a claim as follows:

The combination with a house having walls, one of the walls having an opening therethrough to form a doorway, a door for the opening, and means for supporting the door for movement into and out of position to close the opening.

The examiner of the Patent Office, finding this invention to be new, allows the claim and the patent grant issues securing to "A" for 17 years the exclusive right to the invention defined in the claim. Subsequently "B," whether he has knowledge of "A's" invention or not, conceives the idea of supporting the door at its vertical edge upon hinges so that the door may rock or swing on its hinges into and out of position to close the doorway. This invention makes the use of the horizontal pole of "A's" device unnecessary. "B" then applies for a patent and defines his invention in a claim identical with that previously granted to "A." This claim, it will be seen, applies as readily to the one structure as to the other. The Patent Office examiner, in making his examination of "B's" application, finds "A's" patent, and seeing that "B's" claim is satisfied by "A's" structure, refuses "B's" claim as being anticipated by "A's" prior patent. Thereupon "B," being satisfied that his construction possesses merit and advantage over "A's" arrangement, modifies his claim defining his invention, and asks that a patent be granted to him upon the modified claim as follows:

The combination with a house having walls, one of the walls having an opening therethrough to form a doorway, a door for the opening, and hinges for supporting the door along one of its vertical edges whereby the door may be rocked or swung upon its hinges into and out of position to close the opening.

The examiner finds that this claim points out a structure which "A's" patent does not disclose, and allows this claim, and a patent grant issues to "B" securing to him the exclusive right to the invention he has made. Therefore, "A," although having obtained a patent, is excluded from the use of "B's" invention. At the same time "B" is excluded from using "A's" invention. In granting "B's" patent the examiner did not take into account the scope of "A's" invention as defined in his claim, but considered only the question presented to him by "B's" application, namely, whether "B's" claim defined a new structure and arrangement. Finding this question in "B's" favor, the patent issued to "B" as a promotion of the useful arts. While "B" secured the exclusive right to his own invention, still this grant did not give him the right to use that which had been previously secured exclusively to "A," and since "A's" patent defined and pointed out in its claim a construction which included "B's" invention, that is, since "A" secured the exclusive right to employ a door for the doorway opening in the wall of the house, which door was defined as being "supported for movement" into and out of position to close the doorway opening, "B" is excluded from using his arrangement wherein the door is supported on its vertical edge on hinges so as to rock or swing into and out of position to close the door opening because in doing so he would be using a "door supported for movement" into and out of position to close the doorway opening. That was just what "A" had secured exclusively in his patent. This exclusion of "B" from using what he had invented must continue till the period of "A's" exclusive right terminates. During this period "A" is not at liberty to use a door supported at its vertical edge by hinges because that is what has been exclusively secured to "B."

Suppose, however, that when "A" had originally applied for his patent he had failed to realize the value, importance and possibilities of different door movements, and had defined his invention in his claim as follows:

The combination with a house having walls, one of the walls having an opening therethrough to form a doorway, a horizontal pole supported above the doorway opening and a door suspended from the pole to be shifted therealong into and out of position to close the doorway opening.

A patent would have issued to him for the invention so defined. Now, if subsequently "B" made application for patent for his improvement of a hinged door and defined his invention in the terms of the claim specifying merely "means for supporting the door for movement into and out of position to close the doorway opening," the examiner would have refused allowance of this claim, as before, because in "A's" patent the door is

shown and described as being so supported. If, then, "B" restricts his claim the same as before to a door supported at one vertical edge thereof on hinges to rock or swing into position to close the door opening, his claim would be allowed, because "A's" patent would not show or describe any such structure. Moreover, the grant of "A's" patent for the invention defined in his claim for the horizontal pole and the sliding door suspended from it would not prevent "B" from using his invention of the hinged door, because "A's" claim does not in this case apply to "B's" structure, and the use of "B's" structure would not involve appropriation of that which had been exclusively secured to "A."

Suppose, again, that in the first instance "A" had defined as his invention in his claim merely the structure of the house itself, though showing and describing but not claiming the door. Now, when "B" applies for his patent, claiming the door broadly, as before, his claim would be refused because the broad idea is shown and described in the earlier patent to "A," although not claimed therein. When "B" limits his claim to the hinged door structure his claim is allowed. In this case he is still excluded from using his door construction in connection with the house, because the house has been exclusively secured to "A," although he is at liberty to sell his door to one who buys the right from "A" to use the house, but "A" cannot use the hinged door construction without the consent of "B," because that is the invention which has been secured exclusively to "B."

In this last case, where "A" defines his invention as the house structure, and "B" defines his invention as a hinged door structure for the house, it might happen that "A's" application for patent might be assigned to one examiner or to one class of inventions in the Patent Office, and "B's" application for patent for his hinged door structure might be assigned to another examiner or class for examination. Therefore, when "B's" application is first filed with the broad claim for the door however supported, the examiner might not think of examining the class of house structure patents and so might overlook the previously granted patent to "A." In this case "B" would get his patent with the broad door claim, but the patent would be invalid because the claim granted in "B's" patent would apply to what had been previously shown and described in "A's" patent. Consequently, if "B" should sue "A," or any one else, for infringement of his broad door claim it would be a good defense to the suit to bring forth to the court the earlier patent to "A." But suppose "B" had defined his door invention in two claims, one for the broad door structure and another for the hinged door structure, his patent would have been good and valid as to the hinged structure, though void and invalid as to the broad door structure.

Coming down to modern times, we find life more complex, and we encounter greater refinements and advances in all directions. So, too, we find our patents and the inventions they define in their claims more complicated and refined. We find that they mark narrower steps of advancement and hence include a greater number of elements. We also find a wider and ever increasing range of prior art to be considered in reading and ascertaining the true scope and breadth of our patents. The process remains just as simple and easily understood as originally, but greater care and discrimination are required. The great considerations in any case remain just the same, and these are: (1) What is defined and particularly pointed out in the claims as the invention which is exclusively secured to the inventor by his patent? and (2) Is that invention, so defined and pointed out, new and useful and a promotion of the useful arts? In the solution of these questions many rules have been developed of more or less technical character, and these rules constitute the test by which each case is measured.

Perhaps the most fruitful source of trouble in the application of the technical rules to ascertain the breadth, scope and strength of a patent is the question of proper combination of the elements which enter into the invention and are defined in the claims as the invention which is secured exclusively to the patentee. For a claim to be valid it must be for a true combi-

nation and not for an aggregation of the recited elements. The distinction between these is one that is frequently misunderstood and misapplied, although the principles involved are comparatively simple. It is not necessary that all the elements which enter into an invention shall be new. Indeed, it is not even necessary that any of them shall be new, since invention may reside as well in a new combination of old elements as in a combination of new elements. In fact, most of the inventions of modern times, particularly those relating to mechanical structures, are made up of elements which are themselves individually old. An inventor of to-day is entitled to call to his aid all the knowledge and information which the prior art can afford him, and if from this knowledge and information he can evolve a new combination which promotes the progress of the art in which he is working, and which attains advantages and utility not before realized, he has complied with the requirements and is entitled to be secured in the exclusive right to the invention he has made, always provided that he has made a true combination and has not merely aggregated the various elements he has called to his aid.

REPORT OF THE CHAIRMAN OF THE CENTRAL ELECTRIC TRAFFIC ASSOCIATION*

BY A. L. NEEREAMER, CHAIRMAN

Congratulations are due you for the expeditious manner in which business has been transacted at the meetings and by the committees during the past year and for the peace and harmony which have existed.

The Central Electric Railway Association has a membership of 46 interurban lines and one city line representing 3480 miles. Out of this, 36 interurban lines, representing 2962 miles, are active members of this association and participate in various publications. Thirty-three lines, representing 2840 miles, will be represented in Joint Passenger Tariff No. 3 when revised. Twenty-eight lines, representing 2354 miles, are now party to the interchangeable 1000-mile ticket. Twenty-six lines, representing 2169 miles, are party to the Official Classification, as filed by the chairman.

During the latter part of the year 1910 the time of the association has been occupied in revising Joint Passenger Tariff No. 3. Part of this work is brought about by slight revisions of the various local passenger tariffs, the correction of errors made in the original publication and the insertion of new routes and rules for the accommodation of the traveling public as a result of the experience derived during the past year from its use. A considerable amount of the work of the revision is caused by the addition of four new lines which are to become party to the new tariff. The inclusion of their stations and the opening up of their new routes tend to increase the value of the publication. An extension built by one line has opened another gateway for the routing of passengers, while extensions built by other lines have increased the territory and list of stations covered. The work of the revision is not yet completed, but at the rate it is progressing it will be but a short time until the revised tariff can be placed in the hands of the various companies for distribution. Following as a natural result of this, the tariffs covering the interchangeable 1000-mile ticket and joint and local baggage should be revised to incorporate the additional lines that are participating in the other tariffs. At this point it may be well to call attention to the increased demand for the interchangeable 1000-mile ticket. During the first two years 7000 of these tickets were ordered by the various companies party thereto and placed in the hands of their agents. During the past year nearly 5000 additional tickets have been disposed of. This is a ratio of over two to each mile represented by the lines shown on the cover.

The first step in the association toward uniformity in freight traffic was accomplished this year by the adoption of

Freight Circular No. 1, covering a table of estimated weights of standard commodities, and the filing of the Official Classification. While but 26 lines are party to the Official Classification, as filed by the chairman, there are quite a number that are purchasing the classification through this office in order to use a publication that has the association cover.

At the present time we have in the hands of the various committees a number of important subjects which will be decided within a very short time. These subjects cover an official interurban map, an official interurban guide, a standard scale for the transportation of milk and cream and a uniform exception sheet. The committees in charge of the above propositions have been working faithfully, and the results of their investigations will be of great benefit to the association.

During the past year your chairman has had considerable correspondence with various lines outside of the territory regarding information on various traffic propositions which have been worked out in our meetings. He has been able to answer these communications and give the valuable information requested. During the same period correspondence was carried on with various steam lines and associations regarding the exchange of information and recommendations in joint territory, and this correspondence has resulted in considerable benefit to our members.

In conclusion, the chairman desires to express his sincere thanks and hearty appreciation to each and every member for the earnest support and co-operation given him during the past year in his endeavors to work out the desires and orders of this body. Without this support very little would have been accomplished and our time would have been spent in vain. While the chairman is nominally the executive officer of your association, he is in reality nothing but an employee whose duty it is to carry out the instructions and orders which you give him. Therefore, without the support you have rendered the success which has been achieved during the past year might have been "weighed in the balance and found wanting."

You still hold the record of being the only traffic association existing among interurban lines, as the associations organized in other territories are still in their infancy and have not energetically or systematically taken up this important branch of interurban operation.

EXTENSION OF ENGINEERING FORCE OF MCKINLEY PROPERTIES

H. E. Chubbuck, vice-president executive of the McKinley properties, has just inaugurated a new operating engineering department with a staff which will serve to keep his office in touch with the local properties operated in the States of Illinois, Iowa and Kansas. The new engineering department will have headquarters in the Peoria offices. At the head of the department is W. H. Thompson, Jr., chief operating engineer, and associated with him are F. W. Bedard and R. F. Carley, operating engineers. W. J. Achelpohl, auditor of the Western Railways & Light Company, will look after the accounting of the statistical part of the work of the operating engineers. The new operating engineering department will endeavor to keep in close touch with the conditions on each of the local properties of the Illinois Traction System and the Western Railways & Light Company and serve to bring about a uniformity of operating methods on all properties which have similar operating conditions.

The operating engineers just appointed will visit each of the railway, lighting, gas and heating properties in Illinois at least once every two weeks. The properties in Iowa and Kansas will be visited at least once a month. The engineers will pay particular attention to the operating conditions at each plant and will submit reports of observations to Mr. Chubbuck, calling special attention to any unusual conditions. The operating engineering department will issue no instructions to the various superintendents in charge of the local properties but will submit their recommendations to the vice-president of the

*Report submitted at the annual meeting of the Central Electric Traffic Association at Indianapolis, Jan. 18, 1911.

company at Peoria; then, if any changes in methods are found desirable, instructions to the superintendents of the local properties will be issued from Mr. Chubbuck's office. This new department and staff also will be available for making special reports on power contracts and for similar promotion work.

TRAIN DISPATCHING ON INTERURBAN ROADS*

RY C. E. LEWIS, CHIEF TRAIN DISPATCHER NEW YORK STATE RAILWAYS, ROCHESTER, N. Y.

The safety of passengers and trains is of the first importance in railroad operation. To accomplish this on single-track, interurban railroads where first-class trains are operated at high speed on frequent schedules it becomes necessary to have a first-class dispatching system and a book of rules which are plain, brief and cover all points of train movement in such form as to eliminate all chance of doubt as to their interpretation.

Train dispatching covers a wide difference of opinion, and as the American Railway Standard Code is the result of many years of study of experienced and efficient railroad men, it seems to me to be the only one to follow.

Two forms of orders are used on the Rochester interurban lines of the New York State Railways: the train clearance order and the "31" telephone order. Order offices are situated along these lines about 10 miles apart and are positive block stations. Trains cannot pass or leave these stations without obtaining one of these forms of orders. In the absence of other order the train clearance order is used to allow a train to pass a positive block station. It is issued by the dispatcher under a distinct order number and is recorded in the dispatcher's order book with the train number, motor number, time O. K'd, station receiving and operator's name. The operator, after repeating this order to the dispatcher and receiving the O. K., will hand it to the conductor, who will repeat it to the operator, the operator giving the "complete." Copies are supplied for both conductor and motorman and one is retained by the operator for his record.

When it becomes necessary to make train movements not provided for by the timetable the "31" telephone train order is used and is issued in the following manner:

The operator at the station where the order is to be placed for the superior train is called and is instructed to copy three or as many as are required. Then the operator at the station where the order is to be placed for the inferior train is called and is given the same instructions. The dispatcher then gives the order number and the addresses of the trains in the order of their superiority. The order is then transmitted and is written in full without abbreviation by the operator. After the dispatcher has transmitted the order and the superintendent's initials, the operator will read it back to the dispatcher without abbreviation. The dispatcher will then O. K. the order if correct and the operator will give his name and order number.

The operator will hand the order to the conductor of the train addressed. The conductor will then repeat the order to the dispatcher without abbreviation and when he has finished he will give his name and train number. The dispatcher will complete the order if correct, giving the time and his initials. The order is then in full force and effect and a copy is given to the motorman by the conductor. The motorman must read his order aloud and without abbreviation to the conductor, the conductor watching closely to see that the motorman repeats it correctly. After the order is fully understood by the conductor and motorman they may proceed.

The requirements where orders are delivered at sidings are the same as the foregoing except that the motorman becomes the operator and receives the order and O. K. from the dispatcher, the conductor getting the "complete" in the usual manner. If, for any reason, the conductor or the motorman does

not understand the order, the dispatcher will be notified at once. The responsibility for its correct interpretation must not be assumed and the decision of one must not influence the other.

Twelve different forms with numerous examples and explanations are given for the transmission of the "31" telephone train order, and these forms must be followed if possible. When a train crew is in doubt as to the correct method of handling an order or wishes to refer to the rules that apply in a particular case, the information is easily found by referring to the forms in the book of rules.

Train dispatching on our lines is a very simple matter when all trains are running on schedule time because our rules prescribe that trains in either direction have no superior rights over trains of the same class in the opposite direction, but that they must meet as per timetable unless other orders are issued by the dispatcher.

The numerous causes of delay, such as motor failure, wire down, heavy traffic, etc., require quick, decisive and accurate action on the part of the train dispatcher so as to prevent all of his trains becoming as late as the one which is in trouble. To accomplish this successfully, I believe that a dispatcher's office should be roomy, pleasant and well ventilated and that the furniture should consist of a switchboard, dispatcher's desk, cupboard for stationery, coathook and one chair.

REPORT OF THE SECRETARY AND TREASURER OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

BY A. L. NEEREAMER, SECRETARY AND TREASURER

Your secretary and treasurer has the honor to submit herewith his annual report for the year ended Dec. 31, 1910.

Our railroad membership now consists of 46 interurban lines, representing 3480 miles, and one city line, making a total of 47 lines, a net loss of one interurban line and 51 miles. During the past year two lines have withdrawn, causing us a loss of 189 miles. One new line, covering 44 miles, became a member, and a gain of 98 miles was made by the extensions built by a number of the member-lines. During the past year we had 128 supply members, as compared with 121 supply members and two associate members in the preceding year, a gain of seven supply and the loss of two associate members.

The receipts and disbursements for the year just past are as follows:

RECEIPTS AND DISBURSEMENTS, JAN. 1 TO DEC. 31, 1910.	
Cash on hand.....	\$427.30
Received from railroads.....	3,553.15
Received from city lines.....	37.50
Received from supply men.....	1,024.00
Received from stationery and printing.....	587.60
Received from miscellaneous.....	9.35
Total	\$5,638.90
Payroll	\$2,825.66
Traveling expenses.....	123.85
Stationery and printing.....	877.89
Postage.....	230.60
Telephone and telegraph.....	83.44
Office incidentals.....	32.12
Taxes and insurance.....	8.81
Express.....	45.20
Office fixtures.....	63.75
Office rent.....	546.00
Cash on hand.....	801.28
Total	\$5,638.90

It will be observed from the above statements that the gross receipts and expenditures are less than the same items for the preceding year. This is due to the fact that during 1909 "Joint Passenger Tariff No. 3," which was a very large publication, was issued and no reissue of the tariff has been made since. While the gross revenue has decreased the fact still remains that we are still just as prosperous as we were during the past year. This is borne out by the fact that we now have on deposit in bank \$801.28, as compared with \$427.30 for the year preceding. Your attention is also called to the following statement:

*Paper presented at a meeting called by Public Service Commission, Second District, New York, Syracuse, N. Y., Jan. 19.

*Report presented at the annual meeting of the Central Electric Railway Association, Indianapolis, Jan. 19, 1911.

ASSETS AND LIABILITIES, DEC. 31, 1910.		
Cash on deposit.....	\$801.28	
Due from railroad members.....	44.04	
	\$845.32	
Liabilities		\$900.00
Balance		845.32
Total assets.....	\$845.32	

It is with pleasure that I refer to the above statement and call special attention to the fact that our bills are all paid and our assets are nearly 100 per cent more than in the preceding year. Your association is now practically upon a sound financial basis with an established standing and can be operated, if economy is practised, successfully.

There is still an opportunity to increase the membership and the revenue of the association by active work among the member lines in endeavoring to bring into the fold the rest of the lines in the territory covered by this association. The territory covered by this association embraces in round numbers some 10,000 miles of interurban lines, of which 3480 miles are members of this association.

Since the last annual meeting the various reports by the standardization committee which have been adopted have been compiled, published and placed in the hands of our members. Special publications have been purchased for use by that committee and are now in the secretary's office.

Your secretary cannot help but to call your attention to the claim index bureau. This bureau has been in existence for about three years and has now arrived at the point where the records are valuable. The support given this bureau has not been what it should be, as a number of member lines have been negligent in the matter of reporting. There is no expense attached to this branch of the association other than the postage necessary to send in the reports. The information which can be furnished from this office is invaluable. It is to be very much desired that this branch of the association will be given more attention in the future and that every effort will be made to make it one of the leading features. The success during the past year is due to the support and co-operation given the officers by the various members and committees.

In conclusion I desire to express to the members and officers my heartfelt thanks for their assistance during the past year and to call their attention to the fact that such support and assistance given to the officers mean the establishing of the greatest association of this kind in the United States.

HEARING ON ATTLEBORO FARES

The Massachusetts Railroad Commission on Jan. 12, 1911, heard the petition of the Selectmen of Attleboro for a reduction in fare and additional service on the Interstate Consolidated Street Railway. The case of the petitioners was conducted by Frank I. Babcock. The company was represented by F. H. Dewey, president, and Henry C. Page, general manager.

The company showed that while the seating capacity was frequently exceeded extra cars were run to handle heavy travel and that in general the company endeavored so far as possible to forestall demands upon its service. The petitioners requested the establishment of workmen's tickets at the rate of about 35 for \$1 good between 5 a. m. and 7 a. m. and 5 p. m. and 7 p. m. Mr. Dewey said that this would reduce the average fare between these hours to about 3.5 cents. The effect would be serious on all the lines of the company, since it would not be feasible to discriminate in favor of Attleboro. Counts of traffic showed that 15,600 persons used the company's service between 5 a. m. and 7 a. m. and 5 p. m. and 7 p. m., which would mean a direct loss of \$43 per day, or \$12,000 per year, if the workmen's tickets were put in force. The company paid only 4 per cent dividends and there was little money for a surplus to meet contingencies. The company was liberal in the extent of its service, since one could ride from 6 miles to 12 miles for a 5-cent fare, with a transfer. The board took the case under advisement.

LOGICAL BASIS FOR VALUATIONS OF INTERURBAN STREET RAILWAYS*

BY C. G. YOUNG, CONSULTING ENGINEER, NEW YORK, N. Y.

Much of importance has been said of a more or less contradictory nature on the subject of valuations of various classes of public utility properties, so that an analysis as affecting the investor, the public, the corporation and the government in respect to interurban street railways should be of interest to everyone seeking a fair and reasonable solution of the present perplexing problems involved.

The writer proposes to assume and maintain an independent attitude in dealing with the questions, believing that there is something to be said on both sides, and hoping thereby that a full discussion may be brought out and definite conclusions reached on a basis that will eliminate many of the existing contentions between the public utility corporations and the public; therefore, the writer would prefer to regard the government authorities as occupying the neutral, unbiased position.

To-day there are operating in the United States approximately 12,000 miles of interurban electric railways, representing an investment of probably \$400,000,000. The net earnings are possibly \$24,000,000, or 6 per cent on the investment, but not over 70 per cent of net earnings can be paid out in dividends.

There is in contemplated construction approximately 2500 miles of additional interurban railways, every mile of which is desired by the public, and which it is conceded would add enormous definite financial values in the sections to be served.

To secure the building of any of these lines requires capital, which, for perfectly evident reasons, does not now seem to be forthcoming. It, therefore, behooves both the general public and the corporations to consider carefully fundamental conditions. To secure capital for the construction of an interurban electric railway it is usually necessary to show, by carefully considered examination by competent and experienced engineers in whom the investor has faith, that the road will probably earn double its fixed charges. The investor requires bonds for his investment, and if they be 5 per cent gold bonds they must be issued to him at a considerable discount in order to give him a minimum return of perhaps 6 per cent from the bonds, and, as this return is not guaranteed, he will require in addition a considerable portion of the common stock to justify the risk he takes by investing in a new property and before the actual earnings are demonstrated. In other words, the investor requires and is entitled to receive, if earned, a return in excess of 6 per cent to offset his risks of the actual earnings bringing him much less than 6 per cent.

The differing reasons for the valuation of a public utility property have brought about many divergent views held by different commissions as to the correct and basic method for making valuations. The following are some of the principal purposes that have been advanced for desiring a valuation of a property:

1. To limit the bond issue to the physical appraisal.
2. To determine a basis for taxation.
3. To control the issue of stocks and bonds.
4. To determine the basis of valuation for rate making.
5. To determine a basis for the sale and purchase of property, or for future government ownership.
6. To ascertain a basis for rentals on joint operation.

The purpose of the valuation has a direct bearing on the method to be used in the eyes of the commissions and of the corporations, as may be noted by their usually diametrically opposite views. It is, therefore, advisable to consider carefully what bearing the method of valuation has upon the purpose to be accomplished, not to warp one's ideas in considering the matter, but to determine definitely just what factors in valuation should rule. The method of valuation will have a larger influence and cause a greater variation in the results than a mere guess at the physical appraisal, hence it is of importance

*Abstract of paper presented at the annual meeting of the Central Electric Railway Association, Indianapolis, Ind., Jan. 19, 1911.

to consider the purpose of the valuation, the method to be employed, and the logical and correct plan to be pursued.

The courts have held that the public service corporations are entitled to earn:

- A. Operating expenses.
- B. Expenses of repairs and maintenance.
- C. Taxes.
- D. Sinking fund to cover obsolescence and depreciation.
- E. A reasonable profit on the fair value of the property.

From this it will be seen that the whole question rests on:

1. What is a fair rate of return on the investment?
2. What is a fair value of the property?

After the above are determined and an analysis made of the service necessary and operating details, maintenance of the property, taxes and sinking fund, it can be determined what the proper tariffs should be to insure a reasonable rate of return on a fair value of the property.

A practical method of determining what is a fair rate of return on the investment may be had by considering on what basis and on what terms funds can be obtained for the construction and equipment of a new property.

The investor in a new property always considers it somewhat of a risk even though he has faith in the final result, but his experience in the past has shown him that he would not be warranted in making an investment unless the examination and report, prepared by competent authorities, indicated that the probable net earnings above operating expenses, maintenance and taxes are approximately equal to perhaps twice the total fixed charges, i.e., interest on the bonds issued to produce the property. The investor would not be satisfied to go into a new property if the return on his investment was to be limited to 6 per cent unless that amount were guaranteed, for experience shows that he takes a decided risk and may not receive even the rate obtainable by investment in "seasoned" or proved securities; therefore, he feels justly entitled to participate in any expected surplus earnings made above the fixed charges. This has usually been accomplished by issuing common shares as a bonus. The promoter, who has generally spent much time—perhaps years—as well as money to bring about the establishment of the enterprise, also feels that he is justly entitled to share in any possible surplus through ownership of a portion of the common shares. Now, if the public is fully informed that the common shares do not represent cash investment, or only partially so, no harm or wrong can accrue.

Should the property not earn its fixed charges, as too frequently has been the case, the investor would sustain a large loss. The property, however, must continue to operate and serve the public, and at the expense of the original investor. This requirement and obligation of the original investor is generally disregarded by the public, but it is an important factor and consideration by which, due to there being no minimum guarantee of return on the investment, he is reasonably entitled to a return up to the estimated rate on the faith of which he undertook the investment.

A FAIR RATE OF RETURN

Unquestionably a fair rate of return, or a reasonable profit, that can be expected on an investment in any public utility property depends principally on the risk involved in the investment.

Where the risk is low, or nil, the rate of return demanded will be a minimum.

Where the risk is high, the rate of return required will be a maximum.

Between these limits it is possible to classify all public utility properties.

It is not necessary to specify what particular element is the greatest factor toward increasing the risk, but anything that intimidates capital from investment in public utility properties is necessarily a destructive and wasteful condition or policy, and it should be the united desire and effort of the general public, as well as the management of such corporations, to do whatever is needful to re-establish permanently the confidence of the investors. Otherwise everyone will have to contribute

in one way or another to pay for the higher rate of return justly demanded by capital supplied under unfavorable conditions.

Merely as suggestions and without attempting to say that they should be adopted, the writer gives the following tentative percentages as a fair rate of return on invested capital that would not seem unreasonable under the conditions named:

- (1) 5 per cent where the interest and principal are guaranteed by the government.
- (2) 6 per cent on extensions of large properties showing substantial surplus earnings.
- (3) 7 per cent on extensions of large properties showing small surplus earnings.
- (4) 8 per cent on extensions of small properties showing substantial surplus earnings.
- (5) 9 per cent on extensions of small properties showing small surplus earnings.
- (6) 10 per cent on new properties where the estimated net earnings for the first year of operation under certain accepted methods are from 8 per cent to 10 per cent on the total cost of organization, construction and development.
- (7) 12 per cent on new properties where the estimated net earnings under accepted methods would not pay 5 per cent on the cost of organization, construction and development during the first three years, but where ultimately it is estimated that the property would earn good dividends.
- (8) A variable percentage on existing properties.

Taking the case of a proposed new interurban electric railway or any other proposed new public service utility, it may be reasonably certain that investors cannot be found for any new public service property unless the estimated expected net earnings are likely to show from $7\frac{1}{2}$ per cent to 10 per cent on the total cost of the organization, construction and development, therefore, if by government action the rate of return is likely to be unduly limited to less than what can be obtained in other investments there will be no investment capital available for public utility properties.

The construction of an interurban railway certainly adds greatly to the convenience of the public and greatly enhances the value of the land throughout the territory served. In fact, the actual enhancement in value of the tributary land might aggregate more than the total cost of the railroad and the investor would frequently make more profit by buying up land along the projected railroad than he could possibly make by investment in the securities of said railway even though his return was not limited to even less than 15 per cent.

A prominent builder of steam railways has very pertinently said that in the case of a new steam railroad built through new territory, causing the land to increase in value 1000 per cent or more, as is usually the case, no objection is made by the public, the purchasers of the land or the government, and no attempt is made to hold the value of the land down to its original total cost value; yet the steam railroad that has created these enormous values in land and added great and needed facilities for the people is told that it cannot be permitted to maintain tariff rates which would enable it to receive a return of 10 per cent to 15 per cent on its total cost, nor to permit its total valuation to increase by reason thereof in proportion to the risk taken by the investor, and certainly it would not be permitted to increase its capitalization in proportion to the increase in the value of the lands brought about by the funds invested in the railroad.

In addition the public utility property must continue its operations and serve the public even though its expected earnings are not realized, and if it cannot pay its fixed charges the court intervenes, assumes charge and continues to operate the property for the benefit and service of the public, and this is necessarily so and right, and no corporation can dispute it, but the fact remains that in such cases the original investor is generally a heavy loser and the property is rebuilt, if necessary, out of funds obtained by the receiver, by giving the new funds preference in the distribution of the earnings, and the property continues to operate to serve the public.

The question of physical appraisal has been rather fully covered during the last few years, and the writer finds no great difficulty, by eliminating the theoretical ideas, in harmonizing the various practical methods used or suggested in arriving at the present physical value of any property. However, very grave questions arise in the use of any basis of physical valuation to prove the real worth or value of a property. In other words, physical valuation of a property does not establish its worth or value. This holds true whether it be a new interurban electric railway which does not earn more than operating expenses, nothing toward interest, or a railway operated and maintained in first-class physical condition and earning a substantial surplus above fixed charges.

In the case of a property originally non-productive during several years of the development period and perhaps requiring to be reconstructed by investment of new capital, thus duplicating the original investment before it reaches the time when it can earn interest charges, it has been suggested and approved by at least one of the State public service commissions that a proper valuation would include its duplicate investment or cost of development and also the accumulated deficit capitalized, due allowances being made for charges against interest, depreciation, etc. In other words, it was assumed and granted that since the property was first constructed it was entitled to credit in a valuation to a fair rate of return on the investment from the beginning, in addition to a proper amount for depreciation, and, therefore, if not earned and paid out the company would be entitled to calculate the accumulated deficit and add the capitalized amount to the valuation.

All public utility properties, like private industrials, are entitled to the benefits of good creative judgment, good engineering and all the advantages accruing to the utilization of talent in their investment. If this is not conceded, then the government must step in and guarantee a certain and definite return for all investments alike, whether made with good judgment or otherwise, and manifestly this cannot be accepted nor would it be prudent or advisable.

The principal methods used in valuations of properties are:

1. Valuation based on the earning power. This basis is generally used in the purchase and sale of properties between private interests.
2. Valuation based on market value of securities. This method will appeal practically to business men as indicating a commercial going value, but it should be noted that the market value of securities depends largely upon the earnings, and the earnings depend very largely upon the tariff rates in vogue, so that such a valuation may be directly affected by either a proposed or an actual change in tariff rates and is also subject to speculative movements.
3. Valuation based on original cash cost of organization, construction and development, less depreciation and plus appreciation. This method has great merit in arriving at a fair valuation of the property on which to calculate a reasonable rate of return commensurate with the original and subsequent risks.
4. Valuation based on the cost of reproducing the property new to-day. This basis of valuation has certain merit, but is considered not so equitable as No. 3.
5. Valuation based on an inventory of the physical property at estimated cost of production less depreciation and plus appreciation. This method is that usually employed by appraisers and its results depend very largely upon the personal equation of the men directing the appraisal and the previous experience of the staff employed. Its errors are principally of omission. All things considered, it is not so reasonable, reliable or fair a basis except for limiting a bond issue as outlined in method No. 3.

PHYSICAL PROPERTY VALUATION

It is advisable to consider what should be included in the appraisal of physical property.

1. Legal expenses, including that for right-of-way, franchises, permits, organization, construction, etc.
2. Cost of promotion, covering expenses of preliminary in-

vestigations and reports, preliminary surveys, expenses of conducting a large number of possible investors, local authorities and others over the line, in addition to the legal expenses.

3. Brokerage expenses for securing the necessary funds during the construction period.
4. Interest on carrying charges, on all money expended up to the time the property goes into complete operation.
5. Engineering and supervision.
6. Total cost of construction, including contractors' profits on material and labor.
7. Total costs of right-of-way.
8. Accidents and damages, including all insurance premiums, fidelity, casualty, fire, boiler or other insurance and allowances for contributions to charitable and hospital funds.
9. Cost of complying with conditions of franchises, etc.
10. Overhead charges, including management, office rents and supplies.
11. Working capital.
12. Costs of organizing the business, securing customers, testing-out entire plant and drilling new men for operating.
13. Cost of marketing and discounts on the bonds (considering it as part of the price or cost at which money can be secured from the sale of the bonds).
14. Contingencies to cover incomplete inventories, unforeseen difficulties of construction and other items of expense which cannot be foreseen.
15. Obsolescence.
16. Replacements and betterments—made out of new capital investment.
17. Loss in the early operation during the period of development.

The items outside the actual physical construction constitute a very large part of the total cost of organization, construction and development.

FRANCHISE VALUATION

The question as to whether or not the franchise should be appraised and included in the valuation of a property has been the subject of considerable discussion and argument. Personally the writer feels that if any equitable plan of valuation can be made acceptable to all concerned without including a value for the franchise it would be desirable, for it would immediately eliminate strong public opinion, which undoubtedly stands against crediting public service corporations with a considerable value obtained by grants from the public, and, therefore, it is highly desirable that we should make an analytical study of the conditions in order to suggest a plan, if possible, that would eliminate the value of the franchise from necessary consideration.

In the case of an interurban electric railway the value of its franchise might be considered on its economic basis compared with the line if built on a private right-of-way. The original comparative investment can be readily computed, and against the increased cost in private right-of-way would be the saving in operating expenses, and particularly the costs of maintaining tracks in city streets, pavements and the expense of complying with other stipulations of the franchise, together with the additional expenses of accidents and damages on streets, all of which when capitalized will often more than offset the increased cost of entrance over private right-of-way. In addition there are items which should be credited, such as increase of traffic due to increased speed and right to charge a reasonable fare of, say, 2 cents or 3 cents per mile instead of being limited to a 5-cent fare for any distance with or without transfer. In such cases it is quite possible that the franchise value to operate on city streets may be nil or even negative.

The value of the franchise is generally offset at the time it is granted by the stipulations and conditions imposed. Of course, after a term of years its value may be greatly enhanced, and therefore it is reasonable that the term of expiration be limited, with possibly a renewal stipulation on a new basis of compensation to the city.

In certain cases where the municipality may desire to take over an operating company and where the method of apprais-

ing the property is not stipulated in the franchise, it is generally acknowledged proper to estimate a value for the unexpired term of the franchise. This was worked out in a systematic way in the Chicago appraisal, where several franchises expiring at different dates were involved.

The capitalization of a property should not be limited to the actual investment in the physical property or by the net earnings capitalized on a 5 per cent or 6 per cent basis. The only equitable basis is first to consider and determine the estimated rate of return that the original investor expected and that new capital would require. It is manifestly unfair to hold the total capitalization to the appraised physical value on existing property, as new capital cannot be secured on that basis nor did the original investors undertake the business with that understanding.

Also it is unreasonable to limit the capitalization to the net earnings capitalized, for it would be a hardship on properties earning but a small margin above operating expenses, although they may be serving the public well and in a growing territory that will produce large net earnings in succeeding years; therefore, such a method of controlling capitalization would be very objectionable—going up and down as earnings increased or decreased. It would also mean higher capitalization if tariff rates are increased and vice versa, giving too great a latitude to public utility properties.

Although shares or stock may carry its par, or dollar mark, for perhaps years, it is nevertheless helpful in analyzing the situation to regard shares merely as a division of surplus earnings into shares or parts.

Proper supervision and regulation of the issuance of securities in any public service property, or by any incorporated company for that matter, is advisable. Probably the best regulation that could be effected would be adequate and intelligent publicity and limiting or controlling the issues as follows:

Bonds against the cost of organization, construction and development at the price sold, allowing for the usual discount and commissions, but limited to the estimated net earnings until earnings increase sufficiently to carry the entire authorized bond issue.

Stock.—(a) As preferred shares representing that portion of the cost of organization, construction and equipment which is not covered by the bond issue. (b) As common shares without carrying any stated par value, representing the basis of subdivision for the distribution of estimated expected profits.

OPERATING EXPENDITURES

The writer believes it would pay many of the corporations to go very carefully into the methods and costs of operation by the employment of experts with experience not only in railroading, but also those familiar with outside systematic management and development of industrial methods from a world-wide study of conditions, and then adopt the practical methods which it could be shown would reduce operating costs.

If the purpose of desiring to determine a value for the franchise is to establish a basis for taxation, it would seem reasonable that a tax based on a certain percentage of the gross or net earnings would be more equitable.

Corporations and investors would not so generally object to paying taxes if a method was adopted that would be uniform and definite. What capital fears most in the matter of taxation is the uncertainty of how a corporation will be treated by the tax assessor and the various taxing authorities.

If the value of a railroad for purposes of taxation should be determined by its earning power, which seems reasonable, why go to the trouble of endeavoring to ascertain a valuation by introducing the variable factor of the rate of capitalizing the net earnings? It would be better and more simple to tax the earning power direct by levying a definite percentage of the earnings. This plan would obviate the present difficulties and discussions regarding valuation for taxation.

TARIFF RATES

Rates basically considered should be made upon the value of the services rendered.

The practice of permitting higher rates to be charged for superior service in the same locality is applicable to every mercantile and industrial business and is equally applicable to all public service properties.

The best regulation would be to require:

1. Adequate service for the conditions and the locality having regard to the cost of rendering additional and improved service.
2. Publicity regarding the stock and bond issues.
3. Publicity as to earnings, expenses, taxes, depreciation and sinking fund segregated as to divisions between main line, branches and the underlying properties.
4. Regulation as to unfair or unequal competition and of minimum rates or rebates.
5. Regulation of uneconomical differential rates resulting from competition between cities, shippers, jobbers and wholesalers, which differentials are now equivalent to rebates.
6. Limitation of bond issues to a fair cost of the organization, construction and development. Authorizing the issue of common shares to an appropriate amount, but without any indication of par value attached.
7. Regulation of the granting of charters and articles of incorporation, particularly on the question of authorizing competing unnecessary properties.
8. Directors to give more time and attention to management, holding them responsible, and compensating them better by participation in the net earnings.

COMMITTEES OF THE AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION

Following is a list of complete committees appointed by W. J. Harvic, president of the American Electric Railway Engineering Association, with the number of years each committee member is to serve. The committee on standards is made up of the chairmen of the other committees.

COMMITTEE ON STANDARDS

Paul Winsor, chief engineer motive power (chairman), Boston Elevated Railway, Boston, Mass.

M. V. Ayers, electrical engineer, Boston & Worcester Street Railway, Boston, Mass.

A. F. Hovey, cable engineer, Interborough Rapid Transit Company, New York City.

J. M. Larned, engineer of way, Pittsburgh Railways Company, Pittsburgh, Pa.

L. P. Crecelius, superintendent of power, Cleveland Railway, Cleveland, Ohio.

Martin Schreiber, engineer maintenance of way, Public Service Railway, Newark, N. J.

E. R. Hill, assistant to chief engineer, Pennsylvania Tunnel & Terminal Company, New York City.

F. G. Simmons, superintendent of way, Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Charles Hewitt, superintendent of motive power, Philadelphia Rapid Transit Company, Philadelphia, Pa.

M. H. Bronsdon, electrical and chief engineer, The Rhode Island Company, Providence, R. I.

Edwin B. Katte, chief engineer electric division, New York Central Railroad, New York City.

J. H. Hanna, chief engineer, Capitol Traction Company, Washington, D. C.

H. H. Adams, superintendent roads, stations and structures, Metropolitan Street Railway, New York City.

COMMITTEE ON WAY MATTERS

J. M. Larned, engineer of way (chairman), Pittsburgh Railways Company, Pittsburgh, Pa., one year.

M. J. French, engineer maintenance of way, Utica & Mohawk Valley Railway, Utica, N. Y., one year.

C. L. Crabbs, engineer of way and structures, Brooklyn Rapid Transit Company, Brooklyn, N. Y., two years.

Rudolph F. Kelker, division engineer of track and roadway, Board of Supervising Engineers, Chicago, Ill., two years.

C. B. Voynow, assistant engineer of way, Philadelphia Rapid Transit Company, Philadelphia, Pa.

R. C. Cram, assistant engineer, The Connecticut Company, New Haven, Conn., one year.

C. S. Kimball, engineer maintenance of way, Washington Railway & Electric Company, Washington, D. C., three years.

H. F. Merker, engineer maintenance of way, East St. Louis & Suburban Railway, East St. Louis, Ill., three years.

B. E. Tilton, engineer maintenance of way, New York State Railways, Rochester, N. Y., two years.

JOINT COMMITTEE ON ACCOUNTING

A. D. McWhorter, master mechanic (co-chairman), Memphis Street Railway, Memphis, Tenn.

Charles Hewitt, superintendent of motive power, Philadelphia Rapid Transit Company, Philadelphia, Pa.

H. H. Adams, superintendent of road, stations and structures, Metropolitan Street Railway, New York City.

E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio.

John W. Corning, electrical engineer, Boston Elevated Railway, Boston, Mass.

COMMITTEE ON POWER GENERATION

L. F. Crecelius, superintendent of power (chairman for one year), Cleveland Railway, Cleveland, Ohio, three years.

H. G. Stott, superintendent of motive power, Interborough Rapid Transit Company, New York City, one year.

B. F. Wood, assistant engineer, motive power department, Pennsylvania Railroad, Altoona, Pa., three years.

W. E. Ralston, superintendent of power and shops, The Cleveland, Southwestern & Columbus Railway, Elyria, Ohio, one year.

William von Phul, engineer Southern properties, Ford, Bacon & Davis, New Orleans, La., three years.

R. A. Dyer, assistant general manager and electrical engineer, Rochester, Syracuse & Eastern Railroad Company, Syracuse, N. Y., two years.

C. L. Gates, chief engineer of power stations, Fonda, Johnstown & Gloversville Railroad, Tribes Hill, N. Y., two years.

A. R. Myers, electrical engineer, Buffalo & Lake Erie Traction Company, Buffalo, N. Y., two years.

A. Wolff, superintendent of power, United Railways & Electric Company, Baltimore, Md., one year.

COMMITTEE ON EQUIPMENT

M. V. Ayers, electrical engineer (chairman), Boston & Worcester Street Railway, Boston, Mass., one year.

H. A. Benedict, mechanical engineer, Public Service Railway, Newark, N. J., one year.

A. T. Clark, superintendent of road, stations and structures, The United Railways & Electric Company, Baltimore, Md., two years.

F. R. Phillips, superintendent of equipment, Pittsburgh Railways, Pittsburgh, Pa., three years.

F. G. Grimshaw, master mechanic, Pennsylvania Railroad, Camden, N. J., three years.

W. Thorn, division engineer, cars, Board of Supervising Engineers, Chicago, Ill., two years.

J. M. Bosenbury, superintendent of motive power, Illinois Traction System, Champaign, Ill., three years.

Homer MacNutt, master mechanic, San Diego Electric Railway, San Diego, Cal., one year.

H. L. Patterson, chief engineer, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio., two years.

COMMITTEE ON POWER DISTRIBUTION

A. F. Hovey, cable engineer (chairman), Interborough Rapid Transit Company, New York City, one year.

S. L. Foster, chief electrician, United Railways of San Francisco, San Francisco, Cal., one year.

E. J. Dunne, superintendent district, Public Service Railway, Newark, N. J., one year.

William Roberts, superintendent of motive power, Northern Ohio Traction & Light, Akron, Ohio, two years.

J. J. Brennan, superintendent of roadway and overhead, Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., three years.

*Prof. A. S. Richey, professor electric railway engineering, Worcester Polytechnic Institute, Worcester, Mass., three years.

G. W. Palmer, electrical engineer, Boston & Northern Street Railway, Boston, Mass., two years.

S. D. Sprong, electrical engineer, The J. G. White Company, New York City, two years.

Charles Rufus Harte, The Connecticut Company, New Haven, Conn., three years.

*Professor Richey is appointed special representative of the committee on power distribution to confer with overhead line construction committee of the National Electric Light Association.

COMMITTEE ON BUILDINGS AND STRUCTURES

Martin Schreiber, engineer maintenance of way (chairman), Public Service Railway, Newark, N. J., one year.

George M. Pegram, chief engineer, Interborough Rapid Transit Company, New York City, two years.

F. F. Low, architect, Boston Elevated Railway, Boston, Mass., two years.

C. H. Clark, engineer maintenance of way, Cleveland Railway, Cleveland, Ohio, one year.

M. H. Bronsdon, chief engineer, The Rhode Island Company, Providence, R. I., two years.

F. G. Simmons, superintendent of way, Milwaukee Electric Railway & Light Company, Milwaukee, Wis., one year.

J. H. Frank, architect, Philadelphia Rapid Transit Company, Philadelphia, Pa., three years.

C. G. Young, construction engineer, 60 Wall Street, New York City, three years.

George Weston, Board of Supervising Engineers, Chicago, Ill., three years.

COMMITTEE ON HEAVY ELECTRIC TRACTION

E. R. Hill, assistant to chief engineer (chairman for one year), Pennsylvania Tunnel & Terminal Company, New York City, two years.

Edwin B. Katte, chief engineer of electric traction, New York Central Railroad, New York City, one year.

W. S. Murray, electrical engineer, New York, New Haven & Hartford Railroad, New Haven, Conn., three years.

J. H. Davis, electrical engineer, Baltimore & Ohio Railroad, Baltimore, Md., three years.

Hugh Hazelton, electrical engineer, Hudson & Manhattan Railroad, New York City, one year.

E. F. Gould, electric and mechanical engineer, Aurora, Elgin & Chicago Railroad, Wheaton, Ill., two years.

COMMITTEE FOR CONFERENCE WITH THE AMERICAN SOCIETY FOR TESTING MATERIALS

Martin Schreiber, engineer maintenance of way, Public Service Railway, Newark, N. J.

John Lindall, superintendent of road, stations and structures, Boston Elevated Railway, Boston, Mass.

E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio.

W. J. Harvie, president of the Engineering Association.

Norman Litchfield, secretary-treasurer of Engineering Association.

COMMITTEE ON BLOCK SIGNALING FOR ELECTRIC RAILWAYS

(Jointly with committee of three from Transportation & Traffic Association)

J. M. Waldron, signal engineer (chairman), Interborough Rapid Transit Company, New York City.

John Ross, assistant superintendent of tracks, Detroit United Railways, Detroit, Mich.

G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind.

COMMITTEE ON EDUCATION OF ENGINEERING APPRENTICES

W. H. Evans (chairman), Indiana Union Traction Company, Anderson, Ind.

W. G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, Brooklyn, N. Y.

H. A. Benedict, mechanical engineer, Public Service Railway, Newark, N. J.

COMMITTEE OF THREE TO DRAFT RULES FOR THE COMMITTEE ON
METHOD OF ADOPTING STANDARDS

Paul Winsor (chairman), Boston Elevated Railway, Boston, Mass.

Rodney Hitt, associate editor, *ELECTRIC RAILWAY JOURNAL*, New York City.

C. B. Voynow, assistant engineer of way, Philadelphia Rapid Transit Company, Philadelphia, Pa.

METHODS OF EMPLOYMENT, INSTRUCTION AND DISCIPLINE OF MOTORMEN AND CONDUCTORS ON INTERURBAN LINES *

BY JOSEPH K. CHOATE, GENERAL MANAGER OTSEGO & HERKIMER RAILROAD

The preamble and resolution of the Public Service Commission calling this meeting again bring us face to face with a subject not only of the greatest importance, but one that has been ever present in the mind of the official responsible for the comfort, convenience and safety of life and property on the interurban roads.

Not only is it the horror of accident that has caused him to stop and think, but it has been the thought of absolute financial disaster to the corporation he represents. There are not many railroads in this State that could avoid bankruptcy were they to suffer such misfortunes as have come to some of our Western roads.

I can assure the Public Service Commission that all officials of the interurban roads of the State of New York appreciate the commission's desire in calling this meeting, and I can further assure it that it will have the hearty and earnest co-operation of each and every one in bringing about such methods as shall add to the safety of our operations.

There is no more important part of our operation than the employment, instruction and discipline of motormen and conductors, and it is the most vexatious question we have to contend with.

When travel is light we have all of our oldest and most competent men in charge, and when our travel is the heaviest we have in addition to these old and tried men all of the men youngest in the service and experience.

Every manager and superintendent is always looking forward to the big day on his line, but I can say to you that there is no one so glad as these same officers when they know at night that the last car has been returned to the barn and the day has passed without accident or interruption.

This is a condition that cannot be changed, and our efforts must be devoted to meeting the situation as it is and safeguarding our operations in every way that past experience and science can suggest.

In the employment of men there are more difficulties in the selection of motormen than in the selection of conductors for the reason that, while both the motorman and conductor must fully understand and appreciate the rules and while both are held jointly responsible for the operation of cars, the education of the motorman is not complete until he understands the machinery and apparatus that are placed in his charge, not only that he may get the best service from the machinery, but that he may know what to do in case of accident, delay or emergency.

It is the general custom on all interurban lines when employing motormen and conductors for the superintendent, first of all, to pass judgment on the applicant from his personal appearance and general bearing. If the superintendent is favorably impressed he then requires of the applicant that he submit references as to his character and a statement regarding his previous employment. These references and statements should be carefully and thoroughly investigated and verified.

Next, the applicant should be sent to a competent physician for a physical examination. This examination should be most thorough, not only of his hearing and sight, but should include a most careful examination to determine, as far as possible, the reliability that might be expected of the candidate in cases of emergency; for an excitable or erratic man would be dangerous to trust in charge of the operation of an interurban car. I believe this physical examination of the greatest importance and one too often overlooked.

I would then strongly recommend the procedure recommended by the committee on training of transportation employees as approved by the American Electric Railway Association at the October convention at Atlantic City. [The portion of the report of this committee which Mr. Choate then quoted was published in the *ELECTRIC RAILWAY JOURNAL* for Oct. 15, 1910, page 846.—Eds.]

In connection with this procedure too much stress cannot be laid upon the rules for interurban service being standard and alike on all lines. This, I think, is now conceded by all operating officials, and an earnest effort has been made in the past two years to standardize and perfect rules so that the operation of all interurban lines shall be alike, excepting as to local conditions.

The procedure recommended by the American Association is in a general way that adopted by all of the interurban roads, and is as good a system as can be devised, but the great value of this system lies wholly in the instructions and the care and thoroughness with which the examinations are carried out.

The superintendent, from his experience, is usually a good judge of men, but is often imposed upon unless he is very careful and thorough in looking up the references that are first given to him, for there are many tramp applicants for these positions who go from place to place who know in advance what the superintendent is likely to ask them and have fortified themselves with recommendations that may deceive him. With honest applicants this is not to be feared, and usually the deceitful man is soon found out.

The examinations, both oral and written, should be conducted in the most thorough manner and should be so changed, from time to time, that the applicant cannot be simply coached to the extent of ability to pass them; and he should be re-examined from time to time that the superintendent may know positively that his motormen and conductors have a clear and full understanding of all the rules and regulations under which they are employed and are alive to their importance. The written examination should be carefully filed for future references.

The work in the shops of the applicant motorman should be under a man who thoroughly appreciates what is expected of him in teaching. This assignment should never be carelessly made, and the possibility of students being treated as a nuisance and given simply roustabout work to do should be guarded against by the most careful selection of the man to whom this student is to be intrusted.

A recent reference to the harm that can be done in this direction will be remembered by most of the railroad men here in the paper read at the last quarterly meeting from the pen of the general manager of the Fonda, Johnstown & Gloversville Railroad Company.

The whole secret in the employment of motormen and conductors is in the thoroughness of the original examination and in the careful watching of the employee.

While the corporation that I represent has no school or skeleton car I strongly recommend that every railroad should have an equipment of this kind in which men can be carefully and thoroughly schooled for the service they are to perform, and I further believe that a railroad should, above all, have a paid instructor, or, if a small road, some one of its men assigned to such duties, who could, from time to time, call in, examine and post the men in this direction.

At a recent hearing on interurban operating methods before the Illinois commission a suggestion was made that the roads adopt a uniform application blank, and the commission was

*Abstract of paper read at conference of interurban officials with New York Public Service Commission, Second District, Syracuse, N. Y., on Jan. 19, 1911.

asked if it would take special action on this subject and would require the applicant to swear to the correctness of his blanks and to file a copy at the State House; and that a similar procedure might be adopted upon examination of the applicant by physicians. The Illinois commission indicated its approval of this plan.

I am inclined to agree with this suggestion, as it is the desire of all railroads to secure the best men they possibly can, and some such State provision as this would make our men feel the importance of the service.

After using all the care possible in selecting men and instructing them in their duties the next important step is knowing that the men do their duty and live up to their rules. The secret of this is the constant vigilance of the officer in direct charge of the men.

He should be a disciplinarian and should brook no violations or variations from the rules and regulations, but to be a good disciplinarian he must be absolutely fair and just. The best disciplinarian is the one who, while strict to the letter, is known for his justice and is respected by all his men.

There are men who are very strict disciplinarians and rule with a rod of iron who have been successful, but they are not the men who get in return all that is best out of the men or best for the interests of the company they represent.

In this connection I am very doubtful if railroad officials have always gone as far as they should in the punishment of men responsible for gross and criminal negligence. The simple discharge of such a man is of little consequence or little punishment; he simply disappears and goes where he is not known.

I do not know of a railroad manager in this State who does not believe in publicity and does not welcome honest and fair criticism. But if there is one thing he dreads more than another it is the notoriety given by a reporter of a newspaper who is hungry for news, who likes big headlines and is willing to print the first cause suggested to him of how the accident occurred, before there has been time for anyone to make an investigation and fix the responsibility.

For such reasons we are prone to allow gross and criminal negligence to pass simply with discharge in the hope that the accident will soon be forgotten. I am doubtful if this is as it should be.

Men guilty of gross and criminal negligence should understand that their punishment will be of such severity as to be a warning to others. I am not prepared to say just how this should be brought about, but it is a matter of sufficient importance to receive the serious thought of the railroad managers themselves, if not of the commission.

There are numerous violations by motormen and conductors the cause of which it is a very difficult matter to determine. Violations that can be traced to bad habits, such as drinking, late hours and bad company, can be checked, but why violations occur with men whose characters are good, who have been faithful and long in the service, is hard to explain.

During the past year we had the misfortune to have a head-on collision on the Otsego & Herkimer Railroad caused by a crew passing a time-card meeting point, where the car had to come to a full stop at a steam railroad crossing, and the conductor was obliged to walk across the crossing and throw a derailing switch which was within 30 ft. of the switch he was to take to clear the opposing train.

This motorman and conductor had been in the service of the company for three years and had been making this same meeting point for 30 days previous to the day of the collision. On this occasion the conductor, after having thrown his derailing switch and after his car had crossed the steam railroad, boarded his car, gave his motorman the forward bell, and they deliberately proceeded in the face of the opposing train, passing their time-card meeting point, with the result of a serious collision.

A most thorough investigation of this accident was made immediately. Both the motorman and conductor admitted their responsibility and failure, but could give no explanation of how or why they had forgotten their meeting point. Both men

were absolutely truthful and straightforward, and keenly felt their error. Accidents of this kind do occur, and will occur as long as railroads are operated.

Our greatest safeguard against the violation of rules and regulations, other than those that can be easily and readily traced, is in the character of the officers in control and in the character of the men themselves. For high character is the greatest safeguard against the violation or negligence of all the rules that govern our daily lives.

After covering in a general way the employment, instruction and discipline of motormen and conductors we are again, as expressed in the beginning of this paper, up against the proposition that during the season of the year when our service is the lightest and most easily handled we have our best men in the service, and then when our service is the heaviest and most complex we have not only our best men, but all of our men least experienced and shortest in the service.

I know of no way to overcome this situation. Our oldest and best men are proud of their service and their uniform, are happy in their work and stay with us year after year.

In the early summer season we take on new men. We use every care in selecting and training them, and are obliged to put them on our cars when the service is the most exacting. It is true that these men are divided as far as possible, so that a green motorman is with a long experienced conductor or a green conductor is on with a long experienced motorman. We watch these men with the greatest care, devoting more time to them than to our older men, and safeguard, as far as possible, their work.

The large percentage of new men that make good and efficient motormen and conductors is simply astonishing, but the hardship comes in the fall when the heavy business is over and these men are either dismissed or put on the extra list. It is at this period of the year that the greatest number of men leave the service.

On the Otsego & Herkimer Railroad we try to overcome this as far as possible by dividing up the time of the men kept upon the extra list so that each shall earn a wage that will be sufficient inducement for them to stay through the winter months, with the hope of earning a permanent run when the first vacancy shall occur.

In conclusion I wish to say that I regret that I have not had more time that I could devote to this important subject of the employment, instruction and discipline of motormen and conductors.

I fully appreciate its importance and recognize that I have presented in this paper little that is new; but I hope sufficient will be found in it to bring out a discussion between the railroad men here present and the commission that may lead to a better understanding and to improved methods in the operation of the interurban lines of the State of New York.

STUDY OF STATION CONGESTION IN PHILADELPHIA

At the suggestion of the directors of the Pennsylvania Railroad President James McCrea has appointed two committees to study the subject of the existing congestion of the train service in the Broad Street station in Philadelphia and suggest means for relieving it.

The first committee consists of W. W. Atterbury, fifth vice-president; W. H. Myers, general manager; A. C. Shand, chief engineer, and George Gibbs, chief engineer of electric traction. The second committee consists of E. R. Hill, assistant chief electrical engineer of the New York terminal; E. B. Temple, assistant chief engineer of the Pennsylvania system; A. M. Parker, superintendent of the Hudson division, and E. V. Somerville, assistant engineer of the lines West. It is understood that the latter committee will report to the first committee and that this committee will then make its suggestions and that the use of electrically operated trains will be considered among other means for increasing the capacity of the station.

ELECTRIC RAILWAY REPAIR SHOP PRACTICE *

BY W. J. KELSH, MASTER MECHANIC WISCONSIN ELECTRIC RAILWAY COMPANY AND EASTERN WISCONSIN RAILWAY & LIGHT COMPANY

The Eastern Wisconsin system, composed of the Eastern Wisconsin Railway & Light Company, of Fond du Lac, and the Wisconsin Electric Railway Company, of Oshkosh, operates 67 miles of electric railway along the east shore of Lake Winnebago, including city lines in Neenah, Fond du Lac and Oshkosh and interurban lines from Fond du Lac to Oshkosh, Oshkosh to Neenah and Oshkosh to Omro. Our equipment consists of 10 double-truck interurban cars, 5 double-truck city cars, 23 single-truck closed city cars, 2 sweepers, 1 snow plow, 1 work car, 1 double-truck, 15-bench Narragansetts, 6 single-truck 10-bench open cars and 17 open trailers.

Six cars are required in our daily interurban service, three double-truck cars in our daily Fond du Lac service and from three to five additional cars in the morning and evening to handle our shop traffic between Fond du Lac and North Fond du Lac. Eleven single-truck cars are in daily operation in our Oshkosh city service and from three to five additional cars are required to handle our shop service morning and evening. In Neenah one single-truck car is required. Our summer traffic requires much additional equipment, the amount depending upon the weather and attractions.

At Fond du Lac, our southern terminus, we have a large inspection barn and shop for light repairs. At Oshkosh, about the center of our system, our main shop is located. An inspection barn is maintained at our substation 10 miles north of Oshkosh, where the Neenah city car is taken care of. At Fond du Lac we keep an extra interurban car, allowing us to change every round trip or every 67 miles. As soon as a car is over the pit two inspectors go over every part of the car, making such repairs as are necessary or as can be made in one hour. If anything is discovered which cannot be taken care of in this barn the shop at Oshkosh is notified by telephone and the car is taken off the road when it reaches there on its outward trip. This car, while being inspected, is also being cleaned and fumigated. This gives us a clean and fresh car every round trip. The Fond du Lac city cars are taken care of at this barn.

All city cars, both at Fond du Lac and at Oshkosh, are inspected by night men as to armature clearance, loose bolts, carbon brushes, brakes and lubrication, and are also swept and dusted. All cars are left in the car barn or shop one day each week for a general inspection and a thorough cleaning. We believe that thorough inspection will prevent failures on the road and also is much cheaper from a maintenance standpoint.

Our shop is equipped with a 200-ton Niles wheel press, a 38-in. Niles wheel-boring mill, and a 48-in. Niles wheel lathe, all operated by individual motors geared to the machines. In addition to the foregoing a 24-in. engine lathe, a planer, drill press and other minor machinery are operated by a line-shaft belt connected to a single motor. We also have two 10-ton chain blocks suspended from an overhead truss, enabling us to raise one end of a car at a time. With this shop equipment we are able to do all of our own work, both in equipment and power-plant maintenance.

For our fenders we use 3/4-in. pipe for the frame and strips of 1/8-in. x 1-in. iron, fitted and riveted around pipe, for a filler. These fenders are designed to be tripped by the motorman and cost us \$8.06 per pair installed. We make our armature shafts out of broken car axles for one-half the price we would have to pay for new ones.

Our railway storeroom is at Oshkosh, from where supplies are distributed to the different car barns and other departments. We keep an individual mileage record of all cars, also a card system on all wearing parts, showing actual mileage obtained on car wheels, brake shoes, trolley wheels, carbon brushes, bearing metals and oil. This enables us to judge what material is best adapted to our conditions.

We have adopted as standard on our interurban cars a 34-in. steel wheel with 3-in. tread and 7/8-in. flange, after trying cast-iron and steel-tired wheels. While the steel-tired wheels compared well with the steel wheel in mileage we found a difference in cost.

Our present steel wheels have given us 80,000 miles before the first turning and 60,000 miles since turning. The softest part of steel wheels, it is claimed, is after the first turning, that being the part farthest from the rolls when the wheel is being made. I have reason to believe from the present condition of these wheels that with another turning we shall get 60,000 miles more before scrapping them.

We use 425-lb. cast-iron wheels on all city cars, and get about 50,000 car miles from them. I believe that all double-truck cars equipped with air brakes and weighing 20 tons or over should be fitted with steel wheels from the standpoint of economy. We use a soft-composition-filled brake shoe on all cars, costing us \$0.3392 per 1000 car miles.

We are using a 6-in. trolley wheel without a bushing on our interurban cars. It has a 3/4-in. axle and is lubricated by a special graphite grease which is forced through a 5/16-in. hole in the end of the axle. This hole extends through the center of the axle to a deep groove in the middle of the axle and the grease flows through this groove into the oil cellar of the wheel. We rarely have to change a wheel because it is worn in its bearing. This shows that we are getting good contact as well as good lubrication. We get an average of 5000 car miles from this type of trolley wheel. On our city cars we are using a 5-in. trolley wheel with oil-lubricated graphite bushing and get 10,000 car miles from it. Part of the motors on our cars are oil-lubricated and the rest are lubricated with cup grease. In 1909 the oil and grease used on all cars cost us \$0.2015 per 1000 car miles, and I am satisfied that in 1910 we have done as well, if not better, but the figures have not yet been compiled.

During the past two years we have painted nine interurban and 14 city cars from the bare wood at an average cost of \$137.38 for interurban cars and \$83.55 for city cars. This cost includes burning off old paint, three coats of primer, two coats of color, lettering, striping, two coats of outside varnish and one coat of inside varnish. The floors and roof are painted with lead and the rattan seats are enameled.

All cars go through the paint shop at least once a year for varnish and at this time, if the color is marred so much as to require any spotting out, we cut in between stripes and letters with the original shade of color, and with two coats of varnish outside, one coat of varnish inside, roof and floors painted with lead and rattan seats enameled. For a 38-ft. interurban car this work costs us \$81.57 and for an 18-ft. city car the cost is \$43.47. We do not attempt to spot out defects in paint after the car has been in service, as the color is more or less faded. While we might be able to match faded color at the time it would not stay matched long and would soon show a difference in color, but when the entire panel is cut in between stripes and letters we have no trouble in keeping our cars looking fairly well. We believe we shall not have to paint cars throughout oftener than once in six or seven years.

During the past two years we have rebuilt vestibules on 12 single-truck closed cars. These cars originally did not have vestibules, but later the platforms were inclosed with temporary frames which had glass fronts extended over the dash to allow room for the brake handle and were fastened to hood at top. The left side of the platform was also closed. From this style we changed to a permanent solid vestibule, like those on modern cars. They cost \$116 per car.

Our shop organization is such that we can take care of the general repairs of our Fond du Lac electric light and gas departments. We maintain a testing department with our light department, which also can take care of light repairs required by customers from time to time.

Twenty-five salesmen of N. W. Halsey & Company, New York, N. Y., financiers, inspected the Illinois Traction System recently to gain information on interurban railroading.

*Abstract of paper presented at meeting of Wisconsin Electrical Association, Milwaukee, Jan. 19, 1911.

HEARING ON PLAN FOR REORGANIZATION OF METROPOLITAN STREET RAILWAY

The first hearing on the plan for reorganization of the Metropolitan Street Railway of New York was held before the Public Service Commission, First District, on Jan. 11. Commissioner Maltbie presided.

Charles F. Mathewson, counsel for the joint committee of bondholders, said that as no judicial interpretation of the effect of Sections 9 and 10 of the stock corporation law in connection with the reorganization of corporations had been had the petitioners reserved rights and objections, constitutional or otherwise, to the powers of the commission as to fixing capitalization below that legally outstanding of the company undergoing reorganization and as to the constitutionality of any action which would reduce the value of outstanding stocks and bonds.

The preparation of the plan was a vast work. Every effort had been made to prevent what the commission would concede to be a great calamity, the entire disintegration of the system. The amount of securities outstanding upon the Metropolitan system at the time of the receivership exceeded \$158,500,000, including the Metropolitan Securities Company stock paid up to the amount of \$22,500,000. The capitalization under the present plan was \$96,305,500, or a reduction of nearly 40 per cent.

In a considerable experience in such matters Mr. Mathewson had never known a reorganization so drastic, either in the absolute reduction in the amount of capital obligation or in the percentage of reductions from the previous existing securities. He presented the accompanying statement in relation to the reorganization:

STATEMENT REGARDING METROPOLITAN STREET RAILWAY REORGANIZATION. PRESENTED BY CHARLES F. MATHEWSON.

Metropolitan Street Railway securities, including Metropolitan Securities Company paid-up stock, about.....	\$158,500,000
Capitalization under plan.....	96,305,500
Reduction, nearly 40 per cent.	
Outstanding securities and obligations of Metropolitan system only, about.....	\$136,000,000
Capitalization under plan.....	96,305,500
Reduction, about 30 per cent.	
Securities to be readjusted, about.....	\$104,500,000
New securities in lieu thereof.....	64,850,000
Reduction, nearly 40 per cent.	
Stock of Metropolitan company.....	\$52,600,000
Stock of new company.....	14,150,000
Metropolitan company:	
Fixed charge 4 per cent and 5 per cent bonds superseded....	29,104,000
New company:	
Fixed charge bonds.....	11,768,000
Reduction 60 per cent.	
Annual fixed charges on superseded securities, at present amount (including only Metropolitan 4s, 5s and the Metropolitan Crosstown 5s and Central Crosstown 5s) to.....	\$1,415,910
Fixed charges of the new company will amount to only.....	\$470,724
Reduction, 66 per cent.	
Including also the Metropolitan notes (\$8,000,000) and the Metropolitan stock (\$52,000,000), the guaranteed annual charges upon the superseded securities amounted to over \$3,455,000, from which sum the new fixed charge of \$470,000 will represent a decrease of no less than.....	\$4,850,000
Two and one-half per cent on the income bonds to be issued under the present plan would require only \$1,000,000, and the entire 5 per cent thereon only \$2,000,000 additional, per annum, and if 5 per cent were additionally paid on the stock to be issued under the plan, the total annual requirement for fixed charges, income bonds and stock combined (outside of "undisturbed securities") would be but little more than..	\$3,000,000
Gross earnings were about \$13,000,000 for the last available year.	

Referring to the valuation Mr. Mathewson stated that by appraisal of real estate and by an engineering inventory and estimate, with none of which he believed the commission and its engineers would differ seriously, there was computed what was called construction cost pure, which was found to amount, including a little more than \$1,000,000 of working capital, to \$83,701,000. In addition to this cost, as was recognized by the commission in repeated decisions and by the courts, there was a development period, a development cost in the production of a system of this character. The best method of determining development costs in the light of experience was to compute

the amount of development charges in percentage of the cost of construction. Evidence would be produced that these amounted in a system of this character to 20 per cent to 25 per cent at a minimum on the cost of construction. That would indicate a development cost of about \$20,000,000. By way of illustration Frank R. Ford had worked out in some detail the items which would be included in development cost according to that method and they amounted to a little over \$18,000,000 or, including one or two items of construction which were related thereto, to a little less than \$20,000,000. The total, including construction and development, was \$101,798,000. That did not include the amount of the capitalizable assets.

The reorganization assets coming to the new company in cash and in the value of bonds and stock of the Central Park, North & East River Railroad were estimated at \$5,000,000 at least, which would make a total of nearly \$107,000,000. If there were to be added to this figure the net investment in superseded property, that is to say, the transfer from horse to cable and from cable to electricity, which was a proper investment in its time and which there had not been time or opportunity to sink, there would be added the further item of \$13,355,000, making a total of \$120,154,000.

There were several other assets which had not been taken into consideration, Mr. Mathewson said. The largest, and one of extreme importance, was what was known as the going concern value of the property. That value had been referred to by one or the other of the commissioners in various decisions, as he read them, and it had been accepted as a capitalizable asset of great value by the highest judicial authorities in this country. He thought it was fair to say that the going concern value in a well-kept up corporation was invariably more than the ordinary physical depreciation which existed where the property had been maintained, as property should be, by ordinary repairs and renewals.

Even this going concern value still left unaccounted for in the total of assets the value of claims against various street railway companies which were described in lot 13 of the supplemental decree of foreclosure under the 4 per cent mortgage and the special value of the bonds of the company for street railway purposes as distinguished from ordinary purposes, and it included no profits of promotion and no discounts on securities, or any special value of franchises which were perpetual.

Guy E. Tripp, vice-president of the Stone & Webster Management Association and chairman of the joint reorganization committee, identified various documents. Oliver C. Semple, assistant counsel for the commission, asked a question regarding the Central Park, North & East River Railroad, to which Mr. Tripp replied that the method of disposal of the ownership in that property had not yet been finally determined.

Mr. Mathewson said that the ownership of the \$1,200,000 Central Park, North & East River Railroad bonds had been in litigation. The right to retain them had been approved by the United States Circuit Court, and if the decision was sustained on appeal these bonds would pass to the reorganization committee.

William H. Wheelock, of the Douglas Robinson, Charles S. Brown Company, testified regarding values of real estate.

Mr. Semple thought that the property which belonged to the Metropolitan company or was directly subject to the mortgage and was directed to pass to the new company should be separated from the property held by leased lines.

Mr. Mathewson said that the course of the case would be facilitated if the proof was offered in the order planned. If it was considered pertinent, he would point out hereafter the portions of the real estate which were held in fee by the Metropolitan and the subsidiary companies respectively. Some of the real estate belonged to a company on whose property the Metropolitan had a lease of 1000 years, which was practically equivalent to the fee.

Mr. Semple said the point might as well be drawn directly, because he would stand for it as far as it was allowed to him to do so, that the only thing that could be turned into

capital was what belonged to the Metropolitan or what would belong to the new company. Leases that were thought unprofitable had been abandoned on three months' notice under authority of the court decree.

Commissioner Maltbie decided that, as a matter of convenience to the applicants, he would allow them to proceed to offer the estimates of the value of the property, without prejudice, however, to the rejection of the testimony later.

Mr. Wheelock then stated that he determined the cost of acquisition of the plots by taking first what he believed to be the market value of the various plots, plus an allowance per lot for such improvements as existed in the immediate neighborhood of the property, or, in other words, the typical improvements of the property, and in addition the cost of securing a policy of insurance and survey and of recording the various papers connected with the purchase of each parcel.

Charles F. Uebelacker, chief engineer of Ford, Bacon & Davis, said that, acting for that firm, he was acting chief engineer for approximately two years for the receivers of the Metropolitan Street Railway. He had made a study of the property in order to determine the cost of reproduction aside from land.

Commissioner Maltbie asked if the practice had been followed of considering the property of the Metropolitan and the leased and controlled companies in one schedule.

Mr. Mathewson said it had, and that it was absolutely impossible to disconnect the two for any purposes of operation. If the company could not be reorganized in such a manner that it might be capitalized as a single system, taking the value of the property as it existed and not valuing a lease as such, it simply meant the disintegration of the property into its elements. It was impossible to make any segregation which would not leave the system disintegrated. Of course the committee would be able to show a substantial title in all the properties, either by lease or otherwise.

Mr. Semple said it ought not to be impracticable to show what was the direct property of the Metropolitan and what was subject to this mortgage, and what was to be acquired by the committee and what was to be conveyed to the new company. The commission had to know that the property which the securities were to represent was to be the property of the new company, and was not to be leased property which the new company would have under a tenancy, perhaps for a long time, but subject to be cut off by contingencies that could not be anticipated and that would not furnish a basis for capitalization under the statute. He objected to testimony of the estimate of the cost of reproduction new of property of the system, considered as one corporation. The property described in the plan of reorganization included property owned directly and also leased lines. The witness was asked to testify regarding an estimate of the value of property which was not to be acquired by the company or the committee and could not therefore be property acquired against which stock or bonds might be issued under the statute.

Mr. Mathewson said that the property which the witness was asked to value was property to which the Metropolitan Street Railway Company had the title, and which it was using daily, subject to an annual charge. All the property was held by direct ownership of the Metropolitan company, by direct ownership of a lessor company or by companies controlled by stock ownership. The estimate of value applied only to the roads still operated by the receivers. The commissioner would see that the length of ownership in all these properties was so long that the difference between an ownership in fee and the use under the lease was negligible. No presumption could be entertained for the purpose of defeating their ownership and rights that the lease would be broken or abandoned. He thought that the statute to which the counsel for the commission had referred did not prevent the commission from capitalizing the actual value of property which existed and for which a capitalization was proper to some party.

The hearing was adjourned to Jan 17, and was then postponed to Jan. 20.

MR. TRIPP'S STATEMENT REGARDING LEASED LINES

Guy E. Tripp, chairman of the joint committee, has issued the following statement in reference to the discussion regarding the position of leased lines:

"The effort of the bondholders' committee for the last three years has been to devise a plan that would leave a unitary or complete system. It should be borne in mind that practically all the leases were made for 1000 years, and provide that the Metropolitan company shall make all additions and improvements on its own credit on the theory that it has the use of these improvements for 1000 years.

"It has procured funds and issued its securities for them and expended the money under the terms of these leases. In addition the receivers, acting under the authority of the United States circuit court, have issued receivers' certificates which are chargeable against the Metropolitan Street Railway Company (and not the leased lines) and have expended a large portion of the proceeds for additions and improvements of leased lines. Therefore it is plain that unless the reorganized company be permitted in effect to retain the capital already issued for these improvements, among which is the electrification of all these lines, and in addition be permitted to issue additional capital when required for future additions and improvements, there is no alternative but complete disintegration.

"There are very few steam railroad systems that do not include in their organization similar leased lines, which are financed by the parent company. The sweeping reduction in capital obligations under the plan transfers the burden of any high lease rentals from the public to the Metropolitan security holders."

INCREASED PAY FOR INDIVIDUAL EMPLOYEES ADOPTED BY BRADFORD (ENG.) CORPORATION TRAMWAYS

In accordance with the recommendation of C. J. Spencer, manager of the Bradford (England) Corporation Tramways, the Bradford City Council has approved certain increases in pay of different classes of employees, provided that the men show marked efficiency as individuals. Mr. Spencer's report included the following comments:

"On the general question of advances of wages to certain employees I desire to say that many of our employees could make themselves worth considerably more pay by better attention to work and by exercising a little more intelligence in the execution of their duties. Many men do their duty in a conscientious and efficient manner, and such men, in my opinion, are worthy of recognition, as compared with the man who, while managing just to keep his job, does his work more or less indifferently.

"The current consumption figures show that certain men, due to the manner in which they drive their cars, are costing from 1d. to 2d. per hour more in consumption of current than others.

"Some conductors, by close attention to duty, courtesy, civility and carefulness, succeed in avoiding accidents to passengers and, by encouraging passengers to travel on the cars, are certainly worth more than others who may have been in the service quite the same length of time.

"The same remarks are true even in a stronger sense in the case of inspectors and other administrative officers, who, by their strict attention to duty, make themselves very valuable servants of the corporation.

"I therefore ask the committee, when considering any proposals for advances, to recognize that all men in the service are not of equal value, and that while a man may have succeeded in keeping his job for a number of years, that may mean that he has only been able to observe the minimum requirements of efficiency. The object of increased pay and other inducements for betterment should be educative. If increased pay could only be got by effort toward higher efficiency, then it seems to me that both employer and employee would ultimately benefit."

MESSAGES OF THE GOVERNORS

The following abstracts from the messages of the Governors to the State Legislatures supplement those published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 75:

GOVERNOR WOODROW WILSON OF NEW JERSEY

We have a Public Utilities Commission in New Jersey, but it has hardly more than powers of inquiry and advice. It could even as it stands be made a powerful instrument of publicity and of opinion, but it may also modestly wait until it is asked before expressing a judgment, and in any case it will have the uncomfortable consciousness that its opinion is gratuitous and carries no weight of effective authority. This will not do. It is understood by everybody who knows anything of the common interest that it must have complete regulative powers: the power to regulate rates, the power to learn and make public everything that should furnish a basis for the public judgment with regard to the soundness, the efficiency, the economy of the business—the power, in brief, to adjust such service at every point and in every respect, whether of equipment or charges or methods of financing or means of service, to the general interest of the communities affected. This can be done, as experience elsewhere has demonstrated, not only without destroying the profits of such business, but also with the effect of putting it upon a more satisfactory footing for those who conduct it no less than for those who make use of it day by day.

Such regulation, based on thorough and authoritative inquiry, will go far toward disclosing and establishing those debatable values upon which so many questions of taxation turn. It would seem that in every locality there is some local variety of practice, in the rate, the ratio of assessment value to market value, and that every assessor is a law unto himself. Our whole system of taxation, which is no system at all, needs overhauling from top to bottom. There can be no system, no safety, no regulation in a multitude of boards. An efficient Public Utilities Commission will be a beginning toward a system of taxation as well as toward a system of corporate control. We cannot fairly tax values until we have ascertained and established them.

GOVERNOR HERBERT S. HADLEY OF MISSOURI

We need more railroads to assist in the development of the undeveloped sections of the State, as we need more capital to aid us in the development of our undeveloped resources. In order to secure this result such interests must be assured of fair and conservative treatment by the State. I believe that this assurance can be best given and a satisfactory result secured if the Legislature would create an appointive public service commission, with such provisions as to its personnel and powers as would insure a careful, scientific and conservative investigation of every situation before an order was made in reference thereto. It is my judgment that a State public service commission can more effectively and satisfactorily regulate all public service corporations doing business in the State than can such commissions created by the Councils of the different municipalities, or can the Councils themselves. However, if it was deemed advisable to except those municipalities in which public service commissions exist, or may exist by law, such an exception could be easily made. The experience, however, of the various municipalities in regulating public service corporations doing business therein has not, in my opinion, been sufficiently gratifying to justify or necessitate such an exception. The establishment of a State public service commission would, I am satisfied, give to capital invested and seeking investment that assurance which it seeks and requires that investigation would precede regulation; that no radical, extreme or retaliatory orders would be adopted or enforced, and, on the other hand, it would give the people assurance that their rights would be safeguarded and their interests protected.

In order that Missouri may not lag behind other States in the consideration of employers' liability and workmen's compensation laws, I have asked a number of those interested in this question to investigate the subject and report their recommendations to this General Assembly. There is some question as to how far we can go under our constitutional limitations in

the enactment of a law providing for compulsory compensation for workmen injured in industrial pursuits. If it is the opinion of the members of this General Assembly that there is not sufficient time to give to the different phases of this subject the consideration and investigation necessary for such an important change in our system of litigation and in the conduct of our industrial and commercial occupations, I earnestly recommend that you provide for a commission which shall further investigate this subject and make its report to the next General Assembly.

GOVERNOR BERYL F. CARROLL OF IOWA

I do not understand that compliance with the finding of a board of arbitration with reference to disputes between employees and employers could be enforced, but the public is entitled to know the facts relating to matters of controversy which usually involve the public welfare, and it is hardly likely that either party to a dispute could long maintain itself against the finding of a competent and unbiased tribunal. I therefore recommend that you give careful consideration to the question of establishing such a body in this State.

In this connection I desire to call attention to the fact that efforts will be made at this session of your body to have enacted a law with reference to compensation of workmen injured in hazardous occupations. While not fully advised with reference thereto, it is my understanding that such a law is desired, both by the employer and the employed, so that the conditions under which and the amount of damages that may be recovered in so far as is possible, may be determined in advance. It is desired also in order that expensive litigation and excessive costs of insurance may be avoided as well as for various other reasons. This is an important subject to the industrial interests of the State and it merits careful consideration.

Two years ago I recommended to the General Assembly the creation of a public utilities commission or the enlargement of the powers of the Board of Railroad Commissioners of Iowa. I then suggested that the membership of the railway commission, if clothed with the powers referred to, be increased to five and that the added members be appointed by the Governor, and as the terms of the present members expire their successors shall be appointed. I desire now to renew that recommendation and to say that, in my opinion, a commission clothed with such power and authority as is given by the laws of New York or Wisconsin would prove of great benefit to the State. Then too the question of the regulation and control of the water-power of the State should be lodged with the proposed commission. This is an important matter and one which has been very much neglected.

The thirty-second session of the General Assembly enacted a law to prevent the issuing of watered stock. It provides that no stock shall be issued by any corporation except for cash, unless the consent of the Executive Council is first obtained, and that no stock shall be issued unless the par value is paid in cash or its equivalent. As to incorporating an ordinary going business the law does not seem to have worked any particular hardship, but as to promoting new corporations, and especially electric railways, it evidently has proved a hindrance. The particular cause of the trouble seems to be that the law does not take into account the expense incurred before arriving at the time to issue stock, nor does it take into consideration any depreciation in the sale of bonds. It is the claim of those interested in railway building that they cannot meet the requirements of the statute, and consequently railway construction in this State is practically at a standstill. It is possible that if other States and the federal government were to enact laws similar to our own it might to some extent relieve the situation, or at least Iowa would be placed upon an equality with other States. But until such laws are passed we seem destined to suffer a decided disadvantage. I have called your attention to this matter in order that it may be determined whether any relief can be had without defeating the real purpose of the law and, if none can be had, so that you may decide whether the law shall continue unchanged to await the hope of action by other States and by Congress.

ELECTRIC RAILWAY TRANSPORTATION

The issue of the "Annals of the American Academy of Political and Social Science" for January, 1911, is devoted to the subject of "Electric Railway Transportation." The contents are divided into discussions on two general aspects of this subject. Part 1 is devoted to "Traffic and Financial Problems" and Part 2 relates to "Public Regulation of Electric Railways."

Bion J. Arnold, chairman of the board of supervising engineers, Chicago Traction, contributes a paper on "The Urban Transportation Problem—a General Discussion." An abstract of this, which is a report on the Pittsburgh traffic situation, was published in the *ELECTRIC RAILWAY JOURNAL* for July 30, 1910, page 179.

Thomas Conway, Jr., Wharton School of Finance & Commerce, University of Pennsylvania, discusses the decreasing financial returns of urban street railway properties. He declares that there is no matter in which it is more important that the public receive the fullest, frankest and most complete information than that concerning the earnings and financial problems of electric railway properties. Professor Conway says that the urban street railway industry at the present time is facing a financial crisis, due to the decrease in the average earnings per rider and to the widespread increase in the cost of maintenance and operation. The writer says that the most important factor in decreasing the earnings of urban systems has been the alarming decline in the average fare, due to the rapid growth in transfer traffic. Professor Conway concludes that the solution of the problem must be found in the readjustment of the average fare per passenger carried on a basis which will remove the danger and accord satisfactory financial conditions.

William B. Jackson, of D. C. & William B. Jackson, consulting engineers, Chicago and Boston, discusses "The Depreciation Problem." Mr. Jackson concludes that it seems unavoidable that rates will be periodically revised in the future and that it therefore appears manifest that a full understanding of all the elements which make up the cost of railroad service is necessary. An important one of these elements and one which has heretofore failed of adequate attention is that of depreciation renewals. The renewal expenses required by depreciation should be squarely faced and not passed on in multiplied ratio to future generations.

"Methods of Increasing the Efficiency of Surface Lines in Large Cities" is the title of an article by Williston Fish, assistant to the president, Chicago Railways Company. Mr. Fish says that the whole question of clear roadway and of stops is one of arithmetic and evolution. He concludes: "If the people in New York, Chicago and other large cities can give themselves a street car service one-half more rapid and much more regular than they now enjoy, at no more expense than the discipline of their team traffic and an extra walk averaging about 150 ft., I think they will demand the better service."

William S. Twining, of Ford, Bacon & Davis, consulting engineers, New York, N. Y., contributes an article on "The Investigation of Traffic Possibilities of Proposed Subway Lines." The writer believes that "inasmuch as the growth of large cities demands the supply of some quicker form of transportation than is afforded by street cars, the city itself should construct the tunnels or elevated structures which represent a large part of the investment, leaving the same to be operated by a transportation company." He urges the transportation committees in large cities to have a complete urban engineering study made of local needs and conditions before deciding to recommend franchises for any particular rapid transit route, whether subway or elevated, as the transportation of cities should be developed as a whole and along a definite and determined plan.

Frank S. Cummins, traffic manager of the Inter-Urban Railway, Des Moines, Ia., in an article on the "Possibilities of Freight Traffic on Interurban Lines" says that the possibilities of freight traffic on any interurban property are great and the earnings most gratifying.

"Express Business on Interurban Lines" is the subject of a contribution by A. Eastman, general manager Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont. Mr. Eastman discusses the various classes of methods followed in conducting an electric railway express business and says that it nearly always can be made remunerative.

Samuel M. Curwen, vice-president and general manager of The J. G. Brill Company, Philadelphia, Pa., contributes an article on the subject "Economic Factors in the Selection of Cars for Urban Service." He says that great economies in operation can be gained by proper construction standards, enabling the car builder to build the very lightest car to meet satisfactorily the requirements of the service. Standardization will reduce the cost of production to the manufacturers by the elimination of much of the special designing, special patterns, castings, etc. This will benefit the railway company, for besides reducing the initial cost of equipment and the cost of replacement it will be productive of economy in the maintenance and engineering departments and will furnish a lighter and better design of car in most cases.

C. D. Emmons, general manager Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., in an article on "The Relations of the Electric Railway Company with Its Employees" concludes that the keystone of the policy of most electric railways at the present time is the necessity for fair, impartial and humane treatment of their employees, care for their physical comforts and such treatment that a spirit of courtesy to the public and loyalty to the companies may be fostered.

Dan'el T. Pierce, formerly executive assistant of the Philadelphia Rapid Transit Company, in discussing "The Strike Problem Upon Electric Railways" says that no street railway company can win, in any proper sense of the word, a strike of its motormen and conductors, and for this reason if for no other such strikes should never occur. The remedy will be found in the improvement and readjustment of working conditions on street railways.

A. W. Warnock, general passenger agent Twin City Rapid Transit Company, contributes an article on "Educating the Public to a Proper Appreciation of Urban Street Railway Problems." Mr. Warnock believes that the daily and weekly newspapers, the display cards in the company's own cars and the company's folders and publications offer the most effective mediums for conducting a campaign of education.

A. D. B. Van Zandt, publicity agent Detroit United Railway, in an article on "The Presentation of Interurban Problems to the Public" says that the interurban line is not a deterrent but an aid to the small towns. While the course of trade was from the village to the city before the advent of the interurban roads, to-day it runs equally from the city to the village and from the village to the city.

Frank R. Ford, of Ford, Bacon & Davis, consulting engineers, New York, N. Y., discusses the "Valuation of Intangible Street Railway Property." Mr. Ford's exhaustive article on this subject includes the testimony presented before the New York Public Service Commission, First District, in the case affecting the Coney Island & Brooklyn Railroad. The testimony in this case was reviewed in the issues of the *ELECTRIC RAILWAY JOURNAL* for Dec. 25, 1909, and Jan. 15, 1910.

William Osgood Morgan, vice-president and counsel Sheboygan (Wis.) Railway & Electric Company, contributes an article on "The Indeterminate Permit as a Satisfactory Franchise." He discusses the Wisconsin law relating to the indeterminate permit.

B. H. Meyer, member of the Interstate Commerce Commission and formerly chairman of the Railroad Commission of Wisconsin, in an article discussing the "State Supervision of Electric Railways in Wisconsin" describes the study of the service situation in Milwaukee, an account of which was published in the *ELECTRIC RAILWAY JOURNAL* for April 9, 1910. He also refers to other cases which have been before the Wisconsin commission.

Milo R. Maltbie, member of the New York Public Service

Commission, First District, in an article on the subject "The Fruits of Public Regulation in New York" describes the powers and activities of that commission.

George Weston, assistant chief engineer of the board of supervising engineers, Chicago Traction, contributes an article on "Supervising Engineers and Street Railway Service—the Value of a Board of Supervising Engineers in Securing Efficient Street Railway Service." Mr. Weston says that the influence of such a board is toward good service, the best that can be afforded for the rate of fare paid. He adds that the street railway business, like any other business, must be a commercial success in order that it may live and give efficient service.

HEARING ON SERVICE IN TRENTON

Hearings were held in Trenton, N. J., on Dec. 6, 1910, Dec. 13, 1910, and Dec. 22, 1910, on the complaint of the City of Trenton to the Board of Public Utility Commissioners of New Jersey regarding the service furnished in Trenton by the Trenton Street Railway in which it was asked that the board should withhold its sanction of the terms of the lease of the Trenton Street Railway to the Trenton & Mercer County Traction Company. The commission was represented at the first hearing by Frank A. Sommers, chairman, Robert Williams and Thomas A. Hillery; at the second hearing by Mr. Sommers and Mr. Hillery, and at the third meeting by Mr. Hillery and Mr. Williams. The petitioners were represented at all the hearings by John H. Beckes and the company by George W. MacPherson, of counsel. The testimony presented in behalf of the city on the first hearing was confined principally to complaints of the alleged bad condition of the track and pavement in certain streets. Mr. Hurley, formerly general manager of the company, testified on the other hand that the entire system had been rebuilt during the past eight years.

The application of the Trenton & Mercer County Traction Company for permission to lease the Trenton Street Railway, the Trenton, Hamilton & Ewing Traction Company, the Mercer County Traction Company and the Trenton, Pennington & Hopewell Street Railway is now before the board. Each of these leases calls for the payment by the lessor to the lessee of a certain stipulated sum of money, increasing in amount through a period of 15 years, in addition to the payment by the lessor of interest on all bonds outstanding, all taxes, etc., and the proper up-keep. The lease of the Trenton Street Railway also provides that upon request the Trenton Street Railway will further mortgage its property for \$500,000, the proceeds of the mortgage to be used for rehabilitation and improvements.

On Dec. 17, 1910, the members of the board traveled over the principal lines of the company in a special car to study the physical conditions of the property and inspect the track in places about which complaint had been made.

BANQUET ANNOUNCEMENT

The second annual banquet which the American Electric Railway Manufacturers' Association will tender to the officials of electric railway companies attending the mid-year meeting of the American Electric Railway Association will be held in the grand ballroom of the Hotel Astor, New York City, on Jan. 27, 1911. Covers will be laid for approximately 600 guests, and will be so arranged as to accommodate eight or ten persons at each table. The price of the dinner to representatives of the Manufacturers' Association who wish to attend will be \$10 a plate.

Charles C. Castle, president of the Manufacturers' Association, will be toastmaster of the evening. The speakers will include: Governor Dix of New York; President Arthur W. Brady, of the American Association; Hon. W. B. McKinley and Col. H. G. Prout, vice-president and general manager of the Union Switch & Signal Company.

MEETING OF THE CIVIC FEDERATION

At the annual meeting of the National Civic Federation held in New York on Jan. 12, 13 and 14 a number of subjects of public interest were discussed. These included workmen's compensation, arbitration, industrial efficiency, uniform State laws and the regulation of trusts.

Harrington Emerson read a paper whose subject he gave as "Justice, Common Sense and the Pay Roll." He said that it was impossible to gain a greater degree of efficiency without giving a larger proportion to workingmen. He considered the principle of piecework bad, but declared that if men wanted to work hard and earn more they should be encouraged. The reward of efficiency was the best form of promotion.

H. L. Gantt, in discussing "Industrial Efficiency," said that the financiers representing the steam railroads had admitted that rising costs compelled them to ask the public to meet the burden through advances in freight rates. If it was a fact that every possible economy had been effected there was a serious condition to confront. The engineer and his able assistant, the skilled mechanic, asked the financiers to wait before reaching the conclusion that this situation existed. It was the duty of every employer to see that workingmen were rewarded and not penalized for efficiency.

Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, said that every labor organization had contended with "efficiency methods" in some form or other. The engineers wanted the very best work done and not a bonus system which would enable men to slight their work. It was the same old question of pacemaking. American railroads were managed better than any others in the world. The individual shippers who were now complaining were the very men who reaped the benefits of rebates and brought about the regulation of railroads. There was never a time when so much was demanded of the railroads in speed, roadbed and equipment as now, and the whole country wanted the Interstate Commerce Commission to approve increases in freight rates.

John Mitchell said that the efficiency system should be presented undisguised. It meant the piecework system introduced in a new way.

Andrew Carnegie and Colonel Theodore Roosevelt discussed the advantages of a workmen's compensation law. P. Tecumseh Sherman presented the draft of a proposed bill for uniform State legislation on this subject.

A letter on the need for greater uniformity in railway regulation, written by Martin S. Decker, member of the New York Public Service Commission, was read. Mr. Decker referred to the activities of the National Association of Railway Commissioners in various directions, adding:

"These movements, and others in contemplation, show real progress toward uniformity in regulation and indicate a common purpose on the part of the federal and State commissions to work along harmonious lines. The federal commission could not of itself take up the work of these committees and carry it to a successful conclusion, nor could the State commissions do so acting without the federal commission.

"In my address as president of the National Association of Railway Commissioners at its last meeting I recommended strongly the policy of conference between the federal and State commissions in regard to matters having common interest, and there is good reason to believe that these conferences will become frequent in future.

"I call attention to the matters above indicated as showing practical results and real progress and venture to predict that with persistence along these lines embarrassments resulting from the conflict of federal and State authority in the regulation of railways will eventually become few and unimportant.

"I also venture to point out here how much this course is to be preferred to one involving departure from the scheme of separate State and federal jurisdictions which has always been an essential part of our government."

PROPOSED DUPLEX TRANSFER TICKET

The American Bank Note Company, New York, has brought out a duplex transfer of the type shown in the accompanying illustrations. It consists of a central portion with stubs at the left and right. The front of the transfer is used for a. m. hours and the back for p. m. hours. The central portion of the front contains the usual transfer data, such as the name of the line, the serial number of the transfer, the lines to which direct transfers can be made, the date of issue, the hour time limits and two frac-

A. 2062 M.		2062 BROADWAY LINE		A. M.		A. 2062 M.	
1 2 3 4	5 6 7 8	<div>CITY R. R. CO. TRANSFER If punched above here denotes A. M. hour and direction going NORTH</div> <div>1 2 3 4 5 6</div> <div>7 8 9 10 11 12</div> <div>IF PUNCHED ABOVE HERE DENOTES A. M. HOUR AND DIRECTION AS PUNCHED</div> <div>FEB. 22, 1910</div> <div>Schwartz's Direction & Time Limit, Feb. 22nd '10</div>				9 10 11 12	
NORTH							
SOUTH							

Fig. 1.—Duplex Transfer—A. M. Side

tional time limits, one of which is for north or south and the other for east or west. The front of the left-hand coupon in Fig. 1 has the identifying serial number, the hourly time limit, and is marked "North" to indicate the riding direction. The right-hand coupon is like the other, but is marked "South." The back of the transfer, which is for p. m. use, carries the conductor's number for identification and shows a list of second transfer lines.

The hour limits on both sides of this transfer are so arranged that when a p. m. hour is punched it will not mutilate the a. m. hours and vice versa. However, the fractional time limits are printed exactly back to back. The transfer can be made with any desirable number of coupons, but it will be assumed in the following description of its use that it is provided with two stubs only.

Suppose that a passenger traveling north at 9:40 a. m. asks for a transfer. The conductor will punch "10" on the "North" stub, the cardinal point "N," the hour "10" on the central portion, and the serial number on the "South" coupon to indicate to the auditor that the latter coupon does not represent a cash fare. On reaching the transfer point the passenger boards another car. The conductor who takes his ticket will see that the "South" coupon is not mutilated in the time limit and that the rest of the transfer is properly punched. He then detaches the "South" coupon for registration. It is assumed that if the car is traveling east, the conductor punches the fractional time limit "10" above the cardinal point "E." He then returns to the passenger the ticket, which now consists of the central por-

CONDUCTOR P. 343 M.		343 BROADWAY LINE		P. M.		CONDUCTOR P. 343 M.	
SOUTH		<div>SECOND TRANSFER LINES CLINTON ST. DELANCEY ST. 101 ST. and AVE. A 102 ST. and AVE. A 103 AVE. MADISON AVE. 117th and 10th 118th AVE. 119th AVE. 120th AVE. 121st AVE. 122nd AVE. 123rd AVE. 124th AVE. 125th AVE. 126th AVE. 127th AVE. 128th AVE. 129th AVE. 130th AVE. 131st AVE. 132nd AVE. 133rd AVE. 134th AVE. 135th AVE. 136th AVE. 137th AVE. 138th AVE. 139th AVE. 140th AVE. 141st AVE. 142nd AVE. 143rd AVE. 144th AVE. 145th AVE. 146th AVE. 147th AVE. 148th AVE. 149th AVE. 150th AVE. 151st AVE. 152nd AVE. 153rd AVE. 154th AVE. 155th AVE. 156th AVE. 157th AVE. 158th AVE. 159th AVE. 160th AVE. 161st AVE. 162nd AVE. 163rd AVE. 164th AVE. 165th AVE. 166th AVE. 167th AVE. 168th AVE. 169th AVE. 170th AVE. 171st AVE. 172nd AVE. 173rd AVE. 174th AVE. 175th AVE. 176th AVE. 177th AVE. 178th AVE. 179th AVE. 180th AVE. 181st AVE. 182nd AVE. 183rd AVE. 184th AVE. 185th AVE. 186th AVE. 187th AVE. 188th AVE. 189th AVE. 190th AVE. 191st AVE. 192nd AVE. 193rd AVE. 194th AVE. 195th AVE. 196th AVE. 197th AVE. 198th AVE. 199th AVE. 200th AVE.</div> <div>IF PUNCHED BELOW HERE DENOTES P. M. HOUR AND DIRECTION AS PUNCHED</div> <div>1 2 3 4 5 6</div> <div>7 8 9 10 11 12</div> <div>NOTE: Passenger receiving this transfer is requested to note carefully the date and direction of travel and the direction of travel.</div>				9 10 11 12	
NORTH							
SOUTH							

Fig. 2.—Duplex Transfer—P. M. Side

tion and the "North" coupon. The transfer has now been marked "North" and "East" with time limits so that the passenger cannot use it to go toward his starting point via his original line. On arriving at the second transfer point the passenger may again transfer if he does so to a car going north. The conductor on the latter car then detaches the "North" stub and registers it as a fare, but before returning the central portion, he punches a fractional time limit and also punches it at the side of the cardinal point "N." At the third transfer point the passenger may transfer westerly or in any other direction permitted by the rules of the railway. The body portion of the ticket is taken up for passage from the third transfer point.

In printing this transfer it is important that the points of the compass be printed in colors to avoid mistakes either in punching the tickets or in detaching coupons.

A conductor cannot turn in as three fares a complete transfer from those passengers who do not wish to retransfer. On finishing each trip, he must place all received transfers in a sealed envelope with the time marked thereon. The auditor who looks over the time marked on each envelope and the number of trips can determine from the common serial and conductor's numbers as well as by the time limit and direction marks whether the conductor has made an incorrect report. A conductor whose number does not correspond to the transfer serial numbers cannot issue tickets belonging to another conductor, because such action on his part would be readily discovered. The ticket shown contains the names of various streets in New York, but is not used in that city.

RAILROAD DATE STAMP

The A. D. Joslin Manufacturing Company, Chicago, Ill., is making for railway use the "Cosmo" No. 2 date stamp machine shown in the accompanying illustration. This is a five-wheel perpetual dater built with accurately adjusted working parts and an entirely inclosed ribbon feed mechanism with 6 yards of ribbon. The engraved date wheels are of brass, mounted with solid bearings on a revolvable steel shaft to eliminate lost motion and thus prevent illegible impressions. The date wheels are positively locked by individual lever keys. They are released for change of date by the same means, this being accomplished by a short turn of the shaft to carry the released wheel to the required position. The top part of the stamp swings upward on a hinge as illustrated and remains in that position while the dating is being changed. After this it swings back in place and is securely held down by the locking device. The die plate is made of a special bronze reinforced by two braces resting on brass shafts between the date wheels, which construction prevents the die plate from sagging in the center. If desired, the stamp is supplied with a pointer and dial to show the extent to which the ribbon has been used. The dates



Railroad Date Stamp

printed run lengthwise of the railroad ticket so that the full date, namely, the month, day and year, is always impressed. The stamp was invented by the late A. D. Joslin, who was for many years auditor of passenger receipts of the Illinois Central Railroad.

The monthly record of passenger train performances on the steam railroads of the State, just issued by the Public Service Commission, Second District, for the month of November, 1910, shows that 61,863 trains were run, of which 82 per cent were on time at the division terminal. The average delay for each train late was 22.8 min.

COASTING CLOCKS FOR THE THIRD AVENUE RAILROAD, NEW YORK

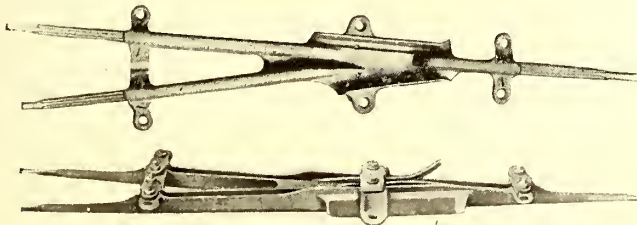
After several months' tests with a sample coasting register, the Third Avenue Railroad, New York, has ordered from the Railway Equipment Company of that city 100 registers. These devices will be installed on all the cars of the Broadway-Forty-second Street line. It is expected that the clocks will be delivered within the next two or three weeks. The company is planning to give awards monthly to a certain number of motormen who have the best records, but the details of the award system and the methods of keeping the records have not yet been finally decided. Judging from the tests made with the sample register, the company believes that it will be possible to effect a saving in energy of 10 to 15 per cent.

This installation will be watched with considerable interest because it is the first one of importance for street railway service in thoroughfares with considerable trucking. The Broadway-Forty-second Street line is one of the most favorably situated, however, as the greater portion of the route is through wide avenues on the West Side of Manhattan Borough. The company realizes the difficulties of making comparisons under city conditions and it will therefore give this matter the closest attention so that proper exceptions may be made for traffic peculiarities.

TROLLEY FROG

E. J. Dunne, superintendent of distribution, Public Service Railway of New Jersey, has designed a trolley frog which is suitable for turnouts on all kinds of special work and which will permit operation at regular running speeds. This design, termed the "Detroit" trolley frog, with a number of minor improvements, is now manufactured by the Westinghouse Electric & Manufacturing Company. The essential features are a long tongue on the turn-out to engage the wheel when taking the curve, a groove in the pan of the frog to steady the wheel when traveling on the tangent line and a very short distance for the wheel to travel on its flanges. The short flange travel reduces arcing and greatly increases the life of the frog and wheel. The mechanical features mentioned allow the frog to be placed 4 ft. further back from the track frog and permit centering the frog with the track, thus avoiding kinks in the tangent wire and avoiding dragging the wheel at an angle to the line when the car is taking the curve. Another feature of the trolley frog is the long, flexible approach. This approach prevents the wheel from striking a blow and thus avoids crystallization of the wire. A large space and a "preventer" between the two approaches prevent a wild wheel from jamming and make it unnecessary to construct additional "preventers."

Differing from frogs of earlier design this frog allows the curve wire to be run through and dead-ended in a strain guy with obvious advantages. The main line is relieved of undue stresses and the trolley wire need not be cut when it becomes



Two Views of Trolley Frog

necessary to replace a frog, nor is any block and tackle necessary in such cases.

The mechanical construction of the frog is such that it cannot buckle, but remains always level and smooth under running. The frog is installed over a point 18 ft. from the track frog for standard 18-ft. to 20-ft. trolley for all curves up to

80 ft. radius. For longer curves this distance is increased accordingly. When properly placed the turn-out points directly to the first curve pull-off, thus avoiding a bend at the frog.

A NEW SLEET CUTTER

The Bonney-Vehslage Tool Company, New York, has recently placed upon the market the "B-V" sleet cutter, which is of the simple type shown in the three accompanying illustrations.

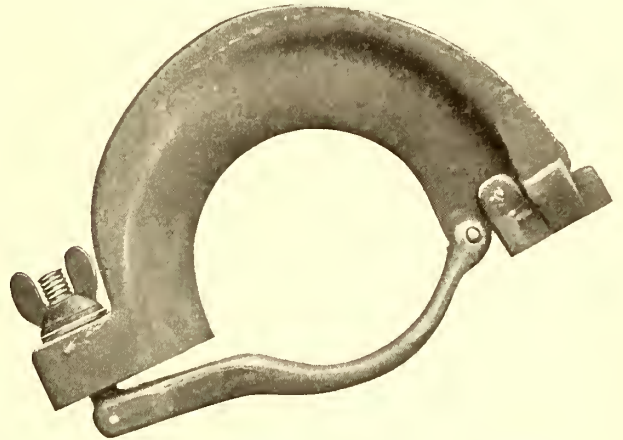


Fig. 1—Cutter Detached from Trolley Wheel

This device is composed principally of an iron yoke and a bronze holder. The yoke has a detachable bronze cutting piece, which is held in place by a pin at one end. The bronze holder

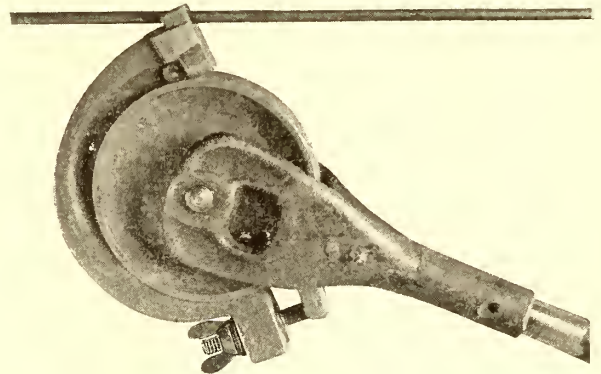


Fig. 2—Sleet Cutter in Position with Forward Running

is hinged to the yoke at the cutter end and locked about the wheel at the other end by means of a thumbscrew. The entire cutter can be removed in a few seconds merely by loosening

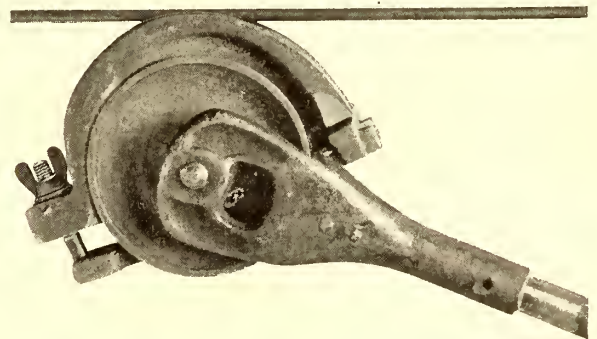


Fig. 3—Position of Sleet Cutter with Car Backing

the thumbscrew. Fig. 1 shows the sleet cutter when removed from the trolley wheel; Fig. 2, when applied to a forward running car; while Fig. 3 shows how the cutting piece remains out of the way when the car is moving backward. In this position the wheel simply slides along underneath the lower part of the wire.

News of Electric Railways

Railway Affairs in Detroit

William B. Thompson was inaugurated as Mayor of Detroit, Mich., on the evening of Jan. 10, 1911, to succeed Philip Breitmeyer, who held the office two years. In his closing address Mayor Breitmeyer defended the position he at first assumed on the street railway situation and the policies which had been followed through his administration.

Mayor Thompson devoted a large portion of his inaugural address to the street railway situation. He said, in part:

"For 20 years the city and the Detroit United Railway, or its predecessors, have been engaged in a bitter controversy over the terms of existing franchises and of franchises sought for by the several traction companies. An adjustment with the company as presently controlled seems very unlikely; in my judgment, the majority of our people have come to the conclusion that the only satisfactory and lasting settlement is to be found in municipal ownership of the street railway system.

"There is now pending before the Supreme Court of Michigan a suit which involves the right of this city to submit to the electors a proposal to engage in municipal ownership and operation of the street railway lines. We cannot anticipate what may be the termination of the suit. If the city is successful the earliest possible date should be selected for the submission of this proposal. On the other hand, if the city should fail in this litigation, the Council should lose no time in taking every step within its power to adjust itself to the new situation, so as to submit this question promptly to the public. The revised constitution gives this power.

"In this same connection I urge that you recommend to the Legislature, and particularly to the delegation representing this municipality in that body, the passage of a comprehensive condemnation act which will completely empower Detroit to condemn the private property of public utility companies, so that if the city embarks upon any municipal enterprises it may carry along the enterprise under the same advantageous conditions now enjoyed by private operators.

"I recommend that you disregard the pending lawsuit in the Circuit Court of the United States which was brought during my previous administration to test the validity of an order to compel a sufficiency of cars so that each car would not be expected to carry in excess of its seating capacity and one-half as many more; and that you take action looking to immediate relief. When a city, upon an important proposition of this kind, waits beyond a period of two years for a decision from a court, no one should be heard to complain if its patience is exhausted.

"As to the litigation pending between the city and the company: While this company continues to maintain its hostile attitude toward the city, no suggestion should be entertained to discontinue the city's struggle for a judicial declaration of our right to control our own property. The suit instituted by the company through its bondholders in the federal court to prevent the enforcement of the Hally ordinance has involved in its principle that Detroit cannot make a public offer for the future use of its streets, and that a term franchise is unending in point of time. The suit started by the city in the Wayne Circuit Court to collect revenue for the use of the unfranchised Fort Wayne system will determine whether the city or one of its favored grantees can continue on its own terms and in defiance to constituted authority to use the streets which Michigan has placed under the control of the people of this city."

Alderman John C. Garvey has introduced a resolution in the Council calling upon Corporation Counsel Hally for an opinion on 10 important questions which virtually cover the street railway situation. The questions follow:

"1. What is the city's title to any physical property on public streets or highways now used for street railway purposes upon which the franchises have expired?

"2. Do non-physical items cease to exist conterminously with franchises that have expired?

"3. Can the city legally guarantee the present or any other company a fixed compensation or return upon any physical property on public streets or highways where the franchises have not expired?

"4. Can the city legally guarantee the present or any other company a fixed compensation or return upon any physical property on public streets or highways where the franchises have expired?

"5. Has the city the right to demand an accounting on lines upon which franchises have expired and to collect the profits thereon from date of expiration?

"6. Under what condition has the city the right to demand an accounting on lines upon which the franchises have not expired?

"7. In case of guarantee or purchase, would the city have to assume or buy all of the physical property, or only such part of it as the city may deem necessary?

"8. In case of guarantee or purchase of physical property, what method of valuation should be used?

"9. Has the city the right to take possession of the company's property upon which franchises have not expired, paying it a daily rental until the franchises do expire, since the company is now paying the city daily rental on all lines upon which franchises have expired?

"10. Has the city the legal right (a) to demand the application of profits to supply adequate service before the company can devote such profits to the payment of a dividend on stock; (b) to demand the application of profits to supply adequate service before the company can devote such profits to retire bonds which have been issued against this property?"

On Jan. 12, 1911, Judge Phelan decided that the company must accept workmen's tickets in the regular hours on the Grand River Avenue line, between the city limits on Grand River and on Jefferson Avenue; in other words, the company must carry passengers within the city limits at one fare on this line. The company held that it was not bound to carry passengers to the new city limits at the same rate of fare that prevailed previously.

The Detroit United Railway has purchased 20 acres of land adjoining the 33 now used for its car houses and terminals, at Highland Park.

Tentative Franchise Prepared by City Solicitor Schreiber of Toledo

City Solicitor Cornell Schreiber, of Toledo, Ohio, has completed his draft of a tentative ordinance as a basis for negotiations between the city and the Toledo Railways & Light Company for an extension of the franchise of the company. The proposed life of the grant is 12 years. The ordinance provides for a straight 3-cent fare, with universal transfers, and no reference is made to a sliding scale to enable the company to increase the fare if it should be found that it is operating at a loss. Children between 8 and 12 years of age shall be carried for 2 cents and those under 8 may ride free. In case the Council found it necessary, a transfer on a transfer would have to be given without extra charge.

Four-minute service between 5 and 8 o'clock morning and evening is required, with a 6-minute service at all other hours of the day, except between 12:30 a. m. and 5 a. m., when hourly service will be required. The Council reserves control of the service, schedules, extensions, double tracking, types of cars to be used, interurban cars and equipment in general, and also reserves the right to examine the books of the company whenever it deems it advisable to conduct such an examination.

Provision is made for an 8-hour workday for all employees, or 56 hours per week. In case of dispute between the company and its employees settlement by a board of arbitration of three members is required, the company to choose one member, the City Council one and the employees the third. The decisions of this board shall be binding on the company if the employees accept the findings.

The city reserves the right to grant the use of the company's tracks to other companies, and it is made compulsory for the Toledo Railways & Light Company to allow any interurban road with 10 miles of track in operation outside of the city to reach terminals within the city over its tracks. Transfers shall be exchanged with the interurban companies. The terms and payments for the use of tracks by the interurban railways are to be decided by the City Council.

The tracks are to belong to the city at the expiration of the franchise or in case of forfeiture, unless the company pays cash for putting the streets in good condition. In case of separation of grades the company will be compelled to pay half the cost. The company will be required to pay \$25 per year for each linear foot of track which it has on the city bridges. As maintained at present the cost to the company would be \$110,000 per year, but the city must keep up the bridges and pay for repairs. Paving assessments are to be paid for in cash when the work is completed and the company will be required to pave the streets 18 in. on the outside of the outer rails instead of between the outside rails as at present.

Before a new grant shall become operative the company must pay all debts due the city, including the amount claimed by the city under the so-called Robison 1 per cent agreement. It is stipulated that the city shall have the protection of all existing laws, including the Schmidt referendum law, even if, in the future, these are amended or repealed, and the right is reserved to purchase the lines at an appraised value and operate them whenever the laws of the State will permit. The company must pay the city \$10,000 to cover the expense of auditing the books and must furnish a surety bond of \$500,000 to guarantee the performance of its part of the contract. Violation of any feature of the ordinance is held to constitute a cause for the forfeiture of the ordinance.

Mayor Brand Whitlock underwent an operation for relief from appendicitis on the evening of Jan. 16, 1911, and may be unable to take part in negotiations for some time.

Transit Affairs in New York

In the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 89, mention was made of the majority report by Comptroller Prendergast and President Mitchel of the transit committee of the Board of Estimate and Apportionment of New York in which they declared in favor of an independent subway as the only solution of the city's transit problem. Mayor Gaynor, the other member of the transit committee, presented a minority report on Jan. 11, 1911, in which he said:

"The false notion, long abroad and industriously disseminated, that private capital built the present subway has not yet been wholly driven from men's minds.

"The report of my associates substantially admits that if what is called the triborough route should be built by the city the Interborough Rapid Transit Company would probably be the successful bidder to operate it, when bids for operation should be advertised for, as required by the statute, after construction is completed; if, indeed, any bidder for operation at all could be found. But they say 'it is not of first importance that the operation of those systems should be in different hands, if only there be two distinct, separate and self-sufficient systems.' But, pray, if both systems are operated by the same company, or by allied or subsidiary companies, how are they 'distinct' and 'separate'? These words and the phrase 'independent system' may be very attractive, but I hope they will delude nobody.

"I have expressed a doubt whether any bid to operate the triborough would be forthcoming. The cost of constructing and equipping that system is put at \$250,000,000. I believe no competent person has claimed that it would be less than \$225,000,000. But if we say \$200,000,000 the case is still hopeless. Five and one-half per cent of that sum for annual interest and sinking fund is \$10,500,000. The highest estimate of gross receipts from operation of the system that any one has made is \$16,000,000. Forty per cent of that for maintenance and operation would be \$6,400,000. This added to the interest and sinking fund amount of \$10,500,000 already shows a deficit without going into other items. But the case is worse, for the gross receipts would probably

not reach \$16,000,000. As is well known, that system was recently put up for bids for operation in advance of construction, but no bid was forthcoming. No one with private capital for investment could see anything but a deficit ahead.

"The Interborough Company offered one year ago to furnish all the funds needed for the city to build the extensions to the present subway, according to my associates, who ask what has caused that company to change its mind in that respect. The Interborough Rapid Transit Company never made such an offer. It did offer to furnish the money to the city to build the extensions from Forty-second Street down Seventh Avenue and to the Battery, and the extension up Lexington Avenue to the Bronx. The extensions which it now proposes that the city should build, and to which it offers to contribute, are in mileage four times the length of the fragments embraced in the said offer by it a year or more ago.

"Permit me to say that the majority of the intelligent people of New York desire that this board now go forward in this matter. An end should come to this perpetual talking and arriving at no result. The Public Service Commission is now ready to proceed to formulate constructive and operative contracts and if there be any delay the cause is here in this board."

William G. McAdoo, president of the Hudson & Manhattan Railroad, has applied to the Public Service Commission for an extension of time in which to build the company's branch line from Sixth Avenue under Ninth Street to Fourth Avenue. The franchise stipulated that the branch should be completed by June 15, 1911, but Mr. McAdoo wants until June, 1913.

Plans for the main section of the new Grand Central Station, which it is estimated will cost \$4,000,000, have been filed by the architects of the New York Central Railroad. The new station will occupy the plot facing Forty-second Street on which the old station stood. The old building is now about demolished. The station will cover the entire block front on the north side of Forty-second Street between Depew Place and Vanderbilt Avenue, and will occupy 245.6 ft. on each of these thoroughfares. Architecturally as well as in size the building will be one of the most imposing in New York. It will be from one to eight stories high. The façade will be of brick, granite and limestone, with massive Corinthian columns and large allegorical figures carved in stone above the bays on the Forty-second Street side. The station will be set back several feet from the Forty-second Street building line, giving room for a plaza approach. A distinctive feature will be the continuation of Park Avenue over Forty-second Street at this point by means of a viaduct. The roadway will be about 20 ft. above the level of Forty-second Street. The main entrances to the station will be on the Forty-second Street side beneath the raised roadway. There will be cab and carriage entrances on the Vanderbilt Avenue side.

Cleveland Traction Situation

J. J. Stanley, president of the Cleveland Railway, sent another letter to Mayor Baehr and the City Council on Jan. 14, 1911, to show his earnestness and sincerity in the endeavor to finance the needs of the system, preserve the value of the property and furnish the people with the kind of service they demand. The letter contains a repetition of the request that the administration confer with the company regarding suggested changes in the Tayler grant that will permit the company to sell its bonds and stock in amounts that will secure the necessary funds for the purchase of cars, the construction of five extensions, the additions to the power equipment that will be required for the increased load and the refunding of the mortgage indebtedness within the next two years.

The letter of the company says that last year the company gave 1000 car miles of service for every 8848 passengers carried, as compared with 8150 in 1900, 7878 in 1908, 7474 in 1907, and 7321 in 1906. The passengers carried were 27,000,000 more in 1910 than in 1900, a gain of 18½ per cent. Two hundred new cars, each with four motors, costing \$6,000 each, are needed. Additions to the power house will cost \$1,250,000. Car houses and shops will cost \$100,000. Demands are made on the company for five extensions, including lines on West Madison to Rocky River,

Superior to Euclid, an extension of the Wade Park line from East Fortieth at Perkins, directly through to East Ninth, and another south from the business section through the flats. These will cost \$950,000. The letter says in part:

"We have tried repeatedly and persistently to sell stock. We have succeeded to the extent of less than \$400,000. People whom we ask to invest in the stock say to us that, while the payment of the 6 per cent interest permitted by the franchise seems to be very well assured, the principal is not so certainly and definitely protected, although the ordinance in several places refers to the security of the capital value and although it was clearly the intent and purpose of Judge Tayler, and the representatives of the city and the company who worked with him in drafting the ordinance, that it should amply protect the entire investment in the securities of the company—stock as well as bonds and notes.

"It was the intention of those who framed the ordinance that every investor in the securities of the company should have his investment secured by property worth, at all times, the amount of the investment in it. Suppose we should sell additional property; it was not intended that the investors should lose 30 per cent of this amount, or nearly \$2,000,000 of their investment.

"It was decided that the maintenance fund should be large enough not only to provide for keeping the 1908 property up to its appraised value, but for taking care of this 30 per cent depreciation, as well as for maintaining the new property in a 70 per cent condition. No injury can be done the city by stating that intention in such language that prospective investors can have no doubt about it.

"If the city should elect to exercise its option to buy the property within the lifetime of the grant it would have to pay to the company, if N. W. Harris & Company's experts are right in their understanding of the ordinance, from 10 per cent to 11 per cent of the cost of the property that might then have depreciated to 70 per cent, no provision having been made for the lost 30 per cent. How, then, can it injure the city or the car riders in any way to amend the ordinance so as to provide that property hereafter acquired shall be maintained by means of a maintenance reserve at its cost?

"Without claiming or pretending to be sponsors for the city, but realizing our own duty to Cleveland and its citizens, we may say that it seems to us decidedly to the advantage of the city that our property be kept in such a good state of preservation, all depreciation being provided for by an ample maintenance fund, as to make it worth the price that the city will have to pay for it, if it elects at any time to buy it.

"In order to obtain money for these purposes we must be able to tell investors that they may rely upon receiving not only interest upon their money, but its full return at the end of the franchise.

"We shall be glad to join with you or your representatives in any method that may be found feasible to bring about the result we assume we both desire, without modifying the spirit of the Tayler ordinance, or making any more changes in its phraseology than are necessary to express and make effective its meaning and purpose."

Mayor Baehr and Street Railway Commissioner Dahl stated that they considered the letter on Jan. 16, 1911, and will frame a reply to be submitted to Council for approval.

Director of Public Service Lea has instructed Superintendent of Streets Kenahan to collect more than \$21,000 from the Cleveland Railway, which is claimed to be due from rentals at 6 per cent on tracks which the city built at a cost of \$137,000. These are the loops in the Public Square which were built under the Johnson administration.

The City Council of Cleveland adopted a resolution on the evening of Jan. 16, 1911, approving a letter prepared by Mayor Baehr, Street Railway Commissioner Dahl and the street railway committee of the Council in which the city again refuses to negotiate with the Cleveland Railway on the changes proposed in the Tayler grant. The city takes the position that the company has admitted that it can sell bonds to the amount of \$6,000,000 for its present needs and that it should not ask the city to enable it to finance by the sale of stock until its inability to secure funds by a bond issue is demonstrated. The letter was sent to Mr. Stanley on Jan. 17, 1911.

Arthur W. Brady on Electric Railways in Indiana

Arthur W. Brady, president of the Indiana Union Traction Company, Indianapolis, Ind., and president of the American Electric Railway Association, contributed an article on the electric railways in Indiana to the *Indianapolis Star* recently, in which he said:

"The most noteworthy changes in the interurban situation in Indiana in 1910 were the completion of the Indianapolis-Newcastle line and the Warsaw-Peru line. The completion of the Indianapolis-Newcastle line added an eleventh to the series of interurban railways radiating from Indianapolis, a development unexampled elsewhere in the world. The completion of the Warsaw-Peru line filled a gap that separated northern Indiana from central Indiana. The first direct railroad communication between Indianapolis and South Bend has thus been due to the interurban railway. Not only is this true, but now it is possible for one to travel by interurban railway from one end of the State to the other, starting at New Albany or Louisville on the south, and ending at South Bend, or even Chicago, on the north.

"The link of interurban railway between Warsaw and Peru, which was completed in 1910, is only about 70 miles long, but it presents a fair example of the interurban situation generally throughout the middle West. The construction of a few links, each of no great mileage, would immensely enlarge the territory reached and benefited by the existing interurban railroads, from which they in turn would profit. For example, only a few additional miles are needed—none in Indiana—to make an all-interurban route between New York and St. Louis. The same is true of interurban routes between Chicago and New York and between Indianapolis and Cleveland, although in the last case there now exists a possible electric route between the two points. There are a number of other similar examples.

"The interurban development in Indiana has been phenomenal, both in quantity and quality. The policy of the State has wisely been to foster the growth of these railways, and the practical results of that policy are seen in the development of to-day. It is reasonable to look for a continuance of that policy, and with it for an improved financial outlook and important further developments.

"Many lines have been projected in the State, some of which are impracticable, but others would undoubtedly bring a fair return to the builders. As the present interurban companies gain in stability and strength, and as investors gain additional confidence in the safety of their investments in this class of property, it is only reasonable to believe that some at least of these projected and needed lines will be constructed. The interurban business for the last year was on the whole satisfactory, and the prospects for a good business during the coming year are excellent.

"No large developments may be looked for in Indiana during the present year. At the same time, the steady improvement of the present interurban lines may be expected. The aim of all of the companies in the State is so to build up their properties that each year may see them better and safer and capable of greater service to the public, for the managers of these properties realized that the financial returns of a company are proportioned on the service which it is capable of giving to its patrons."

Reply by Mayor to Proposal for Subway in Newark

Mayor Haussling of Newark, N. J., on Jan. 12, 1911, sent to Thomas N. McCarter, president of the Public Service Railway, a letter replying to the letter of Mr. McCarter to the Mayor, an abstract of which was published in the *ELECTRIC RAILWAY JOURNAL* of Dec. 31, 1910, page 1288, in which Mr. McCarter urged action by the city on subways.

The Mayor at the same time wrote to the Board of Works informing it of the attitude he has assumed on the subject, inclosing his letter to Mr. McCarter, and suggested that the board invite the Common Council or its committee on finance, the State Public Utilities Commission, representatives of the Public Service Railway and of the Board of Trade to confer in regard to the matter.

The Mayor, in his letter to Mr. McCarter, takes up the subject of the need of subways to relieve traffic congestion in Broad Street and Market Street, and refers again to his repeated recommendations in his annual messages for ac-

tion on that line. He also discusses broadly the manner and method of financing and constructing the projected subways.

The Mayor also stands for public ownership by the respective municipalities of the bed of the Morris Canal when abandoned, with due provision to enable them to acquire reversionary rights. He also returns to the plan, defeated last year in the Legislature, to bring the terminal of the high speed line of the Hudson & Manhattan Railroad to the southern head of Military Park. He favors this plan, regardless of whether the canal should be abandoned and a subway built in Broad Street. He also takes the view that the abandonment or removal of the Centre Market, with the idea of developing the streets in the locality to improve vehicular conditions, is not necessarily involved in the general proposition of transportation facilities.

City ownership of the proposed subway; a rental varying with the terms of the bonds; their construction whether or not the abandonment of the canal is secured, and the right of the city to extend the subways when the growth of traffic requirements demands are other features taken up by the Mayor.

Meeting of Missouri Electric, Gas, Street Railway & Waterworks Association.—The executive committee of the Missouri Electric, Gas, Street Railway & Waterworks Association has arranged to hold the annual convention of the association in St. Louis on April 13, 14 and 15, 1911. R. J. Irvine, Marshall, Mo., is president of the association.

Meeting of New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club was arranged to be held at the American House, Boston, Mass., on the evening of Jan. 19, 1911. After the regular business meeting Lee H. Parker, railway engineer Stone & Webster Engineering Corporation, Boston, Mass., was to address the club on "The Electrification of Railroad Terminals."

Warren & Jamestown Street Railway to Substitute Direct Current for Alternating Current.—The Warren & Jamestown Street Railway, Warren, Pa., which operates between Warren and Jamestown, N. Y., has decided to replace its present alternating-current single-phase system with direct current, so far as car operation is concerned. The alternating-current service proved undesirable, it is said, because the company was obliged to install transformers so that 550-volt current might be used in Warren and Jamestown. The line is 22 miles long and alternating current will be retained for transmission. The power house is at Stoneham, Pa., and new substations will probably be erected at Frewsburg and North Warren.

San Francisco's Municipal Railroad.—Specifications for general supplies and materials for the municipal railroad which is to be built by the city on Geary Street, San Francisco, Cal., have been received from the city engineer and approved by the Board of Works. The board will ask the supervisors to set aside the following sums, and bids thereon will be called for: 30,000 redwood ties, \$17,000; 530 tubular steel trolley poles, \$17,000; 48,500 pounds of copper wire, \$8,000; rail bonds, \$5,000; rail fasteners, \$18,000; steel tie nuts and rods, \$3,000; total, \$68,000. The president of the Board of Public Works said recently: "Everything is in readiness to begin work on the Geary Street road. The rails will be delivered within 75 days. At the same time, all poles, wires and overhead equipment will be delivered. It is purposed to provide immediately 20 steel cars of the pay-as-you-enter type and the most modern design. The line will be put in shape for immediate operation from Geary and Market Streets to the beach, with a line to the park in Tenth Avenue."

Strike in Everett.—On the afternoon of Dec. 31, 1910, the Everett Railway, Light & Water Company, Everett, Wash., refused the request of a delegation of the motormen and conductors of the company which requested an increase of the minimum wages of these men from 18 cents an hour to go into effect at once, and at 6 p. m. that day a strike was declared, which continued until Jan. 7, 1911, when a compromise was effected, by which the men are to be given a small increase in pay. The company maintained a partial service during the day time with the men who remained loyal to it, but there was considerable disorder. In commenting on the

strike the Everett *Herald*, in an editorial, said: "If the statement of the management of the company is correct that the street car men who went on strike did so without giving the least warning to the company or to the public, the men certainly acted too hastily. The earnings of the company cannot be commensurate with profits of companies in larger cities, but if it is necessary to run fewer cars in order to pay better wages to the men, the *Herald* believes that the company should do so."

Mason Laboratory of Mechanical Engineering at Yale.—Work on the new Mason Laboratory of Mechanical Engineering, which is now being built for the Sheffield Scientific School, Yale University, New Haven, Conn., is now in progress, and the contract calls for its completion in the early summer of 1911. The frontage on Hillhouse Avenue is about 85 ft., and the building extends through to Temple Street, a length of about 200 ft. It will have three stories above the basement. A traveling electric crane with a span of about 40 ft. will extend the entire length of the building on the main floor. This floor will contain the larger part of the equipment, especially the heavier pieces of machinery, and will be surrounded by a gallery on the second floor with space for lighter machinery. The second floor will also contain several offices and a general lecture room, with a seating capacity for 150. The third floor will be used principally for research work and as an exhibit laboratory for instruction in machine design, machine construction and mechanism. The gift for this laboratory included \$200,000 for the building and its equipment and \$50,000 for its endowment.

Public Service Commission Proposed in California.—At a meeting called by Meyer Lissner, chairman of the Republican State Central Committee of California, to listen to reports of legislation proposed for the next session of the California Legislature, Percy V. Long read a report from the committee that had been appointed to prepare a plan for a State public service commission, saying that the measure which it would submit would provide for a commission with the following powers: To issue permits to persons and corporations to engage in public service business; to compel complete publicity in the affairs of corporations and individuals engaged in public service; to control stock and bond issues of public service corporations; to authorize and require capital expenditures; to regulate and prescribe the terms on which franchises may be acquired; to control sales and leases of the property of public service corporations; to compel adequate service and the use of safety devices and to control construction in public service work; to determine the value of property devoted to public service; to assist municipalities in acquiring the property of public service corporations by acting as arbitrator or appraiser when requested so to do; to advise municipalities as to the reasonableness of rates to be fixed for public service.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Indiana.—More than 100 bills were introduced up to Jan. 14, 1911. The Indiana Railroad Commission has prepared three bills for introduction. One provides for the installation of block signals on steam railroads and inter-urban railways; the other bills relate to grade crossings, trespassing, etc. Senator Proctor has introduced a bill which provides that no stock shall be issued by any corporation unless it is paid for dollar for dollar. No increase in the stock or bonds of public service corporations nor the consolidation of such companies within the State shall be permitted without the permission of the Railroad Commission. Three workmen's compensation bills have been introduced in the Senate. Senate Bill No. 65 provides that only experienced conductors, engineers and motormen shall be employed by railroad companies. House Bill No. 127 prescribes the kind of highway crossings to be put in by railroads and their maintenance.

Massachusetts.—A bill has been filed in the House which provides that a day's work for all conductors, guards, drivers and motormen who are employed by street or elevated railways shall not exceed nine hours, arranged so that the service may be performed within 11 consecutive hours. By the terms of the bill no officer or agent of such a company is permitted to require from such employees more than nine

hours' work for a day's labor; but on legal holidays, Sundays, and in case of accident or unavoidable delay, extra labor may be performed for extra compensation. A maximum penalty of \$500 is fixed for each offence. Another similar measure provides for a reduction of about one hour per day on the present schedule of street railway platform service. A bill has been introduced to abolish the Railroad Commission and establish a railroad court of three justices, to be appointed by the Governor, with the advice and consent of the Council. Three expert assistants, preferably graduates of some school of mechanical or civil engineering, are provided for in the bill. In general the powers of the court are named along the lines now included in the jurisdiction of the commission, except that the orders of the court would have the force of legal decrees. A bill has been introduced which provides that the Railroad Commissioners shall hereafter be elected by the people. A bill has been introduced to provide for a loop subway under the West End from Park to Cambridge Street. A similar bill presented a year ago was referred to the Railroad and Boston Transit Commissions for recess consideration, and has been reported on adversely by these boards on the ground that the line would be unduly expensive. A bill has been introduced which provides for the removal of the present exterior stations of the Tremont Street subway in Scollay Square and Court Street, Boston, with the right granted the Boston Transit Commission to take private property for new and so-called more suitable entrances and exits. The Boston & Eastern Electric Railroad has filed a petition for the passage of a law to require the Massachusetts Railroad Commission to issue to it a certificate of exigency to build a high-speed interurban railway between Boston, Salem and Lynn. Speaker Walker has appointed a special committee to consider the recommendations of Governor Foss to abolish existing public utility commissions and form a single public service board. House Chairman Grafton D. Cushing, of Boston, will preside over the sessions of the committee.

New Jersey.—The Legislature reconvened on Jan. 16. The committee appointed by Governor Fort, who retired from office that day, to investigate the question of employers' liability filed its report with him. This committee has drafted a bill for presentation to the Legislature which embodies its views on the subject of employers' liability. The commission unanimously believes that the compensation to injured workmen is a legitimate charge against the cost of manufacture and that the victim of an accident or his dependents should receive compensation as a matter of justice. Senator Lodge, of Atlantic, has introduced an employers' liability bill which provides among other things that the right to compensate injured employees shall not be defeated on the ground of the negligence of an employee or because of the employee assuming the risk.

Ohio.—Judge Cyrus B. Winters, member of the Legislature from Erie County, is preparing a public utilities bill for introduction. The Ohio liability commission will complete its report soon and a workmen's compensation bill will be formulated and presented to the Legislature. Representative Meyer Geeleerd, of Lucas County, is preparing a bill that will enable cities to own and operate street railways.

Pennsylvania.—The General Assembly reconvened on Jan. 16, 1911, after the usual recess following the opening session. The Law Committee of the League of Third Class Cities has approved several new laws and amendments to the 1889 act to conform with the 1908 constitutional provisions regarding the tenure of office for municipal offices, etc. Among the third class city bills to be presented to the Legislature are: A tax on real estate of all public service corporations, including electric railways; quo warranto proceedings whereby cities may deprive public service corporations of their franchises where violations have occurred; placing all telephone and telegraph wires in conduits, the cities to be empowered to construct their own conduits and compel the companies to install their wires in them or to compel the companies to construct their own conduits; notification of municipalities within 30 days after an accident on a public highway of the intention of the plaintiff to bring suit against the city for damages. At the present time such a suit may be filed two years after the accident.

Financial and Corporate

New York Stock and Money Market

Jan. 17, 1911.

During the past week the Wall Street market has shown quite a satisfactory improvement in prices and some increase in activity. Although the volume of daily sales has almost doubled recently, there is no evidence that outsiders are taking part in the trading. During the week Interborough-Metropolitan issues have been a trifle less active than formerly, owing to uncertainty as to the reorganization plans.

The bond market continues to be fairly good, with the volume of sales increasing. Accumulations of cash are large and rates are easy. To-day's quotations were: Call, $2\frac{1}{2}$ @3 per cent; 90 days, $3\frac{1}{4}$ per cent.

Other Markets

In the Philadelphia market a persistent disposition to accumulate traction stocks has created a firm and steady market for all offerings. The volume of transactions has been fairly large and prices are fractionally higher. Rapid Transit and Union Traction are the leading issues.

In the Chicago market there has been little activity in tractions during the week. Sales have been mostly small lots and prices have been unchanged.

Tractions cut but little figure in the Boston market last week. Moderate sales of Massachusetts Electric issues and Boston Elevated have been made at former prices.

Except for the usual dealing in the bonds of the United Railways there has been little doing in tractions in the Baltimore market. A few shares of the stock of the same company have been sold at about 17.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 10.	Jan. 17.
American Railways Company.....	a42	a44½
Aurora, Elgin & Chicago Railroad (common).....	a40¾	a40
Aurora, Elgin & Chicago Railroad (preferred).....	a85½	83½
Boston Elevated Railway.....	129½	129½
Boston Suburban Electric Companies (common).....	a15½	a15½
Boston Suburban Electric Companies (preferred).....	a71	71
Boston & Worcester Electric Companies (common).....	a10½	a10
Boston & Worcester Electric Companies (preferred).....	a40	a39½
Brooklyn Rapid Transit.....	75¾	77¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83	83¾
Capital Traction Company, Washington.....	*129	a120
Chicago City Railway.....	a200	a200
Chicago & Oak Park Elevated Railroad (common).....	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred).....	*7¼	*7¼
Chicago Railways, ptctg., ctf. 1.....	a100	a99½
Chicago Railways, ptctg., ctf. 2.....	a25	a21¼
Chicago Railways, ptctg., ctf. 3.....	a11	a9¼
Chicago Railways, ptctg., ctf. 4.....	a6½	a6
Cleveland Railway.....	*91½	*91½
Consolidated Traction of New Jersey.....	a72½	a73
Consolidated Traction of N. J., 5 per cent bonds.....	a104½	a104
Detroit United Railway.....	a67½	a67¾
General Electric Company.....	a152	a152
Georgia Railway & Electric Company (common).....	118	a118
Georgia Railway & Electric Company (preferred).....	88¼	87½
Interborough-Metropolitan Company (common).....	19¼	19¾
Interborough-Metropolitan Company (preferred).....	53¼	54¼
Interborough-Metropolitan Company (4½s).....	79¾	79¾
Kansas City Railway & Light Company (common).....	a22	a20½
Kansas City Railway & Light Company (preferred).....	a71	a71
Manhattan Railway.....	a140	140
Massachusetts Electric Company (common).....	a19	a18
Massachusetts Electric Companies (preferred).....	a85	a84½
Metropolitan West Side, Chicago (common).....	a22½	22½
Metropolitan West Side, Chicago (preferred).....	a69½	*69½
Metropolitan Street Railway, New York.....	*19½	*19½
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	64	66
Northwestern Elevated Railroad (common).....	a22	a22½
Northwestern Elevated Railroad (preferred).....	a62	a65
Philadelphia Company, Pittsburgh (common).....	a52	51¾
Philadelphia Company, Pittsburgh (preferred).....	a44½	44¼
Philadelphia Rapid Transit Company.....	a19½	20¾
Philadelphia Traction Company.....	a84½	85
Public Service Corporation, 5 per cent col. notes.....	a96	a96
Public Service Corporation, ctf. s.....	a100½	a110½
Seattle Electric Company (common).....	a106½	a110
Seattle Electric Company (preferred).....	a103	a103
South Side Elevated Railroad (Chicago).....	a68	a72
Third Avenue Railroad, New York.....	a11½	a11
Toledo Railways & Light Company.....	a8	a8
Twin City Rapid Transit, Minneapolis (common).....	a109	a110½
Union Traction Company, Philadelphia.....	a45¾	a46¾
United Rys. & Electric Company, Baltimore.....	a17	*17
United Rys. Inv. Co. (common).....	a1¾	a2¾
United Rys. Inv. Co. (preferred).....	65	66½
Washington Ry. & Electric Company (common).....	*33¾	34
Washington Ry. & Electric Company (preferred).....	*86½	a90
West End Street Railway, Boston (common).....	a92¾	92¾
West End Street Railway, Boston (preferred).....	a104¾	104¾
Westinghouse Elec. & Mfg. Co.....	66½	67
Westinghouse Elec. & Mfg. Company (1st pref.).....	*124	*124

a Asked. * Last sale.

Chicago Railways

On Jan. 7, 1911, Judge Grosscup, of the United States Circuit Court at Chicago, incorporated the following terms in the order entered by him confirming the sale of the property of the Chicago Consolidated Traction Company to the Chicago Railways:

"Any one of the suburbs served by the old Consolidated lines which can prove that a 5-cent fare to the loop would be compensatory to the street car companies can have such a fare.

"Not only this, but if through routes are desired and can be shown to be profitable they, too, can be demanded by the suburbs without any possibility of objection by either the Chicago Railways or the County Traction Company.

"Whether the terms to be offered by the suburbs are compensatory or not is to be determined not by the companies but by two experts, one appointed by the village interested and the other by Judge Grosscup.

"The present truce offer of the Chicago Railways may be extended from Feb. 12, 1911, to March 28, 1911, if accepted by any of the suburbs before the former date. The truce agreement and the contract for the arbitration of rates are both to expire finally on March 28."

The transfer of the property of the Chicago Consolidated Traction Company within the city limits of Chicago to the Chicago Railways and the property outside of the city to the County Traction Company and the dispute which followed over the extra fares which were exacted were referred to in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, page 49.

The County Traction Company has increased its capital stock from \$1,000 to \$300,000. The following statement has been made by President Blanchard, of the company:

"The underlying bonds of the Consolidated Traction Company were trusted with the various committees formed from time to time and the properties were bid in by Andrew Cooke as trustee for the bondholders' committees. That portion of the lines inside the city limits was bought by the Chicago Railways, in accord with the plan of reorganization last promulgated. The lines outside of the City of Chicago were not bought by the Chicago Railways, but were sold to the County Traction Company—the Chicago Railways, believing that the outlying lines under their franchises were a liability rather than an asset, declining to take them over. The new company, the County Traction Company, was formed to work out the destiny of these outlying lines.

"The original capital of \$1,000 was put at that nominal figure pending confirmation of the sale and the delivery of the properties to the County Traction Company. As soon as the properties were so delivered the capital was increased to \$300,000, a sum more commensurate with their values. The original cost of the 52.6 miles of property (including the Cicero power house) was about \$2,000,000, and the scrap or junk value which might be realized if it became necessary to scrap the properties was placed at about \$500,000, although the amount that could be raised if this method of procedure were followed is uncertain."

Albany Southern Railroad, Hudson, N. Y.—The Public Service Commission of the Second District of New York has authorized the Albany Southern Railroad to issue its first-mortgage bonds to the amount of \$52,000. The bonds are to be sold at not less than 85, and the proceeds used for construction expenses in connection with the double tracking and rehabilitation of its property. The directors of the company have declared an initial dividend of $1\frac{1}{2}$ per cent upon the preferred stock of the company, payable on Feb. 1, 1911.

Brooklyn (N. Y.) Rapid Transit Company.—At the annual meeting of the Brooklyn City Railway Frank Lyman was elected president of the company to succeed Edward Merritt, who declined renomination. W. N. Dykman was elected a director to fill a vacancy. Other directors and officers have been re-elected.

Columbus, Marion & Bucyrus Railway, Delaware, Ohio.—At a meeting of the stockholders of the Columbus, Marion & Bucyrus Railway recently an issue of \$100,000 of 6 per cent preferred stock was authorized, the proceeds to be used in the reorganization of the company. The committee in

charge of the reorganization is composed of the following John H. Caldwell, Peter McCarthy, H. M. Caswell, Joseph A. Powers and G. M. Walker. The reports of the receivers, George H. Whysall and Fred E. Guthery, show that the business of the road increased 58 per cent over the previous year.

Detroit (Mich.) United Railway.—The Detroit United Railway has applied to the Michigan State Railroad Commissioners for permission to issue \$140,000 of bonds to refund outstanding bonds.

Frederick (Md.) Railway.—The Public Service Commission of Maryland has authorized the Frederick Railway to issue an additional \$40,000 of preferred stock to pay for a majority of the shares of the stock of the Frederick Gas & Electric Company.

Lancaster & Southern Street Railway, Lancaster, Pa.—George B. Atlee & Company, Philadelphia, Pa., have exercised the option which they secured recently on the Lancaster & Southern Street Railway.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—The property of the Meadville & Conneaut Lake Traction Company and the Meadville Street Railway was sold at foreclosure on Jan. 14, 1911, to a committee representing the bondholders of the companies.

Oakland (Cal.) Traction Company.—The stockholders of the Oakland Traction Company have authorized an issue of \$250,000 of serial equipment bonds to cover cars now under construction. The San Francisco *News Bureau* recently said that a letter has been sent to the holders of the preferred stock of the company by H. M. Webster, manager of the financial department of the Realty Syndicate, intimating that dividends will not be paid this year and offering to exchange certificates of the Realty Syndicate for shares of the Oakland Traction Company. The *News Bureau* further said that an agent of F. M. Smith, a director of the United Properties Company of California, the incorporation of which under the laws of Delaware was noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 92, had declared that Mr. Webster had written the letter on his own responsibility. In his letter Mr. Webster said: "There are many sections of Oakland where car lines should be built. There is trackage to improve, street work to be done, car houses to build and rolling stock to buy. This work has to be done and the Oakland Traction Company must do it, although it is going to take millions of dollars. Therefore for a time it is likely that they will invest the entire earnings of the Oakland Traction Company in these improvements, in which case your preferred stock would pay no dividends. Oakland Traction Company stock has been paying 60 cents; we do not want any of the stockholders to be needlessly deprived of their income, and have therefore concluded to offer the following proposition for the time being: Any holder of Oakland Traction Company 6 per cent preferred who wishes to do so may exchange each share of stock for a \$100 Realty Syndicate 6 per cent certificate."

Providence & Fall River Street Railway, Swansea Center, Mass.—The Providence & Fall River Street Railway has failed to pay the coupon due on Jan. 1, 1911, on its issue of \$165,000 of 5 per cent bonds. Arthur W. Clapp, the secretary and treasurer of the company, is reported to have stated that the company will probably be able to meet the payment by March 1, 1911.

Springfield & Xenia Railway, Springfield, Ohio.—The Springfield & Xenia Railway paid an extra dividend of $\frac{1}{2}$ of 1 per cent on Jan. 5, 1911, on the \$300,000 of 5 per cent cumulative preferred stock of the company and the quarterly dividend of $1\frac{1}{4}$ per cent. This made the total dividend for 1910 $5\frac{1}{2}$ per cent, the same as was paid in 1909.

Syracuse (N. Y.) Rapid Transit Company.—The Public Service Commission of the Second District of New York has authorized the Syracuse Rapid Transit Railway to issue its preferred capital stock to the amount of \$1,750,000 at not less than par. The proceeds are to be used to pay and discharge the principal of promissory notes of the company to the amount of \$1,660,000. The remaining \$90,000 is to be used for additions, extensions and betterments.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The reorganization committee of the Washington, Baltimore & Annapolis Electric Railway and the Baltimore Terminal Company has received deposits of

about 90 per cent of the bonds and stock of the companies in advocacy of the plan for reorganizing the corporations, mention of which was made in the ELECTRIC RAILWAY JOURNAL of Nov. 26, 1910, page 1078.

Dividends Declared

Boston (Mass.) Elevated Railway, 3 per cent.
 Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.
 Columbus (Ohio) Railway, quarterly, $1\frac{1}{4}$ per cent, preferred.
 Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.
 East St. Louis & Suburban Railway, East St. Louis, Ill., quarterly, $1\frac{1}{4}$ per cent, preferred.
 Gary & Interurban Railway, Gary, Ind., quarterly, 1 per cent.
 Grand Rapids (Mich.) Railway, quarterly, $1\frac{1}{4}$ per cent, preferred.
 Havana (Cuba) Electric Railway, quarterly, $1\frac{1}{2}$ per cent, preferred; quarterly, $1\frac{1}{2}$ per cent, common.
 Mexico (Mex.) Tramways, quarterly, $1\frac{3}{4}$ per cent.
 Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, $1\frac{1}{2}$ per cent, preferred.
 Montreal (Quebec) Street Railway, quarterly, $2\frac{1}{2}$ per cent.
 Pacific Coast Railway, San Luis Obispo, Cal., 3 per cent preferred, $2\frac{1}{2}$ per cent common, $\frac{1}{2}$ per cent common (extra).
 Railway & Light Securities, 3 per cent preferred, 2 per cent common.
 Railways Company General, Philadelphia, Pa., quarterly, 1 per cent.
 Rio de Janeiro Tramway, Light & Power Company, quarterly, $1\frac{1}{4}$ per cent.
 Seattle (Wash.) Electric Company, quarterly, $1\frac{3}{4}$ per cent common.
 Union Traction of Indiana, Indianapolis, Ind., 1 1-5 per cent common.
 United Traction Company, Pittsburgh, Pa., $2\frac{1}{2}$ per cent, preferred.
 West Penn Traction Company, Pittsburgh, Pa., quarterly, $1\frac{1}{2}$ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE ELECTRIC COMPANY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Nov. '10		\$9,747	\$5,681	\$4,066	\$1,967	\$2,099
1 " " '09		9,904	6,608	3,296	1,720	1,576
12 " " '10		109,338	70,436	38,902	23,128	15,774
12 " " '09		98,191	68,355	29,836	.....	.....
BINGHAMTON RAILWAY.						
1 m., Nov. '10		\$27,609	\$17,472	\$10,137	\$9,136	\$1,001
1 " " '09		25,911	15,909	10,002	8,931	1,071
5 " " '10		161,217	89,197	72,020	45,691	26,329
5 " " '09		152,487	84,527	67,960	45,000	22,960
BROCKTON & PLYMOUTH STREET RAILWAY.						
1 m., Nov. '10		\$8,026	\$6,472	\$1,554	\$1,571	*\$17
1 " " '09		8,628	6,450	2,178	1,756	422
12 " " '10		119,955	84,953	35,002	20,393	14,609
12 " " '09		130,747	91,748	38,999	22,012	16,987
DALLAS ELECTRIC CORPORATION.						
1 m., Nov. '10		\$127,042	\$74,828	\$52,214	\$24,028	\$28,186
1 " " '09		121,215	68,780	52,435	27,471	24,964
12 " " '10		1,449,793	950,039	499,754	312,967	186,787
12 " " '09		1,307,186	812,326	494,860	337,856	157,004
HOUGHTON COUNTY TRACTION COMPANY.						
1 m., Nov. '10		\$22,799	\$13,028	\$9,771	\$6,637	\$3,134
1 " " '09		24,915	13,538	11,367	6,215	5,152
12 " " '10		312,526	165,641	146,885	78,243	68,642
12 " " '09		318,716	171,616	147,100	72,024	75,076
NORTHERN TEXAS ELECTRIC COMPANY.						
1 m., Nov. '10		\$119,263	\$63,309	\$55,954	\$23,878	\$32,076
1 " " '09		105,253	57,097	48,156	16,189	31,967
12 " " '10		1,423,321	760,083	663,238	235,700	427,538
12 " " '09		1,248,516	686,028	562,488	202,248	360,240
PADUCAH TRACTION & LIGHT COMPANY.						
1 m., Nov. '10		\$21,523	\$11,650	\$9,873	\$7,840	\$2,033
1 " " '09		20,710	11,319	9,391	6,621	2,770
12 " " '10		246,334	144,615	101,719	85,140	16,579
12 " " '09		227,110	132,575	94,635	81,638	12,997
PENSACOLA ELECTRIC COMPANY.						
1 m., Nov. '10		\$24,427	\$14,328	\$10,099	\$5,067	\$5,032
1 " " '09		21,176	12,362	8,814	4,509	4,305
12 " " '10		267,952	157,453	110,499	60,010	50,489
12 " " '09		245,049	140,443	104,606	52,316	52,290

*Deficit.

Traffic and Transportation

Decision in Regard to Passes on Electric Railways in New Jersey

The Board of Public Utility Commissioners of New Jersey has decided that the granting of a railroad pass or identification card to municipal employees charged with seeing that ordinances are enforced is not a violation of the act passed by the last Legislature, which prohibits any public utility from bestowing upon any official any discrimination, gratuity or free service. The question was raised as a result of the refusal of the Public Service Railway to issue passes to Joseph Crawford, electrical inspector of the Board of Street and Water Commissioners of Newark, and his assistants. The company held that the law prevented the continued use of the tickets which it had previously furnished to the inspectors. Frank H. Sommer, president of the commission, in his opinion, said in part:

"The municipalities of the State, under powers conferred by the Legislature, have adopted ordinances requiring the payment of a license fee for each street railway car operated. They have issued license certificates evidencing the payment of the fee, and have required the placing of the certificates in a conspicuous place in the cars licensed. Some of them have by contract ordinances provided for the payment to the municipality by the street railways of a percentage of gross receipts. They have further adopted ordinances regulating the operation of cars, providing, among other things, for their maintenance in a cleanly and sanitary condition, their heating and against overcrowding.

"The municipalities adopting these ordinances have created corps of license and other inspectors to ascertain whether their provisions are observed and to enforce them. These inspectors are, for obvious reasons, not uniformed. To ascertain whether the provisions of the ordinances, or some of them, are observed, it is requisite that the inspectors enter the cars. This they have been permitted to do without payment of fare until the enactment of Chapter 41 of the Laws of 1910. This section, so far as it is relevant to the question under consideration, provides as follows: 'No public utility, as herein defined, shall hereafter give, grant or bestow upon any local, municipal or county official any discrimination, gratuity or free service whatsoever, but nothing herein contained shall prevent the free transportation of uniformed public officers while engaged in the performance of their public duties.'

"The company admitting to its cars an inspector in the employ of the municipality without payment of fare to observe whether the provisions of municipal ordinances governing their operation are complied with neither gives, grants nor bestows upon him any discrimination, gratuity or free service whatsoever. It grants no discrimination, for it recognizes the right of free entry of all who in the performance of public duties are obliged to enter the cars for the purpose of observing whether, in their operation, the municipal ordinances are complied with. It grants no gratuity or free service, for it provides no gratuitous or free transportation to such inspector; it admits him solely for the purpose of inspection, and his being carried is a mere incident to the inspection, due to the fact that the detaining of the cars operating upon a schedule for the period of time requisite for inspection might seriously interfere with that adequate service to which the public is entitled.

"It is suggested that under this ruling it will be difficult to distinguish between inspectors entering cars for the legitimate purpose of inspection and inspectors entering cars for the illegitimate purpose of being transported free of charge. The board is not willing to assume that a municipal employee will improperly use an identification card issued to him. The statutes of this State provide for the free transportation of specified public officials within this State. Because of transportation conditions it is possible, particularly on the under-river tubes between this State and the State of New York, to use the identification cards issued under this statute illegally, in interstate transportation. This possible illegal use of cards has at no time been considered a ground for withholding them.

"In the judgment of the board these cards have not been misused. Nor, in its judgment, will identification cards

issued under this ruling be improperly employed. Should a card so issued be misused, the company affected has it within its power to withdraw it, and no just complaint could be based upon such withdrawal."

Blotters Used in an Accident Campaign

The Indianapolis & Louisville Traction Company, Louisville, Ky., is distributing standard-size blotters on which attention is called to the reasons why accidents happen to passengers on interurban cars. The blotter is headed "Most Interurban Car Accidents Happen," and is followed by these reasons:

"Because you persist in getting on or off before the car really stops.

"Because you get off facing the rear of the car.

"Because boys and girls persist in playing in streets which are used by the cars.

"Because you get off and cross behind the car, so as to come suddenly in front of an automobile or a wagon coming from the other direction.

"Because you run after and jump on a car when it is moving.

"Because you persist in riding on the platform or steps of the car.

"Because you often abruptly turn your vehicle when driving, in front of a moving car.

"Because you do not stop, look and listen before crossing interurban tracks at highway crossings.

"The speed of a car is very deceptive, when the observer is near the track. When the car is 1000 ft. away it appears to be moving slowly, but the closer it gets the faster it seems to go. An interurban car goes about 50 ft. per second, or about 35 ft. each time you take a step. Is it any wonder that accidents occur when one tries to cross in front of a moving car?

"With your assistance we feel that travel on our lines can be made safe; without it, we are helpless in accidents resulting from the above causes. It is dangerous around cars and tracks, and, therefore, more than usual care is necessary for absolute safety."

The reasons are of course too terse to extend across the blotter, so they have been arranged in two columns separated by a rule with a rule at the bottom under which, in a space 1¼ in. high, is the appeal: "Go the Electric Way" Louisville to Indianapolis and Intermediate Points. Low Rates. Frequent Service." Underneath this in display type is the name of the company.

Physical Condition of Subway Employees

Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., has issued a statement in regard to the physical condition of the employees of the subway division of the company, in which he says:

"The report that nearly every employee who started work when the subway was first opened has been replaced by a new man is not true. It is true that our trainmen—by that I mean the guards on our trains—change frequently. But since the subway opened not more than 24 conductors and motormen have been discharged or have given up their positions.

"The reason is that the trainmen who fail to be promoted to conductors or motormen are likely to get offers of other places at better salaries. Those who are promoted stay with the company, and their health is good. Some time ago I caused 100 men employed in the subway to be examined by physicians to learn how their health had been affected in the course of a year. The men were found to be in first-class physical condition, and had increased in weight from 4 lb. to 40 lb.

"Like every railroad, we insist on good physical condition among the new men taken into our employ. Every member of a train crew is examined for a weak heart when he applies for a job. If his heart is not strong, he is not employed. We do not want our employees to fail us in an emergency.

"In addition, our motormen and conductors are examined by physicians at periods of two years. The results of these examinations have shown that their health has, if anything, improved in the course of service. We have a voluntary sick and death benefit association, and the majority of our

employees are members. This association pays to a sick or injured employee a daily sum while the employee is disabled. The records show that more sick men are employed on the elevated lines than on the underground. In fact, we have paid out more than twice as much money from this benefit organization to men employed on the elevated lines who have been sick than to men employed on the subway lines who have been sick.

"Of course it is true that the men employed on the subway lines are, on the average, younger than those on the elevated lines, and consequently they are less apt to become sick. But I do not think that fact is of great importance. We have men on the elevated roads who have held their places more than 30 years."

Order Entered for Reconstruction of Windows in Brooklyn Elevated Cars

As the result of the hearing held before Commissioner McCarroll, of the Public Service Commission of the First District of New York, Nov. 21, 1910, on the motion of the commission to investigate the question of improving and adding to the service and equipment of the Brooklyn Union Elevated Railroad, Nassau Electric Railroad, Sea Beach Railway and the South Brooklyn Railroad, all subsidiaries of the Brooklyn Rapid Transit Company, the commission entered an order on Jan. 11, 1911, against the companies, requiring them to reconstruct the windows of 118 combination cars having arched roofs without deck ventilators. The provisions of the order follow:

"Ordered, That said companies reconstruct every alternate side window in each of said cars used by them respectively, so that said windows shall be divided into two parts, of which the upper part may be raised and lowered or opened in such manner as to allow of better ventilation.

"Ordered, That said companies commence such reconstruction of said windows within 30 days after service upon them of a copy of this order, and that they proceed with such work of reconstruction as rapidly as possible, but in such manner as will not require more than three cars to be out of service at any one time.

"Ordered, That such reconstruction of the windows in all of said cars shall be completed by said companies within four months of the time of service of this order upon said companies respectively.

"Ordered, That within three weeks after service of this order said companies file with the commission a plan or design for the reconstruction of said windows in accordance with the foregoing provisions."

A brief report of the hearing before the commission, on Nov. 21, 1910, was published in the *ELECTRIC RAILWAY JOURNAL* of Dec. 3, 1910, page 1101.

Joint Rate Order in New York

On Jan. 10, 1911, the Public Service Commission of the First District of New York adopted an order which requires that a joint rate shall be established by the Central Park, North & East River Railroad and the South Shore Traction Company, which operates over the Queensborough Bridge and on Long Island, for the transportation of passengers. The order calls upon the companies "to establish on or before Feb. 15, 1911, and thereafter maintain in operation through routes for the transportation of passengers in each direction between the intersection of Tenth Avenue with Fifty-ninth Street, in the Borough of Manhattan, and the eastern terminus of the Queensborough Bridge, in the Borough of Queens, over the Fifty-ninth Street line of said Central Park, North & East River Railroad and the Queensborough Bridge line of said receivers, and on or before said date to establish and put in force a joint rate of fare for each such passenger by the use of a transfer slip, coupon ticket or other sufficient token delivered to each passenger, and to apply said date of fare to the transportation of passengers between the said points and over the lines specified."

A summary of the testimony presented at the informal hearing on Dec. 8, 1910, before Commissioner Bassett, of the Public Service Commission, at which the question of through routes and joint rates between the companies was considered was published in the *ELECTRIC RAILWAY JOURNAL* of Dec. 31, 1910, page 1270.

Advertising a Railway Under Construction

The New York, Westchester & Boston Railway, which is now under construction, has shown through a number of advertisements the large increase in population and in the value of real estate in the Borough of the Bronx, New York, between the years 1900 and 1910, due to a large extent to the electric railway service which has facilitated easy access into the heart of New York City. These advertisements have been entitled "A Lesson in Cause and Effect," and state:

"In 1900 the population of the Bronx was 200,507, the assessed value of its real estate \$138,494,849. In 1910 its population was 430,980, an increase of 230,473, or over 114 per cent; the assessed value of real estate, \$462,704,008, an increase of \$324,209,159, or over 234 per cent."

Through the building of the New York, Westchester & Boston Railway, the same wonderful results are now in the making, the advertisements say, in the upper Bronx and Westchester County. It is the belief of the company that a portion of the line will be in operation by fall, and that the whole road will be completed in about one year.

The train schedule has not yet been decided upon by the company. The local trains will average about 20 m.p.h., while the express trains will make an average of approximately 35 m.p.h. The express stations on the main line will be located at 180th Street, Pelham Parkway, Mount Vernon and New Rochelle, and on the White Plains branch, at Wykagyl, Palmer Avenue and White Plains. Each station will contain a number of stores and more may be added at very little trouble, as fast as conditions warrant.

Companies Will Exchange Transfers.—The Tacoma Railway & Power Company and the Pacific Traction Company have arranged to exchange transfers.

Strip Tickets in Reading, Pa.—It has been decided in the local courts of Reading that the United Traction Company must sell six tickets for 25 cents. An appeal will be taken to the Supreme Court by the company.

Indianapolis & Cincinnati Traction Company to Remove Indianapolis Office.—The office of the Indianapolis & Cincinnati Traction Company, in the Traction Terminal Building, Indianapolis, Ind., will be removed to Rushville, Ind.

University of Illinois to Use Special Train.—The Illinois Traction System is preparing to place an interurban train at the service of the Agricultural Department of the University of Illinois, to be used by the faculty and students in demonstrations and presenting lectures on agricultural subjects at points on the interurban system. The schedule calls for the tour to begin early in February.

Electric Cars Should Have Rear Lights.—An ordinance will be presented to the Mayor and City Commissioners of Kansas City, Kan., providing that all railway cars operated on the streets of Kansas City shall be equipped with red tail lights of not less than 100 candle-power, and shall be lighted by other illuminant than electricity, so that the lamps will burn when the electric current fails.

Interstate Commission Without Power to Require Additional Trains for Commuters.—Upon application of a resident of a suburban station that sufficient trains were not run to and from New York City during the morning and evening hours to accommodate commuters, the Interstate Commerce Commission has held that it is without authority to require the running of three additional trains during such hours.

Bonus Paid Motormen and Conductors.—The Public Service Railway, Newark, N. J., has put into operation its bonus-paying system for new motormen and conductors. Carrying out this plan, the company will pay a bonus of \$10 to each motorman and conductor at the end of his first year as a recognition of his faithful service and as partial compensation for the time lost by the men while learning their new duties.

Changes in Methods of Operation in Owensboro.—The Owensboro (Ky.) City Railroad has adopted the pay-as-you-enter system and stops its cars now on the near side of the street. Passengers enter and leave the cars by the front platform, where the fare boxes are located, as the Owensboro line employs no conductors. The motorman,

by this method, can supervise the entrance and exit of passengers and can also furnish change as desired.

Public Service Commission Orders Transfer Exchange.—The Brooklyn, Queens County & Suburban Railway and the Long Island Electric Railway have been ordered by the Public Service Commission to arrange to exchange transfers on Jamaica Avenue. The two companies have an agreement for the joint use of tracks for a stretch of about 2000 ft. on this avenue, and the law requires that wherever there is such joint use transfers must be exchanged.

Street Railway Commissioner Proposed in Memphis.—As the result of suggestions made by J. A. Riechman, fire and police commissioner of Memphis, Tenn., Thomas Dies, commissioner of utilities of Memphis, is preparing a bill which provides for the creation of the office of street car inspector, the incumbent of this position to be empowered to enter the car houses and in other ways to enforce the municipal ordinances and see that the railways maintain their schedules.

Question of Limiting Car Capacity in Covington, Ky.—In the case of the South Covington & Cincinnati Street Railway against the City of Covington, Ky., to prevent the city from enforcing an ordinance intended to limit the number of passengers to be carried on a car John Shepherd, city solicitor, has filed a demurrer to the petition in the Kenton County Circuit Court, in which he holds that the only way to test the validity of the ordinance is to allow an arrest to be made and a fine to be imposed with the object of appealing the case.

East St. Louis Wants 5-Cent Fare to St. Louis.—The committee of City Council of East St. Louis, Ill., appointed a short time ago to take up the matter of securing a 5-cent fare between St. Louis and East St. Louis, has arranged a meeting with L. C. Haynes, vice-president of the East St. Louis & Suburban Railway. Mr. Haynes said recently that any reduction in the fare would have to come entirely from the revenues of the street railway as the railway has a contract with the bridge company to pay a flat sum for each person carried across the bridge on its cars.

Indianapolis & Louisville Traction Company Advertising.—The Indianapolis & Louisville Traction Company, Louisville, Ky., has adapted to its own uses the effective illustration used by the Bell telephone interests in the current magazines, reproducing the view looking down the railroad track with the advertisement in the center. The following advertisement appeared in a recent issue of the Louisville Herald: "The electric way to Indianapolis. Six Hoosier flyers daily, 7:30, 9:30, 11:30 a. m., 1:30, 4:30, 6:30 p. m. Hotel to hotel in four hours; 150 lb. baggage checked free. Fare one way, \$2; round trip, \$3.65. Depot, Third Street, near Walnut."

Opposition to Second Fare.—Refusal of passengers to pay an extra fare between Rutherford and Passaic, N. J., has caused the Public Service Railway, Newark, N. J., considerable trouble recently. The company has stated its reason for the change as follows: "The real cause of this extra fare is the fact that in our franchise granted to the Hudson River Line was a stipulation that if ever this line should be consolidated with what we call the White Line, transfers should be issued. These lines cross in our borough, and if passengers coming south from Hasbrouck Heights, Woodridge, or Carlstadt, on the Hudson River Line, should receive transfers on the White Line, the 5-cent fare would carry them west to Passaic."

Steps Taken to Prevent Accident Among School Children.—The Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, has recently finished a series of talks with about 40,000 school children along its lines regarding the prevention of accidents. The company also distributed 50,000 desk blotters, 9 in. by 4 in., headed "Help Us Prevent Accidents." At the side of the blotter were the words "Do Not," followed by a bracket which inclosed the following: "Play or coast on streets where there is a car track. Cross a street car track without first looking both ways. Cross a street car track if a moving car is in sight. Get on to car while car is moving. Get off of car while car is moving. Lean out of car windows. Face to the rear in stepping off car. Touch or allow anyone to touch any wire."

Personal Mention.

Mr. C. F. Crane has been appointed superintendent of railways of the Eastern Pennsylvania Railways, Pottsville, Pa. Mr. Crane was formerly general passenger and claim agent of the company.

Mr. Chester P. Wilson, who resigned recently as general manager of the Rockford & Interurban Railway, has become associated with J. G. White & Company, Inc., New York, N. Y. For six years Mr. Wilson was general superintendent of the Lackawanna & Wyoming Valley Railroad, of Scranton, Pa.

Mr. W. R. Putnam has resigned as superintendent of the Menominee & Marinette Light & Traction Company, Marinette, Wis., effective Feb. 15, 1911. Mr. Putnam was manager of the Red Wing Gas & Electric Company, Red Wing, Minn., and its successor, the Red Wing Gas, Light & Power Company, from May 1, 1899, to Feb. 1, 1909.

Mr. David Harlowe, traffic manager for the Allis-Chalmers Company, Milwaukee, Wis., has been appointed a member of the Wisconsin Railroad Commission by Gov. F. C. McGovern to succeed Prof. B. H. Meyer, who resigned recently to accept a place on the Interstate Commerce Commission at Washington.

Mr. H. U. Wallace, consulting engineer with offices in Chicago, Ill., has been elected vice president of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia. Mr. Wallace was graduated from Purdue University and has been connected with the Illinois Central Railroad, J. G. White & Company, Inc., the Wallace-Coates Engineering Company and the Chicago, Lake Shore & South Bend Railway.

Mr. G. N. Lemmon has been appointed electrical engineer of the Michigan United Railways with headquarters at Jackson, Mich. Mr. Lemmon was formerly superintendent of overhead lines of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, and before he served in that capacity Mr. Lemmon represented Sanderson & Porter, New York, N. Y., in construction and power-house work for the Youngstown & Shenango Railway & Light Company at Youngstown.

Mr. R. C. Taylor, who resigned as superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind., in September, 1910, to become master mechanic in charge of the shops of the Illinois Traction System at Granite City, Ill., and who was subsequently appointed engineer of maintenance of equipment of the company, was appointed assistant superintendent of motive power and equipment of the Illinois Traction system, with jurisdiction over outside shops, effective Jan. 15, 1911.

Mr. Elton G. Dunlap, assistant treasurer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, since August, 1909, has been elected treasurer of the company to succeed Mr. S. C. Rogers, who has resigned to become secretary and treasurer of the Youngstown Dry Goods Company, as noted elsewhere in this column. Mr. Dunlap has been employed by Mahoning & Shenango Railway & Light Company for eight years and has served in almost every capacity in the accounting and treasury departments of the company. For two years previous to August, 1909, he was assistant chief clerk of the company.

Mr. Austin E. Gibson has been appointed local manager of the railway and lighting properties at Owosso and Corunna, Mich., which are under the control of the Michigan United Railways. Previous to his present work Mr. Gibson was in charge of power with the Cleveland Cliffs Iron Company, Negaunee, Mich., and served as operating engineer of the Mexican Light & Power Company; master mechanic of the Southwestern Smelting & Refining Company, Oro Grande, N. M., and maintenance engineer of the Arizona Copper Company, Humboldt, Ariz. He also was in charge of the electrical work of the Shattuck Copper Company and the Denn Copper Company in Arizona.

Mr. M. C. Carpenter has been appointed master mechanic of the United Traction Company, Albany, N. Y. Mr. Carpenter has been master mechanic of the Hudson Valley Railway, Glens Falls, N. Y., for some time. He entered the service of the United Traction Company about three years ago and the first work he did was to supervise the

strengthening of the track joints of the roadbed throughout the entire system. When the control of the Hudson Valley Railway passed to the Delaware & Hudson Company, which also controls the United Traction Company, Mr. Carpenter was made master mechanic of the Hudson Valley Railway and has been located at Glens Falls.

Mr. Frank Arnold, whose resignation as superintendent of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., was announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 12, 1911, will engage in business in Rochester, N. Y., in the commercial line. Mr. Arnold has been engaged in railway work for 30 years. He was with the transportation department of the New York Central & Hudson River Railroad for 18 years. For seven years he was manager of the Oswego (N. Y.) Traction Company. For the last five years he has been superintendent of the Fort Dodge, Des Moines & Southern Railroad.

Mr. Judson C. Clements, of Georgia, ranking member of the Interstate Commerce Commission, was elected chairman of that body on Jan. 13, 1911, in place of Mr. Martin A. Knapp, who is now presiding justice of the Court of Commerce. After serving in the Confederate Army, Mr. Clements practised law. He served from 1872 to 1880 in the Georgia Legislature and then went to Congress for eight years. In Georgia he had a prominent part in passing the railroad legislation of the State, and in Congress he helped to enact the original Interstate Commerce Commission law. In 1892 President Harrison appointed Mr. Clements as a member of the Interstate Commerce Commission and he has since continued in that capacity.

Mr. Hugh O'Neil has been appointed superintendent of power stations of the United Traction Company, Albany, N. Y. Mr. O'Neil has been connected with the United Traction Company for 20 years and was employed by the Albany Railway before the organization of the United Traction Company. He was formerly assistant to Mr. H. A. Benedict, in charge of the power stations and the electrical branch of the service. Mr. O'Neil and Mr. Carpenter, whose appointment as master mechanic of the company is noted elsewhere in this column, will assume the duties of the position of mechanical and electrical engineer of the company, from which Mr. Benedict has retired to become connected with the Public Service Railway, of Newark, N. J.

Mr. J. F. Reardon has resigned as general superintendent of the Salt Lake & Ogden Railway, Salt Lake City, Utah. Mr. Reardon was formerly general superintendent of the Lehigh Valley Transit Company, Allentown, Pa. He was born in northern Michigan about 38 years ago and entered street railway work when he was about 17 years old with the Twin City Rapid Transit Company, Minneapolis, Minn., and remained with the company for 10 years. After resigning from the Twin City Rapid Transit Company Mr. Reardon became master mechanic of the Everett Railway, Light & Water Company, Everett, Wash., and later was made superintendent of the company. He resigned from the Everett Railway, Light & Water Company to become connected with the Lehigh Valley Transit Company.

Mr. J. R. Gilhoul, trainmaster of the Père Marquette Railroad, with headquarters at St. Thomas, Ont., has been appointed trainmaster of the Illinois Traction System, with headquarters at Springfield, Ill., to succeed Mr. F. L. Richards, whose appointment as superintendent of the terminals of the Illinois Traction System at St. Louis is announced elsewhere in this column. Mr. Gilhoul began his railroad career as a telegraph operator and has worked for the Rock Island Railroad, Missouri Pacific Railway, Wabash Railroad and the Père Marquette Railroad, filling the positions of train dispatcher, chief train dispatcher and trainmaster. He has practically had charge of the division on which he is trainmaster for the Père Marquette for the last six years. Mr. Gilhoul will assume his duties with the Illinois Traction System on Feb. 1, 1911.

Mr. Archibald B. Millar was appointed secretary of the Pennsylvania State Railroad Commission recently by Mr. E. S. Stuart, whose term of office as Governor of Pennsylvania expired on Jan. 17, 1911. Mr. Millar succeeds Mr. Harry S. Calvert, Pittsburgh, Pa., who resigned some time ago. During the interval between Mr. Calvert's resignation and Mr. Millar's appointment Mr. W. S. Seibert, Pitts-

burgh, filled the office. Mr. Millar was born in Hartford, Conn., on April 16, 1882, and was educated in the public schools of Philadelphia and the Peirce Business College, Philadelphia, from which he was graduated. Subsequently he served as a member of the faculty of the college for three years. In 1900 he entered the service of the Union League of Philadelphia and was assistant superintendent during the term of Mr. Stuart as president of that organization. When Mr. Stuart became Governor of Pennsylvania on Jan. 15, 1907, he appointed Mr. Millar as his private secretary.

Mr. F. L. Richards, trainmaster of the Illinois Traction System, with headquarters at Springfield, Ill., has been appointed superintendent of terminals of the company at St. Louis, with jurisdiction over the line between Edwardsville and St. Louis, and the freight terminals at Twelfth and Lucas Streets, St. Louis, Mo., and the Salisbury yard, also Venice, Madison, Granite City and as far north as Edwardsville. He will also handle all the summer excursion business of the company. Mr. Richards began his railroad career as a telegrapher and resigned as assistant superintendent of the Chicago & Alton Railroad to become connected with the Illinois Traction System. The position of superintendent of terminals of the Illinois Traction System at St. Louis is a very important one, as the company expects to do a heavy passenger business and a large freight business in handling merchandise and coarse freight. Mr. Richards will assume his new duties on Feb. 1, 1911.

Mr. S. C. Rogers has resigned as treasurer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, to accept the position of secretary and treasurer of the Youngstown Dry Goods Company, Youngstown, Ohio, in active charge of the business management of the company. Mr. Rogers has been connected with the Mahoning & Shenango Railway & Light Company and its constituents for 10 years. He was connected with mercantile business in New York and Chicago before entering the field of public service accounting and finances, and served 19 years with J. M. Young & Company, New York, N. Y., importers of china, glass and fancy goods. For 10 years Mr. Rogers was in charge of the office of this company, and subsequently represented an Eastern manufacturing company for three years as manager of its business interests west of Chicago. Mr. Rogers has always taken an active interest in the affairs of the Central Electric Accounting Conference and the American Electric Railway Accountant's Association, and at the third annual meeting of the Central Electric Accounting Conference, held in Youngstown, on Dec. 10, 1910, he was elected president of the conference.

Mr. J. L. Blake, whose resignation as general manager of the Fort Dodge, Des Moines & Southern Railway, Boone, Ia., was announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, began railroading on the Des Moines & Fort Dodge Railroad, from Des Moines to Fort Dodge, in 1881, when he was 16 years old. He learned telegraphing at Dallas Center and went from Dallas Center to Des Moines and served in the capacity of telegraph operator, ticket agent and finally chief clerk in the local freight office of the Des Moines & Fort Dodge Railroad for about two years. Mr. Blake next went to Angus, a coal mining camp which produced about 2500 tons daily, and was agent for the Des Moines & Fort Dodge Railroad. He was afterward made joint agent for the Chicago, Rock Island & Pacific Railway and Minneapolis & St. Louis Railroad at Angus and remained there about eight years. Mr. Blake next became connected with the Minneapolis & St. Louis Railroad as traveling freight agent, commercial agent at Minneapolis and assistant general freight agent of the company and continued with the company about 13 years. He has been general manager of the Fort Dodge, Des Moines & Southern Railroad since July 20, 1903. The Fort Dodge, Des Moines & Southern Railroad consisted of 19 miles of road when Mr. Blake entered its employ, whereas now there are 156 miles. Mr. Blake has bought between 600 and 700 acres of land near Perry, Ia., and has had it highly improved and stocked with big horses and short horn cattle and proposes in the future to give his entire attention to the development of this property.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Oakland & Bay Shore Railway, Oakland, Cal.**—Application for a charter has been made in California by this company to build an electric railway to begin at the east end of Shafter Avenue, in Oakland, extending to Thirty-eighth Street, and thence to the west end of the contemplated projection of Seventh Street at the water front. A branch line on Webster Street and various spurs and switches will be built. This proposed line is to be an extension of the Oakland & Antioch Railway. Capital stock, \$500,000. Incorporators: R. H. Miller, Albert J. Kurtmeyer, John R. Selby and Walter Arnstein, secretary, all of Oakland.

***Calumet United Railway Company, Indianapolis, Ind.**—Application for a charter has been made in Indiana by this company to build an electric railway from Michigan City to the State line between Indiana and Illinois at Hammond, connecting Michigan City, Chesterton, Porter, East Gary, Miller, Aetna, Gary, East Chicago, Whiting and Hammond. Capital stock, \$10,000. Incorporators:—James A. Slattery, C. H. Weak, R. W. Grimes, of Philadelphia, Pa., and Thomas K. Bell, H. W. Darling and L. L. Bomberger, of Chicago.

Missoula & Hamilton Railway, Hamilton, Mont.—Application for a charter has been made by this company to build an electric or steam railway from Missoula to Hamilton. Work is to be begun in the spring. Capital stock, \$500,000. Incorporators: H. M. Sloan, F. G. Bennett, R. A. O'Hara and Ira M. Cobe. [E. R. J., Jan. 30, '09.]

***Kamouraska-L'Islet Railway, Quebec, Can.**—Application for a charter will be made by this company to the Legislature of the Province of Quebec, to build an electric, steam or gasoline railway to extend from a point near Ste. Anne de la Pocatière, Kamouraska County, to the Intercolonial Railway station, thence to the National Transportation road to make connection with the Quebec Central Railway. Another branch will go north to Pointe de la Rivière Ouelle and from there to the Rivière Ouelle wharf to connect there with the Intercolonial Railway. Adolphe Stein, attorney.

***Nashville-Gallatin Interurban Railway, Gallatin, Tenn.**—Application for a charter has been made by this company in Tennessee to build a 30-mile electric railway from Nashville to Gallatin. The plans call for four steel bridges 100 ft. long to be part of the necessary construction, and it is expected to begin work in the spring. Connection is to be made with the Nashville Railway for the operation of the interurban cars through Nashville. Transfer arrangements will also be made. H. H. Mayberry is interested.

FRANCHISES

Los Angeles, Cal.—The Los Angeles & Redondo Railway will ask the City Council for a franchise to build its railway within the city limits.

Oakland, Cal.—The Southern Pacific Company, San Francisco, has received a 50-year franchise from the City Council to electrify its Seventh Street line in Oakland.

Oakland, Cal.—The Oakland Traction Company has received a 35-year franchise from the City Council to build its railway over Nineteenth Street, in Oakland.

Stamford Conn.—The New York, New Haven & Hartford Railroad will ask the General Assembly during the coming session for the right to build an electric railway from New Hartford to Barkhamstead, Hartford and Colebrook, following the boundary line of Connecticut and Massachusetts to the highway running from Winsted, Conn., to New Boston, Mass.

Wichita, Kan.—The Wichita Railroad & Light Company, Wichita, has been asked by residents of West Wichita for a new street railway into that part of West Wichita in the vicinity of the Orient Railroad shops. This petition has been presented to the City Commissioners.

Hagerstown, Md.—L. N. Downs and H. L. Kirby, representing the Hagerstown & Clear Spring Railway, have re-

ceived a franchise from the Mayor and City Council to construct an electric railway on Franklin Street from the city limits to Potomac Street, in Hagerstown. This proposed 25-mile railway will connect Hagerstown and Clear Spring, Md., and Mercersburg, Pa. [E. R. J., Dec. 17, '10.]

Springfield, Mass.—The Springfield Street Railway will ask the Council for a franchise to double track Main Street as far as Cherry Street, in Springfield.

Hanover, N. J.—The Pine Brook Electric Railway, Caldwell, has asked the Township Committee for a franchise to build its proposed railway through Hanover. This proposed 10-mile electric railway will connect Pine Brook, Caldwell, Fox Hill and Denville. S. William Kerris, Pine Brook, is interested. [E. R. J., Dec. 24, '10.]

Lakewood, N. J.—The Trenton, Lakewood & Atlantic Railway, Trenton, has asked the Township Committee for a franchise to build its railway into Lakewood over the public highways.

Mineola, N. Y.—The New York & North Shore Traction Company, Mineola, has received from the Board of Estimate an extension of time on its franchise of 6 months, from January 10, 1911, in which to complete its lines between Flushing, Whitestone, Bayside and the city line.

Charlotte, N. C.—The Southern Power Company has received a six months' extension of its franchise for the completion of the two miles of track it is building in Charlotte.

Portsmouth, Ohio.—The Cincinnati, Portsmouth, Pomeroy & Pittsburgh Electric Railway, Cincinnati, has received from the County Commissioners an 18-months' extension of its franchise to build its railway through Portsmouth County. The line will extend from Cincinnati to Pittsburg along the Ohio River valley. A. E. Cox, Huntington, W. Va., president. [E. R. J., July 23, '10.]

Ottawa, Ont.—The Morrisburgh & Ottawa Electric Railway, Morewood, will ask the City Council for a franchise to build its proposed railway along Main Street, Ottawa, connecting there with the Ottawa Street Railway. The line will connect Morrisburgh and Ottawa via Williamsburg, Winchester, Chesterville, Morewood, Orwan, Metcalf and Kenmore. C. M. Willard, Morewood, president. [E. R. J., May 15, '09.]

***Philadelphia, Pa.**—Councilman Byram, representing the Northeastern Street Railway, has asked the City Council for a franchise to build an electric railway into the northeastern section of Philadelphia.

***Philadelphia, Pa.**—Councilman Bryam, representing the B. & R. Rapid Suspension Railway, has asked the Select Council for a franchise to construct an overhead railway having double tracks that will reach Kensington, Frankford, Bustleton, Manayunk and League Island.

***Knoxville, Tenn.**—J. A. Anderson, G. K. Kesterson and associates have received a franchise to build about a mile of extension of the Fountain City line to Greenwood. The Knoxville Railway & Light Company has announced that it will assist in building this extension.

Beaumont, Tex.—The Beaumont Traction Company has received a new franchise from the City Council under which the company promises to expend \$100,000 in betterments.

South Bend, Wash.—J. D. Creary has received a franchise from the City Council to build an electric railway in South Bend and extend it to Raymond. Work will begin in the spring. [E. R. J., Jan. 14, '10.]

TRACK AND ROADWAY

Fort Smith Light & Traction Company, Fort Smith, Ark.—During 1911 this company will build a 4-mile branch of its railway from Van Buren to Fort Smith.

British Columbia Electric Railway, Vancouver, B. C.—This company states that it will construct during 1911 about 23 miles of interurban railway and 15 miles of new track in Vancouver city and suburbs. The improvements will consist in extending the Burnaby line from Sapperton to Vancouver, passing through Hastings and Grandview. Another track will be built from Vancouver to Eburne and the line to Westminster will be double tracked in places and part of this line will be relocated.

Pacific Electric Railway, Los Angeles, Cal.—It is announced that this company will build an extension from

Washington to the mouth of Eaton's Canyon. A bonus of \$35,000 asked by this company has been raised and surveys for this line have been made.

San Diego & El Cajon Valley Interurban Railway, San Diego, Cal.—This company has just finished the grading of 7½ miles of its proposed 65-mile railway to connect San Diego, La Mesa, El Cajon, Bostonia, Lakeside, Morton, San Pasquel, Bernardo and Escondido. G. W. Pursell, San Diego, general manager. [E. R. J., July 9, '10.]

Visalia (Cal.) Electric Railroad.—About 10 miles of track will be built between Lemon Cove and Three Rivers by this company during 1911.

Macon Railway & Light Company, Macon, Ga.—This company expects to extend its railway from Macon to Rivoli, a distance of about 6 miles.

Forest City & Mason City Railway, Forest City, Ia.—Plans are now being considered by this company for building a 30-mile electric railway to connect Forest City, Fertile and Mason City. C. N. Christoferson, Forest City, is interested. [E. R. J., July 2, '10.]

Chicago (Ill.) Railways.—This company is in the market for 15,000 tons of rails.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company expects to place in operation, in March, its 17-mile extension from Godfrey to Jerseyville. It has begun work on a 10-mile extension from Jerseyville to the Illinois River via Fieldon. W. R. Heagler, general manager.

Peoria (Ill.) Railway Terminal Company.—This company expects to build a one-mile extension of its tracks in Peoria during 1911.

Indiana & Northwestern Traction Company, Monticello, Ind.—This company has been voted a subsidy tax by the township of Lincoln in aid of the construction of its line through Lincoln. This proposed railway will connect Cedar Lake, Hammond, Crown Point, Lincoln and Chicago. Eugene Purtelle, 222 La Salle Street, Chicago. [E. R. J., Sept. 17, '10.]

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—It is reported that this company will soon build an extension of its railway from New Castle to Muncie. The right-of-way has been secured and it is expected to begin work in the spring.

***Baldwin, Kan.**—H. L. Murlin, Baker University, Baldwin, is said to be interested in a plan to build an electric railway from Baldwin to Olathe via Black Jack, Edgerton and Gardner.

Louisville (Ky.) & Interurban Railway.—This company has amended its charter so as to extend its railway through Lyndon, Anchorage and Lagrange, also a branch line to Middletown, Eastwood, Simpsonville and Shelbyville. Since the purchase of the Louisville & Eastern Railway by this company, citizens of Shelbyville have been making overtures to secure service through Shelbyville. Owing to a disagreement between the municipal authorities and the railway, the extension was built only to the western limits of the city.

***Madisonville, Ky.**—D. Fowler, Madisonville, is said to be planning to build an electric railway from Madisonville to Ashbysburg, a distance of about 15 miles.

Lafourche Valley & Gulf Railway, Donaldsonville, La.—It is reported that this company has made financial arrangements and that work will begin soon on this proposed 90-mile electric railway to connect Donaldsonville and Leesville on the west bank of Bayou Lafourche. F. M. Welch, Donaldsonville, president. [E. R. J., Dec. 10, '10.]

Hagerstown & Clearspring Railway, Hagerstown, Md.—This company announces that it will let contracts before March 1 for building its railway from Hagerstown to Clearspring, a distance of 12 miles. There will be one steel bridge. Eventually this line will be extended to Mercersburg, Pa. L. N. Downs, Hagerstown, is interested. [E. R. J., Dec. 17, '10.]

St. Paul Railway Promotion Company, St. Paul, Minn.—This company is planning to extend its railway to Winona and La Crosse. W. L. Sonntag, 810 Metropolitan Building, St. Paul, general manager. [E. R. J., Dec. 10, '10.]

Mesaba Traction Company, Virginia, Minn.—This company has completed preliminary work and will begin con-

struction as soon as the weather permits on its proposed 36-mile electric railway to connect Virginia, Eveleth, Gilbert and Hibbing. W. M. Prindle, Duluth, is interested. [E. R. J., Aug. 27, '10.]

Joplin, Oklahoma & Western Railway, Joplin, Mo.—This company is said to have completed surveys and expects to begin construction next month at Welch for its proposed electric railway to connect Joplin, Mo., and Carman, Okla. This line will eventually be extended to Bartlesville. F. M. Overlees, Bartlesville, is interested. [E. R. J., Aug. 16, '10.]

Ogdensburg (N. Y.) Street Railway.—This company will build an extension to Morristown.

Rochester, Corning & Elmira Traction Company, Rochester, N. Y.—This company expects to build 90 miles of track from Rochester to Dansville during 1911.

***Winston-Salem, N. C.**—A. H. Eller and associates are considering the construction of an electric railway from Winston-Salem to Yadkinville. Application will soon be made for a charter. The line will eventually be extended to Elkin.

Ohio Electric Railway Company, Cincinnati, Ohio.—This company has bought from the Norfolk & Western Railway the bridge which spans the Ohio River at Kenova, W. Va., and will replace it with a new structure. The company will extend its line to Hanging Rock, Ohio, to connect with a line operating from Hanging Rock to Coal Grove. Through cars can be operated from Huntington, W. Va., to Ironton, Ohio, and Ashland, Ky.

Oklahoma (Okla.) Railway.—This company will construct two extensions of its railway during 1911. One branch will be from Britton to Edmond, a distance of about 6 miles, and the other from Yukon to El Reno, a distance of 12 miles.

Johnstown & Altoona Railway, Johnstown, Pa.—During 1911 this company will build 32 miles of track between South Fork and Altoona in Cambria County.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—A 3-mile extension from Blackburn to Herminie will be built by this company during 1911.

Lewisburg, Milton & Watsonville Passenger Railway, Milton, Pa.—This company is now operating cars into Lewisburg, Pa. The Simplex Surface Contact Company has completed the electrification of the Lewisburg & Tyrone branch between Lewisburg and Montandon. The company plans to electrify the section between Lewisburg and Mifflinburg.

Oxford, Cockranville & Parkesburg Electric Railway, Oxford, Pa.—During 1911 this company expects to build 14 miles of railway extending from Oxford to Parkersburg via Hayesville, Russellville, Edenton, et al. Theo. E. Stubbs, Oxford, president.

Philadelphia & West Chester Traction Company, Philadelphia, Pa.—This company is taking steps to build an extension of its Philadelphia & Garrettford line into Media.

Scranton (Pa.) Railway.—This company will reconstruct about 2 miles of track in Scranton during 1911. It will also reconstruct about 12 miles of track in Old Forge, Taylor, Dickson City, Blakely, Archbald, Jermyn, Mayfield, Simpson and Fell.

Montreal & Southern Counties Railway, Montreal, Que.—This company will build during 1911 about 2 miles of track to the Country Club, St. Lambert. It will also build a 13-mile extension to connect Chambly Basin, Chambly Canton and Richelieu.

Memphis (Tenn.) Street Railway.—This company has begun constructing a cross-town line in Memphis and contemplates other extensions during this year.

Nashville Railway & Light Company, Nashville, Tenn.—About 5 miles of new track will be constructed by this company during 1911.

Nashville (Tenn.) Interurban Railway.—This company, now operating 20 miles of track from Franklin to Nashville, is about to extend the line from Nashville to Gallatin. The W. K. Palmer Company, Kansas City, Mo., has been retained as engineers to do all preliminary work and have charge of the construction.

Galveston-Houston Electric Railway, Galveston, Tex.—It is reported that this company will soon let contracts for

grading between Houston and Brays Bayou, a distance of about 20 miles. Mark Lowd, Houston, engineer. [E. R. J., Dec. 10, '10.]

Port Bolivar Iron Ore Railway, Longview, Tex.—The C. H. Sharp Construction Company, Kansas City, Mo., has been awarded a contract by this company to build its 30-mile railway from Longview, Tex., to the iron ore fields in Cass County. L. P. Featherstone is interested. [E. R. J., Jan. 14, '11.]

***San Antonio, Tex.**—A. D. Powers, J. C. Nelson and P. L. Telford are said to be interested in a projected electric railway in San José, near San Antonio.

Pan Handle Traction Company, Wheeling, W. Va.—This company will construct a 3-mile extension from Wheeling to Glenova during 1911.

SHOPS AND BUILDINGS

Los Angeles-Pacific Company, Los Angeles, Cal.—It is reported that this company is considering plans for building a new car house at Santa Monica during 1911.

Philadelphia & Wilmington Traction Company, Wilmington, Del.—It is stated that this company will build a new repair shop having storage room for 35 cars and six tracks.

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This company has begun work on its new car house in Ottawa. The cost is estimated to be about \$30,000.

Peoria (Ill.) Railway Terminal Company.—It is said that this company will construct a frame building at the corner of Washington Street and Western Avenue, in Peoria. The cost is estimated to be about \$1,000.

Des Moines (Ia.) City Railway.—This company is considering plans for building new car houses on East Twentieth Street and Walnut Street in Des Moines.

Boston (Mass.) Elevated Railroad.—This company has begun work remodeling the Sullivan Square terminal station in Boston.

Interborough Rapid Transit Company, New York, N. Y.—This company has formally opened its new station on its subway division at 191st Street and St. Nicholas Avenue, Manhattan.

Cincinnati (Ohio) Traction Company.—The old Brighton car house of this company at Harrison Avenue and Patterson Street, Cincinnati, was destroyed by fire Jan. 13. The loss is estimated to be about \$45,000, with \$30,000 insurance. The building was used lately as a storage house for track material.

POWER HOUSES AND SUBSTATIONS

Shore Line Electric Railway, New Haven, Conn.—This company is in the market for one 500-kw. turbine.

Chicago-New York Electric Air Line Railroad, Chicago, Ill.—This company has contracted with the Northern Indiana Gas & Electric Company to furnish power for the Laporte-Gary division. A substation will be built at Goadrum.

Bangor Railway & Electric Company, Bangor, Me.—This company is considering plans for building a new power house at Basin Mills or rebuilding the dam at Veazie.

Winnipeg (Man.) Electric Railway.—It is announced that this company will erect a subsidiary steam power house at Winnipeg. The cost is estimated to be about \$500,000.

Austin (Tex.) Electric Railway.—This company expects to replace its present power house at Austin with a larger structure.

Galveston-Houston Electric Railway, Galveston, Tex.—This company has awarded the contract to Stone & Webster Engineering Corporation Company, 147 Milk Street, Boston, for building its power plant. The structure will consist of an engine-room 72 ft. x 77 ft. and a boiler-room 52 ft. x 92 ft. It will be built of structural steel, with brick and concrete foundation. The machinery and equipment have been purchased and construction has already begun. The cost is estimated to be about \$175,000.

Twin City Light & Traction Company, Centralia, Wash.—This company will expend during the coming year about \$100,000 for improvements, which will include the erection of a new power house.

Manufactures & Supplies

ROLLING STOCK

Easton (Pa.) Transit Company will purchase a number of single-truck car bodies.

North Jersey Rapid Transit Company, Paterson, N. J., will purchase two closed passenger cars.

Du Bois Electric & Traction Company, Du Bois, Pa., it is reported, will order three passenger cars in the spring.

Geary Street Municipal Railway, San Francisco, Cal., is in the market for 200 steel cars of the pay-as-you-enter type.

Central Pennsylvania Traction Company, Harrisburg, Pa., has ordered eight passenger cars from The J. G. Brill Company.

Oakland (Cal.) Traction Company will purchase new rolling stock, \$250,000 in bonds having been issued to cover the cost.

South Covington & Cincinnati Street Railway, Covington, Ky., is reported as being in the market for 20 single-truck cars.

Philadelphia (Pa.) Rapid Transit Company has ordered 15 passenger cars from the Pressed Steel Car Company for the elevated lines.

Detroit (Mich.) United Railways is converting 20 cars into the pay-as-you-enter type, under license from the Pay-As-You-Enter Car Corporation.

Lake Shore Electric Railway, Cleveland, Ohio, has ordered four passenger, baggage and smoking cars from the Jewett Car Company, Newark, Ohio.

Corregidor Island (P. I.) Railroad will order through M. Gray Zalinski, Deputy Q. M. General, U. S. A. Depot, Q. M., Army Building, New York, N. Y., four electric passenger cars and four electric freight cars.

Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis., is in the market for four or five new passenger cars and two snow plows. This company will also order new fenders for the cars now in use.

Boston (Mass.) Elevated Railway, noted in the *ELECTRIC RAILWAY JOURNAL* of Nov. 26, 1910, as having ordered 50 semi-convertible cars for pay-within operation, has specified the following details: These cars will be equipped with four-leaf double-folding doors and folding steps, all four entrances of which will have the same size doors. A double manual control is so arranged that both doors on either platform may be operated by either the motorman or conductor from his respective control stand.

Elmira, Corning & Waverly Railway, Waverly, N. Y., has ordered six passenger and smoking cars from the Jewett Car Company, for which the following specifications have been prepared:

Seating capacity	52	Couplers	Van Dorn
Weight (car body only),		Curtain fix....	Curtain S. Co.
26,000 lb.		Curtain material...	Pantasote
Bolster centers, length,		Gongs	Dedenda
26 ft. 4¾ in.		Heating system...	hot water
Length of body..	36 ft. 11½ in.	Headlights.....	G. E. arc
Over vestibule..	45 ft. 11½ in.	Push button signal...	Jewett
Width over sills...	8 ft. 2¾ in.	Sanders...Knight	pneumatic
Over posts at belt..	8 ft. 2¾ in.	Sash fixtures.....	Edwards
Sill to trolley base..	9 ft. 3 in.	Seats, style..H. & K.	199A
Height rail to sills...	40 ¾ in.	Seating material.....	plush
Body	wood	Step treads.....	wood
Interior trim.....	mahogany	Trolley retrievers..	Knutson
Underframe	composite	Trolley base.....	Nuttall
Air brakes....	Westinghouse	Trucks, type.....	MCB
Bumpers,		Wheelguards	Root
Hedley anti-climber		Special devices, etc,	
Car trimmings.....	bronze	automatic trap door	

TRADE NOTES

Standard Steel Works Company, Philadelphia, Pa., has moved its Philadelphia offices from the Harrison Building to the Morris Building.

Weir Frog Company, Cincinnati, Ohio, has appointed F. W. Allen sales agent. Mr. Allen recently resigned his

position as superintendent of the Buffalo & Susquehanna Railroad.

Sydney F. Weston, who resigned recently as manager of the New York district for the National Brake & Electric Company, has accepted a position with the New York Cement-Gun Company, with an office at 30 Church Street, New York.

W. H. Whiteside, who resigned recently as president of the Allis-Chalmers Company, Milwaukee, Wis., is to sail from New York on Jan. 21, 1911, with his family on the Caronia, bound for Spain and the Orient, for a holiday of several months.

Sangamo Electric Company, Springfield, Ill., has appointed M. B. Chase New York manager of the company, with an office at 50 Church Street. Mr. Chase up to this time has been connected with the Westinghouse Electric & Manufacturing Company.

Ackley Brake Company, New York, N. Y., has appointed Frederico H. Bragge agent for Argentine Republic, with headquarters at Calle San Martin 201, Buenos Ayres. This company has also appointed Walter Brothers & Company agents for Brazil, with an office in Rio de Janeiro.

Pay-As-You-Enter Car Corporation, New York, N. Y., reports that the Chicago Railways Company has during the past few months placed 278 additional pay-as-you-enter cars in service. Most of these cars were remodeled for prepayment operation at the Pullman Company's plant.

B. & L. Company, Norwich, Conn., has been incorporated with a capital stock of \$50,000 for the purpose of manufacturing all styles of ball-bearings, which have previously been imported from Germany. Otto Bruenauer is president of the company, and B. F. Leavitt, treasurer. The New York office is located at 50 Church Street.

Heywood Brothers & Wakefield Company, Wakefield, Mass., will remove its New York warehouse and offices from 129 Charlton Street to 516-520 West Thirty-fourth Street, about Feb. 1, 1911. The company has erected a 13-story building containing about 300,000 sq. ft. of floor space. This new building will be used exclusively by the Heywood Brothers & Wakefield Company.

Railway Add Bulletin Company, Ft. Wayne, Ind., has been incorporated for the purpose of manufacturing advertising devices and electrical advertising cabinets, for use in railway and interurban stations, and to lease or sell advertising space in these cabinets or devices. The capital stock of the company is \$10,000, and the incorporators are W. C. Millet, M. E. Bates and T. J. O. Dowd.

United States Electric Signal Company, West Newton, Mass., has just completed an extensive addition to its plant. It was found, however, that this addition was not adequate to take care of and promptly deliver the business already on the company's books. Ground has therefore been broken for another addition, which will double the capacity of the plant. New machinery has been ordered to fully equip the new addition when completed.

C-A-Wood-Preserver Company announces that on and after Feb. 1, 1911, its general offices will be located at St. Louis, Mo. The company has also recently established a branch office at 135 Broadway, New York, in charge of J. H. Denton & Company, for New England and New York; the Pacific Coast is handled by the Western Electric Company through its branches at Portland, Seattle, San Francisco and Los Angeles. The office in the Littlefield Building, Austin, Tex., where the main offices of the company have been in the past, will look after business in the Southwest. The branch offices heretofore maintained at New Orleans, Salt Lake City and Chicago will be continued.

Dearborn Drug & Chemical Works, Chicago, Ill., which have distributed their feed water treatment and lubricants through an agency in the Philippines for the past two years, have decided to open their own branch office and warehouse in Manila. F. O. Smolt, who has been connected with mining propositions since his graduation in chemistry from the University of Illinois, in 1891, has become connected with the company, and sailed on Jan. 7, 1911, for Manila, to take charge of this work, under the supervision of E. C. Brown, manager of the foreign department of the company. Mr. Brown has spent most of the past two years in Japan, China and the Philippines, in-

vestigating steam plant and railroad conditions in the interests of Dearborn products, and is still there, having made selling connections at Tokyo, Tientsin, Hongkong and Shanghai.

H. M. Byllesby & Company, Chicago, Ill., opened their second annual convention of officers and employees at Chicago, Ill., on Jan. 17, 1911, with an attendance of 250 delegates. The purpose of the association, as stated in the constitution, is "the interchange of ideas and the promotion of acquaintanceship and good feeling among officers and employees." F. H. Tidnam, of Oklahoma City, presided at the sessions, which were held at the Auditorium Annex. At the opening meeting speeches were made by H. M. Byllesby, president of the company, and Arthur S. Huey, vice-president. After a very interesting program, which included the following papers, the convention was concluded with a dinner at the Auditorium Annex, at which time addresses were made by a number of prominent men outside of the organization: "Insurance," by W. E. Higbee, Chicago; "Advisability of Utility Companies Handling Gas and Electrical Appliances," by Samuel Kahn, Fargo, N. D.; "Ornamental Curb Lighting," by B. M. Cowperthwait, Faribault, Minn.; "Effective Illumination," by A. Larney, Oklahoma City, Okla.; "Accounting Statistics," by N. P. Zech, Chicago; "General Station Economies," by Eugene Holcomb, St. Paul, Minn.; "Unusual Engineering Design and Construction," by W. R. Thompson, Chicago; "The Prepayment Gas Meter," by H. H. Hyde, Tacoma, Wash.; "Construction of Hydro-Electric Plants Relative to Economy in Operation," by J. M. Link, Chicago; "Electric versus Horse-Drawn Wagons," by F. H. Tidnam, Oklahoma City, Okla.; "The Effect of Low-Wattage Lamps on the Central Station Industry," by A. F. Douglas, Portland, Ore.; "Progress and Success of the Employees' Investment Club," by R. J. Graf, Chicago; "Late Developments in the Manufacture of Crude Oil Gas," by R. P. Clarke, San Diego, Cal.; "New Business," by D. D. Callahan, Chicago; "District System of Meter Reading," by T. H. Jackson, Mobile, Ala.

ADVERTISING LITERATURE

United Nut Lock Company, Springfield, Mass., has issued a small catalog and price list of "Hugtite" nut locks.

Sangamo Electric Company, Springfield, Ill., has issued a series of bulletins showing the various elements of its mercury-flotation ampere-hour and watt-hour integrating meters.

Graphite Lubricating Company, Bound Brook, N. J., has issued a circular letter calling attention to the merits and the uses to which "Bound Brook" graphite and bronze bushings, which run without oil or grease, may be put.

Under-Feed Stoker Company of America, Chicago, Ill., has issued the January number of the "Publicity Magazine," which is devoted to the interests of the Jones stoker. It contains a description of installations of the Jones stoker abroad and numerous illustrations showing some of the large installations of this apparatus.

Electric Service Supplies Company, Philadelphia, Pa., has recently issued a booklet entitled "Comments on Capital Traction Company, Washington, D. C. Pay-Within Cars," containing a short article on "Platform Riders," and also a report which was made by H. C. Eddy of the District Electric Railway Commission to the Interstate Commerce Commission.

Warren, Webster & Company, Camden, N. J., have issued a pamphlet containing a paper by William G. Snow, chief engineer of the company, entitled "Ventilation in Its Relation to Health." This paper was read at Cornell University, in the course on sanitary science and public health, which is being conducted in co-operation with the New York State Department of Health.

Robert W. Hunt & Company, Chicago, Ill., noted in the *ELECTRIC RAILWAY JOURNAL* of Dec. 10, 1910, as having issued a pamphlet entitled the "Inspection of Rails for Street and Interurban Railways," report that there is a typographical error on page 6, section 4, of the pamphlet. This paragraph relates to the chemical composition and the proper limits for the carbon content should be 0.60 to 0.75 per cent, and not the limits which were shown in the pamphlet.

NEW PUBLICATIONS

Edison, His Life and Inventions. By F. L. Dyer and T. C. Martin. In two volumes. New York: Harper Brothers. 989 pages; illustrated. Price, \$4.

In future generations Thomas A. Edison will undoubtedly be considered as a genius who typified the tremendous progress made in mechanical invention and the application of electricity to the arts in the latter part of the nineteenth and at the beginning of the twentieth century. Mr. Edison's life reads like a romance. He was born in Ohio, but his father moved soon after to Port Huron, Mich., where Edison's boyhood life was spent. Here he early exhibited the zeal for experiment and invention which has characterized his more mature life, and he provided funds for this experimental work by selling newspapers on the trains of the Grand Trunk Railroad. This life brought him in touch with the telegraph offices in the railroad stations and led probably to his becoming a telegraph operator. This turned Mr. Edison's attention to electricity. His first invention of note was an improvement in the electrical stock ticker. The automatic duplex and quadruplex telegraphic inventions of Mr. Edison soon followed, and through them he became acquainted with Jay Gould and other capitalists of the day. In 1875 he began to interest himself in common with a number of other inventors in methods of transmitting and recording speech and later developed the microphone and phonograph. It is interesting at this day to consider the prophecies of that day as to the uses of this latter machine. Only a few of them have been commercially realized. In Mr. Edison's first phonograph the records were made on tin foil, but he soon found that this material would not be satisfactory for the purpose and he substituted a wax cylinder. During his work on telephone development Mr. Edison's mind was constantly working upon the possibility of developing the electric light, and his first lighting patent was taken out in 1878. Then followed a remarkable series of experiments to develop and perfect the filament necessary in the incandescent lamp and a generator for supplying the requisite energy. The first central station lighting plant on Mr. Edison's system, outside of his own laboratory at Menlo Park, was put in operation in England in 1882. The Pearl Street station in New York was installed about nine months later. It would be impossible in this review to give a sketch of the history of all of Mr. Edison's more recent inventions, such as the motion picture machine, the storage battery, the magnetic ore separator and others, but a tabulation indicates a present investment of more than \$6,000,000,000 in 12 industries which are directly founded upon or affected by inventions of Mr. Edison.

No better choice of biographers could have been made because the authors have not only been very closely associated with Mr. Edison for many years but have also been actively identified with the whole field of electrical endeavor. They have thus been able to treat their subject with a wide perspective and in a sympathetic manner.

Dr. Richard C. Maclaurin has presented to the Massachusetts Legislature a strong argument urging an increase in State aid for the Massachusetts Institute of Technology. Dr. Maclaurin states in part: "The institute cannot be maintained unless it receives an additional \$100,000 per annum from the State or elsewhere. It needs this increased income because the cost of maintaining leadership in this field of education has greatly increased. In the 16 years that have elapsed since the State first made its annual contribution of \$25,000 the annual expenditure has increased by \$268,547. This increase has been due in part to the natural growth of the institute itself, in part to the general rise in prices, but more to the increasing recognition by the commercial world of the value of technically trained men to carry on this work." Further claims of the institute, according to Dr. Maclaurin, are that it was "the first school to equip a mining and metallurgical laboratory for the instruction of students by actual treatment of ores in large quantities; the first to establish a laboratory for teaching the nature and use of steam and a laboratory for testing the strength of the materials of construction in commercial sizes, and the first in America to establish a department of architecture. It was also the first in this country to set up distinct and separate courses of study in electrical engineering, in sanitary engineering, in chemical engineering and in naval architecture."

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CONTENTS.

The New York Accident Conference.....	145
Increase in Boston Earnings.....	145
Handling Men in the Shop.....	146
Coöperation Between Associations and Commissions.....	146
Reduction of Taxes Is a Feasible Means of Relief.....	147
The Maintenance of Hand Brakes.....	147
Flush Transfer Table in Kansas City Railway Shops.....	148
Report of Massachusetts Railroad Commission.....	150
Regular and Commutation Rates on Washington Suburban Line.....	151
Special Reports by Joint Commission on Boston Transit Matters.....	153
Public Service Commission Conference on Accidents.....	154
Train Dispatching on the Buffalo & Lake Erie Traction Company's Line.....	158
Collisions on Interurban Roads and Their Causes.....	159
Wood Preservers' Association.....	160
Temporary Organization of Illinois Electric Railways Association.....	161
Annual Meeting of the Central Electric Railway Association.....	162
Wisconsin Electrical Association at Milwaukee.....	164
Electrification Discussed at New England Street Railway Club Meeting.....	166
Committees of the American Electric Railway Transportation and Traffic Association.....	167
Change in Brooklyn Integral Oil Cup.....	168
Committee Meetings on Jan. 25 in New York.....	169
An Interesting Steel Tower and Cable Installation in Denver, Col.....	173
Trolley Line Section Insulator.....	174
Montreal Dump Cars.....	175
Turtle-Back Cars for Kansas City.....	175
Double Spindle Shaper.....	176
Portable Railway Telephone.....	176
Non-Automatic Oil Switch.....	176
News of Electric Railways.....	177
Financial and Corporate.....	180
Traffic and Transportation.....	183
Personal Mention.....	186
Construction News.....	187
Manufactures and Supplies.....	189

The New York Accident Conference

The conference on accidents held on Jan. 19 last in Syracuse between the Public Service Commission and the electric railways of the Second District, State of New York, brought out in the most forcible manner the difficulties with which the managements are confronted in the selection and education of trustworthy trainmen and dispatchers. The cause for every accident quoted at this meeting was clearly traced to the breakdown of men and not of apparatus. The possible failure of a signal device can be discounted by an emergency rule, but what wisdom can foresee the failure of an employee who has hitherto proved faithful to his duties? It was well, therefore, that there should have been so frank an interchange of opinions on this grave subject. The cardinal point of the whole discussion was the irresponsibility of the individual. As an applicant for work, he can submit false references of character with little danger of detection and punishment; as an employee found guilty of the grossest negligence, he can escape scot-free because of the unwillingness of juries to indict him despite the provisions of the penal code. Electric railway companies, if left to themselves, cannot obviate these conditions to a measurable degree. As Mr. Peck clearly showed, the question is not one relating entirely to the qualities of reliability or of intelligence in the employees, as these terms are usually employed. In that class of accidents which are attributed to "man failure" the record of the employee at fault usually shows that his general conduct has been exemplary and that his previous railroad record has been good. For this reason Mr. Peck suggests the desirability of introducing some means of maintaining the mind of the employee in the alert condition in which it should be in the case of a man in charge of the operation of any high-speed car or train, whether it is operated by steam or electricity. How to secure this combination of alertness, reliability and intelligence, then, is the question which must be solved by any transportation manager who wishes his road entirely immune from accidents due to the human cause. Whether such a goal is possible is another question. One real improvement in the standard of employees can come, however, if a public sentiment can be aroused to demand the passage and enforcement of laws penalizing men for making false statements in employment applications and also punishing those who are found guilty of disastrous disobedience to the prescribed rules of railway operation.

Increase in Boston Earnings

The last annual report of the Boston Elevated Railway does not give opportunity for a comparison of results with previous operations. As the Board of Railroad Commissioners of Massachusetts changed the fiscal year to end June 30 instead of Sept. 30, the report covers the period of but nine months.

There is an advantage in the adoption of the new date, which conforms to the fiscal year of the Interstate Commerce Commission and of various State commissions, but it is unfortunate that the value of comparison not only of the 1910 figures with 1909 but possibly also of 1911 with 1910 is to be lost. An abstract of the report for the nine months ended June 30, 1910, was published in the issue of the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, page 47. It shows gross earnings from operation for that period of \$11,383,686. This sum is equal to 78.5 per cent of the total gross earnings for the fiscal year ended Sept. 30, 1909, which amounted to \$14,493,853. It is therefore evident that the company earned gross in three-quarters of the year an amount greater than three-quarters of its total revenue for the previous year. It still had remaining, however, the three very good traffic months of July, August and September, and the revenue in that period brought the total gross income for the year ended Sept. 30, 1910, to \$15,503,000. This is an increase of more than \$1,000,000 over the preceding year, or 6.9 per cent. This compares favorably with the increase made in the fiscal year 1909 over 1908, which was 3 per cent. In one other important detail the last annual report permits a comparison with the previous year. The report states that the total payments for taxes and public benefits during the twelve months ended Sept. 30, 1910, reached the large proportion of 13.2 per cent of the gross revenue of the company for the year. In the preceding year the corresponding payments were but 12.4 per cent.

Handling Men in the Shop

The statement made by Louis Brandeis a few weeks ago at the hearing on increase of freight rates before the Interstate Commerce Commission that the steam railroads of the United States could save \$1,000,000 a day by the introduction of modern machinery and efficiency methods in all departments received wide publicity at the time and has been frequently quoted and commented upon since in the daily newspapers and popular magazines. The answer of one railroad officer was that if he were given a choice between all the latest shop facilities and methods and of an experienced, capable and efficient shop superintendent with only a fairly modern equipment of tools he would choose the latter. He believed that the result in any shop would be greater output and economy than with all the modern facilities, but without such a man to superintend their use. This is only another way of saying that a good carpenter can do good work with poor tools, but a poor carpenter cannot do good work with the best tools. The ability to handle men, to get the most and best out of their labor and to keep them satisfied with the conditions under which they work is no less an essential qualification of the successful master mechanic than of a successful general manager. Many master mechanics have been selected for the place they occupy because they were clever at devising shop "kinks" to do a particular job of minor importance at a slightly lower cost or because they were skilled workmen in some one line. The specialist or the man who rides a hobby usually is so absorbed in some one detail of the shop work that he fails to see the waste and lack of efficiency in other departments. The ideal master mechanic is one who combines mastery of men with mastery of tools and an appreciation of the relative importance of the different branches of work placed under his charge with a true conception of the relations of the shop department to the operating, purchasing, claims and accounting departments.

CO-OPERATION BETWEEN ASSOCIATIONS AND COMMISSIONS

The discussion at the Syracuse conference on Jan. 19 between the Public Service Commission and the electric railways of the Second District, State of New York, has already been commented upon in these columns so far as the subject of employees is concerned. It is instructive, however, to refer to another and very interesting matter brought up at this conference, namely, the suggestion of Chairman Stevens, of the Public Service Commission, that a further study shall be made of the subjects considered at the meeting and of others relating to electric railway operation by joint committees composed of representatives of the commission and of the electric railway companies.

Among the topics mentioned by Mr. Stevens as being particularly desirable for consideration in this way were dispatching, operating rules and a physical examination standard for trainmen. In making this suggestion Mr. Stevens candidly acknowledged the fact that the State association had been and still was working faithfully along the lines defined in its constitution as "the acquisition of * * * knowledge relating to the construction, equipment and operation of street railways, and the diffusion of this knowledge among the members of this association, with the view of increasing the accommodation of passengers, improving the service and reducing its cost." His reasons for suggesting committees outside of those in the association were, first, that not all of the companies in the commission's territory were members of the association, and, second, that no action of the association was binding even upon the member companies. On the other hand, if the representatives of the electric railways should in future agree on fixed standards of operation such standards could be made compulsory on all companies through the executive and judicial powers vested in the commission.

The effect upon the electric railways in New York State on the adoption of Mr. Stevens' suggestion should be very beneficial. Up to this time the usual policy of railroad commissions has been to devote themselves principally to the investigation of the results of past operation rather than to lay down rules for future service. There is every reason, however, why they should participate in the latter kind of constructive work. Such co-operation should be beneficial to both the commissions and the companies because it would give the former a closer insight than they otherwise might obtain of the practical reasons for the adoption of various rules and methods, and it would give a standing to the conclusions reached which they would not acquire in any other way. In this connection it might be said that the plan suggested is a common one abroad. There joint committee and association work between corporations and the authorities is very general and nearly all of the European governments regularly send official delegates to the conventions of the International Railway Congress and the International Street & Interurban Railway Association to take part in the discussions and assist in reaching conclusions.

Although the reasons given by Mr. Stevens for making the membership of the committees broader than that of the membership in the State association are entirely logical, we believe that the plan proposed would also greatly widen the field of usefulness of the New York State Association. Its present membership comprises practically all of the important electric

railways in the Second District in the State and its committees have already accomplished a great deal of valuable work on the subjects which would naturally receive first attention. The results already secured properly could, and undoubtedly would, be made the foundation for future action by any new committees. The matter is still in an inchoate form, but is capable of becoming the basis for a practical working arrangement which may prove very beneficial to the railway companies in the State of New York.

THE REDUCTION OF TAXES IS A FEASIBLE MEANS OF RELIEF

In interviews published recently the executive heads of at least two great industrial corporations have discussed the impracticability of a decrease in wages as a feasible remedy for existing or threatened conditions that might prove inimical to the interests of their companies. These conditions consisted in the one case of a stability in prices which has not led to a normal output in such times as the present and in the other case of a threatened revision of the tariff.

We do not recall any recent instance where lower wages have been suggested for employees of electric railways as a means of lightening the burden arising from higher costs of operation and the decreasing returns per passenger carried. The various suggestions for relief advanced by the companies throughout the country pertain usually to the abolition or curtailment of transfers, the adoption of the zone system of fares in the hope that it will furnish a larger average revenue per mile traveled, an increase in the rate of fare, or relief from taxation.

In one or another of these directions some help has been secured by a few companies, but the examples which may be cited are so slight in number that they are an almost infinitesimal proportion of the whole number of companies in the country. With the large majority of companies the introduction of substantial relief measures in almost any one of the four directions mentioned will require some form of legislative commission or municipal sanction.

As the necessity for such sanction exists generally, a period of public education should be the initial step in the movement of each company concerned. The direction which this publicity should take is a problem that each company, because of its knowledge of local characteristics, should settle by itself. The Boston Elevated Railway follows the practice, in its annual reports to stockholders, of giving the details of its payments for taxes and other public benefits during the fiscal year and their percentage of the gross revenue. Other companies have compiled similar statements for their own information, and exact figures of the large outlays on these accounts might be made public with great advantage.

The public is inclined to forget that the payment which it makes in return for a commodity or a service is one which must be disbursed in large part before the small net return can be computed. The payment for railroad transportation is not different in this respect from the cash paid to the merchant or the manufacturer. If a cash fare passenger lengthens his ride by the use of a transfer, he does not reflect that he dilutes the average fare received by the company. He is likely to think that his 5-cent piece goes to enrich the stockholder. He does not remember that by far the larger part of his coin is devoted to operating expenses, taxes and fixed charges and that, after the deduction of the proportion required for these

purposes, the return in most instances is not over a reasonable rate and that frequently it is less. It is the duty of the companies to make these facts plain.

Good service is the first and essential feature of the business of the street railway company, and its maintenance has not permitted any general reduction in the scales of wages for trainmen. Under existing conditions relief for electric railways should have come through other avenues. However, as the tendency of the wages of trainmen has been uniformly toward higher scales, the companies should demand some other form of definite relief in order to offset the rising tide of costs. Of all suggested methods, the one which is applicable most reasonably to all companies is that of reduction in taxes. This would afford an equitable means of distributing the abatement among the entire community.

THE MAINTENANCE OF HAND BRAKES

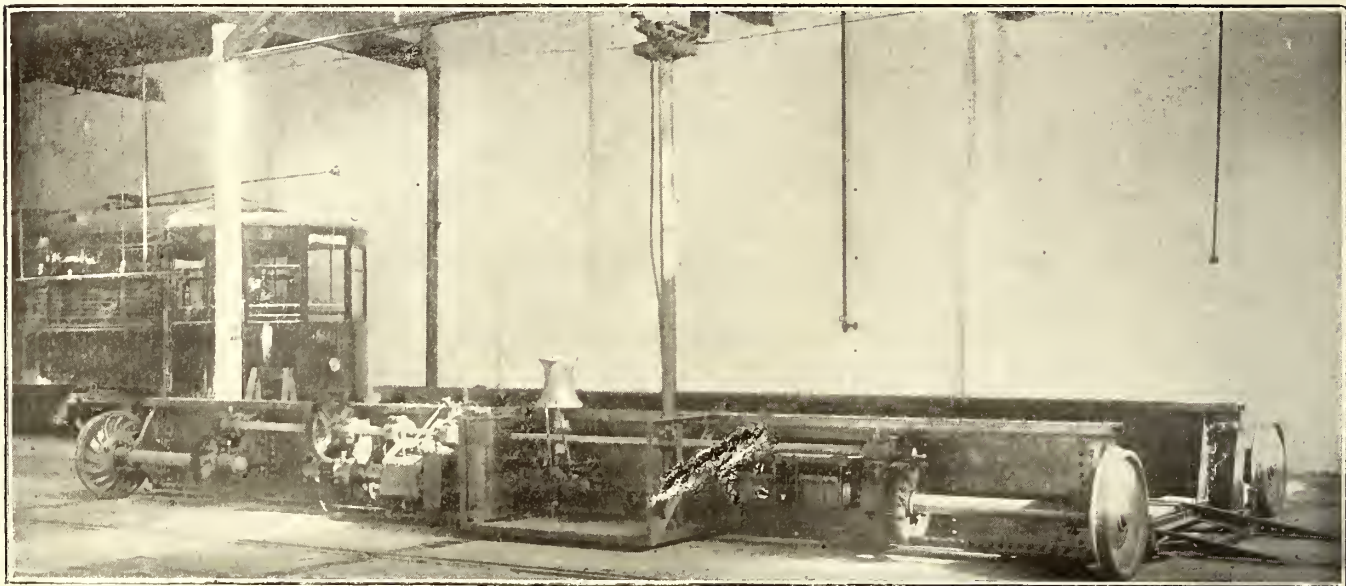
The increasing use of air brakes on cars of even moderate size tends toward a reduction in some cases in the amount of inspection given to hand-braking equipment. It is an easy matter to overlook apparatus which is used only in extreme emergencies, although the regulations of most roads provide for the frequent testing of hand brakes on all rolling stock. Like all equipment with many detailed parts, hand brakes are subject to many minor ailments which are capable of development into serious troubles on account of the vital relation of such apparatus to the safety of operation. Among these defects are disturbances of the mechanical system due to breaks in fittings, looseness and excessive wear. At the handle a common difficulty is the failure of the staff to wind, on account either of broken pawl springs or excessively worn ratchets. Experience indicates that steel springs give better service here than brass coils. Loss of set screws or excessive wear of the top of the brake staff so that the screw can pass by the butt also leads to failures in service. Another trouble sometimes encountered is the breakage of the handle proper on account of an effort to bend it back into shape after it has become deformed through shock. The best practice takes no chances on equipment of this character, preferring to scrap the handle rather than risk its failure when a strain is applied at a critical moment.

The cutting of holes in the brake staff at points where the ratchet rivet should be placed from time to time weakens the stock and tends to cause a break in the staff, and the plan of cutting the top entirely off and fitting on a new one is well known to be preferable. Care in the selection of links to be used in the brake chain forestalls no little trouble from the chain riding and slipping off the sprockets or else binding so as to cause the brakes to pull with extreme difficulty. In this connection it is important to discard the links before they wear down to the danger point, since the common fault of trying to utilize the maximum life of the chain opens the way toward serious trouble in emergencies. The cost of a single accident, apart from the humanitarian side, will offset in a moment all the bone-cutting economies of many months in stock. Missing cotter pins, the excessive wear of brake-shoe links, poor welding of brake rods in the forge shop, failure to take account of the settling of the car body under load, cracks in castings and fractures in rods resulting from bends or shocks are all fertile causes of disaster and need to be looked after with special care by the inspection force.

FLUSH TRANSFER TABLE IN KANSAS CITY RAILWAY SHOPS

The mechanical department of the Kansas City Railway & Light Company recently installed at its main repair shops a flush transfer table the design of which includes a number of interesting details. Half-tone illustrations and drawings of the transfer table are shown. Probably the chief reason why a flush table was installed rather than one of the drop-pit type

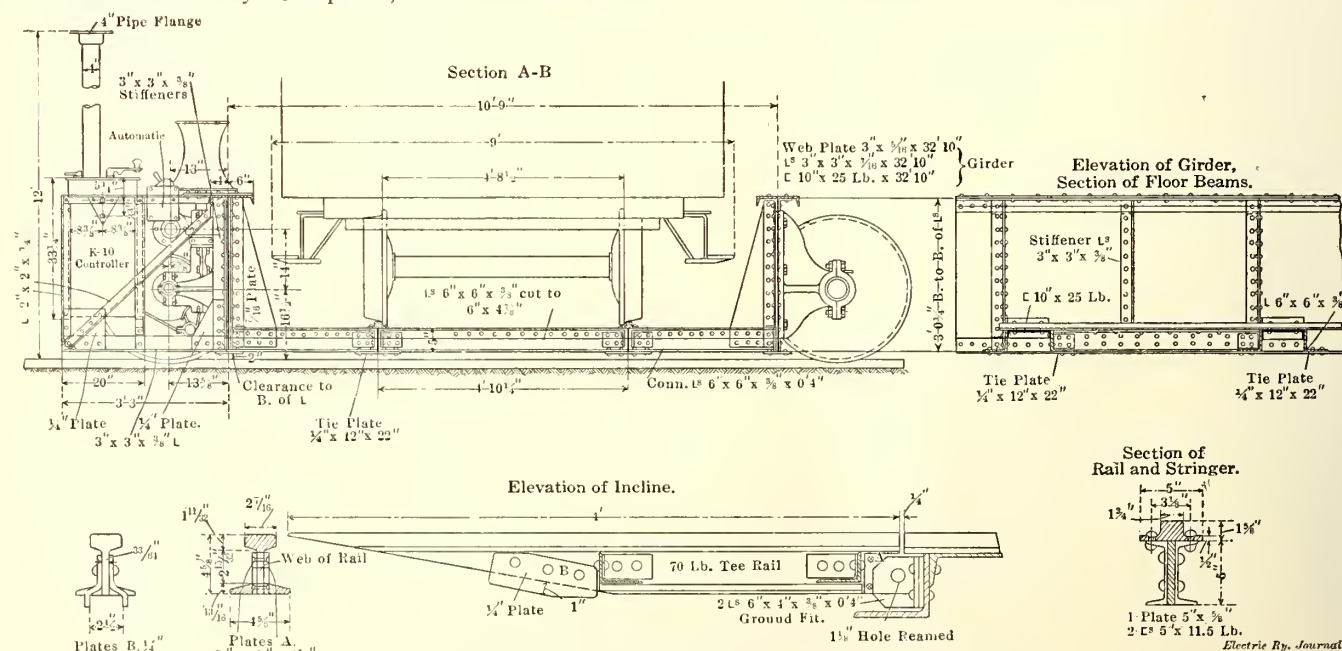
plate girders 37 ft. 10 in. long by 3 ft. $\frac{1}{4}$ in. deep. The web plate of each is $\frac{5}{16}$ in. thick and is stiffened and reinforced at the top by a 10-in. 25-lb. inverted channel iron and at both top and bottom by 3-in. x 3-in. angle irons. The floor system connecting the two main girders and supporting the car-track rails is subdivided into panels 5 ft. between centers along the axis of the bridge. The clearance between the sides of the bridge is 1 ft. less than the spacing of the main girders, which is 10 ft. 9 in. This leaves ample room in which to handle a



Kansas City Flush Transfer Table—Side View

was because it does not interfere with the use of any tracks now extending through the car house; also, it does not sectionalize the bays in which it is placed so as to make difficult the trucking of materials and the passage from one end to the other. It is understood that where a sprinkling system with drop heads has not been installed a substantial reduction in insurance rates may be expected, because a transfer table

9-ft. car. The cross members of the bridge are made of angles and channel sections to which two Trilby rail heads are riveted to carry the car wheels. The entire transfer bridge is supported by two 33-in. chilled cast-iron plate wheels. The clearance between the lowest part of the transfer table and the top of the car house rails is 2 in. These rail tops are $1\frac{5}{8}$ in. above the level of the concrete floor of the car house.



Kansas City Flush Transfer Table—Cross-Sections and Details

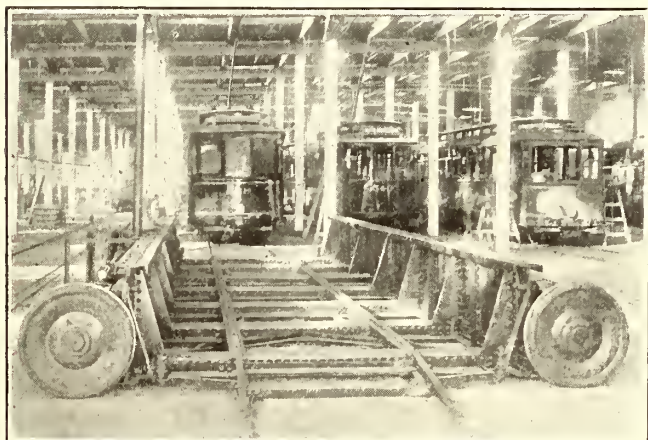
of the flush type does not interfere with the full use of tracks extending from one bay to another.

The table designed and installed at the Kansas City shops has a bridge 37 ft. 10 in. long. Under test this bridge carried a 58,000-lb. car with a deflection of but $\frac{1}{8}$ in. The bridge of the transfer table essentially is made up of two through

Inclines 4 ft. long connect the track rails on the bridge with the rails buried in the car house concrete floor. The inclines are made of short sections of 70-lb. T-rail pin-hinged at the points where they join with the bridge rails. Normally the inclines are supported clear of the car house floor by springs which permit the incline rails to rest on the car house track

rails as soon as the car wheels touch the incline. Each incline rail is fitted with two guide plates which fit over the sides of the car house rails and prevent the incline from side-play while loaded.

The transfer table is operated with 500-volt current. A K-10 controller serves to regulate the speed of the driving motor. The control apparatus is installed on a platform 3 ft. 3 in. wide, bracketed to the driving side of the table. The current-collecting trolley pole also is installed on a platform so that the entire handling of the transfer table may be done by one man. The transfer table is moved by a GE-67-A motor driving two of the supporting wheels through a system of shafts and gearing. This motor also serves to drive a hauling winch built as a part of the transfer-table equipment. The armature shaft of the motor, which is bracketed to one of the main girders of the transfer table, is 2 $\frac{5}{8}$ in. in diameter and is extended at each end of the motor casing to carry a positive clutch. The clutch at one end of the motor drives the transfer table through a double-reduction gearing using 5-in. pinions with 15 teeth and 23-in. gear wheels with 69 teeth and 5-in. face. The clutch at the commutator end of the motor drives



Kansas City Flush Transfer Table—End View

a worm gear, which in turn operates a rope drum substantially mounted at the center of one side of the transfer table and so arranged that one man may use this drum to haul a disabled car onto the transfer table. A friction band brake is connected to the armature shaft inside of the couplings so that no matter whether the motor be coupled to move the transfer table or operate the winch this single brake will be in gear.

THE BYLLESBY CONVENTION IN CHICAGO

The second annual convention of the employees of H. M. Byllesby & Company and of this firm's affiliated public service companies was held in the Congress Hotel, Chicago, on Jan. 17 to 20, inclusive. The registered attendance was 286; 128 of this number were from the home office and 158 from the various affiliated companies scattered throughout the country. These companies operate electric service, street railway, gas, power transmission and telephone utilities in 82 municipalities throughout the West and South.

In his address to the convention Mr. Byllesby referred to the fact that the employees directly on the payroll of the company and those connected with the various local companies aggregated 2538, in addition to an average of about 2000 men in the field on construction, making a total of 4538. Mr. Byllesby also referred to the financial condition of the company and its banking business in the sale of securities in different public service corporations, both of which were in a very satisfactory condition.

During the four-day convention papers were presented by men connected with the different companies on topics connected principally with the central-station industry. The meeting concluded with a banquet on the evening of Jan. 20 at the Congress Hotel.

REPORT OF MASSACHUSETTS RAILROAD COMMISSION

The forty-second annual report of the Board of Railroad Commissioners of Massachusetts gives returns of street railways for the nine months ended June 30, 1910, as the fiscal year has been changed to end on that date instead of on Sept. 30. Returns for the full period were received from 73 companies and to the date of consolidation or purchase from five companies additional. An abstract of the report follows:

"The net increase during the past nine months in the mileage of the Massachusetts companies is 7.746 miles of street railway line and 9.393 miles of second track, making 17.139 miles additional main track. There was also a net increase of 4.883 miles of side track, making a total net increase of 22.022 miles reckoned as single track.

"The Massachusetts companies now own 2246.247 miles of street railway line, 456.485 miles of second main track and 188.347 miles of side track, making the total length of track owned, reckoned as single track, 2891.079 miles. This does not include 3.195 miles of main line and 0.103 mile of side track of the Rhode Island Company located in this Commonwealth. All of the track owned is surface street railway track, with the exception of 9.983 miles of elevated line and 9.809 miles of elevated second track. Of the sidings all are surface track, with the exception of 4.378 miles of elevated track.

"The gross assets of the companies, June 30, 1910, were \$185,456,187. The gross liabilities at the same date, including capital stock (but not including sinking and other funds), were \$175,470,489.

"The aggregate capital stock of the 73 companies June 30, 1910, was \$84,345,065, an increase of \$3,616,185 over the amount returned Sept. 30, 1909. The total amount of dividends declared during the nine months' period was \$2,767,314.99. Thirty-five out of the 78 companies paid dividends ranging from 1.50 per cent to 10 per cent, and 43 companies declared or paid no dividends during the nine months. One company paid 10 per cent; three paid 8 per cent; one paid 7.22 per cent; seven paid 6 per cent; one paid 5.5 per cent; two paid 5 per cent; one paid 4.5 per cent; three paid 4 per cent; two paid 3.75 per cent; one paid 3.6 per cent; one paid 3.5 per cent on common and 8 per cent on preferred; one paid 3.25 per cent; one paid 3 per cent on preferred; three paid 3 per cent; one paid 3 per cent on common and 3 per cent on preferred; three paid 2 per cent; one paid 2 per cent on common and 3 per cent on preferred; one paid 2 per cent and 4 per cent on varying amounts, and one paid 1.5 per cent.

"The funded debt of the companies June 30, 1910, was \$67,762,000, a decrease of \$316,000 from the year ended Sept. 30, 1909. The total unfunded debt, including mortgages, was \$23,363,424, an increase of \$3,542,153 over the year ended Sept. 30, 1909.

"The average cost of the street railways of the State per mile of main track (including the cost but not the length of sidetrack), as returned by the companies June 30, 1910, was \$32,484 for construction, \$11,654 for equipment, and \$17,594 for lands, buildings (including power plants), parks and other permanent property, making a total average cost of \$61,732 per mile of main track.

"The total income of the companies from all sources for the nine months ended June 30, 1910, was \$25,329,312, and the total expenditures (including dividends declared) for the same period were \$25,496,252, making a net deficit of \$166,940 to be deducted from the surplus of previous years.

"The total number of passengers carried during the nine months on the railways in operation of the 78 companies making returns to the board, computed on the basis of 5-cent fares collected, was 469,330,784. The total number of miles run by street cars during the nine months was 87,712,572. The operating ratio during this period was 67.38 per cent.

"The gross earnings per mile of track owned averaged \$8.892 for the nine months. The expenses of operation were \$5.991 and the net earnings \$2.901. Per car mile the results were: Gross, 27.39 cents; expenses, 18.45 cents; net, 8.94 cents.

The averages per passenger were: Gross, 5.12 cents; expenses, 3.45 cents; net, 1.67 cents.

"The whole number of persons injured in connection with street railway operation, as returned by the companies for the nine months ended June 30, 1910, was 5458, of whom 80 received fatal injuries and 5378 injuries not fatal. The number of passengers injured was 3730, of whom nine were injured fatally. The injuries to employees were 246 in all, 12 of which were fatal. The number of injuries to travelers and others on the street was 1482, of which 59 were fatal. These figures include a very large number of injuries of a trivial character that have been returned by the companies.

COMMUTATION RATES

"During 1910 the board has been engaged in a study of the equalization of the rates for commutation tickets outside of the suburban district and also of a uniform commutation ticket, and in view of this study, together with its recommendation to the general passenger agents of the three principal railroads of the Commonwealth requesting their study and co-operation, it deems it in the public interest that a recommendation should not be restricted to the time limit of the tickets solely but should cover a uniformity of rate for equal distance, so far as possible, not only upon each of the said railroads, but upon all of them.

"The present inequalities of rate arise largely from the practice of certain companies in establishing rates of fare many years before consolidation or lease, and public policy demands that these rates should, in many instances, be readjusted. This will doubtless result in raising certain rates and lowering others, but a complete fabric of rates in operation will tend to the same results as have been secured by the principle of the act of 1908, which has received the general acquiescence of the traveling public.

"The board is now anticipating schedules from the several railroad companies within a few weeks, the rates being made upon the uniform basis of all commutation tickets limited to one month in duration. Upon presentation they will be carefully examined with a view to securing their uniformity. It is somewhat doubtful at the date of this report if any legislation will be necessary, as the board hopes to work the matter out to a satisfactory conclusion. If, however, occasion should present itself for the enactment of any statute, we desire, so far as we properly may, to reserve the right to submit a draft of any legislation necessary.

THROUGH ROUTES

"Chapter 138 of the Resolves of 1910 provides for a report as to the desirability of requiring street railway companies to convey cars of other companies. In the opinion of the board the public interests require additional legislation making it compulsory under certain conditions for street railway companies to receive and convey over their tracks traffic and cars tendered by connecting street railway companies. The controlling reason therefor is as follows:

"Under the permissive right a street railway company exclusively serving a community, especially one of considerable size, is enabled to make its own terms or to refuse to make any terms with a connecting street railway company which desires to route through cars into the thickly populated portion of the territory served by the terminal carrier. The connecting carrier, in most places an interurban street railway company, is thus left at the mercy of the terminal carrier. Some public supervision of this situation is necessary. We do not believe, however, in view of the different sizes and weight of cars, different weight of rails and differences of power equipment, that one street railway company should be required to receive and convey over its tracks cars of another street railway company except upon approval of the public authorities, for it is doubtless true that in some instances the requirements of safety would preclude such arrangement.

ISSUES OF SECURITIES

"Ten orders approving issues of street railway stock, aggregating \$2,479,500, have been signed. Of this amount \$10,000 was original stock issued upon the petition of the Point Shirley

Street Railway Company, and three petitions for preferred stock were approved, the total amount being \$208,000.

"There have been nine petitions by street railway companies for approval of issues of bonds, the total amount being \$2,047,700. In each case an order of approval was issued.

"In three cases the board has required, under the provisions of Chapter 536 of the Acts of 1910, the establishment of a sinking fund. The law provides for the designation by the board of some Massachusetts trust company as trustee and custodian of the fund.

"Under the general law providing for the purchase and sale or consolidation of street railways no adequate provision is made for the protection of minority stockholders. The board, therefore, suggests legislation upon this subject."

REGULAR AND COMMUTATION RATES ON WASHINGTON SUBURBAN LINE

There is pending before the Interstate Commerce Commission a case in which the rates of fare charged by the City & Suburban Railway, of Washington, D. C., and the Washington, Berwyn & Laurel Electric Railway are in question. The City & Suburban Railway is a subsidiary of the Washington Railway & Electric Company. At the time of the hearing in the case the Washington, Berwyn & Laurel Electric Railway was in the hands of receivers, but it has since been acquired by the City & Suburban Railway. After the hearing of the case before a special examiner a brief for the defendant companies was filed by S. Russell Bowen, attorney. The following information is taken from the brief.

It was alleged by the complainants, residents of the district affected, that the existing rates for regular fares and commutation books were unreasonable, excessive, unjust and discriminatory, and that the companies were subject to the act to regulate commerce. The substitution of a reduced schedule of rates was requested.

The City & Suburban Railway answered that it operated an electric railway from Washington to the District line for which a cash fare of 5 cents or a ticket amounting to 4 1-6 cents was collected; that it operated a line within the State of Maryland, commencing at the State line and extending to Berwyn, Md., which was divided into two zones for which 5 cents for each zone was demanded, and that it did not give any through rates, although it sold a commutation book to points within the State of Maryland. The company denied the jurisdiction of the commission as to street railways engaged in passenger business and not carrying any express or freight traffic, and asserted that, therefore, it was not amenable to the act to regulate interstate commerce.

After the presentation of testimony by the complainants, the defendants moved for a dismissal of the complaint on the ground that the complainants had not made out a prima facie case and had not introduced any proof to show that the rates demanded by the defendants were unreasonable or unjust.

The defendants introduced W. F. Ham, comptroller of the City & Suburban Railway, who testified as follows: "The bonds of the City & Suburban Railway amount to \$1,750,000, the stock to \$1,750,000 and bills payable to \$200,787. The deficit for the year ending Dec. 31, 1909, amounts to \$6,946." Mr. Ham further testified that if the revenue of the City & Suburban Railway was reduced the bonds would be jeopardized and the financial condition of that company would be disturbed. He stated that it was impossible under the zone system to eliminate all inequalities; those living just across the point of collection had to pay a higher rate per mile than those who happened to be at the dividing point.

Mr. Ham further testified that the issue of bonds and stock covered the cost of the property, and that the limit set by Congress was \$150,000 per single mile of track, whereas the average cost had been \$110,000 per mile of single track, including the making of changes in motor power, etc., by the City & Suburban Railway as required by acts of Congress.

Mr. Ham testified that the revenue per car mile within the District of Columbia was 23.31 cents and in Maryland 23.62 cents. He said that the defendants did not give any through rates and that the rates within the District of Columbia were fixed by act of Congress. In the State of Maryland on the City & Suburban Railway there were two zones. The defendants had never paid any dividends and the cost of the City & Suburban Railway for road and equipment had been \$3,682,993. Mr. Ham made certain comparisons of the rates charged by the defendants with those of the competing steam road. Tables showing some of these rates charged by the two defendant companies are reproduced herewith.

Mr. Ham testified that the rates proposed by the complainants in lieu of existing rates were unreasonably low and confiscatory and that no electric railway could afford to operate its line under such rates.

STATEMENT SHOWING REGULAR RATES OF FARE

Between Maryland points and Washington, of the Baltimore & Ohio Railroad, compared with the City & Suburban Railway.

Station.	Miles.	B. & O. R. R.		Miles.	C. & S. Ry.	
		Regular fare.	Reg. fare. per mile.		Regular fare.	Reg. fare per mile.
Brentwood	5.6	\$0.17	\$0.03			
Hyattsville	6.6	.20	.03			
Riverdale	7.5	.23	.03	7.72	.09 1/6	1.19 c.
College	8.5	.26	.03			
Lakeland	9.6	.29	.03			
Berwyn	9.8	.29	.03	9.95	.14 1/6	1.43 c.

STATEMENT SHOWING COMMUTATION RATES

Between Maryland points and Washington, of the Baltimore & Ohio Railroad, compared with the City & Suburban Railway.

Station.	Miles.	B. & O. R. R.			Miles.	C. & S. Ry.		
		Comm. rates	Comm. rate per trip.	Comm. rate per mile.		Comm. rates	Comm. rate per trip.	Comm. rate per mile.
Brentwood ..	5.6	\$4.15	.069	.0123				
Hyattsville ..	6.6	4.35	.074	.0112				
Riverdale ...	7.5	4.75	.079	.0105	7.72	\$3.50	.06 2/3	.0085
College	8.5	5.05	.084	.0099				
Lakeland	9.6	5.36	.088	.0092				
Berwyn	9.8	5.40	.090	.0092	9.95	4.80	.09 1/6	.0092

STATEMENT SHOWING REGULAR RATES OF FARE

Between Maryland points and Washington, of the Baltimore & Ohio Railroad, compared with the City & Suburban Railway and Washington, Berwyn & Laurel Electric Railway.

Station.	Miles.	B. & O. R. R.		Miles.	C. & S. Ry.	
		Regular fare.	Reg. fare. per mile.		Regular fare.	Reg. fare per mile.
Branchville	10.1	\$0.30	\$0.03			
Sunnyside	12.1	.36	.03			
Beltsville	12.9	.39	.03	13.19	.19 1/6	1.45 c.
Ammendale	13.9	.42	.03			
Muirkirk	15.1	.45	.03			
Contee	16.4	.49	.03	16.49	.24 1/6	1.46 c.
Oak Crest	17.0	.51	.03			
Mistletoe Sp.	17.7	.53	.03			
Laurel	18.7	.56	.03	18.90	.29 1/6	1.54 c.

STATEMENT SHOWING COMMUTATION RATES

Between Maryland points and Washington, of the Baltimore & Ohio Railroad, compared with the Washington, Berwyn & Laurel Electric Railway and the City & Suburban Railway.

Station.	Miles.	B. & O. R. R.			Miles.	Electric lines.		
		Comm. rates	Comm. rate per trip.	Comm. rate per mile.		Comm. rates	Comm. rate per trip.	Comm. rate per mile.
Branchville ..	10.1	\$5.50	.092	.0091				
Sunnyside ..	12.1	6.00	.100	.0083				
Beltsville ..	12.9	6.30	.105	.0081	13.19	\$6.10	.11 2/3	.0088
Ammendale ..	13.9	6.60	.11	.0079				
Muirkirk	15.1	7.00	.117	.0078				
Contee	16.4	7.35	.122	.0074	16.49	7.40	.14 1/6	.0086
Oak Crest	17.0	7.45	.124	.0073				
Mistletoe Sp.	17.7	7.60	.127	.0072				
Laurel	18.7	8.65	.134	.0072	18.90	8.00	.15 1/3	.0081

Mr. Ham also testified that the present commutation rates were not enough to compensate the defendants; that they only tended to develop the territory along the electric lines; that if all the business of the defendants were at those rates the defendants would show a greater deficit than now; that it was the policy of most transportation companies to have a commutation rate whereby they could help to develop their business; that the commutation rates were not profitable, but by having the commutation rates the regular traffic was increased; that if the City & Suburban Railway was doing twice as much business as it was now doing the present rates would not be unreasonable. Mr. Ham said that the expenses of the City & Suburban Railway exceeded its income and that none of the expenses or charges for the past two years included improvements. He further testified that about \$150,000 of new money had been

put into betterments upon which no return had been received and that during the last 10 years the total deficit of about \$70,000 had accumulated.

Although at the time of making the answer the City & Suburban Railway had nothing to do with the management of the Washington, Berwyn & Laurel Electric Railway, Mr. Ham testified as an expert accountant who had examined the books of the latter company. He stated that the line of the Washington, Berwyn & Laurel Electric Railway between Berwyn and Laurel was 8.95 miles; that the road was divided into three zones and that a fare of 5 cents for each zone was collected. He further testified that the monthly commutation rates charged by the Washington, Berwyn & Laurel Electric Railway were less than those charged by the competing steam road and that all of the proposed rates asked for by complainants were unreasonable and would be confiscatory.

Concerning the jurisdiction of the commission the brief says:

"At the outset we respectfully urge that this honorable commission has no jurisdiction over street railway companies engaged in operating street cars for the transportation of passengers, not engaged as commercial railroads in the general transportation of freight and passengers and not doing an express business. We are supported in this view by the recent case of Omaha & Council Bluffs Railway & Bridge Company vs. Interstate Commerce Commission in the United States Circuit Court for the District of Nebraska.

"We also contend that this honorable commission has no jurisdiction over intrastate rates such as are demanded by the Washington, Berwyn & Laurel Electric Railway between Berwyn and Laurel.

"The City & Suburban Railway charges merely local rates within the District of Columbia and in the State of Maryland. It gives no through rates and sells no through tickets.

"It has also been held that commutation tickets as well as party tickets and mileage books are exempted from the provisions of the act to regulate interstate commerce."

An abstract of the argument follows:

"The complainants neither called any witnesses nor submitted any proof to substantiate the allegations in their complaint, and, while not qualifying as experts on rate-making, testified in their own behalf, in substance stating their own individual wishes or what rate would suit them and their particular locality or place of residence. All the complainants disclaimed attempting to show the value of the service and the cost of the property employed in rendering the same in determining their belief in the unreasonableness of the rates. They made no inquiry into the character of the business, the amount of capital required, the hazard involved and especially the losses which the defendants were meeting under the rates attacked. The complainants simply alleged that the rates are unreasonable *per se*.

"The complainants have not considered any point along the lines of the defendant except where they reside, not caring what effect reductions demanded may have upon other points. The respective complainants swore that they did not know what patronage was given to the electric lines; that they personally had no knowledge of the effect of the rates complained of upon the property or the development of the country along the line of electric railways. They could not tell personally the actual straight or commutation rates charged by the defendants at their place of residence or at other points along the lines operated by the defendants and could not state what effect the reductions demanded would have upon the defendants. They testified that they were not concerned whether the defendants were able to suffer the proposed reduction or not. They had not considered that the rates of the defendants carried with them certain transfer privileges which were not given by the competing steam road, which carries its passengers to the union terminal in Washington City.

"The commission is not administering the law to regulate interstate commerce upon such a flimsy basis as that proposed by complainants. It is not authorized under the act to order a reduction in rates in cases where it has jurisdiction upon

complaints of such character unsupported by competent evidence. The commission will only order a reduction of rates when it is made clearly to appear that existing rates are unjust or unreasonable, or unjustly discriminatory.

"The complainants fail to realize that many electric lines have to go through a sort of pioneer period and are real suburb builders. Complainants say that the defendants have deterred settlers from settling in the locality contiguous to the line operated by the defendants, but, strangely enough, point to figures in their brief which prove the contrary. The defendants report an increase in the number of passengers carried in 1909 over those carried in previous years, which was to be expected. But how does this square with the complainants' charges that defendants' rates are prohibitory and deter development of the country along the lines operated by the defendants?"

Regarding the reasonableness of regular and commutation rates the brief says in part: "The issuance of commutation tickets is merely voluntary on the part of the carrier. They may be issued to induce people to travel or to meet a competition, and may be withdrawn.

"The complainants fail to realize that tickets issued upon the commutation principle owe their origin to a different cause from that of the ordinary or regular kind which are fixed or made on a dissimilar basis. The complainants evidently fail to realize that if there should ever come a day when the regular and ordinary rates of an electric railway should be superseded by commutation fares entirely then the latter would take the form of a regular rate and should be reckoned with as such. The facts are that the defendants not only have an ordinary or regular rate in existence, but a commutation rate as well, which they give to develop territory along their lines.

Revenue from transportation	\$499,047.45
Revenue from operations other than transportation.....	18,420.21
Gross earnings from operation.....	\$517,467.66
Operating expenses:	
Way and structures	\$67,084.43
Equipment	33,507.43
Traffic	624.35
Conducting transportation	236,998.00
General and miscellaneous.....	60,176.95
	398,392.06
Net earnings from operation.....	\$119,075.60
Miscellaneous income	648.28
Gross income less operating expenses.....	\$119,723.88
Deductions from income:	
Taxes	\$24,621.12
Interest on funded debt (\$1,750,000 bonds at 5 per cent)	87,500.00
Interest on bills payable	9,042.34
Depreciation of equipment	4,906.70
	126,670.16
Net deficit	\$6,946.28

"This honorable commission has held that it has no jurisdiction over commutation rates of carriers.

"While the complainants failed to introduce any evidence showing any of the rates charged to be unreasonable, the defendants on the other hand introduced material evidence proving conclusively that the existing rates, both regular and commutation, are reasonable.

"The law does not prohibit all discrimination. To be unlawful discrimination it must be unjust and unreasonable. The law does not undertake to put persons in all localities on exactly the same footing at all times and under all circumstances. It prohibits only undue or unreasonable preferences or advantage.

"What the company is entitled to ask is a fair return upon the value of the property which it employs for the public convenience. What are the facts involved in this hearing? Neither of the defendants has earned expenses, and both have suffered annually a deficit. The City & Suburban Railway has carried and is carrying a deficit to the amount of about \$70,000. Can it be said under such conditions that the existing rates charged by the defendants are unreasonable and unjust? On the contrary, we respectfully submit that any reduction in present rates would be confiscatory. We do not believe, even if this honorable commission holds it has juris-

diction over electric railways not doing an express or freight business, it would, under the guise of regulation, attempt to require the defendants to carry persons without reward, nor would it do that which in law amounts to a taking of private property for public use without just compensation or without due process of law.

"Defendants, therefore, respectfully urge, in view of the above, that the complaint herein should be dismissed."

The income account of the City & Suburban Railway of Washington for the year ended Dec. 31, 1909, is shown in the table in the first column.

SPECIAL REPORTS BY JOINT COMMISSION ON BOSTON TRANSIT MATTERS

The Massachusetts Railroad and the Boston Transit Commissions, sitting as a joint board by order of the Legislature of 1910, have submitted three reports on Boston transit matters to the General Court of 1911, taking up in detail the subway propositions referred to it in the last session. Three matters in connection with subway development were assigned to the joint board for investigation during the recent legislative recess. One covers the extension of the Boston end of the Cambridge subway to the South Station via Winter and Summer Streets, another the construction of a subway to provide additional rapid transit facilities from Park Street to South Boston and Dorchester, and the third a proposed subway under the West End district of Boston, from Park Street through Scollay and Bowdoin Squares to the vicinity of the Charles River.

SUBWAY TO SOUTH STATION

In a report to the Legislature of 1910 the joint board pointed out that quicker and easier means of transit between Park Street and the South Station by means of a subway under Winter and Summer Streets are legitimately demanded, and the resolve passed last year directed the board to investigate the cost of construction and to report a bill in 1911 for the building of such a subway. In its present report the board reiterates the point that such a connection would co-ordinate the existing lines of the Boston Elevated Railway Company and create a direct, rapid and easy means of connection between the largest passenger terminal in the City of Boston and the territory now served by the Washington Street tunnel and the Tremont Street subway. The length of the proposed subway is but ½ mile between terminal stations. The estimated cost of the subway, with connections, stations, entrances and exits, but exclusive of land damages, is \$2,600,000. The subway is to be designed for double-track service, and the plans provide for its construction beneath the existing subway and tunnel lines. The work would be done by the Boston Transit Commission, which has built all the existing subways and tunnels in Boston proper. The extension of the Cambridge subway to the South Station will enable passengers to travel from Harvard Square, Cambridge, to the Boston & Albany and New York, New Haven & Hartford terminal in about 10 minutes, as compared with about 30 minutes at present under the most favorable conditions.

SUBWAY TO SOUTH BOSTON AND DORCHESTER

In its report on additional rapid transit facilities to South Boston and Dorchester the joint board points out that the objections cited in its report to the Legislature of 1910 against extending the Boston subway system from Park Street to Marine Park and Milton Lower Mills, in South Boston and Dorchester respectively, still hold. The expense of such extensive subways would be prohibitive. This year the joint board is able to deal with far more practicable proposals affording the people of these districts rapid transit to a terminal at Andrew Square, with transfers to surface cars. The board estimates that such a subway will cost about \$3,500,000.

An interesting feature of the report in this connection is an analysis of recent subway development in Boston, which shows conclusively that the rapid transit lines have been laid

out according to a consistent general plan, meeting the needs of Boston and its more immediate suburbs with due regard to the radial character of the city. Studies of the acting-chief engineer of the Boston Transit Commission, Edmund S. Davis, show that the Boston metropolitan district is divided into the following somewhat arbitrary areas, with populations as tabulated tributary to the principal subway and elevated lines:

Direction of Dist. from Urban Center.	Area in Sq. Miles.	Rapid Transit Lines Serving District.	Population of District.
N. & N. W.	17.92	Sullivan Sq. and Malden "L"	164,000
N. E.	14.60	East Boston tunnel	121,000
W.	19.	Cambridge subway and E. Camb. "L" ..	183,000
W. & S. W.	30.	Tremont St. and Riverbank subways ..	210,000
S. & W.	14.	Wash. St. tunnel and Forest Hills "L" ..	186,000
S. & E.	30.	New subway or "L" line	190,000

In all cases the above districts are within 10 miles of Boston City Hall. The board points out that, in addition to surface cars and steam railroad facilities, rapid transit by elevated or subway lines is very desirable, and that the existing surface facilities of the South Boston and Dorchester sections of the city are inadequate. The population of the Dorchester district is increasing with great rapidity, the gain in the past 10 years in Dorchester being 55 per cent. In Mr. Davis' studies are included numerous valuable statistics of the character of the existing service on the elevated and surface lines serving various parts of South Boston and Dorchester through surface car transfers, the population of various portions of the metropolitan district and counts of traffic taken by the commission

WEST END LOOP SUBWAY

All members of the board sitting in this matter are agreed that it is inexpedient to build a subway under the West End as desired by various property interests and embodied in the so-called Codman bills filed with the Legislature of 1910 and referred to the commissions for investigation. The project provided that the two tracks of the Cambridge subway, after entering Park Street station, shall be continued northerly under the Tremont Street subway to Scollay Square, and thence under Court Street, Bowdoin Square and Cambridge Street, to the authorized Boston elevated section of the incoming Cambridge subway, forming a loop through the West End. The arguments in favor of the subway were chiefly from real estate interests desirous of revivifying one of the most retrograde sections of Boston. The board points out that many other elements besides transportation affect the increase or decrease of real estate values; that easy and convenient access alone will not improve a district; that the presence of a subway will not in itself improve a territory; that much depends on the location and distance apart of stations and upon the number of persons that wish to reach a given area, and that a subway with stations considerable distances apart will not promote the growth of a district as well as a system of surface lines in which the cars stop at every corner. The board states that a subway is justified only when the congestion on the surface of the streets is so great that travel on the surface lines is seriously impeded and where the distances to be traversed are so great that some means of more rapid transit than can be permitted on the surface, even with congested streets, is necessary or desirable. A subway with stations far apart tends to increase real estate values disproportionately near the stations, and with surface car service no such disparity exists. The board shows that no portion of the district is over 750 ft. from some transportation line, that the trend of travel is in other directions, and that the proposed loop would duplicate the most expensive and least used portion of the Tremont Street subway. It finds that if further facilities are later needed in the West End they can best be obtained by the extension of the East Boston tunnel. No legislation is, therefore, recommended in favor of the proposed loop.

At a recent meeting of the Hull (Eng.) corporation street railway committee it was decided to recommend the City Council to seek powers during the next session of Parliament for extending the tramway. When carried out the plan will nearly double the length of the lines.

PUBLIC SERVICE COMMISSION CONFERENCE ON ACCIDENTS

In accordance with the request of the Public Service Commission, Second District, State of New York, a conference was held in Syracuse on Thursday, Jan. 19, between the members of the Public Service Commission and the representatives of the electric railways under their jurisdiction. The meeting was very well attended. There were present about 100 electric railway men from New York State and the five commissioners of the Second District with their secretary and electric railroad inspector. There were also a number of guests from other States, including Commissioner George W. Bishop, of the Massachusetts Railroad Commission; Commissioner J. C. Sullivan, of the Ohio Railroad Commission; Philander Betts, chief engineer Board of Public Utility Commissioners, New Jersey, and M. H. Hovey, safety device expert, Railroad Commission of Wisconsin. There were two sessions, one from 10:45 a. m. to 1:15 p. m. and the other from 2:55 p. m. to 7 p. m. Frank W. Stevens, chairman Public Service Commission, Second District, presided at both sessions.

MORNING SESSION

Chairman Stevens opened the proceedings with a brief address, in which he gave the reasons for calling the conference. He said that as long as cars are propelled at high speed and as long as human beings are not blessed with infinite wisdom accidents will happen. Nevertheless, it was part of the duty of everyone connected with electric railway operation to endeavor to reduce such accidents to a minimum. The most forcible fact that was impressed on his mind was that all accidents of consequence seemed to be resolvable into failures of the human being. Human negligence, human error and human inefficiency in some form or other were chargeable with the serious accidents which had occurred on inter-urban railways. Another factor was the failure at times of the best trained men to perform their duties properly. Many serious accidents had resulted from the lapses of careful and highly efficient men. There were two objects to be obtained: First, to procure skilled employees; second, to procure devices to prevent the mistakes of employees. The conference had been called that each operator might have the benefit of the experience of others and that the commissioners might have the benefit of the experiences of all the operators as to their difficulties, troubles and dangers, and how they can best be corrected. However helpful such suggestions might be, there would be no really valuable results unless the work of the conference was followed up. Whenever it had been determined by a consensus of the opinion of all the operators that something not now done should be done, or some device not now used should be used, then the carrying out of such policies and the installation of such devices would be made obligatory by the commission.

C. E. Lewis, chief train dispatcher New York State Railways, then read a paper entitled "Train Dispatching on Inter-urban Roads." This paper was published on page 114 of the ELECTRIC RAILWAY JOURNAL for Jan. 21. Mr. Lewis' paper was followed by a paper by E. H. Wade, train dispatcher of the Buffalo & Lake Erie Traction Company, entitled "Train Dispatching on the Buffalo & Lake Erie Traction Company's Line." This paper appears on page 158 of this issue.

W. G. Park, train dispatcher Buffalo, Lockport & Rochester Railway, said that his company operated a dispatching system similar to that of the New York State Railways. All conductors must give their motorman a bell signal before reaching a meeting point, and this signal must be answered by the motorman.

DISPATCHER'S CONTROL OF POWER CIRCUITS

C. R. Barnes, electric railroad inspector of the commission, inquired what, if any, provisions were made for the shutting off of power by train dispatchers in cases of emergency caused by mistakes in train orders issued or for other reasons.

J. M. Campbell, former receiver Buffalo, Lockport & Rochester Railway, said that this question had been taken up by his company with the Niagara, Lockport & Ontario Power Company, from which energy is purchased. He thought that when power is cut off all of the substations should be affected and not one.

H. C. Prather, master mechanic and superintendent of motive power Buffalo, Lockport & Rochester Railway, stated that the present practice in shutting off power is to call the operator of the substation nearest to the point where the power is to be cut off. When the substation has only one operator there is no assurance that this can always be effected, because he may be outside of the building on other duties. The company therefore took up the question of making the whole line dead in emergencies. This object probably could be accomplished either by grounding or short-circuiting the high-tension line, assuming that the latter extends from one end of the railway to the other. The object desired could be carried out with some device like an electrolytic cell and operated by remote control from a button on the dispatcher's desk.

J. K. Choate, general manager Otsego & Herkimer Railroad, thought that when there was any question of danger it was a good plan to stop the entire road. There should always be proper connection between the dispatcher's office and the power station to permit the immediate stopping of every car.

C. O. Weidman, superintendent of transportation Otsego & Herkimer Railroad, said that a special wire from the dispatcher to the power plant was in circuit with a large warning gong in the latter. Mr. Barnes did not think that this was the ideal way, as it involved loss of time and the possibility of not getting the power house attendant in time. There should be some plan whereby the train dispatcher himself could shut off the power.

J. P. Maloney, superintendent Albany Southern Railroad, which is a third-rail line, stated that all that company's stations were equipped with an iron bar which was placed in a convenient location, so that the agent could have immediate access to it in case he desired to stop a train after it had passed his station. He simply had to place the iron bar across the third rail and the running rail. This would short-circuit the line and "dead" that section of the rail between substations. Each car is also equipped with the same kind of an iron bar for the use of train crews. In case of serious trouble a crew is able immediately to short-circuit the rail and "dead" that section of the rail between substations and in the immediate vicinity of its car. The dispatchers also have an arrangement by which they can immediately order the power shut off on the whole line or on a certain section of the line, as the case may require. This method had been in vogue for the past five or six years.

W. J. Harvie, chief engineer Oneida Railway, said that after a conference between the officials of his company it was concluded that the shutting off of power should be controlled by the dispatcher. Therefore, the crews have instructions to get the dispatcher first, to put the latter in immediate touch with conditions. Furthermore, the substation operators have instructions when called up by a crew which reports serious trouble to take the power off and notify the dispatcher. Mr. Harvie saw no reason why it was not perfectly feasible to follow Mr. Barnes' suggestion that the cutting off of power should be effected directly by the dispatcher. The cars were put on the road to serve the transportation department and were under the control of the transportation superintendent and his agents. It was his privilege, if he thought fit, to take the power off the entire system. Therefore, all delay should be eliminated in making this change. It should be possible to eliminate all waste time except that required to make the first call.

REGISTER STATIONS

Mr. Barnes brought up the question of where register stations should be maintained.

Mr. Lewis said that on the New York State Railways there is a register station at all terminals and at the end of double

track. The rules provide that all train crews which pass these stations must register.

J. H. Cain, superintendent Buffalo, Lockport & Rochester Railway, said his practice was similar to that of the New York State Railways. In addition to registering stations, the company's rules require the trains to register at all terminal points. A terminal point meant any place where a train or section of a train is annulled for any reason. The standard "31" order was used, but it was ruled to avoid mistakes in time and place. Some steam lines and electric interurban lines use an order board for stopping trains. The usual practice is to direct the operator to display an order board and take the train order where the stations are at terminals and certain other stations spaced to give flexibility of train movement. On his system if there are no order boards the station itself is a positive stopping point. A train which leaves one block station cannot go beyond the next without communicating with the train dispatcher. The object is to prevent failures of operators to display the boards after being directed to do so. Should the operator fail to be awake the train crews will stop and arouse him. The block stations also permit the train dispatcher to have trains in individual blocks without getting out train orders. The block stations are register stations only where the train terminates or leaves a line.

Mr. Barnes asked if register stations were maintained at the end of sidings, say, 1 mile long.

R. A. Dyer, Jr., assistant general manager of the Auburn & Syracuse Electric Railroad, said that when a siding was 1 mile or even ½ mile long it would be good operating practice to register at the end. Where the siding was shorter there was not much danger that the motorman would forget whether he had passed a car.

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, did not agree with Mr. Dyer in cases where the siding was parallel to the main line. If such a siding were only 1 mile long the register station would be quite unnecessary. A register station was all right, however, on sidings with a detour which would cause the motorman to lose sight of the other track for some time.

M. D. Kilbride, superintendent transportation, interurban lines, New York State Railways, agreed with Mr. Collins. He said his company had a parallel siding about 2 miles long. Should a motorman forget whether he had passed an opposing train there was no reason why he should not call up and inquire when he reached the end of the siding.

Mr. Cain asked whether register stations were maintained where there are passing points in city limits with city cars and if any accidents had ever occurred because of the absence of such stations. Mr. Barnes replied that he could not recall any accidents from this source. In reply to a question by J. B. Potter, local manager New York & Stamford Railway, Mr. Barnes said that the headway on lines where register stations are maintained varies from half an hour to 5 minutes. Yet each car is obliged to register.

Mr. Campbell said that this was good practice. The only complaints had come from the public, who resented the loss of time taken by the conductor to register.

MEETING POINTS AND OTHER DISPATCHING DETAILS

Mr. Barnes inquired whether the opposing regular train should not be notified when orders are given to crews to run extra between two points.

Mr. Wade thought it was more practicable to notify trains running in the same direction rather than opposing trains. It was almost impossible to notify all opposing trains. One could not always tell when an extra was coming out. The extras look out for themselves, but the men who run second sections depend too much upon the man ahead. The trouble was that too many train orders were being issued. To notify the men on the extras about opposing trains would tend to make them more careless.

Mr. Cain said that wherever they could not run specials or chartered cars as second sections they figured a schedule to make meets with all opposing trains.

Mr. Barnes asked what was the permissible number of meets which should be contained in one train order. He mentioned one instance where on a 40-mile to 50-mile line the crew had an order given it which contained half a dozen meets, so that the train was run with one order for the entire length of the road. It seemed to him that there should be a limit to the number of meets on one order to reduce the chances of error.

Mr. Cain said that an order was given his men for a particular meet only, but in the course of their runs they would receive a number of individual orders.

There was an active discussion on this subject from which it appeared that the general opinion was that there should not be more than two or at most three meets on one order.

Mr. Barnes inquired what methods were employed where crews were changed to insure that the train orders followed the change.

Mr. Choate stated that he did not see how misunderstandings were possible unless the train ran without regular orders. Every one of his trains moves with an order, and that order must be handed over to the next crew or else the new crew will not move. In reply to a query from Mr. Campbell, Mr. Choate said that if the telephone got out of order the trains would be dispatched by time card and moved with a clearance order from the agent. Under these conditions, of course, extra trains could not be moved.

Mr. Cain said that the man who runs the car has the order before him on a hook; if he takes the order away his successor, not finding the order on the hook, will immediately call the other motorman back. The new motorman will not move the train a foot without receiving the order.

TRAINING OF DISPATCHERS.

Mr. Barnes asked what examinations train dispatchers were required to pass.

E. J. Cook, general manager New York State Railways, said that his men were taken off the road. It was customary to try them out for a while to determine their fitness as dispatchers. The men selected were those who had good records in the transportation department, but one could not tell without a trial whether a man would make a good dispatcher.

Mr. Cain said that his train dispatchers are required to pass a written examination which embraces 275 questions on operating rules and 25 to 30 questions on the issuance and understanding of train orders. The men now employed were all recommended by the operators of other roads, but before direct responsibility was given them they were placed with the chief train dispatcher until it was clear that they understood the full procedure.

Mr. Maloney stated that the Albany Southern Railroad also employs only experienced train dispatchers. They are questioned by the superintendent of transportation and are under his personal supervision for a long period before they are permitted to have entire operation of trains.

R. R. Smith, superintendent Buffalo & Lake Erie Traction Company, did not believe in taking men from the transportation department for dispatchers. He thought it better to get a well-recommended steam-railroad dispatcher. It seemed to him that this was the only safe way to handle a long interurban property, especially a new one, which required the building up of a sound organization.

Mr. Campbell asked whether it was possible to get out a "lap" order under the standard system of train dispatching. Mr. Wade said that this was possible where the telephone was used.

Mr. Lewis added that "lap" orders were possible on roads with telegraph dispatching. Many "lap" orders were caused by operators not taking the proper pains to trace the order from its original copy, or, if they made an error in the first place, they did not like to call up the dispatcher to ask for a repetition of the order.

Chairman Stevens suggested that the train dispatchers get together and discuss the points which had come up at the conference and any others which required their attention. If real action was to be secured it would be desirable to have the train

dispatchers form committees to work in harmony with other committees of railway men to study, amend or approve existing practices.

LIABILITY OF EMPLOYEES

The next order of business was the reading of the paper entitled "Collisions on Interurban Roads and Their Causes." This paper, which is published on page 159 of this issue, was prepared by E. F. Peck, general manager Schenectady Railway. As Mr. Peck unfortunately had a cold, his paper was read by W. B. Rockwell, general manager Eastern Pennsylvania Railways.

Chairman Stevens was particularly interested in Mr. Peck's final suggestion that one thing that would have a tendency to prevent collisions would be the enforcement of the present criminal law or the enactment of new laws that would severely penalize the negligence of railroad employees. If the motormen mentioned by Mr. Peck had been indicted they would not have been convicted. He mentioned one case where the Grand Jury refused to indict a motorman despite his confession of negligence which had resulted in the death of another motorman. It was his experience that juries would not prosecute a railroad employee unless it was evident that he had wilfully intended to commit murder. He had never heard of a case in New York State where negligence alone had convicted any man. A brief discussion followed on the responsibilities of conductors. Mr. Cain said that there were several roads in New York which hold the conductor and motorman equally responsible for train movements. In approaching meeting points the conductor must signal the motorman, who is required to answer. On his line the conductor pulls the emergency valve cord if he gets no answer from the motorman.

Mr. Choate then read his paper entitled "Methods of Employment, Instruction and Discipline of Motormen and Conductors on Interurban Lines." This paper was published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, on page 120. After the reading of Mr. Choate's contribution the meeting adjourned for luncheon.

AFTERNOON SESSION

James McPhillips, claim agent Hudson Valley Railway, opened the discussion on the papers of Messrs. Choate and Peck. He said it was true that accidents happened even under the oldest and best conductors and at times even three parties were at fault. If the employees realized that they were facing at least a possible term of imprisonment through negligence they would be deterred from taking such risks.

Chairman Stevens said that there was already a statute to cover criminal negligence, but the trouble was the failure of juries to indict.

Mr. Choate mentioned one thing wherein the railroad men needed the help and co-operation of the commission—it concerned the unwillingness of the railroad men themselves to prosecute. Possibly a law that would require sending to the commission and to the district attorney an account of all cases reported might be of help in having a deterring effect on the men. Something must be done to make the men feel their responsibility and to punish those who are reckless.

EMPLOYEES

Chairman Stevens replied that the object before the conference was not so much the punishment of men who had done wrong, but to determine ways and means which would obviate the employment of men of reckless or inefficient character. Continuing, Chairman Stevens asked what the railroad companies were doing to keep their men up to date on the rules of operation. He had found great variations in practice. Some companies even had no rules at all.

Mr. Choate believed the men should be examined from time to time and that every railroad should have a skeleton instruction card.

A free discussion followed on the best method of estimating the character of applicants for employment. There was a common sentiment that letters of recommendation were generally worthless, as few men would undertake to give a bad character to individuals who had been in their employ.

Mr. Choate thought that a man should swear to the truthfulness of his record and that this record should be placed on file with the Public Service Commission.

Mr. Cook said that so few men were employed on his interurban lines that it was perfectly feasible for the trainmaster and superintendent of each division to be in thorough touch with the individual trainman. Both oral and written examinations were given. The company had no skeleton car, but instruction was given by arrangement with the mechanical department.

Mr. Kilbride said that a motorman employed on the interurban lines of the New York State Railways must have a year's experience under the standard code of rules. After his breaking-in period he must pass an examination on that code with a minimum rating of 80 per cent. A conductor is not always an experienced man. He must pass the same examination but is given six months to become thoroughly posted. He must pass the examination in the rules with the same rating as a motorman. It does not follow that the men who receive the highest percentages prove the best operators. In one case a conductor learned the entire code perfectly and yet permitted a passenger to ride from one end of the line to the other without collecting more than the first nickel.

Mr. Dyer thought that books of rules were a good thing, but in the final analysis the selection of men got down to the personality of the superintendent and his judgment of human nature. It was just as impossible to make a motorman good by rule as it was to make people good by law. The greatest safety of operation lay in getting men of good character rather than judging them by their ability to pass examinations. His company did not hire steam railroad men, preferring to take inexperienced men who would more readily accustom themselves to his company's operating methods. The number of accidents might be decreased by suitable signal systems, but he did not know of much more that could be done to improve the present methods of selecting employees. He had tried the merit system some years ago, but it had not proved very successful. Practically it was sometimes hard to penalize a man for an accident. If a man had an accident which was at all excusable he was cautioned to follow the rules to the letter. Generally such a man returned to his work more reliable than before the accident. On the other hand, if a man was responsible for an accident through direct negligence he was discharged at once. Mr. Dyer thought that a quiet reprimand usually was better than humiliating a man by laying him off. The merit system and the practice of laying off tended to promote ill feeling between the men and the company.

Mr. Cook said that the New York State Railways were using the merit system. A man was discharged when he had 60 demerits. Ninety per cent of the men had voted for the adoption of this system. Mr. Cook thought that one of its valuable features was that the men could work off demerits by exceptionally good behavior.

W. O. Wood, president of the New York & Queens County Railway, thought that the greatest weakness of the Rochester merit system was that a specific penalty was provided for each offense. He had been very careful in his experience never to prescribe a penalty for any specified offense against the rules, but to graduate the penalty in accordance with the circumstances of the case and the previous record of the man. Some managers thought that the merit system was not severe enough, but as a matter of fact results had shown that it was too severe, because a man may accumulate 60 demerits in a very short time. The employment of an instructor was a great help in decreasing accidents.

Mr. Potter said that rules could be compiled and bulletins set up without end, but unless the inspectors and superintendents and managers saw that they were carried out with vigilance mere regulations were useless.

Mr. Peck suggested the possibility of making the physical examination of applicants for employment somewhat broader, so as to include tests for alertness, mentality, etc. A committee of physicians representing the different New York

railways might be brought together to determine the scope of this new form of examination. Surprise tests would be a good thing in connection with keeping the men up to date on the operating rules. He thought that the Public Service Commission ought to see that those New York electric railroads which do not belong to the association should follow the standard rules adopted by the association.

Chairman Stevens said that there was a difference of opinion as to whether these rules were adequate for all conditions. Mr. Peck replied that of course some local rules would always be necessary but that the main rules could easily be made standard.

Mr. Cain said that as the basis of 75 per cent of train movements hinged on the accuracy of the trainmen's watches more attention should be given to specifying standard makes and allowable variations. At the last surprise test made on his line it was found that about 85 per cent of the watches varied no more than 15 seconds.

W. C. Callaghan, superintendent transportation, city lines, New York State Railways, thought that the interurban men had turned about completely in placing the man above the signal. He thought that accidents would be reduced when the men appreciate that the signals were secondary to them. He was greatly interested in the accident prevention work done by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway. Railway managers did not talk often enough to the men about maintaining the same pitch of efficiency every day as they do on extra days. With regard to application for employment, his company had succeeded in securing six convictions out of eight arrests of men who made false statements concerning employment.

John E. Duffy, superintendent Syracuse Rapid Transit Railway, said that the electric railways should leave no stone unturned for the proper instruction of their men. He did not believe that a superintendent could always look a man in the eye and decide at once whether he was a good man. He thought that the formulated code of rules of the American Electric Railway Association fundamentally was proper and correct and could be used by any electric railway in the United States. The company should make sure by follow-up work and personal supervision that the employees understand the rules. New men especially should not be lost sight of until the management is satisfied that they are going to make trustworthy employees. He had secured very good results by having frequent meetings at which the rules were explained to the men in detail.

GENERAL

Chairman Stevens said that to some extent the frequency of accidents depended upon the ability of the supervising officers. He asked whether it would not therefore be advisable for the Public Service Commission annually to publish a list of the accidents on different roads to show whether the supervision is good or bad.

Mr. Potter said that the detailed publication of accidents was a feature of the Connecticut Railroad Commission's reports. He thought this practice was of material help in furthering improvements in the service.

Mr. Rockwell said that there was hardly a general manager present who could not better his system if he had the means. There were a number of roads in New York State which could lessen their accidents at least 50 per cent if they had the money to put their roads in shape. It would consequently be unfair to a great many managers to publish accounts of accidents which could have been forestalled had enough money been available for improvements. Thus, very few roads could afford to install a complete block signal system, although there was no doubt that such a system would help greatly to prevent accidents. Many roads which could not afford to do so have double-tracked their lines, thinking that the accidents were due to single-track operation. Experience had shown, however, that there were more rear-end collisions on double tracks than head-on collisions on single tracks. No steam railroads would dare to follow the interurban railway practice of running

trains at 40 m.p.h. on a 2-minute headway, yet this was done right along when the annual State Fair is held in Syracuse.

Mr. Barnes added that for the year ended June 30, 1910, there were three head-on and nine rear-end collisions in the Second District, New York.

Mr. Cook said that the objects of the conference, as defined by Chairman Stevens, were exactly those of the Street Railway Association of the State of New York. Work of this character was being carried on at both its quarterly and annual meetings.

Chairman Stevens said that he appreciated the point made by Mr. Cook, but the practical difficulty was that not all of the companies in the Second District were members of the association. The association had no other powers than to discuss, urge and recommend, but the commission had the power to enforce. If the representative of the railways should make certain definite recommendations it was probable that the commission would order all companies under its jurisdiction to obey them.

Calvert Townley, vice-president Connecticut Company, believed that there were great possibilities for beneficial co-operation between the commission and the association and that the result of this and similar conferences would be to bring into the fold of the association many who were now outside of it. The commission will get the benefit of the experiences of all the railway companies while the help of the commission would give new impetus and life to the association.

Chairman Stevens concluded this discussion by stating that the commission would be very unwilling to do anything to injure the excellent work which the association is performing.

BLOCK SIGNALING

The next order of business was the paper by W. K. Howe, of the General Railway Signal Company, Rochester, N. Y., entitled "Block Signaling for Electric Railways." Mr. Howe gave a historical review of signaling, including the time interval, space interval, manually controlled and automatic block systems. After pointing out the principal characteristics of each and their unsuitability for high speed and efficient service he discussed the latest developments in automatic track-circuit block signals. His talk was illustrated by a number of diagrams of circuits, illustrations of signal apparatus and full-size working installations which had been set up in the meeting room of the conference. Mr. Howe laid particular stress on the fact that there has now been developed an automatic block signal system, the cost of which made it available for the average electric interurban railway. The speaker believed that the signal should be under the control of the dispatcher and that means should be provided to compel the obedience of the trainmen to signal indications.

MEETING OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The annual meeting of the Central Electric Traffic Association was held in the office of the chairman of the association at Indianapolis, Ind., on Jan. 16, 17 and 18, 1911. Regular routine business and work on the revision of Joint Passenger Tariff No. 3 consumed most of the time. On the afternoon of Jan. 18 the annual report of the chairman was presented, as shown in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, page 113. It was decided to furnish a copy of this report to the companies which are members of the Central Electric Railway Association. The annual election resulted in the selection of A. L. Neereamer as chairman for the ensuing year. The next meeting of the association will be held in the office of the chairman on Feb. 13, 14 and 15, 1911.

A study is being made of conditions on the Congo River, between Matadi and Leopoldville, for obtaining power to electrify the railway between the two places operated by the Compagnie du Chemin de Fer du Congo, whose headquarters are at 48 Rue de Namur, Brussels, Belgium. This railway is the connecting link between the Upper and Lower Congo, and is about 250 miles in length.

TRAIN DISPATCHING ON THE BUFFALO & LAKE ERIE TRACTION COMPANY'S LINE*

BY E. H. WADE, TRAIN DISPATCHER, BUFFALO & LAKE ERIE TRACTION COMPANY

The adoption of a standard book of rules by the electric roads of this country will open the way to make a more careful set of railroad men. Superintendents and assistant superintendents try to see that rules are properly understood and obeyed, but they cannot do so regularly because of other pressing duties demanding a large share of their time. For this reason there should be one competent man to supervise all examinations and to travel over the system as often as possible to see that his instructions are understood and are being observed. Instructions upon the air brake are of minor importance compared with train rules and orders. The examiner should call all employees in frequently and re-examine them to keep them brightened up. It is only by these means that the company will reap the full benefit of the expense of issuing a book of rules.

Two years ago this company installed a train dispatching system on its 90 miles of single interurban track between Buffalo and Erie, adhering to the steam railroad ideas as far as practicable. Our dispatching force consists of three men on eight-hour tricks, all of whom are steam road dispatchers with several years' experience. Our telephone system consists of a private dispatcher's wire and a commercial wire, both of which are cut in at all sidings. We have register stations located at all terminals and ends of double track; our telephone booths are lighted by electricity and in each booth is a locked box in which conductors deposit a copy of all orders received.

The double-order system on "31" blanks is the only system used by us, and must be personally signed by the conductor and motorman. The orders are copied by the conductor and repeated by both the conductor and the motorman, then the word "complete" and the time are given by the dispatcher. Our motorman must also thoroughly understand how to receive train orders. Handling train orders in this manner insures perfect safety in so far as the system is concerned. The results have been very gratifying because we have a lot of unusually careful men, who are examined and thoroughly instructed regarding both train orders and standard steam road rules, and they are not allowed to take charge of a train until they are thoroughly competent.

In handling trains in sections the usual steam railroad system is used, that is, green flags by day and green lights by night. The same orders are used, the conductor of the first section copying a sufficient number of orders to cover the sections of that train, his motorman repeating same to the dispatcher. The following sections repeat orders in turn to the dispatcher, receiving "complete" when the dispatcher is satisfied that the orders are understood by all concerned.

If one or more sections drop out at a non-register station, this fact is promptly reported to the dispatcher, who satisfies himself at once that the proper exchange of orders has been made. Then he immediately notifies all opposing trains that a section of a certain train has been represented to that certain point, but if a train displays signals for one or more sections to a given point and if it takes down the signals at that given point they notify the dispatcher and then proceed as a single train to destination. They must also, in all cases, stop opposing trains and advise them of their having displayed signals to that certain point. At all meeting points our trainmen are required to notify each other personally what train they represent.

When advance notice is given of special movements the dispatcher creates them as sections. When they are designed to run to non-register stations all opposing trains are given a copy of the section order. While this insures double safety, it also gives the dispatcher a chance to move special trains without delay.

*A paper presented at a conference called by the Public Service Commission, Second District, New York, Syracuse, Jan. 19, 1911.

This company is nearly ready to install a method which should add to the safety of running trains in sections. A box with lettered and numbered slides is to be placed in the front window of each car to indicate whether the car is the first, second or last section, or an extra. This is to be used in addition to the present signals. As another means of adding to the protection of such trains, I would suggest having a partly printed form which could be quickly filled in, giving notice of such movements to all opposing trains concerned. I always feel that in the movement of trains in sections the chance of accidents is greater than in any other movement, so no means should be spared to protect them.

I would recommend the placing of semaphores at points where substations are located in the vicinity of sidings and instructing the substation operators in the handling of train orders, etc. It is my opinion that better movement thus would be gained with a certain amount of safety added. This would especially protect trains which drop out at non-register stations, and, in cases of breakdowns of cars between stations, their meets could be advanced and serious delays averted.

At present we are inaugurating a freight system, which consists of a half dozen freight cars moved as extra trains. Inasmuch as it is a difficult matter to move extras through sections where work extras and other extra trains are constantly using the main track, I should like to see such trains placed on the timetable as second-class trains. This action would necessitate all irregular extras keeping clear, adding safety, giving better movement and requiring the issuance of fewer orders. The fewer orders the better, and in cases of wire trouble the cars will not be tied up. Then, again, regular schedule trains are seldom overlooked by trainmen.

Our work extras are manned by a train crew of three men. When they receive an order to protect against an extra after a certain time they are required to clear that extra five minutes, just as they would a regular train, unless where they are unavoidably detained; then they are to protect with a flag. The extra is also given a copy of the work extra's order. If an extra be given an order through the working limits of a work extra, the crew receives an order to protect. To do this the crew must send a flag ahead on a regular train until the work extra is reached, when arrangements are made to allow the extra to pass. When circumstances permit we create the extra as a section of a regular train through the working limits.

We have practically built and rebuilt our entire system with this system of handling our work trains. We have operated thousands of cars of slag, other ballast and material, the greater portion of which was handled in large-capacity steam railroad cars. We have also replaced and built bridges and we have as yet to hear the first complaint from our construction superintendents regarding our system.

The most dangerous proposition is the operation of snow plows on the interurban lines, because they are used only in storms and bad weather. We have used extra precautions to avoid accidents, employing the same thoroughly instructed crews as on our regular cars. We realize the danger of moving regular or extra trains in proximity to a snow plow, owing to the fact that during storms the snow plow is covered with ice and snow to such an extent that the headlight and markers often are practically useless, and in cuts or snowbanks the plow is liable to be stalled or derailed. In such cases there is only a short notice for the flag to protect properly. In other words, we practically block from siding to siding in extreme weather. I would suggest that when it is necessary to drop a flag the flagman be instructed always to go back to a stop, where the following train is more likely to observe the signal while looking to pick up passengers.

Trainmen on electric as well as on steam railroads occasionally forget their orders. As a reminder to the motorman that he has orders to fulfil, we are to have placed in each car, just above the motorman's order clip-board, a small red incandescent lamp. This lamp is to be turned on by the motorman as soon as he places an order in the clip, and it will remain lighted until the order has been fulfilled.

COLLISIONS ON INTERURBAN ROADS AND THEIR CAUSES *

BY E. F. PECK, GENERAL MANAGER, SCHENECTADY RAILWAY

There is no man here to-day who will not admit that railroading, be it steam or electric, is the most exacting and fascinating business in this busy world of ours; but there is one great and overwhelming obstacle to the complete happiness of railroad employees and that is the ever-present fear of accidents. The proper protection of passengers who are intrusted to our care is a duty that cannot be neglected. It must also be remembered that every person, be it man, woman or child, who rides on our cars is guaranteed insurance against accident. To some of our roads the cost of this insurance has been extremely heavy.

In order to bring this subject before you in a practical way it is my purpose to outline a series of accidents that have happened on interurban roads during the past few years and their causes.

On Sept. 21, 1910, a disastrous collision occurred on the lines of the Ft. Wayne & Wabash Valley Traction Company, resulting in the death of a large number of passengers. The cause of the accident was the fact that the crew operating a southbound extra car failed to make proper clearance, as required by the rules. Both employees had had proper training and instruction and were apparently fully qualified to perform the duties in which they were employed. They had not been overworked, the motorman not having been on duty the day before and the conductor having had nine hours' rest since his ten hours' labor on the previous day; prior to the accident they had been on duty only about three hours. They were given an order at Ft. Wayne to take car 303, southbound, to Bluffton, the order reading, "Run extra to Bluffton." They were fully aware of the rule and had passed written examinations as to the necessity of clearing regular trains by five minutes; the motorman himself had been operating regular train No. 56 northbound, with which they collided, so without doubt he was fully aware of the time of the northbound train at all of its points. By having the extra southbound train run at the speed of the "Limited" schedule the farthest south the crew could have got and properly cleared northbound train No. 56 was siding No. 105. This they overran and also ran past siding No. 106, meeting the northbound car at the point of a sharp curve, where the view was obstructed by a clump of trees. The southbound extra was operated at a speed of about 40 m.p.h. and the northbound regular at a speed of perhaps 20 m.p.h.

On Oct. 4, 1910, by overrunning a meeting point at Wall's Siding, near Staunton, Ill., a head-on collision occurred on the lines of the Illinois Traction System. This accident resulted in the death of 36 passengers, serious injury to 12 and minor injury to 15. It occurred at 3:38 p. m. on a curve at the foot of a grade two miles north of Staunton and one mile north of the meeting place and was due solely to the failure of the motorman to obey orders. The motorman in question was one of the oldest, most efficient, sober and careful employees in the service. He was noted for the care with which he executed train orders and there seems no tangible reason for his fatal, if not criminal, absent-mindedness.

Last summer a collision occurred on the lines of the Albany Southern Railroad during a period when considerable construction work was going on. This accident was due to one employee leaving a switch open so that one of the regular passenger trains collided with the rear-end of a work train which stood on a siding. In this particular case the blame was placed entirely upon two employees who failed to observe the rules of the company. The motorman in charge of the car could have seen the switch in sufficient time to avoid the accident had he noticed its position, and, of course, the party leaving the switch open was inexcusably negligent. Both of these men had been first-class employees up to the time of the accident.

*A paper presented at a conference called by the Public Service Commission, Second District, New York, Syracuse, Jan. 19, 1911.

On the night of Sept. 2, 1907, a serious rear-end collision occurred at a point known as stop No. 1 on the Albany division of the Schenectady Railway Company. This was on the night of Labor Day, when traffic was exceptionally heavy and cars were scheduled five minutes apart. The first car was stopped on signal at the above-mentioned point to pick up a number of passengers. Just as the motorman was starting his car the second car ran into the rear end, causing the death of 4 passengers and injuring 55. After a rigid investigation it was found that the first car was on schedule time and the motorman of the second car by his utter disregard of all rules was responsible for the accident. The Albany division of the Schenectady Railway Company is a double-track line through from terminal to terminal. The motorman who was responsible for the accident, before leaving Albany for Schenectady, knew that a car had preceded him five minutes, as he was in the terminal when the preceding car left. The first car was run as an accommodation, making all regular stops on signal between Albany and Schenectady. The motorman of the second car knew he might overtake the car ahead and should have used every precaution to prevent collision. He disobeyed the rules of the company in running ahead of his schedule and also failed to obey a slow-up order in effect.

Again on Oct. 9, 1909, on the Saratoga division of the Schenectady Railway Company another collision occurred; this resulted in the death of the motorman of the second car and injuries to passengers aboard both cars. After a careful investigation it was brought out that the motorman of the second car was running ahead of his schedule and was also violating a fog order which provided that a motorman who operated a car through fog banks or dark places where vision was obstructed should reduce the speed of his car so that he could stop within the length of his vision.

A serious head-on collision which resulted in a number of deaths occurred on the Washington, Baltimore & Annapolis Electric Railway. This accident happened on a single-track line between Naval Academy Junction and Annapolis. It was due to the failure of the crew of the westbound extra properly to take its siding to permit the regular eastbound train to pass.

My object in reviewing the accidents that have just been cited is to call your attention to the fact that without exception 80 per cent of the serious accidents which have happened on interurban electric roads have been caused by the frailty of human nature. In practically all the cases the rules were adequate and sufficient to prevent the mishap if the employees had performed their duty. Interurban collisions seldom are caused by faulty car equipment or defective roadbed, and, while it may be said that varying weather conditions often contribute to the causes of such collisions, yet the largest percentage is chargeable to lack of judgment on the part of crews or to the gross carelessness of the motormen. This at once brings up the question as to whether or not the trainmen whom we employ are sufficiently examined as to their mental qualifications and rigidly enough trained in obedience.

I was recently asked to investigate the school report of a 12-year-old boy on which the teacher had written the word "immature." The teacher stated that the child lacked the ability quickly to grasp the meaning of questions which were put to him. We found it was necessary to repeat the question several times before the mind of the child would fully grasp the facts. The child was not stupid, but simply lacked that elasticity of mind to act quickly when questions were put to him. The teacher on being asked as to what training was necessary to improve this condition immediately replied that giving the child some regular task to perform and holding him strictly responsible for its performance would have a tendency to improve his alertness. Is it not true that the railroads have many employees in their organizations who have minds that are immature, men who can perform thoroughly their ordinary duties, but who in case of emergency or where decisive action is necessary fail to respond quickly? It may be that the monotony of the labor of a motorman has a tendency to make his mind less alert.

Must we wait until some other terrible accident occurs to demonstrate the incompetency of the employee, or should we have some form of examination and practical tests to weed out men of this type? It would seem that we have an intricate problem to solve, one which might be classified as mental or human engineering. It is a question that involves not only the motorman and conductor but also the trainmaster and dispatcher.

The collision of interurban cars has been minimized to a certain extent by the installation of double tracks, improved dispatching methods and the use of modern block signals; but no matter how perfect the protective device and danger-proof appliances may be, as long as the forgetful or disobedient motorman is assigned to cars the preventive virtues of up-to-date railroad devices will amount to little. It is emphatically the man in charge of our cars to whom we must look for the prevention of collisions. He must obey his orders and be so trained that in case of emergency he can be trusted to use good judgment.

Another thing that would have a tendency to prevent collisions would be the enforcement of the present law or the enactment of new laws that would severely penalize negligence on the part of railroad employees. It seems to me unjust that employees who are the direct cause of death, personal injury and large property loss should be allowed to escape all responsibility for their acts and suffer only the loss of their positions.

WOOD PRESERVERS' ASSOCIATION

The seventh annual meeting of the Wood Preservers' Association was held in the Auditorium Hotel, Chicago, on Jan. 17, 18 and 19. President Walter Buehler, of St. Louis, was in the chair and F. J. Angier, of Chicago, the secretary, performed the duties of his office. The attendance was about 100, composed principally of railroad men or commercial men interested in methods of wood preservation. The discussions were technical to the art of wood preservation and were brought out by the following papers: "What Railroads Have Done for Forestry," by E. A. Sterling, of Philadelphia; "Impurities in Zinc Chloride," by C. M. Taylor, Port Reading, N. J.; "Piling of Timber," by J. H. Waterman, Galesburg, Ill.; "General Review of Timber Treating in This Country," by Walter Buehler, St. Louis; "Results with Treated Ties Along the South Atlantic Coast," by William A. Fisher, Wilmington, N. C.; "The Covering of Retorts," by R. W. Yarbrough, of Texarkana, Tex.; "Plants in the North and in the South," by Andrew Gibson, Brainerd, Minn.; "Grouping Timbers for Treatment," by W. F. Goltra, Cleveland, Ohio; "Penetrations from Different Amounts of Preservatives," by R. L. Allardyce, Texarkana, Tex.; "Prolonging the Life of Railway Cross Ties," by F. J. Angier, Chicago; "Treatment of Sawn and Hewn Ties," by H. J. Whitmore, Denison, Tex.; "Depths of Penetration with Different Amounts of Preservatives," by David Allerton, Madison, Ill.; "Benefits of the Annual Meetings," by William Townsley, Jr., Cleveland; "Withdrawal of Creosote from Wood by Subsequent Vacuum," by C. E. Chanute, of Chicago, and "General Review of Timber Treating in This Country," by John T. Logan, Texarkana, Tex.

This list of papers indicates the varied aspects of the art of wood preservation. It is the province of the Wood Preservers' Association to maintain a high standard of professional procedure in the work. One point brought out which may be of some importance to electrical men interested in the preservation of poles is that creosote penetrates farther into wood than the discoloration of the wood would indicate. Officers were elected as follows: President, John T. Logan, Texarkana, Tex.; vice-presidents, Andrew Gibson, of Brainerd, Minn.; R. J. Calder, Galveston, Tex., and D. Burkhalter, of Bradford, Pa.; secretary-treasurer, F. J. Angier, 1033 First National Bank Building, Chicago. The next annual meeting will be held in Chicago on Jan. 16 to 18, 1912.

TEMPORARY ORGANIZATION OF ILLINOIS ELECTRIC RAILWAYS ASSOCIATION

At a meeting of Illinois electric railway operators held at the Great Northern Hotel in Chicago on Jan. 19 temporary organization of the Illinois Electric Railways Association was effected. H. E. Chubbuck, vice-president executive of the Illinois Traction System, Peoria, was elected temporary president, and C. E. Flenner, auditor of the Aurora, Elgin & Chicago Railroad Company, Chicago, was elected temporary secretary. G. W. Quackenbush, traffic manager of the Illinois Traction System at Springfield, acted as temporary chairman of the meeting.

The names of the companies represented at the meeting and of the gentlemen present follow:

Chicago, Aurora & DeKalb Railroad Company, Aurora—Joseph O'Hara.

Chicago & Southern Traction Company, Chicago—W. B. Tarkington, Robert A. Barnett and Charles Oldenburg.

DeKalb, Sycamore & Interurban Traction Company, DeKalb—A. Norman.

Central Illinois Public Service Company, Mattoon—Marshall E. Sampsell and Charles H. Cox.

Chicago, Ottawa & Peoria Railway, Ottawa—A. E. Blackburn and H. J. Vance.

Sterling, Dixon & Eastern Electric Railway, Sterling—Henry S. Dixon.

Joliet & Southern Traction Company, Joliet—L. D. Fisher. Aurora, Elgin & Chicago Railway, Chicago—R. Breckinridge, B. E. Merriman, C. E. Flenner and J. W. Brown.

Illinois Traction System—C. F. Handshy, of Springfield; H. E. Chubbuck, of Springfield; G. W. Quackenbush, of Springfield, and J. D. Maynes, of Champaign.

Chicago & Joliet Electric Railway, Joliet—J. R. Blackhall, W. H. Heun and A. W. Jordan.

Springfield Consolidated Railway, Springfield, and Rockford & Interurban Railway, Rockford—A. A. Anderson.

East St. Louis & Suburban, East St. Louis, and Alton, Granite City & St. Louis Traction Company, Alton—C. F. Hewitt.

Elgin & Belvidere Electric Company, Chicago—W. L. Arnold.

Terre Haute & Western Railway, Paris—T. F. Grover.

Chicago & Milwaukee Electric Railroad, Chicago—E. E. Downs.

Galesburg & Kewanee Electric Railway, Kewanee—R. H. Haywood.

Mr. Quackenbush called the meeting to order, and Mr. Flenner acted as secretary. Mr. Quackenbush explained the purpose of the meeting, which was to form a permanent organization of the electric railway men of Illinois. He recited the history of the Interstate Electric Railway Association, formed in Illinois six years ago to act as a clearing house for interchange of mileage, and said that through lack of interest that association had virtually gone out of existence. The present organization is, in a way, a successor to it. On Dec. 1 last a preliminary meeting was held to form an association to embrace all the street railways, elevated railways and interurban railways in the State, and Messrs. Quackenbush, Fisher and Flenner were named as a committee at that meeting to issue a call for the present meeting.

C. D. Emmons, general manager of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., was introduced as representing the Central Electric Railway Association and made a plea to the Illinois men to join that association. He related its history and said that it had fifty-two member companies in Michigan, Ohio, Indiana and Kentucky, with a total mileage of 4000. Its scope is broad enough to take in other States, and the speaker urged the appointment of a committee to consider the matter of joining the Central Electric Railway Association. The latter, he said, would be perfectly willing to change its organization so that Illinois would have full representation. The Central Electric Railway Association holds meetings every two months, and if it be urged that there is no physical connection between the Indiana and Illinois roads

Mr. Emmons argued that that was also true in the case of some of the territories already served by member companies of the Central Association. He spoke of the advantages of the association's mileage book, which could be changed to embrace Illinois, and spoke of the good work done by his association's committees on standardization, insurance and carrying United States mail. The association's claim index bureau is also of great value for the prevention of fraud. The importance of the properties in Illinois was appreciated. At the same time Mr. Emmons thought that the Illinois men needed the support of the Interstate organization, especially as in a short time it is probable that the electric railways of Illinois and Indiana will be connected physically. The matter should be considered from a broad business point of view, and if the Illinois men would join there would be a strong electric railway association in the Central West only second to the national association.

F. I. Hardy, Fort Wayne, Ind., also spoke for the Central Association, directing his remarks particularly to the advantages of the Central Electric Railway Traffic Association. He spoke of the benefits of the common mileage book and also of the work of the standardization committee, the latter having been a great help in traffic relations of the various companies and a great incentive to the shipping of freight over different roads, so that now a shipment may be made from Toledo to Indianapolis, a distance of 270 miles, within twenty-four hours. Standard forms of tickets, standard passenger tariffs, through tickets, through checking of baggage, official classification books and uniform exception sheets are also some of the benefits which have accrued from the efforts of the Central Association. These advantages and also such details as excess baggage rates, milk tariffs and other results of concerted action have given the electric railways of the States mentioned prestige with the traveling public and with steam railroads. A permanent secretary and a central office are maintained.

A. A. Anderson, of Springfield, Ill., a former president of the Central Electric Railway Association, said the work of that association had been very beneficial, and he believed that the Illinois companies should consider seriously the desirability of affiliating with it.

Mr. Emmons added that the Central Association is about to issue an official interurban railway map of the territory which it covers, and also an official interurban guide. Illinois roads should be shown in both these publications. It was explained that the State work is taken care of by the State people, as the Central Association is exclusively an interstate association.

The matter of affiliating with the Central Association was discussed in executive session by the representatives of the Illinois companies, and it was decided to go ahead with the temporary organization of the Illinois association and take up the matter of possible affiliation later.

After an adjournment for luncheon Messrs. Blackhall, Handshy, Hewitt, Flenner and Tarkington, who had been named in the executive session as a committee to nominate a temporary president and secretary, reported the names of Messrs. Chubbuck and Flenner, and these gentlemen were elected, as stated above.

To get the new association in working order various committees were appointed, as follows:

Executive Committee—E. C. Faber, Chicago; A. A. Anderson, Springfield; C. F. Handshy, Springfield; M. E. Sampsell, Mattoon, and J. R. Blackhall, Joliet.

Constitution and By-Laws—George W. Quackenbush, Springfield; L. D. Fisher, Joliet, and T. F. Grover, Paris, Ill.

On Affiliation with the Central Electric Railway Association—H. J. Vance, Ottawa; Charles H. Cox, Mattoon, and B. E. Merriman, Wheaton.

Membership—W. L. Arnold, Chicago; Joseph O'Hara, Aurora, and R. Breckinridge, Chicago.

The companies represented at the meeting subscribed to the temporary organization, although some of the representatives did so with the proviso that their action was subject to formal approval by superior officers. The name "Illinois Electric Railways Association" was adopted, and the question of admitting

supply men was left to the committee on constitution and by-laws. After a general discussion and the adoption of a resolution of thanks to the representatives of the Central Electric Railway Association for their attendance adjournment was taken until 10 a. m. on Feb. 17, when a meeting will be held at the Great Northern Hotel, Chicago, to perfect the organization.

ANNUAL MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

At the annual meeting of the Central Electric Railway Association held at the Claypool Hotel, Indianapolis, Ind., on Jan. 19, 1911, officers for the ensuing year were elected as follows: President, E. B. Peck, vice-president Indianapolis Traction & Terminal Company, Indianapolis; first vice-president, W. S. Whitney, general freight and passenger agent Ohio Electric Railway, Springfield, Ohio; second vice-president, A. W. Brady, president Indiana Union Traction Company, Anderson, Ind.; treasurer, A. L. Neereamer, Indianapolis. The members of the executive committee elected for the year are as follows: H. A. Nicholl, C. N. Wilcoxon, J. H. Crall, T. C. McReynolds, C. L. Henry, George Whysall, R. A. Crume, F. W. Coen, E. F. Schneider, S. D. Hutchens, F. W. Brown, J. F. Jeys, M. J. Insull and A. A. Anderson.

The meeting was well attended by members of the association and 19 new members were elected to membership. The day's proceedings were not confined so closely to the reading and discussion of set papers as is ordinarily the case. During the morning session the report of the standardization committee was read and approved without discussion. The report was substantially as presented in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, page 70. In substance, the committee recommended the adoption of the automatic system of air-brake equipment for electric interurban railway service. Other recommendations made by the committee related to the desirability of adopting standard heights for bumpers on electric railway cars and the use of anti-climbers on the faces of bumpers.

President Whysall stated that as there were no members of the insurance committee in attendance at the meeting a report from this committee would be deferred until such time as definite action has been made by a similar committee appointed by the American Electric Railway Association. He also stated that owing to the absence of the members of the vigilance and membership committee no report would be forthcoming from that committee. He said that C. D. Emmons, chairman of this committee, was attending a meeting of the electric railway men of the State of Illinois at Chicago and endeavoring to get them to join the Central Electric Railway Association instead of organizing a new association for the State of Illinois. Later in the day the president received a message from Mr. Emmons stating that the Illinois men had perfected a temporary organization, but that a committee had been appointed to confer with the members of the Central Electric Railway Association to determine on what basis the railway men of Illinois could join forces with the Central association.

The paper read by C. G. Young, New York City, on "Logistical Basis of Valuations of Interurban Street Railways," which was published in abstract in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, page 115, opened up many new lines of thought regarding the relations that exist between the public and the public service corporations. Following the presentation of this paper a discussion prepared by F. Lavis, consulting engineer, of New York City, was read. An abstract follows:

In beginning his remarks Mr. Lavis asserted that most of the opponents of the policy of valuation started off with the argument that the value of the purely physical elements did not represent the value of the property. Of course it did not. One would hardly suppose that this could be put forward seriously, but it had been, not only once but frequently, and recently. The so-called intangible values must be considered

in making any valuation for the purpose of protecting the investor from the effects of improper inflation of capital, the public from the imposition of unjust rates, or to compel adequate service. In a determination of the real worth of a property a careful appraisal of the value of the physical elements must be the first step taken. The gross or net earnings, market values and amounts of stocks and bonds, etc., all had a certain weight, but the weight or value they had could not properly be determined without due reference to the physical value. If it were not for so many statements to the contrary, this would seem to be self-evident. Mr. Lavis favored decidedly the cost of reproduction as a basis for valuation, with unit prices based on a fair average for several years, although the Supreme Court of the United States had apparently decided that the original cost must be taken into consideration.

Mr. Lavis had been surprised in looking up some information on the subject of valuation to find a widespread objection among railroad men to valuation for any purpose whatsoever, but he believed that this was largely because they felt that they did not know how or by whom such valuations were to be made, or what use was to be made of the data after they were obtained. He believed that the valuations should be undertaken by the federal government if for only one reason, to get away from the almost insuperable difficulties incidental to division of the property of railroads at the State lines by the States themselves. If valuation was to be made a basis for rate regulation, such regulation should be of the aggregate rates, and the adjustment of individual rates should be left to the railroads themselves. There should be an understanding that the ascertainment of the value of the physical elements was simply an item of information for the use of the government authorities. Such valuation should be intrusted only to a thoroughly competent body of men, some of whom at least should be engineers, and all well qualified by training and experience in railroad affairs.

Mr. Lavis thought that the classification of the rate of return made by Mr. Young was admirable as a basis on which to start a consideration of the proposition. There must not, however, be any definite rate as the maximum. If one of the rates should be fixed as the amount which the operating company was to have all to itself the property should be allowed to earn as much more than this as it could and divide the extra amount in some equitable way with the State. No scheme would work which removed the incentive to continued improvement, and the only incentive which really counted was money.

It seemed to Mr. Lavis that it was incumbent upon the railroad men of the country to present their ideas of the controlling elements in valuation instead of lying back and saying that valuation was entirely useless and leaving it to the various commissions to say how it ought to be carried out and what ought to be done.

A. W. Brady, president of the American Electric Railway Association, stated that the paper read by Mr. Young was one of the most able and thorough treatises to which he had ever listened. He thought that it would be useless for the members of the association to endeavor to discuss all of the various commendable references made in the paper without a further opportunity to digest them. Mr. Brady believed that the fundamental subjects so carefully treated by Mr. Young were of the greatest importance to all electric railway men. The experiences during the past few years at Chicago and Cleveland, and those now being had at Detroit and Toledo and a few other large cities, made the questions of valuations, rate of return, securities, capitalization and operating expenditures of the greatest possible interest. The questions involved in Mr. Young's paper could not be solved in a year or in a quarter of a century. In the minds of a large part of the public to-day some public service companies had no right to live. This reflection of the mind of the public was due to a lack of knowledge of just what rights the companies had and what they were really trying to accomplish. The public had an idea

that public-service properties owned by independent interests must be treated differently from properties owned by companies engaged in other lines of work. Since railways enjoy certain public privileges they must expect some kind of regulation. There seemed to be a prevailing idea that the public service companies should be curtailed in their earning capacities in order that the properties should earn only a minimum rate of interest on the investment. Instead of giving the railways the same privilege of earning a fair rate of profit that is expected in other lines of business, the public seemed to think that they should not be allowed a free hand in the matter of developing their business to make a fairly good earning proposition. Mr. Brady cited the case of railroad projects which had been developed at a great expense in mountainous and sparsely settled districts. He stated that wherever financial men were induced to place their money in a proposition involving tremendous difficulties they should at least be allowed to expect to get a larger percentage on their money than they would if they were supporting a less speculative venture. He did not think that the American public should continue to expect financial men to place their money in projects without a chance of a fair interest return. He stated that a great deal of criticism had been directed toward the railroads because of the so-called "watered" stock. He did not believe that the electric railways of the United States need apologize for their "watered" stock, as this was the only means that was permissible to-day whereby the investor could get an adequate return on his money. He thought that the tentative percentages which Mr. Young laid down as a fair rate of return on invested capital formed a very commendable schedule, although he stated that the questions involved could not be discussed off-hand. He suggested that if careful study of the subject referred to was made by the railway men present, a very interesting discussion of the subject could be had at a future meeting of the association.

At the afternoon session Joseph A. McGowan, secretary and treasurer Terre Haute, Indianapolis & Eastern Traction Company, gave a pleasing impromptu talk on "Relation of the Common Carrier to the Public." After paying tribute to the members of the Central Electric Railway Association for the good work they had done in the past for the electric railways of the States which they represented, he said that the development of the electric interurban railways during the past 10 years, as compared with the development of the steam roads during the past 60 or 70 years, was next to marvelous. He believed that the progress made by the electric railways was due to a great extent to the close relations that had existed between the public and the railway companies and between the railway companies and their employees. He stated that if these pleasant relations should be continued he could see a great future for the electric railways, as, with loyalty and enthusiasm existing between the interests mentioned the public service companies would be able to accomplish great things. Because of the improvements that had been made in the means of transportation in the past he stated that we might well expect wonderful achievements to be accomplished during the next decade.

The report of the secretary and treasurer for the year 1910 was read. This report was published in last week's issue of this paper.

President Whysall took occasion to compliment the members who had given their hearty support on the various committees to which they were appointed during the past year. He stated that the work done during that period by the members of the Traffic Association was commendable. These men have met frequently to discuss matters pertaining to tariffs, etc., and although they had not been given, in many instances, a free hand to develop the ideas that had come to their attention they had accomplished a great deal of good for the industry in the Central States. He thought it was the duty of every railway company to give its best support to this association. He also expressed his gratitude to the members of the standardization committee who had worked conscientiously during the past year to bring about uniform standards in car equip-

ment. He recommended that the superior officers of railway companies should insist that the members of committees from their companies, appointed by the president of the Central Electric Railway Association, should attend all meetings of those committees. He also thanked Secretary Neereamer for the good work he had done during the past year.

After his election and upon being conducted to the chair President-elect Peck made a short address. He said he had noted in the report of the secretary that the association had lost one member company during the past year. He urged that every member of the association do everything possible to get this member back into the association during the coming year and with it several other companies which are not now members. He stated that he believed this association was the strongest and most successful of the State associations and that more than ever before could be done in the future for the benefit of the industry through close application and thorough co-operation of the members.

When called upon in behalf of the executive committee Martin J. Insull, general manager Louisville & Northern Railway & Lighting Company, recommended that a claim adjusters' association be organized as a part of the Central Electric Railway Association. He stated that there were several members of this association who had a national reputation because of their advanced ideas on matters pertaining to the equitable adjustment of claims. If such an association was organized he thought much good could be accomplished and the heavy drain now made on railway companies by unjust claims could be reduced materially.

James Anderson, general manager of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ontario, in a very pleasing address expressed the hope that the United States and Canada would have even closer trade alliance than at present. He thought this would be equally beneficial to the residents of both countries.

A. Shane, general manager Indianapolis, Columbus & Southern Traction Company, stated that the paper presented by Mr. Young earlier in the day suggested a line of thought regarding the valuation of properties that is serious to contemplate. He said the present agitation throughout the United States regarding the earnings of public carrying companies is unjust. He reviewed the history of railroads built in the United States. The men who financed the first railroads, with but few exceptions, lost all of the money they invested in the properties. He said that the people who have had their money invested in properties for the past few years are getting very small interest on their money and the physical value of the properties has depreciated largely. He stated that with but very few exceptions there are no first-class railway systems in the United States. The roads have been built and rebuilt from time to time to meet the existing demands for additional transportation facilities until the money originally invested has been replaced many times by investors. For this reason he thought that the complaints made against railroads for having so-called "watered" stock were far-fetched. Unless the investor could be assured that he would receive a fair percentage on the money invested it would be a difficult matter in the future to get the necessary money with which to make improvements. The future growth of the industrial world of the United States depends to a large extent on the maintaining of the credit of the carrying companies. He recommended that the electric railway companies keep the public well informed of the things they are doing. By thus educating the public and by being frank and open regarding company matters many of the troubles of the past can be eliminated and better conditions will result.

G. W. Parker, general express agent Detroit United Railway, stated that the interests of the railway companies could be better conserved by closer co-operation between the railway men and the public.

W. H. Evans, superintendent of motive power Indiana Union Traction Company, stated that the standing of the Central Electric Railway Association in the railway field is shown by the fact that several of the members hold important

offices in the American Electric Railway Association and in the past have originated many things that have resulted in good for the electric railway cause. He urged that the railway men of the Central States aid the committees of the American association materially in their work by replying promptly to requests for information sent out by the big association.

The next meeting of the association will be held at Columbus, Ohio, on March 23, 1911.

WISCONSIN ELECTRICAL ASSOCIATION AT MILWAUKEE

The Wisconsin Electrical Association convention, comprising representatives from the electric lighting and electric railway properties of the State, was called to order Wednesday morning, Jan. 18, at the Hotel Pfister, Milwaukee, by Vice-president George B. Wheeler, of Eau Claire, in the absence of President Clement C. Smith, who was detained from the sessions by illness. Nearly 100 members, including operating men and supply salesmen, were present. A commendable feature of the convention arrangements was the provision of identification tags bearing the inscription: "I am ——— (name), from———. My company is ———. Glad to meet you. Who are you?" with blanks for the insertion of names. At the special suggestion of Mr. Wheeler these tags were put on and worn by every member of the convention, including the older men, so that the younger and newer members might more easily become acquainted. The minutes of the summer meeting at Oshkosh and the secretary's report were presented by Secretary D. S. Allen, of Lake Geneva. It showed the association to be in a flourishing condition with more than \$1,000 deposited to its credit in bank and all bills paid.

PUBLICITY

Ernest Gonzenbach, of Sheboygan, read a paper on "Publicity Campaigns," in which he advocated carefully prepared advertising directed to the ultimate consumer of public-utility service. The good will of customers should be cultivated directly, without reverting to political middlemen for favors. The speaker discussed newspapers, company publications, billboards and street car cards for advertising purposes, and pointed out that in any case the material used must be exceedingly well-written and pungent to compel attention and be successful. He advocated the use of space in those newspapers of largest circulation, regardless of editorial policy or journalistic class, observing that the large number of the lower element of readers are quite as good public service customers as the so-called better class of citizens. When the newspaper's editorial policy is appreciative of the company it is well enough to use advertising space, said Mr. Gonzenbach, but the reasons are far greater for doing so if the paper is antagonistic, as carefully prepared rebuttals should then be employed to counteract unfavorable statements in the reading columns. Street car advertising should supplement the use of billboards, especially where the electric light company operates both utilities. The best advertising space in the cars should be retained for this purpose. Before closing, Mr. Gonzenbach deplored the actions of those public service managers who to secure peace at any cost submit to impositions from customers or interests. Such peace, without honor, and at the cost of self-respect, will never bring prosperity. The public admires a plucky fighter, and if it can be convinced that the corporation's position is sound and is undergoing attack from unworthy motives the offending elected representative will be thoroughly discredited and the contest result to the company's advantage.

W. H. Winslow, of Superior, spoke of the necessity for care in preparation of advertising matter, and Glenn Marston, of Chicago, urged that newspaper advertising should be undertaken only with the view of securing direct results from readers, avoiding any purpose of tribute. He advocated the use of copy prepared by experts who understand public sentiment, which tells its story directly and avoids technicalities. Mr. Marston recommended a policy of absolute frankness in public service management.

At the opening of the afternoon session a brief address was heard from T. F. Grover, former president of the association, now at Terre Haute, Ind., and telegrams of congratulation to the convention were read from Messrs. H. J. Gille, Minneapolis, Minn.; J. H. Harding, Los Angeles; D. C. Jackson, Boston, and Harold Almer, Chicago, all of whom were formerly identified with the association. A. W. Brady, president of the American Electric Railway Association, also telegraphed extending the national association's greetings and asking the co-operation of the Wisconsin men.

SOME PRINCIPLES ESTABLISHED BY THE WISCONSIN RAILROAD COMMISSION

Edwin S. Mack, of the law firm of Miller, Mack & Fairchild, Milwaukee, then presented an instructive and carefully prepared discussion of the "Principles Established by the Decision of the Wisconsin Railroad Commission." An abstract of his paper follows.

Mr. Mack first reviewed some of the principles established by the Wisconsin Railroad Commission regarding public utilities. Good service to the public was exacted by the commission, and if, upon investigation of a case, it was found that an increase of rates was necessary to enable good service to be rendered the commission was disposed to order an increase. The adjustment of rate cases involved study of many factors. From the gross earnings the operating expenses and taxes must be subtracted, while the rate of depreciation due to age and wear, the reasonableness of return, the correct principle on which the return was to be based and the percentages allowable for interest and profit must be determined. The costs must be properly proportioned among the various classes of service so that each should pay its share.

Mr. Mack said that the gross earnings and operating expenses were usually taken from the company's books and were verified by examination and study of the property in operation.

In considering the principal on which the return was to be based, Mr. Mack pointed out that different principles apply from those in the case of property having an open market value. The principal used might be taken as the funded debt or bond issue, plus the capital stock and investments. If it was necessary to appraise the tangible property its original cost, including additions, might be considered, or cost of reproduction new, or present value—that is, reproduction value minus depreciation. Added to this was the "service" value, engineering, etc., necessary to make up the integral parts of an efficient mechanism.

The "actual total investment" was generally taken as the basis for rate making when it could be shown that the expenditures had been prudent compared with the present value of the investment and that ordinary business sagacity had been employed. When excessive or imprudent investments, not commensurate with the value of service to the customer, had been made a corresponding reduction would be ordered in the principal amount. All values, whether gifts, surplus earnings or new capital, were considered as actual parts of the investment by the commission. The sale of bonds was recognized by the commission as the modern method of raising capital, and bond discounts were viewed as proper items of cost.

"Cost of going value"—that is, the expenditure necessary before the business reached a profitable condition, with organization perfected, customers connected and harmonious operation prevailing throughout its mechanism—was also regarded as an item of the investment. The "cost of going value" was computed by the commission by the method illustrated in the diagram published herewith. This shows the elements of the business during the first year, given over to construction; the second year, when partial operation began, and the following years, during which the business expanded normally until the income finally exceeded the costs and a profit was realized by the company.

Mr. Mack stated that interest at the rate of 6 or 7 per cent would be allowed on going value, the higher figure where the service was good and it could be shown that the plant was not built ahead of public needs or in an excessively expensive or unwise manner, that there were no present prospects of profits, or

that the past management had not been incompetent. Obviously according to the commission's doctrine, public utilities could retrieve errors or losses, as could be done by private enterprises. When a good return had been earned continuously from the beginning of work no cost of going value would be allowed by the commission.

When the investment in the property was not ascertainable or it became necessary to check or approximate such investment recourse was had to the appraisal of the elements of the property by the valuation staff of the commission. Added to the sum of the costs of the elements of the plant as appraised, a general allowance of 10 to 12 per cent was usually made for the expenses of combining the plant in "harmonious operation." Of the usual 12 per cent allowance, which applied to all but store supplies and paving, 5 per cent was credited to engineering, 4 per cent to interest during construction and 3 per cent to legal expenses, commissions and contingencies. In addition there had been allowed for stores and supplies, as part of the working capital, up to 1.5 per cent in some cases. The depreciation factors for getting present values were obtained from curve sheets issued by the commission, showing various rates of depreciation applicable to elements suffering different degrees of wear and obsolescence.

The commission had refused to place a capital value on "successful good judgment" employed in locating a site, allowing

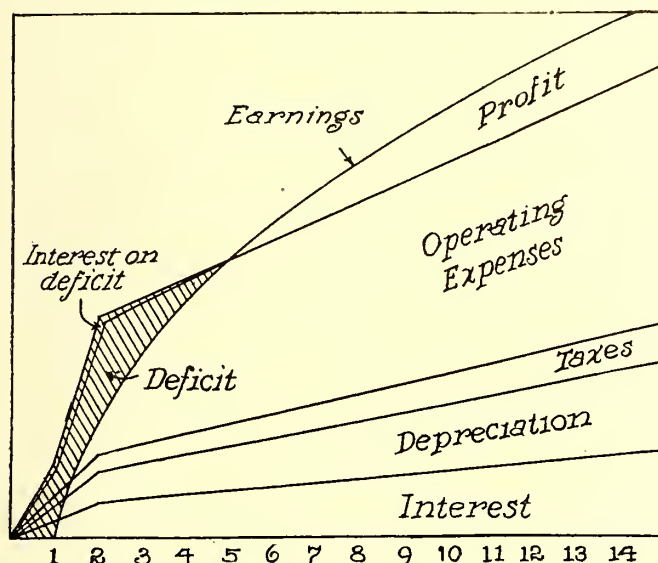


Diagram Showing Method of Computing "Going Value"

only for the amount of money actually expended in acquiring the site. Allowance was made for non-operating property held for reserve or emergency use, but not for discarded equipment or equipment held beyond plant requirements.

"Good will" as an element of public utility value was not recognized by the commission. Mr. Mack said that the commission held that this intangible asset, applicable to a private competitive business, did not hold in a public monopoly. Franchises were recognized as having value, but this value could not properly be considered for rate-making purposes, the commission had declared. The commission carefully distinguished the elements of interest and profit, decreeing for the first a reasonable rate of return on the investment, beyond which the surplus became profit. The commission frequently allowed 8 per cent, chiefly for electrical industries, while water companies were restricted to 7 per cent and sometimes 6 per cent. Municipal plants were limited to 4 per cent.

Mr. Mack added that there had been a tendency in Wisconsin to lose sight of the parts of a business in consideration of the whole, although this, of course, was contrary to cost distribution methods. The cost of service was generally held to control the rate to be charged, although this had been modified in the case of small customers so as to enable them to secure service at a cost which should not be prohibitive.

Following the presentation of Mr. Mack's paper, State Senator G. B. Hudnall, of the Wisconsin Legislature, was introduced to the convention as "the father of the public utility commission law of Wisconsin." He remarked that the success of the act had been due to the high personnel of the commission and to the co-operation of the companies themselves.

BUSINESS MEETING

A new constitution for the Wisconsin association was presented by Irving P. Lord, of Waupaca, chairman of the constitution committee, and was ratified by the convention after a brief discussion. The committee on affiliation with the National Electric Light Association, consisting of P. H. Korst, of Jancsville; L. L. Tissier, of De Pere, and W. R. Putnam, of Marinette, reported against such affiliation owing to the difference in eligibility rules and the resulting possible exclusion of valuable members from the local association. Co-operation in every way with the national association was recommended by the committee.

BANQUET

The association dinner was held Wednesday evening in the Red Room of the Hotel Pfister. Acting-president G. B. Wheeler introduced as toastmaster C. N. Duffy, of Milwaukee. This genial gentleman, between appropriate introductory remarks of his own, called upon F. C. Bolles, Milwaukee; C. M. Axford, Chicago; I. P. Lord, Waupaca; Professor Breckenridge, of Yale University; Oliver C. Fuller, banker, Milwaukee, and Prof. Shailer Matthews, of the University of Chicago, all of whom responded in humorous vein. The address of Professor Matthews, however, included also a more serious and contemplative view of the changes under way in industrial conditions and their significance. The increasing personal consideration granted employees, the responsibilities of capital and wealth, and the hopeful signs for the future of business and industry directed by trained men were some of the subjects discussed in this talk.

ELECTRIC LIGHTING SUBJECTS

Thursday morning's session was opened by A. J. Goedjen, superintendent of tests for the Milwaukee Electric Railway & Light Company, with a paper on "Meters and Meter Testing." Mr. Goedjen's paper was discussed by J. M. Cadby, meter expert of the Wisconsin commission; I. M. Lord, E. Gonzenbach, Prof. C. M. Jansky, of the University of Wisconsin; Mr. McNaughton and H. G. Nutting, of Fort Atkinson.

Frank A. Cannon, secretary of the Citizens' Association of Milwaukee, appeared before the association to enlist its sanction and co-operation for an electrical show to be held at the Auditorium in Milwaukee next January, following the Chicago show. C. M. Axford, of Chicago, also read a paper on "Ornamental Street Lighting" discussing electricity as an advertising medium. M. C. Ewing, of Wausau; R. M. Kimball, of Kenosha, and C. N. Duffy, of Milwaukee, also recounted their own companies' experiences with special lighting.

REPAIR SHOP PRACTICE

At the afternoon session W. J. Kelsh, master mechanic and chief engineer of the Eastern Wisconsin Railway & Light Company and the Wisconsin Electric Railway Company, Oshkosh, read a paper on "Electric Railway Repair Shop Practice." An abstract of this paper was published on page 122 in the ELECTRIC RAILWAY JOURNAL for Jan. 21. W. H. Stevenson, Chicago, commenting on the costs of car repairs given by Mr. Kelsh's paper, pointed out that the overhead items of heat, light, rental, etc., were omitted, and that these items would increase the figures by 20 per cent to 30 per cent. A 38-ft. car, he said, could be painted and finished for \$120. While this figure includes the cost of removing old paint, this is offset by the resulting filled condition of the wood, which avoids the use of several first coats of fillers.

Mr. Kelsh said about 2.5 gal. per coat would be required for a 38-ft. interurban car, while 1 gal. per coat was needed for an 18-ft. car. A single-truck car can be scraped, cleaned, painted and released from the shop in 15 days, three men working alternately on two cars.

J. C. Justensen, of Wausau, told of the method used to

keep his commutators in good shape where his cars are required to make 400 miles a day. Once a week each car is run back and forth on a three-block length of track near the barns while one of the crew holds a piece of grindstone against the commutator. By this method the commutators need truing only once in three years.

Mr. Mullet, of the Milwaukee system, said this scheme had been used without success on the commutators of single-phase motors on 80,000-lb. cars operated by his company, but that the commutator required turning every three months. Emery shoes, he said, enabled wheels to show service of 180,000 miles before being trued.

Mr. Kelsh advocated the slotting of commutators now that efficient tools are available. The early method was to mount the armature in a lathe and then with a narrow tool bolted in the tool rest to plow along the slot by manipulating the carriage feed back and forth several times. This was a tedious task, but the modern tools enable the mica to be undercut quickly by a little motor-driven saw. Mr. Kelsh also said that 50 per cent more babbitt metal was required with oil than with grease.

INSURANCE

C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, discussed the subject of "Insurance," recounting the experience and policy of the Milwaukee company. After referring to the excessive insurance rates generally charged on central station and electric railway properties, in spite of modern construction methods. Mr. Duffy pointed out that the subject of insurance affects railway properties more than electric lighting companies on account of the former's large proportion of perishable properties in car stocks. In 1908 the Milwaukee company expended \$15,000 in carrying out changes in its car houses recommended by the insurance inspectors, including the institution of fire drills, approved storage of oils and paints, cleaning of pits and concealed spaces, lowering of trolleys in car houses, provision of waste cans, extinguishers and sprinklers, etc. These changes at a cost of \$15,000 secured a reduction in rate from \$1.40 to \$1 per \$100, involving a yearly saving on \$2,000,000 of the difference between \$28,000 and \$20,000 for the Milwaukee city lines car-barn property. The placing of this insurance is divided among all of the Milwaukee agencies, following a policy established by Mr. Beggs a number of years ago. No insurance is carried on the fireproof Public Service Building or the two power plants of the company. The Milwaukee company has instituted a fire-insurance reserve of \$500,000, the 5 per cent annual interest on which, \$25,000, goes back to the fund. Five-eighths of 1 per cent of the gross earnings of the company are also credited to the fund in monthly instalments, after paying the current insurance premiums. The ability of the company to carry its own insurance risk if necessary probably exerted a potent influence in obtaining the reduction which the insurance companies finally consented to give. Mr. Duffy advocated the display of consideration and reasonableness by both electric companies and insurance agents in securing the desired decrease in rates on electric properties.

A. K. Ellis, of Appleton, explained how, by the expenditure of several hundred dollars in carrying out recommendations, his company had secured a rate reduction from \$1.84 to \$1.50. R. M. Kimball, of Racine, said that in the case of the first fire his company sustained under classified insurance rates the company was forced to share the loss with the insurance people. Later he insisted on a blanket rate, without classification, and when the second fire occurred the adjustment was a satisfactory and simple matter. F. A. Hecker, of Antigo, told of a reduction from \$2.50 to \$0.80 secured by rebuilding the plant.

Mr. Douglass, commercial engineer of the Milwaukee company, deplored the often too literal interpretation of insurance ruling without individual judgment, citing a case where a 500-volt motor in the center of a foundry where molten metal was poured was required to be inclosed in a brick compartment for "fire-protection reasons."

PUBLIC SERVICE COMMISSIONS

John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light Company, was called upon for a brief address, and urged co-operation between the public utility corporations. Such mutual assistance, he said, is especially needed by the smaller companies which cannot afford to employ specialists in their technical, accounting and operating departments. Mr. Beggs spoke of the fair treatment received by the companies from the Wisconsin commission in spite of public clamor, and declared that proper principles, resolutely adhered to, would in the end win out. Mr. Beggs was warmly applauded.

ELECTION OF OFFICERS

A special committee on street lighting was appointed, consisting of Messrs. Winslow, Ewing and Axford. The selection of officers made by the nominating committee, Messrs. Gonzenbach, Vallier and B. G. Broad, was unanimously approved by the convention and the following officers were declared elected: President, George B. Wheeler, Eau Claire; first vice-president, Irving P. Lord, Waupaca; second vice-president, R. M. Kimball, Kenosha; secretary-treasurer, George Allison, Milwaukee.

ELECTRIFICATION DISCUSSED AT NEW ENGLAND STREET RAILWAY CLUB MEETING

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on the evening of Jan. 19, with President C. H. Hile in the chair. After the usual dinner and election of new members, President Hile pointed out the difficulties in transportation which arise from the growing tendency of modern population to concentrate in large urban centers during the daylight hours and practically to desert the business areas at nightfall. He touched upon the objectionable features of the steam locomotive and cited the electrification of terminals as a tendency likely to grow more and more important as time passes. He then introduced as the speaker of the evening Lee H. Parker, of the Stone & Webster Engineering Corporation, Boston, Mass., who read an extended paper on "The Electrification of Railroad Terminals."

Mr. Parker pointed out that the entire steam railroad organization of the present day is specially trained on the basis of operation by the steam locomotive and that there is naturally great inertia to be overcome before the acceleration of service possible with electrified operation can be realized. These great systems of transportation are firmly entrenched as going concerns; they have acquired great momentum, as it were, along existing lines, and some powerful economic force is required to produce such a radical change as electrification would involve. To have railroads at once throw aside their steam equipment and organization and adopt the electric motor car and locomotive with all their auxiliaries immediately after it was found possible to move trains electrically simply because it was a cleaner and quieter method was too much to expect. The public little realizes the magnitude of the additional capital expenditures involved and the so far apparent inadequacy of the savings through electrical operation to offset the increased fixed charges.

After giving an extended list of single-phase, direct-current and three-phase electrified steam roads, with data as to the mileage, line voltage employed, number of motor cars and electric locomotives and a table of similar data relating to the principal elevated railway lines in this country, the salient features of the New York Central and New York, New Haven & Hartford electrifications at New York were reviewed. Mr. Parker pointed out that if there are any important instances where steam has superseded electricity they are yet to be made public. As the different systems of electric traction are being developed we are gradually learning the kind of service for which electricity is especially fitted. The relative economy of the different systems depends on the headway and spacing of trains, the size or weight of the trains, profile of the line.

distance between stops, slow downs and schedule speed required.

Mr. Parker submitted an interesting table showing the comparative cost of equipment and operation of an interurban road having a practically level track with a few easy curves, with the 6600-volt a.c. system, the 1200-volt d.c. system and the 600-volt d.c. system.

TABLE OF COSTS OF CONSTRUCTION AND OPERATION.

Cost per mile of road, typical single-track interurban railway. Single 50-ft. cars, hourly headway, normal service, half-hourly headway, maximum. Catenary trolley, 80-lb. rail; schedule speed, 30 m.p.h.; maximum speed, 45 m.p.h.; stops, one in 2 miles; seating capacity of cars, 54; no baggage compartment, separate baggage and express cars.

	6600-volt a.c.	1200-volt d.c.	600-volt d.c.
Temporary construction.....	\$250	\$250	\$250
Power station.....	2,900	2,700	2,700
Transmission line.....	1,000	1,000	1,000
Telephone line.....	100	100	100
Substations.....	270	1,300	1,800
Catenary trolley.....	2,800	2,800	2,800
Track and roadbed.....	17,500	17,500	17,500
Copper feeder.....	575	575	1,100
Rolling stock.....	4,300	2,800	2,400
Car house and office.....	1,000	1,000	1,000
Organization, eng'g., etc.....	7,530	7,506	7,662
Total	\$37,650	\$37,531	\$38,312

Cost of operation, maintenance, general expense per mile per year; total mileage of all rolling stock, 16,800; power cost, 1.5 cents per kw-hour, including maintenance of power station:

	6600-volt a.c.	1200-volt d.c.	600-volt d.c.
Wages, trainmen.....	\$400	\$400	\$400
Car house expense.....	50	50	50
Cost of power.....	700	620	620
Attendance substations.....	120	120	240
Maintenance of cars.....	335	250	245
Maintenance, substations.....	5	20	40
Maintenance, track and roadway.....	320	300	300
Maintenance, electric lines.....	60	60	60
General expense.....	1,000	1,000	1,000
Total	\$2,870	\$2,820	\$2,955
Per car mile.....	17c	16.8c	17.6c

With 2-car train operation the initial costs were \$17,219 for the 6600-volt a.c. system per mile, \$46,962 for the 1200-volt d.c. system, and \$18,200 for the 600-volt d.c. system. The costs of operation, maintenance and general expense were respectively figured at \$3,990, \$3,800 and \$3,950, or 23.7 cents, 22.6 cents and 23.5 cents per train mile.

In conclusion, Mr. Parker reviewed the recent reports to the Joint Commission on Metropolitan Improvements made by the steam railroads entering Boston on the subject of electrification, giving the estimated costs of the work as determined by the railroad companies. He pointed out that if the electrification should be begun in 1911 and finished in 1915, and if at that time, according to the trend of curves given in the reports, there should be handled a total of 60,000,000 passengers at the North and South Stations in Boston, there would be a total of 600,000,000 passenger miles per year if the average length of the journey on the electrified zones were 10 miles. Assuming the fixed charges and depreciation on the estimated cost of \$40,000,000 to be 11 per cent (interest on bonds, 4.5 per cent; sinking fund interest, 4 per cent; taxes and insurance, 1.5 per cent), then the annual fixed charges of \$4,400,000 would probably be met by a terminal charge on each ticket sold. This would amount to nearly $\frac{3}{4}$ cent per passenger mile, or an increase of not far from 50 per cent to 80 per cent on the present suburban fares. Mr. Parker quoted the increased fares charged by the Pennsylvania Railroad for suburban tickets as an example of the tendency of railroads to make passengers pay for improvements in whose benefits they share. Vice-president A. H. Smith's warning to the Joint Commission that the public should be expected to meet the expense of maintaining an electrified service was also cited.

In closing, Mr. Parker stated that the cost of electrification at Boston might be somewhat reduced by proper credits for equipment released and by the purchase of electricity from either the Boston Edison Company or the Boston Elevated Railway Company. It looks as if Boston, like Chicago and several other large cities, will have to wait a long time before its railroads can be compelled to or will voluntarily electrify. Perhaps the situation will stimulate the building of high-speed interurban roads on private rights-of-way outside and in subways inside large cities. They could make money handling from 10,000,000 to 15,000,000 suburban passengers per year. The day may come when all through freight and passenger steam traffic will be stopped at terminal points 5 miles or 10

miles outside the city limits and the passengers and freight transshipped to all parts of the city proper over the urban transportation system by electric cars, locomotives, taxicabs and auto-trucks on city thoroughfares. The existing steam road tracks could be leased to the city transportation company for use in combination with its existing equipment. Such an arrangement would effectually rid the city of smoke, dust, cinders and the noise incident to steam operation.

COMMITTEES OF THE AMERICAN ELECTRIC RAILWAY TRANSPORTATION & TRAFFIC ASSOCIATION

President Henry C. Page of the American Electric Railway Transportation & Traffic Association has announced the following committees of that association for the present year:

JOINT COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTING

P. P. Crafts, co-chairman, general manager, Iowa & Illinois Railway, Davenport, Ia.

W. S. Whitney, general freight and passenger agent, Ohio Electric Railway, Springfield, Ohio.

Geo. H. Harris, manager railway department, Birmingham Railway, Light & Power Company, Birmingham, Ala.

Walter Shroyer, co-chairman, auditor, Indiana Union Traction Company, Anderson, Ind.

E. L. Kasemeier, auditor, The Ohio Electric Railway, Springfield, Ohio.

J. C. Collins, secretary and auditor, New York State Railways, Rochester, N. Y.

COMMITTEE ON CONSTRUCTION OF SCHEDULES AND TIMETABLES

(For city roads.)

N. W. Bolen, chairman, superintendent of transportation, Public Service Railway, Newark, N. J.

Timothy Connell, timetable clerk, Boston Elevated Railway, Boston, Mass.

J. H. Van Brunt, vice-president and general manager, St Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

F. L. Hubbard, secretary to the general manager, Toronto Railway Company, Toronto, Ont.

(For interurban roads.)

J. J. Doyle, general superintendent, Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.

F. Hardy, superintendent of transportation, Fort Wayne & Wabash Valley Traction Company, Lafayette, Ind.

B. E. Merwin, superintendent of transportation, Aurora, Elgin & Chicago Railroad, Wheaton, Ill.

I. H. McEwen, superintendent, Oneida Railway Company, Utica, N. Y.

COMMITTEE ON TRANSFERS AND TRANSFER INFORMATION

M. R. Boylan, chairman, general auditor, Public Service Railway, Newark, N. J.

F. T. Wood, assistant to general manager for receivers, Metropolitan Street Railway Company, New York.

T. C. Cherry, superintendent, Utica & Mohawk Valley Railway, Utica, N. Y.

E. D. Hibbs, general superintendent, United Railroads of San Francisco, San Francisco, Cal.

Bruce Cameron, superintendent of transportation, United Railways of St. Louis, St. Louis, Mo.

J. V. Sullivan, general supervisor, Chicago Railways, Chicago, Ill.

COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC

H. E. Reynolds, chairman, assistant general manager, Boston & Northern Street Railway, Boston, Mass.

Chas. F. Berry, general manager, Portland Railroad, Portland, Maine.

Geo. W. Quackenbush, traffic manager, Illinois Traction System, Springfield, Ill.

F. W. Watts, general freight agent, Utica & Mohawk Valley Railway, Utica, N. Y.

COMMITTEE ON PASSENGER TRAFFIC

L. D. Pellissier, chairman, secretary, Holyoke Street Railway, Holyoke, Mass.

F. G. Buße, manager of publicity, Illinois Traction System, Champaign, Ill.

J. E. Gibson, general superintendent, Kansas City Railway & Light Company, Kansas City, Mo.

T. A. Cross, general manager, United Railways & Electric Company, Baltimore, Md.

E. C. Hathaway, general manager, Norfolk & Portsmouth Traction Company, Norfolk, Va.

Frank Caum, general manager, Scranton Railway Company, Scranton, Pa.

COMMITTEE ON TRAINING OF TRANSPORTATION EMPLOYEES

G. O. Nagle, chairman, general manager, Wheeling Traction Company, Wheeling, W. Va.

M. J. Feron, superintendent of transportation, Metropolitan West Side Elevated Railway, Chicago, Ill.

W. H. Douglass, general superintendent, Northern Ohio Traction & Light Company, Akron, Ohio.

C. A. Sylvester, general manager, Middlesex & Boston Street Railway, Newtonville, Mass.

C. B. Wells, superintendent of transportation, Denver City Tramway, Denver, Col.

C. S. Krick, superintendent, Pennsylvania Tunnel & Terminal Railroad, New York, N. Y.

COMMITTEE ON INTERURBAN RULES

J. W. Brown, chairman, superintendent of transportation, Aurora, Elgin & Chicago Railroad, Wheaton, Ill.

F. A. Boutelle, superintendent of transportation, Tacoma Railway & Power Company, Tacoma, Wash.

W. R. W. Griffin, general manager, East Liverpool Traction & Light Company, East Liverpool, Ohio.

C. F. Handshy, general superintendent interurban lines, Illinois Traction System, Springfield, Ill.

W. H. Collins, general manager, Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

A. S. Shane, general manager, Indianapolis, Columbus & Southern Traction Company, Columbus, Ind.

F. M. Durbin, general manager, operating department, J. G. White & Company, New York, N. Y.

COMMITTEE ON CITY RULES

H. W. Fuller, chairman, general manager, Washington Railway & Electric Company, Washington, D. C.

D. A. Hegarty, general manager, Little Rock Railway & Electric Company, Little Rock, Ark.

F. I. Fuller, vice-president, Portland Railway, Light & Power Company, Portland, Ore.

M. C. Brush, assistant to vice-president, Boston Elevated Railway, Boston, Mass.

C. B. Buchanan, superintendent of railways, Virginia Railway & Power Company, Richmond, Va.

Marshall M. Phinney, president, Northern Texas Traction Company, Boston, Mass.

COMMITTEE ON SUBJECTS

J. N. Shannahan, chairman, vice-president and general manager, Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.

J. K. Punderford, general manager, Connecticut Company, New Haven, Conn.

H. M. Beardsley, acting general manager, Elmira Water, Light & Railroad Company, Elmira, N. Y.

JOINT COMMITTEE ON BLOCK SIGNALING FOR ELECTRIC RAILWAYS

C. D. Emmons, co-chairman, general manager, Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.

J. N. Shannahan, vice-president and general manager, Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.

D. H. Lovell, superintendent, West Jersey & Seashore Railroad, Camden, N. J.

J. M. Waldron, co-chairman, signal engineer, Interborough Rapid Transit Company, New York, N. Y.

John Ross, assistant superintendent of tracks, Detroit United Railways, Detroit, Mich.

G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind.

COMMITTEE ON ASSOCIATE MEMBERSHIP

W. L. Wood, Jr., secretary, treasurer, general manager and purchasing agent, Texarkana Gas & Electric Company, Texarkana, Ark.

J. E. Duffy, superintendent, Syracuse Rapid Transit Railway, Syracuse, N. Y.

W. I. Sturtevant, manager, Everett Railway, Light & Water Company, Everett, Wash.

Duncan McDonald, manager, Montreal (Que.) Street Railway.

C. D. Emmons, general manager, Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.

M. J. Feron, superintendent of transportation, Metropolitan West Side Elevated Railway, Chicago, Ill.

Thomas A. Cross, general manager, United Railways & Electric Company, Baltimore, Md.

W. J. Jones, president, Austin Electric Railway, Austin, Tex.

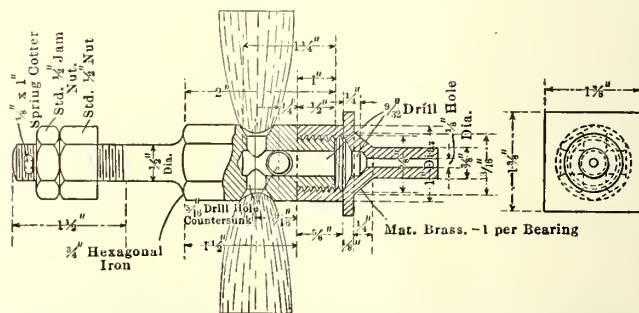
T. W. Passailaigue, superintendent railway division and traffic manager, Charleston Consolidated Railway & Lighting Company, Charleston, S. C.

C. H. Burnett, manager, Los Angeles & Redondo Railway, Los Angeles, Cal.

H. C. Page, general manager, Worcester Consolidated Street Railway, Worcester, Mass.

CHANGE IN BROOKLYN INTEGRAL OIL CUP

The Brooklyn Rapid Transit System has recently made a change in the oil feeder post of the integral type babbitted oil cup for Westinghouse 81 motors from the construction shown in Fig. 2 on page 83 of the *ELECTRIC RAILWAY JOURNAL* for Jan. 14. As shown in the accompanying drawing, the post is now built in two parts to permit the wicking to be inserted



Oil Feed Attachment for Motor Bearings with Babbitted Oil Cups

before installation in the oil cup. Ninety-two strands 4 in. long are placed in each hole for the armature bearings and 112 strands 4 in. long are placed in each hole for the axle bearings. The brass casting into which the feeder post is screwed is babbitted into the bottom of the cup. The dimensions shown are not always the same, as this construction is used on Westinghouse 68, Westinghouse 81 and GE-57 motors.

Bion J. Arnold has had conferred upon him by the University of Nebraska the honorary degree of doctor of engineering. Mr. Arnold began his higher education in the university which has thus tendered to him the highest degree within its command, completing his technical training in the East. In 1884 he achieved his B. S. from Hillsdale College, Mich.; in 1887 M. S., and two years later M. Ph. from the same institution. The University of Nebraska conferred on him the degree of E. E. in 1898, and in 1907 the Armour Institute gave him the honorary degree of D. Sc. Mr. Arnold received a "diploma extraordinary" in 1907 from Hillsdale College for distinguished learning and achievements in invention and in mechanical and electrical engineering.

COMMITTEE MEETINGS ON JANUARY 25 IN NEW YORK

The conferences held in connection with the annual mid-year meeting of the American Electric Railway Association began on Jan. 25, at the New York headquarters of the association. Sessions of committees of the parent body and of the affiliated associations were also scheduled for Jan. 26 and Jan. 27. The meetings were to conclude with a banquet tendered to the visiting delegates on Friday night, Jan. 27, at the Hotel Astor, by the Manufacturers' Association. An account of the committee meetings held on Wednesday, Jan. 25, is given in the following paragraphs:

COMMITTEE ON STANDARD CLASSIFICATION OF ACCOUNTS

The committee on standard classification of accounts and form of report of the Accountants' Association met to consider questions pertaining to the uniform system of accounts. The following members of the committee were present: W. F. Ham, Washington, D. C., chairman; H. L. Wilson, Boston, Mass.; W. H. Forse, Jr., Anderson, Ind.; W. B. Brockway, New York, N. Y. F. E. Smith, of Chicago, Ill., was unable to be present. The Interstate Commerce Commission was represented by F. W. Swecney, examiner, and by A. H. Morrow, of the Bureau of Statistics and Accounts. The meeting was held for the consideration of all questions which have been raised in reference to the uniform system since the publication of Bulletin No. 5 of the series issued by the Interstate Commerce Commission, relating to the questions and answers upon the accounts for electric railways. Between ninety and one hundred new cases were before the committee. It is expected that the decisions in the cases will be published soon.

CLAIM AGENTS' MEETING

A joint meeting of the executive committee and of the index bureau committee of the Claim Agents' Association was held on Wednesday afternoon. The following members were present: H. V. Drown, president, general claim agent Public Service Railway; H. K. Bennett, first vice-president, claim agent Fitchburg & Leominster Street Railway; H. R. Goshorn, general claim agent Philadelphia Rapid Transit Company, proxy for C. A. Avant, second-vice president, claim agent Birmingham Railway Light & Power Company; W. F. Weh, claim agent Cleveland Electric Railway, proxy for W. S. Heaton, third vice-president, claim agent Los Angeles-Pacific Railway; R. E. McDougal, claim agent for the Utica & Mohawk Valley Railway, executive committee proxy for J. H. Handlon, claim agent United Railroads of San Francisco; William Tichenor, executive committee member, claim agent Terre Haute, Indianapolis & Eastern Traction Company; S. W. Baldwin, claim agent Connecticut Company, executive committee proxy for James R. Pratt, claim agent United Railways & Electric Company, Baltimore; B. B. Davis, secretary, claim agent Columbus Railway & Light Company.

Four subjects were chosen for discussion at the next convention. The nature of these subjects will be announced later in a circular to the member claim agents in connection with an account of the committee proceedings. The secretary was instructed to notify the members designated to write the papers and also to send a circular to the member companies requesting that the claim agents who attend the convention be prepared to discuss these papers. It was decided to eliminate the question box at the 1911 convention, but the renewal of this feature will be left to the pleasure of that convention. The executive committee then discussed a report on the Hooper-Holmes index bureau and expressed itself as thoroughly in accord with the arrangements now in operation between that bureau and the American Electric Railway Association. President Drown said that the answers hitherto made by the claim agents to inquiries were satisfactory, and he hoped that they would keep on sending in good reports of accidents to increase the efficiency of the bureau. After discussing several minor subjects relating to claim agents' work, the meeting adjourned.

COMMITTEE ON SCHEDULES AND TIMETABLES

The meeting of the committee on construction of schedules

and timetables of the Transportation & Traffic Association was attended by the following: N. W. Bolen, Newark, N. J., chairman; J. J. Doyle, Baltimore, Md.; Isaac H. McEwen, Oneida, N. Y.; Timothy Connell, Boston, Mass., and F. L. Hubbard, Toronto, Ont. H. C. Donecker was made secretary of the committee. Mr. Bolen read a memorandum of subjects suggested for the consideration of the committee by the executive committee of the Transportation & Traffic Association. It was recommended that the terms "tripper" and "extra" be defined; that the different methods by which companies determine the schedule speed of cars be investigated; that the subject of methods by which men are relieved for meals be considered; that inquiries be made as to the extent of adoption of the revolving extra list, and that a complete report be made regarding schedule and timetable matters affecting inter-urban lines.

It was decided by the committee that the subject of definition of terms was one of the most important to be considered. Definitions will therefore be framed concerning tripper, schedule, timetable, extra, patches, run, special, run guide, run number, train number, block number, assignment sheet, train, run back and car. It was pointed out that the committee on interurban rules has adopted a number of definitions, including one for "timetable," as follows: "The authority for the movement of scheduled trains subject to the rules. It contains the classified schedules of trains with special instructions relating thereto."

The committee discussed the terms to be defined and various subjects concerning which information will be compiled for the report to be made at the next annual meeting. A data sheet containing questions in reference to the research work of the committee will be sent to member companies.

COMMITTEE ON TRANSFERS AND TRANSFER INFORMATION

The committee on transfers and transfer information of the Transportation & Traffic Association met Wednesday at 2:30 p. m. Those present were: M. R. Boylan, chairman, Newark, N. J.; F. T. Wood, New York City; T. C. Cherry, Utica, N. Y.; Bruce Cameron, St. Louis, Mo., and Joseph V. Sullivan, Chicago, Ill. The chairman read the instructions of the executive committee which were to govern the work of the committee. They were, briefly, to consider the question of transfers in connection with prepayment car operation, to determine the percentage of waste due to dating transfers or to using transfers on which the date is punched out before the conductor's period of service begins, and the investigation of the transfer laws of different States. These subjects were carefully canvassed by the committee and a program was partially adopted for submission to the executive committee of the association.

SIGNAL COMMITTEE

The joint committee of the Engineering Association and the Transportation & Traffic Associations on "Signals for Interurban Railways" held a meeting on Wednesday afternoon. Those present were: J. M. Waldron, signal engineer, Interborough Rapid Transit Company; G. W. Kelsay, superintendent of power, Indiana Union Traction Company, and John Ross, assistant superintendent of tracks, Detroit United Railway, representing the Engineering Association, and C. D. Emmons, general manager, Ft. Wayne & Wabash Valley Railway, representing the Transportation & Traffic Association. On motion of Mr. Emmons, Mr. Waldron was elected chairman of the joint committee.

The committee then discussed the form and scope of questions to be incorporated in a data sheet regarding existing installations of signals. Mr. Emmons read the report of the Indiana manager's committee on signals presented to the Indiana Railroad Commission on Jan. 5, which contained a classification of automatic block, manual block and dispatcher's block signals. It was decided to adopt this classification of kinds of signals in making up the data sheet which will be sent out. A rough draft of the data sheet containing 19 questions was made. This will include questions pertaining to mileage of single-track and double-track lines, minimum headway of cars, maximum speed of cars, maximum braking distance, kind of propulsion current,

types and number of signals in use, automatic stop installations, contemplated extensions of signal systems in use, action of State authorities with regard to signals for electric railways, effect of block signals on movement of trains, etc. At the next meeting of the committee it is planned to invite representatives of the signal manufacturers to present brief descriptions of their apparatus for the information of the members of the committee. The data sheet is to be sent out as soon as it can be prepared.

MEETING OF INTERURBAN RULES COMMITTEE

The mid-year meeting of the interurban rules committee, American Electric Railway Transportation & Traffic Association, was held on Wednesday morning, Jan. 25, at the headquarters of the association in New York. The committee members present were J. W. Brown, chairman, superintendent of transportation, Aurora, Elgin & Chicago Railroad; W. R. W. Griffin, general manager, East Liverpool Traction & Light Company; W. H. Collins, general manager, Fonda, Johnstown & Gloversville Railroad.

Replies were read from several companies in response to the committee's inquiry as to their attitude toward the American Railway Association code of rules and the Transportation & Traffic Association's Denver and Atlantic City codes. The committee then discussed the rules which should be jointly considered with the city rules committee of the Transportation & Traffic Association and also took up the question of learning from the State railroad commissions their feeling toward a standard code of interurban rules. It was suggested that the committee make a careful analysis of the several codes of rules with a view to determining the real differences between them and if possible reconciling any important differences which may be found.

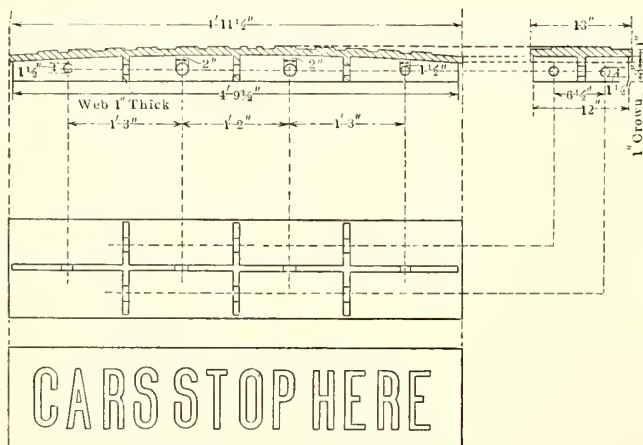
OTHER COMMITTEES

The meeting of the passenger traffic committee, which was scheduled for 10 a. m. on Jan. 25, 1911, has been postponed until Jan. 27, 1911, at 9 a. m., owing to the inability of several members of the committee to be present.

The meeting of the committee on express and freight traffic was also postponed for the same reason until 10 a. m. Thursday.

STOP SIGNS SET IN STREET PAVEMENT

The accompanying drawing shows the dimensions and constructional features of a cast-iron car stop sign which is arranged to be set in the pavement between street railway tracks at busy intersections. The cover is worded "Cars Stop Here" in 8-in. x 3-in. letters, which are raised $\frac{3}{8}$ in. This cover plate



Stop Sign Set in Street Paving

is supported on three 1-in. transverse webs and one 1-in. longitudinal web, as shown on the drawing. This type of sign was devised and installed by E. D. Latta, Jr., when he was general manager of the Charlotte Electric Railway, Light & Power Company, Charlotte, N. C.

REPORT OF F. W. WHITRIDGE TO THIRD AVENUE RAILROAD BONDHOLDERS

In a report addressed to the bondholders of the Third Avenue Railroad System, of New York, dated Jan. 1, 1911, F. W. Whitridge discusses the physical condition of the property and other general matters pertaining thereto, including the relations with the Public Service Commission. An abstract of the report follows:

BUILDINGS

"The building at Bayard Street is unchanged. I have been unable to make a lease of it upon satisfactory terms. The building on Forty-second Street I have not touched. It is superfluous for the uses of the railroad, and I suppose the company will ultimately wish to sell it. It is rented to a satisfactory tenant. The car barn at Fourteenth Street and Avenue B belonging to the Dry Dock road is now under process of complete repair. The car barn at Kingsbridge I have not been able to complete, but expect to put it in order this spring at an expense of \$30,000 or \$40,000. All the other buildings belonging to the system have been put in first-class condition; many of them have been almost rebuilt and equipped with sprinkling apparatus, which has materially diminished the cost of insurance, and the hotel at 130th Street and Third Avenue has been turned into an appropriate office building. An entirely new substation and ducts thereto have been constructed for the Union Railway.

CARS

"All of the cars of the system have been thoroughly overhauled. Many of those turned over to me by the Metropolitan receivers I have sold, and I have purchased 676 new cars, 75 of the old standard box cars, 50 of the old kind of open cars and 551 pay-as-you-enter convertible cars. I have also changed 248 of the old cars to pay-as-you-enter cars and have added platforms to 86 of the cars of the Union Railway for the purpose of making that change. The cars of the new type speak for themselves, and many of the bondholders have had an opportunity to look at them.

"I was subjected to some criticism in the beginning for introducing the cross-seats, but I find they have met with almost universal approval, and the inclosure of the open cars with a wire grill has prevented practically all the serious accidents which used to occur on the lines running through streets where there is an elevated structure. On nearly all the cars I have installed the simplest kind of fare box, which insures the collection of all fares, except in exceptional cases, and has, I think, proved a convenience to the public as well as a saving to the company, for I find that a very great majority of the passengers now have their nickels ready to deposit in these boxes.

REPAIRS TO TRACK

"I have done what was absolutely necessary to put the track in order and presented to the reorganization committee an estimate of \$1,000,000 to relay the whole of the Third Avenue and Forty-second Street track. This would be a very desirable expenditure, and by using Belgian blocks instead of the present asphalt pavement I think \$40,000 a year can be saved in repairs to pavements. This improvement, like many other improvements of a capital character to be made out of the funds usually provided in a reorganization, is held up in consequence of the failure of the Public Service Commission to approve the plans of the committee submitted to them.

POWER

"The agreement with the receivers of the Metropolitan has worked satisfactorily and has resulted in saving a large capital expenditure both to the Third Avenue and to the Metropolitan, and I think may now fairly be considered to be a permanent working arrangement between the two systems.

NEW LINES

"With the concurrence of your committee, I have applied for franchises for several new lines, some of which have been constructed.

"A loop was constructed at the end of the Third Avenue line

at Fort George, a great operating convenience, about 1500 ft. of double track.

"A similar loop is under way at the West 130th Street ferry.

"Franchises have been obtained in the name of a new company for operation over the Queensboro Bridge and the material has been ordered. The line will be put into operation as soon as the special work has been obtained.

"Several lines have also been constructed during the present receivership. Applications are pending and I have every reason to believe will ultimately be granted for various additional lines.

SELF-PROPELLING CAR

"I have made many experiments to find a self-propelling car and have now had built in our own shops 25 cars which we have equipped with battery motors, which so far have worked perfectly satisfactorily, as a substitute for horse cars. I have been using them now for three months on the 110th Street line, which while it was operating with horse cars produced 75 cents to \$1 per day and now is averaging between \$40 and \$50 per day. I do not feel justified in spending any larger sum on these cars until they have been through the winter and we have had a longer period for testing them, but if, as now appears to me to be probable, they are successful I propose to replace all the horse cars on the Third Avenue system by cars of this character.

FRANCHISE TAXES

"After long negotiations and the final decision of every point in controversy by the Court of Appeals, all the franchise taxes due upon any of the Third Avenue properties have been paid. The State Board of Tax Commissioners have appraised the value of the franchises of the Third Avenue properties for the current year at substantially the same figure at which they were appraised at the beginning of the nine years' litigation, exactly as if the courts had never spoken or as if their decisions—reducing the appraisal about half—had never been communicated to this board. It will now therefore be necessary to embark upon a new litigation to reduce the taxes for the current year. This is a surprisingly abominable situation, which I cannot but think will attract the attention of the new executive, and it ought to result in replacing the present board with a more law-abiding body.

CLAIMS AGAINST THE METROPOLITAN

"All the claims made against me by the Metropolitan receivers have been paid. Claims made by me against the Metropolitan-New York City Railway receivers are dragging on before the masters in chancery, with no appearance of an early termination. It is greatly to be regretted that a settlement of all these questions could not have been arranged.

THE BENEFIT ASSOCIATION

"With the permission of the court and the concurrence of the bondholders' committee, I established two years ago a benefit association, by the terms of which the permanent force of the railroad's employees were invited to pay 50 cents a month to the association, which should supply a doctor and free medical advice. The money was to be used in case of illness, to pay a man after the second day \$1.50 per day, and in the case of death \$250 to his widow. The funds are invested by the Central Trust Company in securities in which trust funds may be invested under the laws of this State, and I stated that if 75 per cent of the men joined the association the companies would contribute \$1 for every dollar paid in by the men. This association has been a great success, over 80 per cent of the permanent force becoming members. It has now accumulated \$27,194; it has given relief in 590 cases and has paid insurance upon the death of 15 employees. After a few years this insurance against death can be materially increased and a pension feature can be added.

"For the use of members of the association I have constructed at Sixty-fifth Street, 130th Street and West Farms club rooms for their exclusive use. At each of those places and also at 129th Street and Amsterdam Avenue a lunch counter has been provided, and in connection with each of the club rooms a library has been installed by the New York Free Circulating

Library, together with a number of shower baths for the use of the men.

EXPENDITURES

"All my expenditures have been met from the net earnings of the railway and from the proceeds of the sale of receiver's certificates. Two million five hundred thousand dollars of these were originally issued and subsequently another \$1,000,000 to provide money for paying part of the franchise tax. I was able to pay off \$500,000 of these certificates last summer and a second \$500,000 within the past few days, leaving outstanding \$2,500,000 of certificates.

EARNINGS

"The result of the improvements in your properties is a material increase in their earnings. I have endeavored to charge everything which possibly could be so charged to 'Operations' or 'Maintenance,' and there is included in the latter for the year ended June 30, 1910, upward of \$125,000 paid for masters in chancery and lawyers' fees incidental to the receivership and the operations of the Public Service Commission, and the interest on loans and mortgages also includes the interest on \$3,500,000 of receiver's certificates, which had the property been reorganized would have been, together with most of the money paid for legal expenses, applicable to the payment of interest upon new securities. Making these deductions, the total amount of net earnings would have been upward of \$2,000,000, but there was in this statement no allowance made for the franchise taxes and no allowance for depreciation, which I have estimated to be in the first instance for the new company about \$300,000 a year. I believe the Public Service Commission does not agree with me as to what this amount should be, but I think no more—at least for the present—is necessary. I have stated that—things remaining in a normal condition—I anticipate an annual increase for the next three or four years over and above these figures of about \$200,000, and I am happy to say that for the first six months of the year the increase is actually over \$125,000. In addition to this, upon the reorganization of the company, I have counted upon receiving at least \$100,000 a year from the Yonkers and Westchester companies. This I think is a moderate estimate.

SUBSIDIARY COMPANIES

"The Yonkers company, in the hands of Leslie Sutherland, receiver of the State court, and the Westchester company, in the hands of J. Addison Young, receiver of the State court, have both shown marked improvements during the current year. On both of them, however, very considerable sums should be expended.

"The Tarrytown, White Plains & Mamaroneck was sold at foreclosure sale. A portion of it was bought in your interests for \$110,000. It appeared that the Public Service Commission considered that it could be valued at only \$46,000; it was accordingly sold for \$117,000.

PUBLIC SERVICE COMMISSION

"The various suits at law brought against me by the commission, including one for the payment of \$800,000, were all unsuccessful and were a waste of time and money for everybody concerned. The bondholders may not be aware that under the present law of this State it has been considered necessary to present the plan of reorganization to the commission and to ask their approval of the issue of new securities. It is this which has prevented the reorganization, a complete rehabilitation of the property and the termination of this receivership months ago. Two plans of reorganization have been submitted to the commission and rejected. In rejecting the second plan the commission have announced views which are very serious, not only for your property but for the whole community. An appeal from their decision has been taken to the courts, but should it be decided that the jurisdiction of the commission is exclusive and these views should not be retracted or modified, it is plain enough that no property within the jurisdiction of the commission of the First District can ever be reorganized, and that no capital can be obtained for any public service corporation in this city from any banker on any terms whatsoever, and in the case of the Third Avenue it may become necessary

by some contract between the security holders themselves to avoid all reference to the commission and let the company limp along as best it can.

"The plan submitted to the commission provided:

"First—For a reduction of the fixed charges by about \$1,000,000.

"Second—For upward of \$7,000,000 of new money.

"Third—For new securities about \$4,000,000 less in the aggregate than the old securities.

"The commission in considering this plan would not distinguish between the case of a company which was already capitalized and had an assured income and the case of a new enterprise which was issuing securities for the first time to secure capital for construction. So far as I can understand their views, the commission thought further that the amount of securities to be issued for the Third Avenue Railroad was to be decided without reference to the old securities or to the necessities of the situation of the property, but solely with reference to the value of the property.

"Now, value is a subjective conception; it is not a dimension to be measured by an external standard. The commission, however, have fixed the value of your property, not with regard to its cost, nor to the amount of cash paid into it, nor to its earning capacity, nor to its actual earnings, nor to the report of their own bureau of appraisers, which they have had at work at great expense and without legal authority; they have fixed it by asking their own engineer about it, and from his appraisal they have deducted a theoretical depreciation of \$11,000,000, leaving about \$20,000,000 as the amount of the new securities which may be issued in exchange for \$38,000,000 of your bonds and \$16,000,000 of stock of the old company. That is to say, a man who has two bonds is invited to destroy one of them, and it is perfectly useless to explain to him that his property has suffered a theoretical depreciation of \$11,000,000, because his own eyes enable him to see that such is not the fact. Moreover, were it not for the necessity of raising \$7,000,000 and paying interest on it his property would appear to be now earning substantially the whole of the interest upon the bonds he paid for. To his mind, the commission invite him to a senseless sacrifice. Their activities, though of a different character, seem to him to be more devastating and more indefensible than the performances of the old Metropolitan company which the commission were appointed to abolish, and he cannot be persuaded that the commission are not 'playing the fool' with his property.

"I believe I am disinterested in this matter, for I am only the temporary guardian of your property. I own nothing the commission can destroy, and personally I find the commission collectively amusing and individually rather amiable, though perhaps Mr. Willcox's disposition is not so sweet as it was, but I confess that when I read the letters of this commission, reflect upon their opinions, contemplate their activities, when I consider the course of the Board of State Appraisers in Albany, the vexatious confusion of the statutes and the muddling administration of the law, I am reminded of a saying of a distinguished journalist some years ago, 'This is the hardest country in the world to love.'

"This is a note of despair and not justifiable, for we know by long experience that somehow or other things right themselves. We are a very level-headed people, and Lincoln's epigram, 'You cannot fool all the people all the time,' is profoundly true. So even in the case of so powerful a body as the Public Service Commission in the First District, with the people at first heavily prejudiced in their favor, when it becomes obvious that they have made a mess of their jobs something is done about it. Sometimes the *as triplex* of the self-esteem of such a body is shattered, and they learn or resign. Sometimes public disapproval which has long been passive suddenly blows them away, or sometimes a new executive who is without the parental affection for lame or blind offspring which the Governor who appointed them must be supposed to cherish comes into office and is able to view them with a just and open mind and, officially speaking, decapitates them, or in some way or other they are disposed of.

"This commission in the First District have, in my judgment, demonstrated that they must return to the shades whence they emerged. I think the people are of that opinion. By removal, consolidation or resignation we must part with them. In the slang of the day, they have not 'made good,' and they must go."

Mr. Whitridge gives a summary of the expenditures on rolling stock and equipment, which amounted to \$3,707,458, less \$201,401 derived from the sale of cars and old material; on additions and improvements to buildings, \$1,029,024; extensions, special work and improvements to track, \$612,450, and franchise taxes, \$1,000,000; total, \$6,147,531. A statement is also given of the income accounts of the operating companies in the system for the year ended June 30, 1910. Total gross earnings were \$6,570,085, and operating expenses, \$4,250,760, leaving net earnings of \$2,319,325. Income, including the net revenue from sale of power, rental of equipment and interest and miscellaneous sources, was \$3,071,136. Interest, taxes and other deductions left a surplus of \$1,302,332.

MANAGER'S LOOSE-LEAF POCKET RECORD

The accompanying cut shows the front and back of a monthly loose-leaf pocket record which was designed and used by E. D. Latta, Jr., when he was general manager of the Charlotte Electric Railway, Light & Power Company, Charlotte, N. C. This form is of special interest as it was successfully applied in watching the operations of a system which operates gas and electric service departments in addition to a city and suburban railway. It will be observed that this record, which is only

MONTH ENDING 1910									
	Station Output	Auxiliary Apparatus	UNACCOUNTED	Oil Consumed	Fuel Consumed	Power Cost Per K. W. H.			
RAILWAY									
ELECTRIC									
GAS									
PRODUCER									
MILEAGE			PAY ROLLS			SERVICES			
	CAR MILES	Car Miles Per K. W. H.	PLANTS	Maintenance	Platform	Services Connected	Services Disconnected		
RAILWAY									
ELECTRIC									
GAS									

MONTH ENDING 1910						
	GROSS INCOME	Operating Expenses	NET INCOME	Income Per Unit	Expenses Per Unit	PER CENT
RAILWAY						
ELECTRIC						
GAS						
TOTAL						
Same Month Last Year						
REMARKS:						

Front and Back of Manager's Loose-Leaf Pocket Record

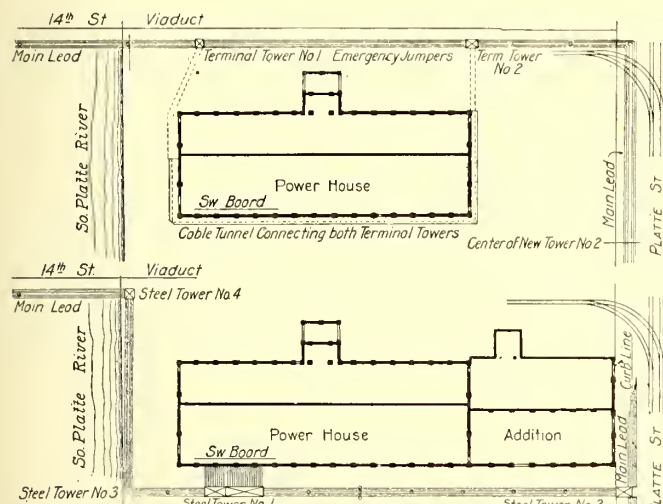
5½ in. x 3¼ in. in size, is divided to show the principal expenditures for labor and material, both as unit costs and as totals, such as the output of each power station and the fuel consumed; the car mileage; the mileage per kw-hour; power and platform payrolls; lighting and gas services connected or disconnected; gross, net and unit income together with the operating ratios. This form also provides for income comparisons with the same month of the preceding year and for general remarks. Comparisons of the other items shown can be made, of course, by referring to the records of other months, which would be bound in the same book for any desirable period.

The Northern Ohio Traction & Light Company, Akron, Ohio, will equip Meyers Lake Park, near Canton, with tank, water plugs and hose for fire protection this spring. New walks will be laid, the grounds beautified and numerous other improvements will be made.

AN INTERESTING STEEL TOWER AND CABLE INSTALLATION IN DENVER, COL.

Through the courtesy of W. G. Matthews, superintendent overhead lines Denver City Tramway, the following particulars are available concerning an interesting installation of steel towers and cables covering the feeder layout for this railway's power house:

Early last year it was decided to enlarge the power station.



Old and New Plans of the Power House and the Tower Circuits

The building, therefore, was extended up to the street line for approximately 140 ft. The plans called for increased trackage facilities and for a scheme of waterways, wells, etc., for condensing purposes. It was soon observed that the original d. c. feeder arrangement both in the tunnels and on the poles on the grounds would seriously interfere with the proper carrying out of the plan as a whole. It was then decided to rearrange the entire d. c. feeder distribution between the switchboard and the main feeder line "pole leads." An underground duct scheme was first mapped out, as the local conditions precluded the possibility of properly guying heavy pole line corners in the usual way, but on investigation it was found that this was not practicable, on account of the water pipes, railroad tracks and river. Consequently it was decided to make four self-sustaining steel towers for the dead ends and angles. It was also decided to use nothing smaller than 1,000,000 circ. mil cable, in order to cut down pin positions and space. The spacing between the cables, the number of cables, their size and weight, height of towers, etc., were turned over to the F. O. Brown Structural Iron Works, of Denver, who prepared the details of towers and foundations and who also constructed and erected the towers. The concrete foundations and footings were placed by the building and bridges department.

The 11 poles used between towers Nos. 2, 1, 3, and 4, designated on the accompanying plan with small circles, are made up of two old "cable slot" rails latted together and spliced out, making a 38-ft. pole. Pieces of $\frac{3}{8}$ -in. \times $3\frac{1}{2}$ -in. \times $5\frac{1}{2}$ -in. angles were bolted on to the slot rail poles, on which the cross-arms rest, thus eliminating cross-arm braces and making a much stronger construction.

Steel tower No. 1 is of the same length as the switchboard. Thus the cables go straight down through the floor from the nut on the switchboard (in order to leave the floor space between the switchboard and the wall clear and unobstructed), back up through floor and are cleated up the wall at the height of 23 ft. from ground outside of the building, then pass straight out to each position on the tower. Provision was made to string 24 1,000,000 circ. mil cables from tower No. 1 to No. 2 at Platte Street, where the new cables were cut in to the old "lead." Provision was made also to string 24 1,000,000 circ. mil cables from tower No. 1 by way of No. 3 to No. 4, where they

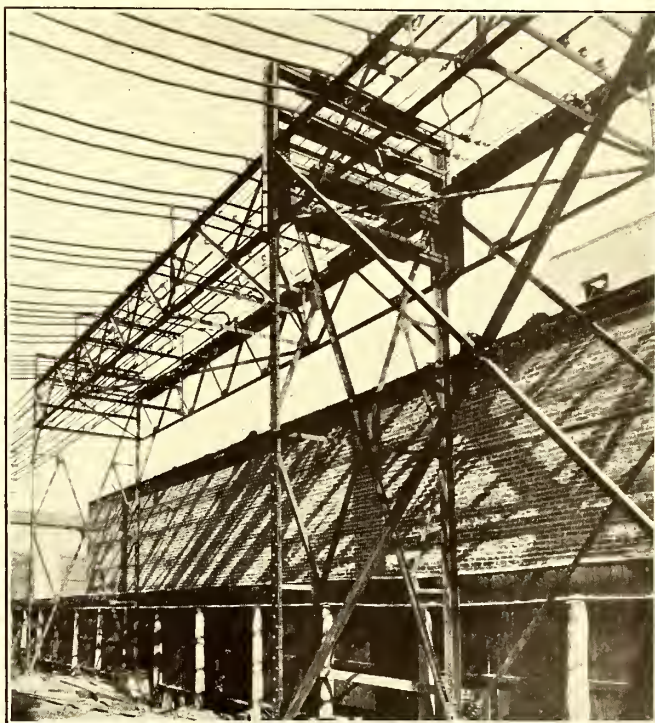
were also cut into the old "lead." When both sets of cables are installed there will be displaced all cables in the tunnels and on the poles via the old terminal towers between the points which are indicated on the new plan as the present locations of steel towers Nos. 2 and 4.

The abandoned cables of all sizes and makes thus reclaimed and put in stock for future use amounted to 71,119 lb., while the new cable put in to date on the new route amounted to 47,237 lb. This gives a difference of 23,882 lb. in favor of the new route, while maintaining in all cases the same circular mils between the switchboard and the main leads. In many cases the capacity for future growth was increased to avoid beginning at the switchboard when reinforcing a given feeder.

Selected locust pins and heavy glass insulators (Locke No. 22) were used on all wooden cross-arms, which are on the "slot-rail" poles only. Each pole carries 6—6 pin 4-in. \times 6-in. \times 6-ft. selected Oregon cross-arms coated with P & B paint. The steel towers have special malleable iron pins which are bolted direct to the angles comprising parts of the towers. They are placed to act as cross-arms.

The only positions where the cables are cut are at towers Nos. 2 and 4, where the circular mils on the main leads are made up of all kinds of combinations. The cables were taken direct from the power house wall to tower No. 1, then divided, one-half going to tower No. 2 and the other half going to tower No. 4. They were dead-ended in each case in the following manner:

The cables were served into the eye-bolt of an Ohio Brass $\frac{3}{4}$ -in. Brooklyn strain insulator, the insulator being attached to a $\frac{3}{4}$ -in. eye bolt, which goes clear through a piece of 4-in. \times 6-in. selected oak. The nut is covered up and protected, to avoid contact with the metal parts of the tower. These oak dead-end pieces each hold six cables and are fastened to the tower proper with $\frac{3}{4}$ -in. machine bolts placed between the cable



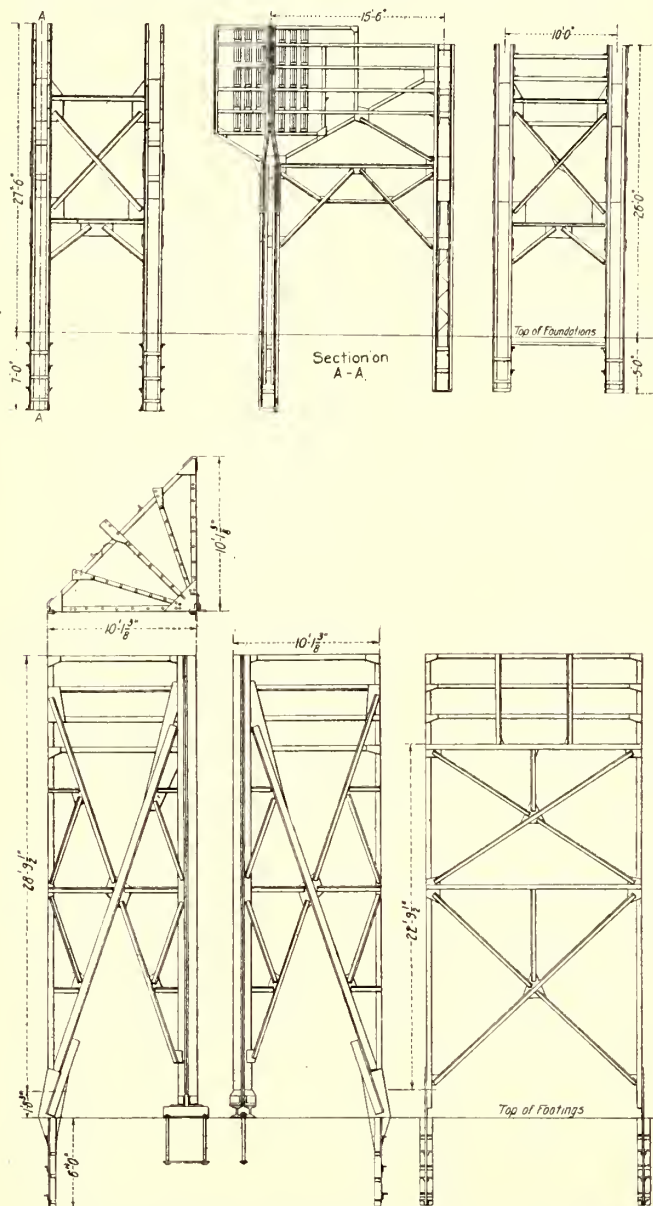
View of Portion of One of the Denver Steel Towers

positions and extending through between two channels laid together with an open space sufficient for the bolt, with a 2-in. square washer under the nut on the back side. The channels referred to are designed and placed so that each set takes the strain of six 1,000,000 circ. mil cables with a dip of 8 in. in a 50-in. span.

The placing of the "oak" dead-ends, in addition to the Brooklyn strain insulators, between the feeder and tower was thought necessary on account of lightning discharges. All bends or

angles were carried around by means of Brooklyn strains and W. N. Matthews & Brother's cable clamps, which made a very neat piece of construction. Formerly the company braided on a piece of 5/16-in. span wire for the same conditions under which the clamps are now used. Hence, the saving in copper over the old method is not large, but the clamps are preferred because they are quicker to apply, they give more uniform splices, they look better and they permit readjustment without the necessity of unserving a lot of strands.

The accompanying illustrations show towers No. 2 and No. 3. Tower No. 2 is rectangular in plan, with sides 10 ft. x 15 ft. 6



Framing Details of Denver Towers Nos. 2 and 3

in. The four legs are made up of columns each composed of four "L"s, 3 in. x 1/4 in., and two plates, 20 in. x 1/4 in. with interior bracing. Tower No. 3 is triangular in plan with the two shorter sides each 10 ft. 1 3/8 in. in length. The respective weights of the towers are as follows: No. 1, 15,820 lb.; No. 2, 18,400 lb.; No. 3, 7330 lb., and No. 4, 9620 lb.

A congress of the municipal officers of the principal cities in America and abroad is to be held in Chicago, Sept. 18 to 30, 1911. The organizations in Chicago which have indorsed the congress are the Association of Commerce, Citizens' Association, Industrial Club, Civic Federation, City Club, United Charities and the Rotary Club. Among the topics are "Control of Public Service Companies by City and State," "Indeterminate Franchise," "Municipal Ownership" and "City Planning."

TROLLEY LINE SECTION INSULATOR

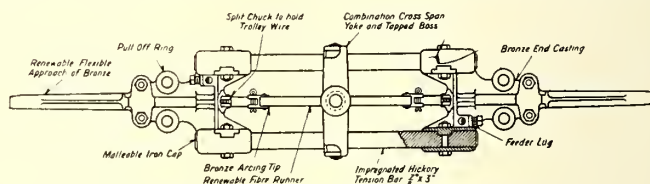
To meet the demand for a sturdy trolley line section insulator, with renewable wearing parts, the Westinghouse Electric & Manufacturing Company has developed the new form type "KB" which is shown in the accompanying cuts. A No. 0000 phono-electric wire has been broken "on a jerk" without any sign of failure in any part of this insulator.

The tension is taken by two 7/8-in. x 3-in. hickory bars. Ver-



Side View

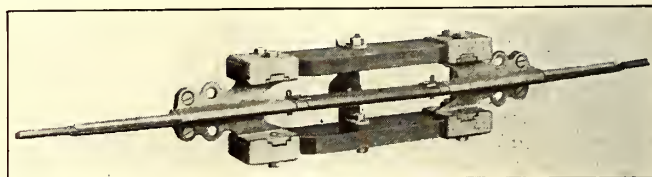
tical slots are provided in these, and projections from the end castings engage in the slots. The stress is thus transmitted to the hickory bars without the bolts assuming any shearing stresses. The bolts serve only to clamp the end castings to the bars. Sherardized malleable-iron caps inclose the ends of the hickory bars to protect them against splitting and injury from "wild" trolley wheels. The sectioned portion of the plan view details this construction. The renewable bronze approaches are identical with those used on Westinghouse "Detroit"



Construction Details of Section Insulator

frogs. They have sufficient length to be flexible and they effectively prevent crystallization of the trolley wire. When worn out the approaches can be replaced in a few minutes by taking out the two bolts previously mentioned.

The renewable runner is of fiber with bronze tips which take the brunt of the arcing. By removing the two cotter pins shown in the plan a worn-out runner can be removed and replaced with a new one in a few minutes. Tapered sleeves hold the trolley wire in the end castings, the renewable approach serving as auxiliary holding device. The sleeves are internally threaded and are slotted longitudinally. Before being driven into position they fit the trolley wire with a small clearance and when tapped into the correspondingly tapered conical seats



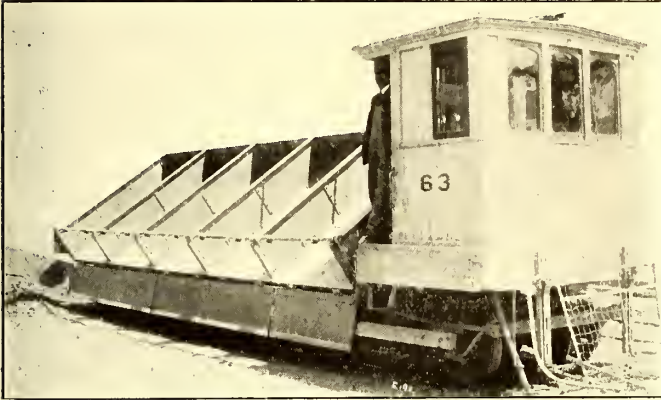
Bottom View

in the end castings they grip the trolley wire tightly. The sleeve cannot lose its grip when the wire is under tension, but by pulling the slack in the trolley wire toward the section insulator the sleeve is loosened and can be easily removed without cutting the wire. The sleeves are furnished for round, grooved or Fig. 8 trolley wires.

Feeder lugs are provided on this section insulator. One lug is cast in each of the end castings and a strong steel set screw is supplied. These lugs may be used either for feeding energy into the adjacent trolley wires or for connecting a "jumper" around the section insulator. The middle casting is tapped and can be furnished to accommodate either a 5/8-in. or a 3/4-in. stud. The middle casting is also formed to constitute a supporting yoke. All metal wearing parts of the insulator are of bronze and all other metal parts are of sherardized iron or steel.

MONTREAL DUMP CARS

The Montreal Street Railway Company has recently added to its freight equipment a new type of car for handling stone which dumps its load all to one side, as shown in one of the accompanying illustrations. One car was built by the Dominion Car & Foundry Company in March, 1909, and 24 more were built between July and September, 1909. An additional 25



Side View of Dump Car

more have since been ordered from the Canadian Car & Foundry Company. On the cars last ordered a plow is added to the rear truck to spread the rock after the car has deposited it beside the track. This plow is detachable and is folded in when the car is in the running position. The car can be dumped and rights itself in one minute.

The car is built entirely of steel with the exception of the cab. The center sills are composed of 12-in. 25-lb. channels, braced with six 8-in. 8-lb. channel separators at the rocker bearing point, and further tied together with a $\frac{7}{8}$ -in. rocker plate. The side is composed of 10-in. 15-lb. channel reaching from end sill to end sill secured with rolled connection angles. The end sills are also 10-in. 15-lb. channel faced with an oak

divided into five separate compartments, each 5 ft. wide x 7 ft. 11 in. long.

The car body rests on cast steel rockers, one at each end and at each partition. The cast steel rockers have lugs that engage openings in the $\frac{7}{8}$ -in. rocker plate. These rocker castings allow the car to rock easily to the dumping side of the car without any undue shock, and the car body is so balanced that it can easily be righted again. The dumping mechanism is composed of two cast-steel racks with pinions secured to the operating shaft, all easily controlled from the motorman's cab.

There are five doors of $\frac{3}{16}$ -in. plates reinforced with bars. They are hinged at the bottom and open downward, so that when the car is dumped they form an extension and help to throw the load away from the track. The locking device for the doors is composed of a shaft $1\frac{1}{2}$ in. round extending the full length of car body. Secured to this shaft are ten malleable iron hooks, two to each door. The hooks lip over the top edge of doors, thus holding them securely in place. At each end of the door shaft there is a short lever which is connected to a toggle on the center sill by a connecting bar with turnbuckle for adjusting. When the car body reaches a certain angle in dumping it operates the door locks automatically and releases the doors. Buffers are provided for the doors to fall on. Wood buffers are also provided on the trucks.

The trucks are the Montreal Street Railway pattern, but any standard truck may be used, although a truck with a short wheel base is preferred. The car is built with motors on each axle, hand brakes only, with the usual electrical equipment in cab. A sand box and fenders are also used. The following are the general data: Length over end sills, 33 ft.; truck centers, 21 ft. 3 in.; width of box, 7 ft. 3 in.; length of box, 25 ft.; height of box, $21\frac{1}{4}$ in.; box spring draft gear; angle of dump, 35 deg.; capacity, 40,000 lb.; cubic contents, 20 cu. yd.; weight, 26,000 lb. without motors.

Dump cars of this design are now being manufactured in this country by the Simplex Self-Cleaning Car Company, New York City.

TURTLE-BACK CARS FOR KANSAS CITY

The Metropolitan Street Railway, Kansas City, Mo., is now operating 25 cars of the flat-arch single-end design shown in the accompanying illustration. These cars were built by the Cincinnati Car Company and are used for pay-as-you-enter operation. The car bodies are 24 ft. long, while the distance between bolster centers is 21 ft. 10 in. The width over the posts at the belt is 8 ft. 7 in. The car body weighs 18,388 lb. and seats 44 passengers. The body is of wood with steel paneling over the sides and vestibules, as illustrated. The body



Turtle-Back Car for Kansas City



End View of Dump Car

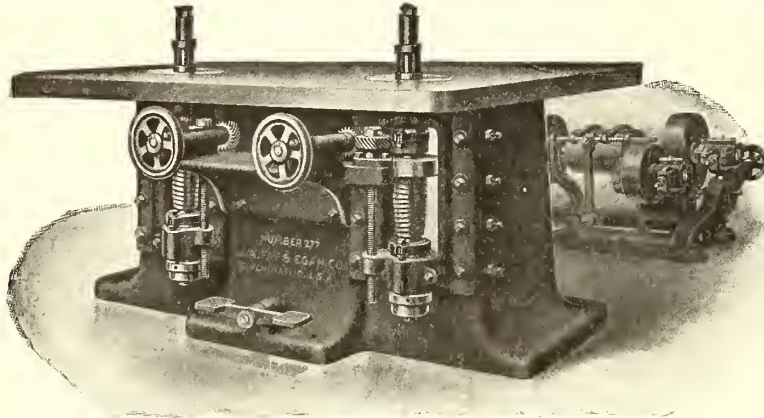
beam 5 in. thick and securely bolted to the web of the end sill channel. The body bolsters are composed of 5-in. 11.6-lb. Z-bars with $\frac{1}{4}$ -in. cover plates top and bottom and secured to side and center sills with $\frac{1}{4}$ -in. gusset plate.

The car is not symmetrical, as the 10-in. side sill is on one side only. There are four channel diaphragms 5 in. deep, reaching from the center sill to the side sill on the non-dumping side of the car; riveted to these channels are the bearing plates that secure the operating shaft. The car body, composed of light angles and $\frac{1}{4}$ -in. plates securely riveted together, as shown in the upper illustration in this column, is

bolsters are of cast steel and the bumpers of steel plates. Each car is mounted on two Standard 0-50 trucks, each carrying two Westinghouse 306 motors. The braking equipment consists of the National Brake & Electric Company's air brakes and Peacock hand brakes. As the cars will be operated on the pay-as-you-enter system they have been equipped with Faraday push-button buzzer signals. Roof ventilation is furnished by means of 10 Garland ventilators per car. Among the specialties supplied with these equipments are Eclipse fenders, International registers, Hale & Kilburn rattan seats and Pantasote curtains with Forsythe and Dayton fixtures.

DOUBLE SPINDLE SHAPER

The accompanying cut shows the principal features of the No. 277 double spindle shaper recently brought out by the J. A. Fay & Egan Company, Cincinnati, Ohio. The spindles are made of forged crucible steel and are mounted in very rigid housings which are fitted into planed gibbed ways their entire length. These housings are adjustable vertically by independent hand wheels operating through cut spiral gears. Both spindles drop below the table. The spindle bearings are tapered and made of phosphor bronze. They have oil reservoirs completely around the inner bearing, and are so designed that a



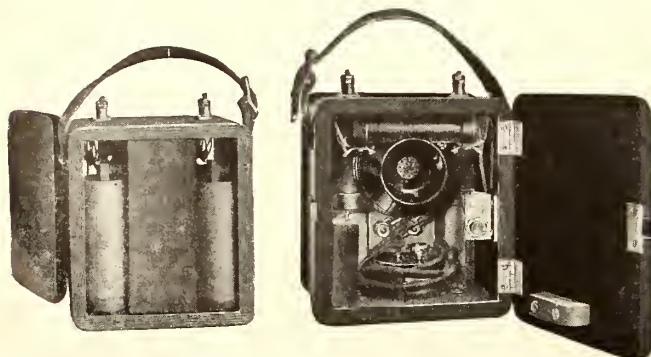
Double Spindle Shaper

continuous flow of oil is assured. Each bearing is independently adjustable with one screw, with provision for taking up wear. The oil reservoir is covered so that no dirt can get into the bearings. This construction is designed to permit the highest speed possible.

Another valuable feature is the construction of the countershaft, the base of which is cast in one piece, on which all the pulleys and belt shifters are mounted. This distinctive feature makes the most rigid design and also eliminates all assembling on arrival at destination. Adjustable independent idlers are provided to take up the slack in either belt to maintain the proper tension at all times. The table is planed true and firmly bolted to the column. It is fitted with removable concentric rings, 10 in. in diameter. The column is a single-cored casting with a broad floor support. It is not in the operator's way and it supports the working parts without vibration.

PORTABLE RAILWAY TELEPHONE

A new portable railway telephone is being manufactured by the Kellogg Switchboard & Supply Company, Chicago, Ill. This telephone weighs 6 lb. 5 oz. The height is 6 13/16 in.; width,



Portable Railway Telephone

6 3/4 in., and depth, 6 in. The containing cabinet is strongly built with a heavy hinged cover.

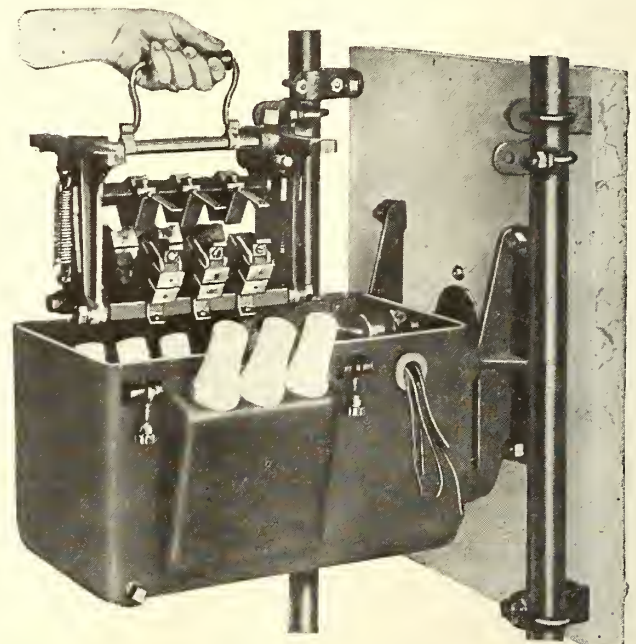
The accompanying illustrations will show the compactness of

arrangement of transmitter, receiver, batteries and the induction coil. The telephone is used by trainmen, signal men, officials and linemen for talking to dispatchers' headquarters, and is arranged to connect at any point on the circuit.

An adjustable leather strap handle makes the telephone box very handy to carry.

NON-AUTOMATIC OIL SWITCH

Allis-Chalmers Company, Milwaukee, Wis., has recently brought out a new type of oil switch designed for either switch-board or wall mounting, for pressures of 3300 volts and under, and in capacities up to 600 amp. They are furnished with or without automatic tripping features, as may be desired. These switches are of the vertical up-break type. The oil tank is made of cast iron and constitutes the main frame of the switch. It has a cast-iron cover which is held in place by hinged bolts and thumb screws and which holds a felt packing ring tightly in place so that practically no dust can get in or oil escape from the case. The level of the oil in the case is shown by an indicator on the outside and provision is made for drawing off the oil by means of a drain pipe. The working parts of the switch, including the stationary and bridging contacts, are made in a unit which is removable from the tank without disturbing the leads or connections. An inter-lock is provided so that the switch unit cannot be removed from or inserted in the tank unless the contacts are in the "open" position. The contacts are so arranged that a rubbing action takes place when they are brought together, tending to



Non-Automatic Oil Switch

keep them clean and to squeeze out the film of oil between them. Auxiliary removable arcing contacts are provided which break after the main contacts have spread approximately 1/4 in.

When the automatic tripping feature is applied three tripping coils, for the three-pole automatic switch, are arranged for connection to three series transformers, which are furnished with the switch. This construction affords protection under all circumstances. The two-pole switches are provided with one series transformer and the four-pole switch with two. The tripping mechanism is rugged in construction and at the same time sensitive to overload conditions and positive in its action. The switches are calibrated for from 80 per cent to 160 per cent of the rated current of the switch.

News of Electric Railways

Personnel of Consolidated Companies at Los Angeles

Following the plan of organization which governs the steam railroads of the Southern Pacific Company, the management of the Pacific Electric Railway and the Los Angeles-Pacific Company, which will be merged on Feb. 1, 1911, as the Pacific Electric Railway, will be conducted by department heads, who will be supreme in their jurisdiction, subject to the general supervision of Paul Shoup, who has assumed the active management of the properties, as announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 96. Under Mr. Shoup will be the new department heads, whose quarters will also be in the Pacific Electric Building, Los Angeles. With the exception of the office of auditor, which department will control the accounts of the Pacific Electric, the Los Angeles-Pacific Railway, the Los Angeles & Redondo Railway and related companies, the changes announced do not affect the Los Angeles & Redondo Railway. On Feb. 1 the following department heads will take up their new duties:

J. McMillan, general manager, in charge of the operating department, formerly general manager of the Pacific Electric Railway.

George E. Pillsbury, chief engineer, in charge of construction, formerly chief engineer of the Pacific Electric Railway.

E. C. Johnson, assistant chief engineer, in charge of maintenance of way, as well as work now under his jurisdiction, formerly engineer of Los Angeles-Pacific Railway.

D. W. Pontius, traffic manager, in charge of all traffic affairs, formerly traffic manager Los Angeles-Pacific Railway.

S. A. Bishop, general claims agent, formerly claims agent Pacific Electric Railway.

George L. Bugbee, land agent of the Pacific Electric Land Company and related companies, formerly land agent of the Los Angeles-Pacific Company.

W. V. Hill, tax and contract agent, formerly tax and contract agent of the Los Angeles-Pacific Company.

Fred F. Small, mechanical engineer, formerly mechanical engineer of the Pacific Electric Railway.

H. A. Culloden, auditor of the Pacific Electric Railway, Los Angeles-Pacific Company, Los Angeles & Redondo Railway and related companies, formerly auditor of the Pacific Electric Railway.

S. H. Anderson, electrical engineer, formerly electrical engineer of the Pacific Electric Railway.

M. S. Wade, cashier, formerly cashier of the Pacific Electric Railway.

W. G. Sherlock, assistant cashier, formerly cashier of the Los Angeles-Pacific Company.

No new announcement has been made affecting the organization of the legal departments of the roads. Judge J. W. McKinley is in charge of the legal department of the Pacific Electric Railway, the related land companies and the Los Angeles & Redondo Railway. The legal department of the Los Angeles-Pacific Company, of which G. E. Newlin is chief counsel, remains intact, and whether the two legal departments are to be consolidated has not yet been announced.

W. A. Sigsbee, who has been assistant auditor of the Los Angeles & Redondo Railway, Los Angeles, Cal., for some time, has been transferred to the Southern Pacific Company as a special auditor, with headquarters in San Francisco, and the position of assistant auditor with the Los Angeles & Redondo Railway has been abolished.

Earnings of Cleveland Railway

The figures shown in the statement of the Cleveland Railway for December, 1910, and for the 10 months of operation under the Tayler grant indicate that something will have to be done to increase the operating allowance, as the past four months show a deficit of \$54,305.45 and December a deficit of \$19,742.87. The grant provides that any surplus in this allowance shall be transferred to the interest fund at the end of each six months. This prevents carrying over the surpluses shown in favorable months of

operation to take care of the months when expenses are heavy.

The surplus accrued under the old scale of wages paid conductors and motormen. The award of the board of arbitration giving the employees an advance of substantially 4 cents an hour and other increased costs of operation during the winter months resulted in a deficit. Officials of the company notified the city authorities of the probable inadequacy of the allowance to cover the additional expenses incurred by the increase in wages, but the city refuses to change the ordinance. It is stated that the company will ask the city for an increase in the operating allowance, which is now 11½ cents per mile. Such an increase would probably endanger the 3-cent fare, as the margin is already very small. Should the request of the company be refused, it can then demand arbitration, under the franchise, and both city and company must abide by the decision of the board.

Table No. 1 published herewith shows the results of operation for December, 1910, and for the period of 10 months ended Dec. 31, 1910, based on the allowance made in the ordinance. Table No. 2 shows the results of operation for December, 1910, based on the actual expenditures for operation and maintenance expenditures on the basis allowed in the ordinance:

TABLE NO. 1.—BASED ON THE ORDINANCE ALLOWANCE.

	December, 1910.	Cents Per Car Mile.	Ten Months Ended Dec. 31, 1910.	Cents Per Car Mile.
Gross earnings from operation.....	\$525,885	22.50	\$6,166,370	23.20
Maintenance allowance.....	93,495	....	1,142,919	....
Operating allowance.....	268,799	....	2,561,207	....
Total allowances.....	362,295	15.50	3,704,126	16.63
Net earnings from operation.....	\$163,590	7.00	\$1,462,244	6.57
Miscellaneous income.....	3,611	.15	30,101	.13
Gross income less allowances.....	\$167,201	7.15	\$1,492,345	6.70
Taxes.....	32,107	1.37	310,598	1.39
Income, less allowances, etc.....	\$135,094	5.78	\$1,181,747	5.31
Interest.....	114,836	4.91	1,128,022	5.07
Surplus.....	\$20,258	.87	\$53,725	.24

BASED ON ACTUAL DISBURSEMENTS.

Gross earnings from operation.....	\$525,885	22.5	\$6,166,370	23.20
Disbursements for maintenance.....	\$68,705	....	\$1,283,058	....
Disbursements for operation.....	288,542	....	2,593,218	....
Total disbursements.....	357,247	15.28	3,876,276	17.40
Net earnings from operation.....	\$168,638	7.22	\$1,290,094	5.80
Miscellaneous income.....	3,610	.15	30,101	.13
Gross income, less disbursements.....	\$172,248	7.37	\$1,320,195	5.93
Taxes.....	32,106	1.37	310,598	1.39
Income, less disburs. and taxes.....	\$140,142	6.00	\$1,009,597	4.54
Interest.....	114,836	4.91	1,128,022	5.07
Surplus.....	\$25,306	1.09	*\$118,425	.53

*Deficit.

TABLE NO. 2.—BASED ON ORDINANCE ALLOWANCES FOR MAINTENANCE AND ACTUAL DISBURSEMENTS FOR OPERATION, DECEMBER, 1910.

Gross earnings from operation.....	\$525,885	22.50
Allowance for maintenance.....	93,495	....
Disbursements for operation.....	288,542	....
Total.....	\$382,037	16.34
Net earnings from operation.....	\$143,848	6.16
Miscellaneous income.....	3,610	.15
Gross income, less allowance and disbursements.....	\$147,458	6.31
Taxes.....	32,107	1.37
Income, less allowance, disbursements and taxes.....	\$115,351	4.94
Interest.....	114,836	4.91
Surplus.....	515	.03

BASED ON THE ORDINANCE ALLOWANCE.
(See Table No. 1.)

Surplus as shown in statement.....	\$20,257	.87
Deficit in operating reserve.....	19,742	.84
Actual surplus for the month.....	\$515	.03

MAINTENANCE RESERVE.

Allowance for the month.....	\$93,495	....
Expended for the month.....	68,705	....
Balance to be credited to previous deficit.....	\$24,790	....

OPERATING RESERVE.

Allowance for the month.....	\$268,799	....
Expended in the month.....	288,542	....
Deficit to be added to previous deficit.....	\$19,742	....
Deficit for four months (0.61 cents per car mile).....	\$54,305	....

Toledo Traction Situation

Mayor Whitlock of Toledo has continued to improve steadily. His illness, however, has delayed the franchise negotiations, as the City Council and city officials refuse to proceed without his aid.

On Jan. 18 the Mayor began to go over the tentative franchise prepared by City Solicitor Schreiber and the data that have been collected. It is said that differences of opinion over the proposed franchise have developed among the city officials. There has been some discussion as to the points that will be taken up first when the Council meets as a committee of the whole to begin the negotiations. Valuation and the rate of fare were to be taken up last, according to the understanding, and blanks were to be left in the draft of the ordinance to be filled in when these points were agreed upon. Paving, bridges, control of interurban cars, tracks and many other points will probably be taken up before property valuation and rate of fare are touched.

An informal conference of the officials of the Toledo Railways & Light Company was held on Jan. 17 to discuss the provisions of the tentative ordinance, but no statement will be made until the city takes definite action upon the various points. At the annual meeting of the stockholders of the company on Jan. 19 Frank Hafer, treasurer of the Milburn Wagon Works Company, and Charles F. Meilink, of the Meilink Manufacturing Company, were elected directors to succeed Dr. J. F. Demers, who died recently, and William B. Hale, who retired. The board organized by re-electing all of the old officers. The executive committee for the present will consist of President Albion E. Lang, Jay K. Secor, Toledo, and William E. Hutton, Cincinnati. The annual statement of the company will be presented at the meeting in February.

Subway Urged by Mayor of San Francisco

P. H. McCarthy, Mayor of San Francisco, Cal., has addressed a communication to the Supervisors of that city, in which he refers to the steadily increasing congestion in Market Street and recommends that they consider the advisability of constructing a subway system. In his letter the Mayor says, in part:

"Between 4 p. m. and 6 p. m. we find the sidewalks on both sides of Market Street, between Sansome Street and Sixth Street, inclusive, crowded to the extent of being uncomfortable for the pedestrian and a handicap to traffic and transportation wherever this moving mass of humanity is obliged to leave such sidewalk. What is true of Market Street in this regard is likewise true of other locations in this city, perhaps, however, in a lesser degree. I have in mind, for instance, certain intersections and transfer points in the Mission district and on Fillmore Street.

"I would respectfully recommend and urge that your honorable board, in view of the above facts, take under advisement the proposition of constructing subways which shall safeguard the pedestrian and facilitate both traffic and transportation, thereby proving of incalculable benefit and advantage to our people. The subway in this, as in other great cities, is inevitable, and particularly is that true of San Francisco, since Market Street is the great intersecting thoroughfare in a rapidly growing city, having as its feeders all the streets north of Market Street."

The public utilities committee of the Council will consider the recommendation.

Transit Affairs in New York

The Bradley Contracting Company, through its president, Frank Bradley, made an offer on Jan. 21, 1911, to the Public Service Commission to construct with the city's money the entire subway part of the triborough as laid out by the commission, to equip it, as well as the Fourth Avenue subway in Brooklyn and the Bridge loop, at its own expense, and to operate these lines upon such terms as the commission might determine. The proposal offers the city the right to take over these routes at any time by paying the cost of the equipment, plus 10 per cent. The offer to the commission follows:

"We hereby offer to construct the triborough route, for

which bids were submitted on Oct. 27, 1910, in accordance with the plans, specifications and terms which accompanied said bids, for the sum of \$85,437,561, or in accordance with such modifications for the triborough route as you may decide upon, at a cost proportionate to the above figure.

"We agree to equip at our expense the said triborough route, the Fourth Avenue route and the Brooklyn loop line route, and to operate them all in such manner and upon such terms as you in your judgment shall determine to be reasonable to us and to the city of New York, giving proper security for such equipment and operation.

"We agree at any time, upon your request, to turn over said roads or routes to the city of New York on payment of actual cost of the equipment, plus 10 per cent on such cost, or we will equip at our own expense said roads or routes and operate them for a period of years to be agreed upon."

William G. McAdoo, president of the Hudson & Manhattan Railroad, speaking at a meeting in Brooklyn on Jan. 19, 1911, outlined a plan for construction by the city of an independent subway system embracing the main features of the triborough route. The physical features of the system to which Mr. McAdoo referred are practically those of the original triborough with these modifications: Connections between the Centre Street loop subway with the three downtown East River bridges and the trunk line in Broadway, so as to allow the operation of trains from Brooklyn through the bridge loop subway up and down town over the main stem in Manhattan; these connections consisting of a link from Centre Street into Broadway at Spring Street and a link from the Brooklyn Bridge into Broadway at Vesey Street. The construction of a local loop from Lexington Avenue and Forty-second Street through Forty-second Street and Sixth Avenue to Thirty-fourth Street and thence down Broadway to rejoin the main line at Tenth Street. Reduction of the size of the triborough tube as adopted by the Public Service Commission to a cross section 9 inches higher than the subway operated by the Interborough Rapid Transit Company. The elimination of reservoir stations and the substitution thereof of separate loading and unloading platforms to avoid the collision of two streams of traffic at the express stations. An operating contract giving the city the right to take over the subway not only at the end of 10 years (as required by the present law) on payment of cost to the operator plus 15 per cent, but the right to take over at any time after one year on payment of the operator's cost plus 20 per cent. If universal subway transfers are deemed desirable, a provision in the operating contract of the independent line that it transfer at intersections with the subway operated by the Interborough Rapid Transit Company and a stipulation that the grant of such transfers by the Interborough Rapid Transit Company shall be a condition precedent to any extensions or third-tracking of its elevated lines. This, Mr. McAdoo estimates, could be built, with roadbed, track and signal systems, for \$107,000,000, and equipped by the operator with electrical apparatus of the most improved design, cars, power houses, storage yards, shops, &c., for \$47,000,000.

At the request of the Board of Estimate and Apportionment a hearing attended by members of the Staten Island Chamber of Commerce and several officials of that borough was held on Jan. 18, 1911, before the Public Service Commission on the proposed tunnel to connect Staten Island with either Brooklyn or the New Jersey shore. Several routes were suggested, but one from St. George to Sixty-fifth Street, Brooklyn, connecting with the Fourth Avenue subway, was the most favored. Borough President Cromwell said he thought any new subway system should include benefits for all boroughs, and that the work should begin in all five at once. He favored the St. George route because of the converging of all the railroad lines of his borough there. He said he had been informed by engineers that a tunnel could be built for about \$6,000,000.

The Pennsylvania Railroad has announced that unless some unforeseen hindrance should be introduced the high-speed line of the Hudson & Manhattan Railroad from the Saybrook Place terminal, Newark, to New York, will be placed in operation in July, 1911.

The Board of Estimate adjourned on Jan. 18, 1911, without taking any action on the subway proposal of the Inter-

borough Rapid Transit Company. A resolution was adopted, at the suggestion of Borough President McAneny, that the Mayor should appoint a committee to confer with the members of the Public Service Commission on rapid transit matters. Comptroller Prendergast raised the point that such conferences should be on subway matters in general and not only on proposals of the Interborough Rapid Transit Company. Communications received by the board which set forth reasons why the Broadway (Brooklyn) subway should be built were referred to committee of the whole.

Another Suit to Set Aside Chicago Settlement.—Clarence H. Venner has filed a suit in the United States Circuit Court at Chicago in which he asks the court to annul the agreement entered into between the Chicago Railways and the City of Chicago and to require all payments from the earnings of the company to the city thereunder to be refunded. He has also asked for an injunction to restrain further operations by the company under the agreement with the city pending a hearing of the suit. He alleges illegality of contract. The dismissal by the Supreme Court of the United States of a similar suit brought by Mr. Venner as a stockholder of the Chicago City Railway to set aside the street railway settlement ordinance of Chicago which was approved in 1907 and under which the Chicago City Railway now operates was noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 90.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The report of the committee on the initial public utilities bill of 1909 has been referred to the judiciary committee of the House. Senator Spellacy's resolution for a special joint committee to consider all measures relating to workmen's compensation acts was tabled again after brief consideration. The opinion seems to prevail that this matter should go to the judiciary committee. The Senate bill for an extension of time until Nov. 1, 1912, for constructing the Danbury & Bethel Street Railway has been referred to the committee on railroads. Feb. 2 has been fixed as the last date for the introduction of new measures. This date has also been selected for a hearing on all public utility measures.

Indiana.—The committee on railroads has recommended persons and corporations interested in the passage of legislation affecting railroads to confer with the Railroad Commission before having bills introduced. Senate bill No. 44, which makes railroads liable for damages by fires which escape from rights-of-way, has been passed. This measure gives the roads an insurable interest in property adjacent to the rights-of-way. House bill 156 would prohibit interurban railroads from employing motormen unless they have had at least one year's experience either as a steam or interurban trainman, and would make it obligatory for interurban roads to operate under a uniform set of rules ratified by the commission. Another bill would amend the Railroad commission act so as to require a report of an accident involving loss of life by telegraph to the commission immediately. The present law allows five days in which to make a report to the commission. House bill 155 would require all railroads to build, establish and maintain farm and foot crossings and provide gates at crossings where tracks cross a farm. A bill introduced in the Senate specifies a clearance of 21 feet for wires and obstructions which cross railroad tracks and regulates fastenings to prevent swagging. Senate bill No. 196 prescribes the distances at which interurban trains shall stop before crossing tracks of other lines.

Kansas.—Two bills to create public utility commissions have been introduced. One is known as the administration bill and the other as the Hodge measure. The so-called administration measure provides that the name of the Railroad Commission shall be changed to the Public Utilities Commission. The jurisdiction of the commission is extended to street railways, suburban electric railways, interurban railways, equipment and pipe line companies, railroads, water companies, electric companies, telephone and telegraph companies, etc. The bill would confer rate-making powers on the commission and give it power to prescribe the amount of stocks and bonds to be issued. Home rule jurisdiction is provided for Councils over local

utilities, with power to appeal to the commission where an amicable settlement between such Councils and companies cannot be effected. The Hedges measure calls for the election of a commission of three to have jurisdiction over railroads, street cars in two or more counties, telephones in five counties, pipe lines in two or more counties and other utilities. Strict home rule regulation is allowed for waterworks, electric lights and kindred utilities.

Massachusetts.—A bill has been introduced into the House to authorize the Worcester & Southbridge Street Railway to acquire the Worcester & Webster Street Railway and the Webster & Dudley Street Railway. A bill has also been introduced into the House to provide for placing underground within two years of the passage of the bill all electric wires in Boston which carry current at 600 volts or over. The recommendations of the Railroad Commission and Boston Transit Commission in regard to Boston subway extensions are met by a bill which would authorize the Boston Transit Commission to construct a subway or tunnel from a point in Atlantic Avenue, near the South Station, under Fort Point Channel and Dorchester Avenue to Andrew Square. The cost of the subway is to be provided by the issue of bonds by Boston. At the petition of the Massachusetts Street Railway Association a bill has been introduced to eliminate so far as possible abuses of the scholars' tickets which are required to be issued by companies in the State (excluding the Boston Elevated Railway). By Chapter 267, Acts of 1904, all street railways are required to print on transfer tickets issued to passengers the conditions under which such tickets may be used, and for the misuse of a transfer ticket a penalty is provided in the shape of a maximum fine of \$50 or a maximum imprisonment of 30 days. The new bill provides that the same course shall be followed with respect to scholars' tickets, with an additional section which provides that whoever uses or attempts to use a scholar's ticket for any purpose except to attend a session of the school in which he is a pupil or to return therefrom to his home, or disposes or attempts to dispose of a scholar's ticket, and whoever, not being such a pupil, attempts to use or dispose of such a ticket to a person not known by him to be a pupil, shall be subject to the above fine or imprisonment. A bill introduced in the Senate provides that damages for the loss of life through the negligence of a railroad or street railway may be collected within two years instead of one year, as at present provided. A bill introduced into the House provides for the State and city ownership of street railways. Bills have also been introduced which require the use of fenders, lifting jacks and other tools on street railway cars, for an investigation into the affairs of the Boston Elevated Railway and to provide for a determination of the value of the shares of stock of consolidated railroads and street railways.

Pennsylvania.—Little was done in the General Assembly during the week which ended on Jan. 21, 1911, beyond the appointment of committees and the passage of the supplemental appropriation measure. The draft of the proposed railroad commission bill extending the powers of the commission has been prepared. It contains about 30 sections. In the appointment of the committees Senator Keyser and Representative Riebel, Philadelphia, again head the committees on electric railways. Nearly 200 bills were introduced in the Senate and House at the opening session during the week commencing on Jan. 23, among them the following: To prohibit trespassing upon the rights-of-way of steam and electric railways; to require street railways to inclose the platforms of their cars; to require that from Nov. 1 to May 1 the front end of trolley cars should be inclosed for the protection of the motorman, with a penalty of \$500 for violation; to give the trustees of Valley Forge Park power to grant electric railway franchises through the park; to prohibit side running boards on summer cars, and to require motormen to be placed on all trailers of the Philadelphia Rapid Transit Company. Mayor Magee, of Pittsburgh, is interested in presenting a bill to supplant the Railroad Commission with a public utilities commission. The new bill would vest the commission with authority to compel compliance with its rulings and recommendations and would confer upon municipalities the right to construct and operate street railways and to acquire by condemnation street railways now in operation.

Financial and Corporate

New York Stock and Money Market

Jan. 24, 1911.

Under the persistent manipulation of professional traders the Wall Street market was pushed up a few points last week and the volume of trading increased slightly. There is considerable increase in activity in bonds and the investment demand is very encouraging.

Money continues to be plentiful and rates easy. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{1}{2}$ per cent; 90 days, $3\frac{1}{4}$ @ $3\frac{1}{2}$ per cent.

Other Markets

In the Philadelphia market thousands of shares of Rapid Transit and Union Traction changed hands during the week, but prices have not advanced. There has also been considerable dealing in American Railways with fractionally higher prices.

In the Chicago market there was increased activity last week in the certificates of the Chicago Railways. Series 2 was the most active of the lot and the price for this issue advanced about 2 points. There has also been very liberal trading in Railways, Metropolitan and Northwestern Elevated bonds. Price changes have not been important.

While there was some dealing on the Boston Stock Exchange last week in Massachusetts Electric and Boston Elevated, tractions as a rule were dull. Prices were somewhat lower.

In the Baltimore market there was very little trading in traction shares during the week; in fact, no important sales were made. The bonds of the United Railways continue fairly active at unchanged prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 17.	Jan. 24.
American Light & Traction Company (common).....	a288	a288
American Light & Traction Company (preferred)....	a105	a105
American Railways Company.....	a44½	a44½
Aurora, Elgin & Chicago Railroad (common).....	a40	a42
Aurora, Elgin & Chicago Railroad (preferred).....	83½	83
Boston Elevated Railway.....	129½	129½
Boston Suburban Electric Companies (common).....	a15½	a16
Boston Suburban Electric Companies (preferred)....	71	a71
Boston & Worcester Electric Companies (common)...	a10	a10½
Boston & Worcester Electric Companies (preferred)...	a39½	a39½
Brooklyn Rapid Transit.....	77½	77½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s..	83½	83½
Capital Traction Company, Washington.....	a129	a130
Chicago City Railway.....	a200	a200
Chicago & Oak Park Elevated Railroad (common)...	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)...	*7¼	*7¼
Chicago Railways, ptctg., ctf. 1.....	a99	a93
Chicago Railways, ptctg., ctf. 2.....	a24¼	a25
Chicago Railways, ptctg., ctf. 3.....	a9¼	a9
Chicago Railways, ptctg., ctf. 4.....	a6	a6½
Cleveland Railway.....	*91½	*91½
Consolidated Traction of New Jersey.....	a73	a73½
Consolidated Traction of N. J., 5 per cent bonds.....	a104	a104½
Detroit United Railway.....	a67¾	a71½
General Electric Company.....	a152	a152
Georgia Railway & Electric Company (common).....	a118	a118
Georgia Railway & Electric Company (preferred)....	87½	88
Interborough-Metropolitan Company (common).....	19½	19¼
Interborough-Metropolitan Company (preferred)....	54¼	52½
Interborough-Metropolitan Company (4½s).....	79½	79
Kansas City Railway & Light Company (common)...	a20½	a21
Kansas City Railway & Light Company (preferred)...	a71	a71
Manhattan Railway.....	140	140
Massachusetts Electric Company (common).....	a18	a18
Massachusetts Electric Companies (preferred).....	a84½	a86
Metropolitan West Side, Chicago (common).....	22½	21
Metropolitan West Side, Chicago (preferred).....	69½	*69½
Metropolitan Street Railway, New York.....	*19½	*19½
Milwaukee Electric Railway & Light (preferred)...	*110	*110
North American Company.....	66	70¾
Northwestern Elevated Railroad (common).....	a22½	a22½
Northwestern Elevated Railroad (preferred).....	a65	a63
Philadelphia Company, Pittsburgh (common).....	51½	53
Philadelphia Company, Pittsburgh (preferred)....	44¼	44½
Philadelphia Rapid Transit Company.....	20¾	20½
Philadelphia Traction Company.....	85	86½
Public Service Corporation, 5 per cent col. notes.....	a96	a96½
Public Service Corporation, ctf.	a110½	a115¾
Seattle Electric Company (common).....	a110	a110
Seattle Electric Company (preferred).....	a103	a102
South Side Elevated Railroad (Chicago).....	a72	a70
Third Avenue Railroad, New York.....	a11	a10½
Toledo Railways & Light Company.....	a8	a8
Twin City Rapid Transit, Minneapolis (common)...	a110½	a110
Union Traction Company, Philadelphia.....	a46¾	a48
United Rys. & Electric Company, Baltimore.....	*17	a17
United Rys. Inv. Co. (common).....	42¾	43
United Rys. Inv. Co. (preferred).....	66½	68
Washington Ry. & Electric Company (common)....	34	38½
Washington Ry. & Electric Company (preferred)....	a90	a89½
West End Street Railway, Boston (common).....	92¾	a91½
West End Street Railway, Boston (preferred)....	104¾	a105
Westinghouse Elec. & Mfg. Co.....	67	68
Westinghouse Elec. & Mfg. Company (1st pref.).....	*124	*124

a Asked. *Last sale.

Annual Report of the Interborough-Metropolitan Company

The annual report of the Interborough-Metropolitan Company for the year ended Dec. 31, 1910, presented by Theodore P. Shonts, the president, at the annual meeting of stockholders, show these receipts and disbursements:

Surplus balance of income account, Dec. 31, 1909..	\$738,308
RECEIPTS.	
Dividend of 9 per cent on 339,128 shares Interborough Rapid Transit Company stock.....	\$3,052,152
Interest on bank balances and loans.....	118,325
Credit allowed by the State of New York in the matter of revision of capital stock tax assessed and paid for, 1908.....	90,766
	3,261,243
Total.....	\$3,999,551
DISBURSEMENTS.	
Paid and accrued interest on \$67,825,000 Interborough-Metropolitan 4½ per cent collateral trust bonds.....	\$3,052,125
Administration and general expense account.....	\$92,426
Taxes.....	24,777
	117,203
Add amount of claim of Interborough-Metropolitan Company against the New York City Railway, cancelled in accordance with agreements of June, 1910.....	36,405
	\$3,205,733
Surplus income.....	\$793,818

Mr. Shonts says in his statement:

"On Feb. 10, 1909, a judgment was rendered against the Metropolitan Securities Company in a suit of the receiver of the New York City Railway Company for the balance alleged to be due under agreement of May 22, 1907, amounting to \$5,271,582, which judgment was subsequently affirmed by the circuit court of appeals. Various payments upon this judgment reduced the amount to July 1, 1910, with interest, to approximately \$4,495,000. In the meantime the receiver of the New York City Railway had instituted an action to collect the amount of the judgment from the stockholders of the Metropolitan Securities Company upon the ground that 25 per cent of their stock subscriptions remained unpaid. Your company being the owner of 293,920 shares out of a total issue of 300,000 shares, its liability for such unpaid balance would have amounted to \$7,348,000.

"There was also instituted by the receiver of the New York City Railway a suit against the Metropolitan Securities Company and certain of its former directors individually to recover the discounts on \$9,324,000 of 10-year 3 per cent debenture notes of the New York City Railway issued under agreement with the Metropolitan Securities Company, dated Feb. 14, 1902, at 70 per cent of par and subsequently redeemed at their face value amounting, with interest to July 1, 1910, to approximately \$4,000,000.

"Other suits were threatened and in course of preparation involving indirectly the Interborough-Metropolitan Company through its ownership of stock in the Metropolitan Street Railway and Metropolitan Securities Companies which, while there did not appear to be any sound legal ground upon which they could be maintained, nevertheless had their effect upon the company's credit. The certainty also that the company, in the most favorable aspect of the case, would have to pay out large sums of money, and the immense advantage of rescuing it from a mass of vexatious and possibly dangerous litigation impelled your directors to join in negotiations with the various claimants and the court having jurisdiction over the various receiverships for a final adjustment of all litigation. Under the terms of this settlement agreements were entered into and orders filed in court disposing, so far as possible, of all pending and threatened litigation upon the payment by the Metropolitan Securities Company of \$4,000,000, its contribution toward the amount required to effect such settlement. This amount was advanced by your company under an agreement by which it will be credited upon its unpaid subscription to the stock of the Metropolitan Securities Company.

"The franchise or capital stock tax assessed by the State comptroller for the year ended Oct. 31, 1908, was fixed at \$104,251. The company believed the amount and the principle on which it was assessed to be inequitable and instituted litigation to review the comptroller's determination. The courts upheld the company's contention and as a result the franchise tax for that year was reduced from \$104,251 to \$13,485, a saving to the company of \$90,766. A

like basis of reduction was applied in the taxes assessed by the State for the years 1909 and 1910.

"The administration expenses of your company for the year ended Dec. 31, 1909, were \$104,803 and for the year ended Dec. 31, 1910, \$92,426, a reduction of \$12,377.

"The reorganization of the Metropolitan Street Railway is still under active consideration, no definite agreement having yet been arrived at between the stockholders and the joint bondholders' committee. The sale of the property was postponed on Jan. 5, 1911, to Feb. 16, 1911.

"The surplus earnings of the Interborough Rapid Transit Company after the payment of the regular 9 per cent dividend for the fiscal year ended June 30, 1910, were \$2,932,147, an increase over the previous fiscal year of \$1,492,323."

Modification of International Traction Company Bondholders' Plan

On Jan. 20, 1911, the committee of bondholders of the International Traction Company, Buffalo, N. Y., which consists of R. L. Fryer, Thomas DeWitt Cuyler, Lewis Cass Ledyard, T. E. Mitten and Charles Steele, issued a notice to the owners of the 50-year, 4-per cent collateral trust gold bonds of the International Traction Company, and to the depositors under the bondholders' agreement, dated June 21, 1910, in which they said, in part:

"Pursuant to the terms of Article 5 of the bondholders' agreement, dated June 21, 1910, the committee acting under the said agreement has filed with J. P. Morgan & Company, New York, N. Y., a statement of a proposed change, modification or departure from the 'bondholders' plan' set forth in said agreement. The committee announces that more than two-thirds of the above-mentioned bonds have been deposited, and that such modification or change is made in compliance with the expressed wishes of the owners of large numbers of both deposited and non-deposited bonds. In place of the alternative rights of bondholders under the original bondholders' plan, to receive either 5 per cent bonds of the new company to the amount of 80 per cent of the par value of the deposited bonds or cash to the amount of 70 per cent of the par value thereof, the 'modified bondholders' plan' offers the single right to all holders of the company's bonds who have deposited or shall in the future deposit the same with the committee, upon the consummation of the plan, new 4 per cent bonds of the same par value as the deposited bonds, secured by a direct mortgage upon the physical properties and the franchises of the underlying and operating companies.

"The bonds of one of said series will bear interest at the rate of 4 per cent per annum and will be limited to an amount sufficient to enable the committee to make delivery thereof at par to depositors of 50-year, 4-per cent collateral trust gold bonds and coupons of the Traction Company deposited under the agreement as above set forth.

"The bonds of the other of said series shall bear interest not exceeding the rate of 5 per cent per annum, and shall comprise all bonds secured by the said mortgage that shall be required for the other purposes of the 'modified bondholders' plan' and of the said bondholders' agreement.

"No formal act of assent to the 'modified bondholders' plan' is necessary on the part of the present depositors. In case of dissent, withdrawals of deposited bonds must be made on or before Feb. 17, 1911.

"Pursuant to and in connection with the foregoing modified plan, the committee also announces that it has arranged for an advance to the holders of certificates of deposit to be issued for the 50-year, 4-per cent collateral trust gold bonds of the International Traction Company which shall be deposited with the committee under the bondholders' agreement and the modified plan, of the interest due July 1, 1910, and Jan. 1, 1911, on the bonds represented thereby, and also to the holders of certificates of deposit heretofore issued by the committee, of the interest due Jan. 1, 1911, on the bonds represented thereby, upon presentation of such certificates at the offices of J. P. Morgan & Company, the depositary under the agreement, the Manufacturers & Traders' National Bank, Buffalo, N. Y., or the United States Trust Company, Louisville, Ky., sub-depositaries, for the proper indorsement of such advances and for formal acceptance of such changed or modified plan thereon."

Austin (Tex.) Street Railway.—The Austin Street Railway has been incorporated in Texas as the successor to the Austin Electric Railway and has made a mortgage to the Equitable Trust Company, New York, N. Y., as trustee, to secure an issue of \$1,500,000 of first and refunding mortgage 5 per cent gold bonds. At present the company will issue \$250,000 of these bonds; \$350,000 will be reserved to retire \$350,000 of first mortgage 5 per cent bonds of the old company and \$900,000 will be reserved for future extensions, additions, etc. The new bonds are dated Jan. 2, 1911, and are due Jan. 1, 1936, but are subject to call at any time at 102½. The authorized capital stock of the company is \$1,250,000, consisting of \$750,000 of common stock and \$500,000 of 6 per cent non-cumulative preferred stock. Of this stock \$500,000 of common and \$250,000 of preferred are outstanding. The officers of the company are: W. H. Folts, Austin, president; A. L. Kelloch, secretary; E. P. Wilmot, treasurer.

Babylon (N. Y.) Railroad.—Judge Chatfield, in the United States Court in Brooklyn, has appointed Paul T. Brady and Willard B. King receivers for the Babylon Railroad, a subsidiary of the South Shore Traction Company, which was recently put into the hand of the same receivers, as noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, page 50.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—Control of the Buffalo, Lockport & Rochester Railway has formally passed to the so-called Beebe Electric Railway System. The new officers of the company follow: C. D. Beebe, Syracuse, N. Y., president; J. M. Campbell, Rochester, N. Y., vice-president and general manager; Frank A. Dudley, Niagara Falls, N. Y., second vice-president; Harold C. Beatty, Syracuse, N. Y., secretary; A. M. Michael, Syracuse, N. Y., assistant secretary; Willis A. Holden, Syracuse, N. Y., treasurer; W. W. Foster, Syracuse, N. Y., assistant treasurer; William Nottingham, Syracuse, N. Y., general counsel; C. D. Beebe, J. M. Campbell, Frank A. Dudley, H. C. Beatty, W. A. Holden, William Nottingham, C. W. Seamans, New York; E. R. Wood, Toronto; F. W. Roebeling, Jr., Trenton, and H. J. Clark, Syracuse, directors. The general offices of the company are in Syracuse, N. Y. The operating offices are in Rochester.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—The directors of the Chambersburg, Greencastle & Waynesboro Street Railway paid an initial dividend of 5 per cent on the \$300,000 of preferred non-cumulative stock on Jan. 16, 1911.

Chicago City & Connecting Railways, Chicago, Ill.—White, Weld & Company, New York, N. Y., and Chicago, Ill., offer for subscription at 100 and interest yielding 5 per cent \$1,250,000 of Calumet & South Chicago Railway first mortgage 5 per cent rehabilitation gold bonds dated Feb. 1, 1908, and due Feb. 1, 1927. The bonds are callable as a whole at the option of the company at 105 and interest on any interest date before July 1, 1912, on 30 days' notice. If the property of the company is purchased by the City of Chicago the bonds may be called for payment at par and interest on any interest date before maturity.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—The Wisconsin Railroad Commission has authorized the Chippewa Valley Railway, Light & Power Company to issue the following securities: (1) \$300,000 of additional common stock in order to acquire the property of the Chippewa Falls Water Works & Lighting Company and to finance additions and extensions made and to be made thereon; (2) \$250,000 of first mortgage 5 per cent 20-year gold bonds of 1907, for extensions and additions and additional equipment. The commission's authorization of Feb. 24, 1910, so far as it relates to \$100,000 of common stock, has been canceled.

Denver (Col.) City Tramway.—Clark, Dodge & Company, New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., offer for subscription at 95 and interest yielding 5.38 per cent \$1,653,000 of Denver City Tramway first and refunding sinking fund mortgage 25-year 5 per cent gold bonds dated Nov. 1, 1908, and due Nov. 1, 1933. Interest is payable May 1 and Nov. 1 at the office of the Mercantile Trust Company, New York, N. Y., or at the office of the Denver City Tramway, Denver, Col. The Mercantile Trust Company is trustee under the mortgage which secures the bonds.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—The Public Service Commission of the Second District of New York has authorized the Fonda, Johnstown & Gloversville Railroad to issue \$380,000 of its 4½ per cent 50-year bonds, secured by its first consolidated mortgage, the bonds to be sold at not less than 85 and the proceeds to be used for the payment of indebtedness to the amount of \$185,129.73, payment of various notes made for payment for pavements in Gloversville and Johnstown, new cars, cost of new carpenter shop at Gloversville, new railroad sidings at Amsterdam, ash track at power house at Tribes Hill and double tracking Main Street in Amsterdam. The authorization is made upon the condition that the company shall credit to its capital account and charge to its surplus the sum of \$22,000, the amount of replacement made in connection with the construction of the new double track in Amsterdam.

Johnstown (Pa.) Traction Company.—The Johnstown Traction Company has announced an initial annual dividend of 3 per cent on its \$500,000 capital stock, of which \$200,000 is said to be paid up.

Lancaster & Southern Street Railway, Lancaster, Pa.—A syndicate managed by George B. Atlee, Philadelphia, Pa., proposes to merge the Lancaster & York Furnace Street Railway, the Lancaster & Southern Street Railway and the Coleman Water & Power Company. For four years the Lancaster & York Furnace Street Railway and the Lancaster & Southern Street Railway have been embarrassed financially, and George B. Atlee conferred with representatives of the three companies recently and submitted a proposition for taking them over which was accepted and the syndicate which Mr. Atlee represents will pay the interest on the loans and assume the liabilities and pay the owners a fixed amount for their equity in the properties. An agreement has been made with the Conestoga Traction Company whereby it is to pay to the Lancaster & York Furnace Street Railway one-third of the fares of the passengers delivered to it by the Lancaster & York Furnace Street Railway.

Los Angeles (Cal.) Railway Corporation.—The Los Angeles Railway Corporation has made a mortgage to the Los Angeles Trust & Savings Bank as trustee to secure an issue of 5 per cent bonds of \$1,000 each, limited to \$20,000,000 in amount, dated Dec. 1, 1910, and due in 1940. Of the new bonds \$5,500,000 are reserved to retire an equal amount of underlying bonds that remain outstanding. The mortgage covers the purchase of the Los Angeles Railway, a portion of the Los Angeles & Redondo Railway, and narrow-gauge lines in Los Angeles formerly operated by the Pacific Electric Railway.

Louisville & Eastern Railroad, Louisville, Ky.—The Federal Court at Louisville has confirmed the purchase of the Louisville & Eastern Railroad by the Louisville & Interurban Railroad, which was announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, page 50, and the formal transfer of the property has been made.

Montreal (Que.) Street Railway.—The General Trusts Corporation, Montreal, Que., has addressed a letter to the shareholders of the Montreal Street Railway in Montreal asking for a 60-day option on their holdings at 235 a share on behalf of a client who desires a large block of the stock.

Northern Texas Traction Company, Fort Worth, Tex.—The Northern Texas Traction Company has filed with the Secretary of State an amendment to the charter of the company increasing its capital stock from \$3,500,000 to \$4,500,000.

Ocean Shore Railway, San Francisco, Cal.—The property of the Ocean Shore Railway was sold under foreclosure in San Francisco on Jan. 17, 1911, to representatives of the bondholders for \$1,035,000, the upset price.

Ohio Electric Railway, Cincinnati, Ohio.—Drexel & Company, Philadelphia, Pa., are said to have placed privately with financial institutions in Philadelphia an issue of \$7,000,000 of 6 per cent notes of the Ohio Syndicate which was organized to finance certain Ohio public service properties with which United Gas Improvement Company interests are identified, among them it is said the Ohio Electric Railway. According to the Philadelphia *Financial Bulletin*

the details, such as the time for which the notes are to run, the price at which they were sold to the institutions, the names of the members of the syndicate, etc., are known only to the participants in the negotiation. Continuing the *Financial Bulletin* says: "It is understood, however, that some of the leading interests in the United Gas Improvement Company are largely interested in the syndicate, that the negotiation is for the purpose of financing the further development of a number of going gas, electric lighting and trolley properties in Ohio, and that \$4,000,000 of stock in the enterprise has also been sold to Philadelphia investors. In general the financing has been arranged on much the same lines as were successful in the case of the 'Indiana Syndicate,' in which the same set of capitalists was interested."

Pacific Electric Railway, Los Angeles, Cal.—The merger of the Pacific Electric Railway and the Los Angeles Pacific Railway will become effective on Feb. 1, 1911, under the name of the Pacific Electric Railway. It is said that the merger of the Los Angeles & Redondo Railway and the Pacific Electric Railway has been decided upon, but that it has not been accomplished as far as the appointment of operating officials is concerned.

Puget Sound Electric Railway, Tacoma, Wash.—The Puget Sound Electric Railway has announced its plans for refunding \$1,500,000 of coupon notes due in 1911 and 1912 and paying floating debt of \$1,100,000 incurred in making improvements. Of the coupon notes \$1,000,000 mature on Feb. 1, 1911, and \$500,000 on Feb. 1, 1912. It is proposed to sell \$1,700,000 of new notes which are to be secured by pledging \$2,429,000 of consolidated 5 per cent and new refunding bonds and also to sell \$500,000 of unissued preferred stock and the further amount of \$116,700 of preferred stock, which is part of the \$625,000 of preferred stock of the company heretofore reported as outstanding, which has been held in trust for the company.

Quebec Railway, Light & Power Company, Quebec, Que.—The Quebec Railway, Light & Power Company proposes to apply to the Railroad Commission of Canada for permission to deed certain parts of its lines to the Quebec County Railway.

Rochester Railway & Light Company, Rochester, N. Y.—The Rochester Railway & Light Company has applied to the Public Service Commission of the Second District of New York for permission to issue mortgage bonds to refund obligations which amount to \$810,000.

Seattle (Wash.) Electric Company.—Harris, Forbes & Company, New York, N. Y.; Lee, Higginson & Company, Boston, Mass., and Esterbrook & Company, Boston, Mass., offer for subscription at 98½ and interest yielding 5½ per cent \$2,721,000 of Seattle Electric Company consolidated and refunding mortgage sinking fund 5 per cent gold bonds dated Aug. 1, 1907, and due on Feb. 1, 1929, with interest payable on Feb. 1 and Aug. 1 in Boston, Mass. The bonds are callable at 105 and interest on or after Aug. 1, 1912, in blocks of not less than \$500,000 or for the sinking fund. The Old Colony Trust Company, Boston, Mass., is trustee under the mortgage which secures the bonds.

Somerset Water, Light & Traction Company, Somerset, Ky.—The property of the Somerset Water, Light & Traction Company was sold under foreclosure on Jan. 16, 1911, at Somerset, Ky., to J. H. Gibson, Somerset.

South Penn Railways & Light Company, Cumberland, Md.—The South Penn Railways & Light Company, which was incorporated in New Jersey on Nov. 17, 1910, with an authorized capital stock of \$4,500,000, proposes, it is said, to merge the electric railways and electric light and power plants between Cumberland, Md., and Garret, Pa., including the Cumberland & Westernport Street Railway, and the Pennsylvania & Maryland Street Railway, and to construct an electric railway from Frostburg, Md., to Bcynton, Pa. V. A. Murray, D. Bellinger and J. R. Bradley, Camden, N. J., were the incorporators of the company. Among those who are said to be interested in the company are James Harts-horne, W. Hicks and George K. Preston, New York.

United Properties Company of California, San Francisco, Cal.—The United Properties Company of California, the incorporation of which was noted in the *ELECTRIC RAILWAY*

JOURNAL of Jan. 14, 1911, page 92, has organized as follows: F. M. Smith, president; William S. Tevis, first vice-president; R. G. Hanford, C. B. Zabriskie and W. R. Alberger, vice-presidents; C. B. Zabriskie, treasurer; F. W. Frost, secretary; Gavin McNab, general counsel. It was arranged that each official of the new company should be assigned to certain duties. F. M. Smith will have general supervision of all of the various kinds of business that are to be absorbed by the new company, but he will give most of his attention to the development of existing railways and those to be created. W. S. Tevis will assume direct charge of the water, electric light, heat, power and the land holdings. R. G. Hanford will have the financing under his direction. C. B. Zabriskie, in addition to his duties as treasurer, will attend to the handling of the funds and securities in New York. W. R. Alberger will be responsible for the railways, the water lines and general traffic matters.

Washington-Oregon Corporation, Vancouver, Wash.—The Washington-Oregon Corporation, which was organized in Vancouver on Dec. 9, 1910, with a capital stock of \$5,000,000, has concluded negotiations to take over the Vancouver Traction Company, the Vancouver Gas Company and the Vancouver Water Works Company.

Wilmington, New Castle & Southern Railway, New Castle, Pa.—Robert H. Richards purchased at foreclosure sale on Jan. 14, 1911, the portion of the Wilmington, New Castle & Southern Railway between New Castle and Delaware City. Mr. Richards is said to represent the bondholders.

Dividends Declared

Cities Service Company, New York, N. Y., monthly, $\frac{1}{2}$ of 1 per cent, preferred; monthly, $\frac{1}{4}$ of 1 per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, $\frac{1}{2}$ per cent, preferred.

Harrisburg (Pa.) Traction Company, 3 per cent.

Helena Light & Railway Company, Helena, Mont., quarterly, $\frac{1}{4}$ per cent, preferred.

Jacksonville (Fla.) Electric Company, 3 per cent, preferred; $\frac{3}{2}$ per cent, common.

Metropolitan West Side Elevated Railway, Chicago, Ill., quarterly, $\frac{3}{4}$ of 1 per cent.

North American Company, New York, N. Y., quarterly, $\frac{1}{4}$ per cent.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS COMPANY.

Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Dec.	'10	\$340,575	.....	.....	.....	.....
1 "	'09	316,867	.....	.....	.....	.....
6 "	'10	2,084,498	.....	.....	.....	.....
6 "	'09	1,943,386	.....	.....	.....	.....

EL PASO ELECTRIC COMPANY.

1m., Nov.	'10	\$59,985	\$33,438	\$26,548	\$8,224	\$18,324
1 "	'09	50,069	31,302	24,767	8,398	16,370
12 "	'10	635,157	364,603	270,494	100,916	169,578
12 "	'09	596,484	364,863	231,621	96,580	135,041

GALVESTON-HOUSTON ELECTRIC COMPANY.

1m., Nov.	'10	\$118,251	\$69,922	\$48,328	\$26,026	\$22,302
1 "	'09	109,058	61,246	47,812	22,986	24,827
12 "	'10	1,298,730	786,239	512,491	287,639	224,851
12 "	'09	1,202,675	705,482	497,193	251,536	235,657

GRAND RAPIDS RAILWAY COMPANY.

1m., Dec.	'10	\$96,274	\$54,973	\$41,301	\$19,248	\$22,053
1 "	'09	90,144	45,186	44,958	18,383	26,576
12 "	'10	1,132,578	563,265	569,313	237,653	331,660
12 "	'09	1,029,011	492,855	536,156	227,056	309,100

KANSAS CITY RAILWAY & LIGHT COMPANY.

1m., Dec.	'10	\$684,385	\$417,682	\$266,703	\$101,069	\$75,633
1 "	'09	622,049	377,571	244,478	172,062	72,416
7 "	'10	4,513,591	2,701,178	1,812,413	1,323,245	489,168
7 "	'09	4,173,697	2,396,205	1,777,492	1,209,122	568,370

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.

1m., Dec.	'10	\$37,694	\$24,706	\$12,988	\$13,735	\$747
1 "	'09	36,417	24,925	11,492	15,186	\$3,694
6 "	'10	292,985	166,617	126,368	82,413	43,955
6 "	'09	293,088	158,245	134,843	89,589	45,254

MONTREAL STREET RAILWAY.

1m., Dec.	'10	\$377,274	\$235,209	\$142,065	\$37,642	\$104,423
1 "	'09	337,563	212,006	125,557	34,481	91,076
3 "	'10	1,130,060	668,401	461,659	101,653	360,006
3 "	'09	1,026,441	586,879	439,562	96,345	343,218

TAMPA ELECTRIC COMPANY.

1m., Nov.	'10	\$43,249	\$22,980	\$20,269	\$6,213	\$14,056
1 "	'09	52,900	28,583	24,317	4,594	19,723
12 "	'10	602,099	334,243	267,856	63,202	204,654
12 "	'09	589,977	346,280	243,697	56,362	187,335

Traffic and Transportation

Service in Albany

The United Traction Company, Albany, N. Y., has replied to the Public Service Commission of the Second District of New York regarding the recommendations which it made to the company in regard to service over its Pine Hills and West Albany lines based on the investigation made for the commission by Charles R. Barnes, its electric railroad inspector. These recommendations were referred to at length in the ELECTRIC RAILWAY JOURNAL of Dec. 31, 1910, page 1283.

The company takes issue with many of the figures submitted by Mr. Barnes, and states finally that an analysis of its affairs will show that carrying out the wishes of the commission would greatly impair the credit of the company. If large cars are put on any line in Troy or Albany the company would be under pressure to equip every line in both cities with such cars, and as there are 237 closed cars on the company's line, of which 184 are 20 feet or under in size, a serious situation would be produced.

A number of important matters will have to be taken care of in the next few years other than the one now under consideration. Among them is the placing of the feed wires in the business district of Albany underground. The company says that this will involve an enormous outlay and the matter is of such vital importance that the engineer of the commission and the company's electrical engineers should reconcile their differences in figures, and the commission should give the officials of the company an opportunity to discuss the entire question after the figures have been reconciled.

In regard to the cost of power, the company asserts that actual conditions would make the cost 60 per cent more than the commission's figures. The company also questions the figures on the additional cost of power on the large cars over the 16-ft. cars, and says that there are many items of expense due to double-truck cars beyond the additional power consumed, namely, the wear and tear, the increased cost of accidents, the motor and truck repairs and the maintenance and paving expenses. The company concedes the correctness of the figures of the commission's engineer on the question of car houses, but says that if the small cars are replaced by double-truck cars these would have to be placed in the open or destroyed, and the book value of each car is placed in the neighborhood of \$2,200.

The company also insists that a new transformer station would be necessary. The company has in the past four years invested \$750,000 in a power station at Mechanicsville and in power lines, and is now considering a further investment of \$175,000. Had it not been for this investment Albany would have suffered in more ways than lack of street car facilities.

The company insists that the double-truck car which was recently tested ran more slowly than schedule during the rush-hour periods, whereas the schedule was maintained with the single-truck cars. After studying the result of the test of the three cars the officers of the company are sure that the requirements of Albany will be well cared for by providing a new design of single-truck car, that it will be possible for the company to run this car continuously at more frequent intervals than it could run the double-truck cars, that during the rush-hour period it will load and unload more quickly, that it will be operated at less cost, and that such a car can be provided by rebuilding the present 16-ft. cars. The company states that it would welcome an order to increase the speed of its cars in the downtown districts of Albany from 8 m.p.h. to 12 m.p.h., and will make every effort to obey such an order if made.

In relation to the body of the remodeled car No. 82, now running on the Pine Hills lines, the company says that the criticism is not a serious one, and that in remodeling other cars the platforms, height of steps, shape, size of seats or other changes can be made to suit the requirements; that the car was changed hurriedly to show and prove what could be done, with the special view of getting a car with exits at either end, wide platforms, wide doors, and that without inconvenience would carry a large number of people and allow them quick ingress or egress. The car probably rode less comfortably than the double-truck car because it was equipped with new springs.

The company is not aware of any double-truck car that weighs only 15 tons which is suitable for operation on the Albany bills. No question as to ability to operate double-truck cars has been involved. The question has been only as to the advisability of operating such cars. The cost of rebuilding all the old 16-ft. cars into cars of the type of No. 82, but changed to meet the objections of the commission's expert, would be not more than \$1,200 each, while a complete new car of this type would cost at least \$3,000. The cost of the double-truck cars would be \$7,000 each, and this would necessitate the scrapping of the 16-ft. cars, at a loss of \$2,200 each, less scrap value.

Adverse Report on Bill to Fix Fares of Standees

The following bill was recently introduced in the House of Representatives by Mr. Clark, of Florida, "to prescribe passenger rates on street cars within the City of Washington and to provide punishment for violating the provisions of the same":

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That no passenger on any street car operated on any line within the city of Washington who on boarding a car is not furnished with a seat before traveling one block shall be required to pay more than 2 cents fare for such transportation.

"Sec. 2. That any conductor who shall collect more than 2 cents fare, in violation of the provisions of Section 1 of this act, and who, upon demand therefor, shall refuse to return the amount over and above the said 2 cents so collected, shall be deemed guilty of a misdemeanor and on conviction shall be fined not less than \$10 nor more than \$50 for each and every offense.

"Sec. 3. That in addition to the punishment prescribed in Section 1 the company on whose line such overcharge shall occur shall be liable in damages in the sum of \$10 for each such overcharge to the passenger at his suit in any court of competent jurisdiction.

"Sec. 4. That this act shall take effect immediately upon its passage and approval by the President or upon its becoming a law without such approval."

The bill was referred to the Committee on the District of Columbia of the House, and was in turn referred to the Commissioners of the District of Columbia for examination and report. The Commissioners of the District have reported as follows:

"The bill provides that no passenger boarding any street car in Washington who is not furnished with a seat before traveling one block shall be required to pay more than 2 cents fare for such transportation, and makes it a misdemeanor, punishable by fine, for any conductor to violate its provisions. It also provides that the street railway on whose line an overcharge of fare is made shall be liable in damages, at the suit of the passenger, in the sum of \$10 for each such overcharge.

"Street railway companies operating in the District of Columbia under charters from Congress are authorized to charge a cash fare of 5 cents, but are required to sell six tickets for 25 cents. By section 16 of the Act of Congress approved May 23, 1908, entitled, 'An act authorizing certain extensions to be made of the lines of the Anacostia & Potomac River Railroad, the Washington Railway & Electric Company, the City & Suburban Railway of Washington, and the Capital Traction Company, in the District of Columbia, and for other purposes,' it is provided as follows:

"Sec. 16. That every street railroad company or corporation owning, controlling, leasing or operating one or more street railroads within the District of Columbia shall on each and all of its railroads supply and operate a sufficient number of cars, clean, sanitary, in good repair, with proper and safe power, equipment, appliances and service, comfortable and convenient, and so operate the same as to give expeditious passage, not to exceed 15 m.p.h. within the city limits or 20 m.p.h. in the suburbs, to all persons desirous of the use of said cars, without crowding said cars. The Interstate Commerce Commission is hereby given power to require and compel obedience to all of the provisions of this section, and to make, alter, amend and enforce all needful rules and regulations to secure said obedience; and said commission is given power

to make all such orders and regulations necessary to the exercise of the powers herein granted to it as may be reasonable and proper; and such railroad companies or corporations, their officers and employees, are hereby required to obey all the provisions of this section, and such regulations and orders as may be made by said commission. Any such company or corporation, or its officers or employees, violating any provision of this section, or any of the said orders or regulations made by said commission, or permitting such violation, shall be punished by a fine of not more than \$1,000. And each day of failure or neglect on the part of such company or corporation, its officers or employees, to obey each and all of the provisions and requirements of this section, or the orders and regulations of the commission made thereunder, shall be regarded as a separate offense."

"As will be seen by this section, street railroads are required to furnish and operate a sufficient number of cars to all persons desiring the use of said cars, without crowding, and the Interstate Commerce Commission is given power to enforce a compliance with these requirements. The commissioners believe that the enforcement of the provisions of this bill would be attended with so many difficulties that it would be practically inoperative, and would give rise to conditions of disorder, endangering the comfort and safety of the traveling public. During the rush hours of the morning and afternoon the street cars frequently carry many more passengers than are provided for by their seating capacity, and it is believed that it would be an impossibility for one conductor, or even two, to attempt to enforce the provisions of this bill. Such an attempt to carry out its provisions by collecting the lower rate of fare from all passengers on boarding the car, and then collecting an additional fare from those who obtain seats, or by collecting the full fare and giving a rebate to those passengers who are not provided with seats, would undoubtedly lead to interminable disputes between passengers and conductors, which would in all probability terminate in breaches of the peace. Moreover, it is not improbable that the practical effect of the passage of this bill might be to put a premium on traveling in a crowded car, and thereby aggravate the very condition which the bill intends to relieve, as a large proportion of the traveling public, to whom it would be no hardship to stand for one square, would deliberately board a car already over-crowded in order to effect a saving of car fare.

"The commissioners believe that the authority given the Interstate Commerce Commission to require a reasonably sufficient number of cars for carrying the traveling public should be ample to secure the desired result as far as it can be practically obtained, and they recommend adverse action on the bill.

"In this connection the commissioners invite attention to the bill now pending in Congress conferring upon them the powers of a public service commission. If this legislation was passed matters of a character contained in this bill could be given consideration by the commissioners."

The Objection of the Interborough Rapid Transit Company to Service Order

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., has issued a statement explanatory of the company's application for a rehearing on the recent order of the Public Service Commission of the First District of New York regarding service in the subway. The company does not object to the order to furnish a seat to every passenger during the non-rush hours, but to the method of determining whether or not the order is obeyed. The statement of the company follows:

"In view of the impression which seems to exist that the recent action of the Interborough Rapid Transit Company in requesting a rehearing regarding the last order of the commission, bearing date of Dec. 28, 1910, was a protest against this company's furnishing a seat to every passenger during non-rush hours, it is felt that in justice to ourselves the public should be told that the company has entered no such protest. There has been for some time in effect an order providing a seat for every passenger during non-rush hours, but the feature of the order of Dec. 28 which caused this company to request a rehearing was the fact that this

last order so modified the rule established by the commission when it first came into power, and which it has since adhered to, for determining whether the order was being violated as to double the chances of a technical violation of the commission's order by the company, besides making no allowances for accidents, unavoidable interruptions to the service, or an unexpected inflow of passengers at some point. What the company has objected to is not the order providing a seat for every passenger during the non-rush hours, but to the method of determining whether such order has been violated."

The rehearing before the commission, which was originally set for Jan. 12, 1911, has been postponed on account of the illness of counsel.

Five-Cent Zone Extended in Los Angeles.—The Los Angeles-Pacific Railway, Los Angeles, Cal., has extended the 5-cent fare zone on its Sixteenth Street-Venice line from Arlington, the former city limits, to the new city limits at Vineyard.

More Trains Added.—The Central California Traction Company has added two more trains each way between Stockton and Sacramento. One of them will be called the "Lodi Express" and will run via Lodi, without change of cars at Lodi Junction.

Want Car Stops Changed.—The Cincinnati Traction Company has received a request from Service Director Sundmaker to have cars make regular stops on the near side of the streets instead of on the far side as at present, especially in the business district.

Record of Accidents in Pennsylvania.—During the year 1910 187 people were killed and 4116 injured on Pennsylvania electric railways. The fatalities included 16 employees, 18 passengers and 27 trespassers. As compared to 1909 there was an increase of four killed on the electric railways.

New Car Service.—The Philadelphia Rapid Transit Company is now operating cars between Delaware Avenue and Market Street and Sixty-ninth Street and Market Street, in conjunction with the Philadelphia & West Chester Traction Company, over which route west of Sixty-third Street the cars pass.

Another No-Seat Ordinance.—Supervisor Hocks, of San Francisco, Cal., has submitted to the Council of that city a proposed ordinance which provides that passengers unable to secure seats on boarding a street car shall not pay more than a 3-cent fare. The bill has been referred to the public utilities committee of the Council.

Recommends Subway Where Canal Now Occupies Land.—A special committee of the Engineers' Club of Cincinnati, Ohio, has recommended that a proviso be inserted in the proposed bill which calls for the abandonment of a portion of the canal in Hamilton County, that a subway be constructed, to be under the control of the city, and that it be used by the interurban roads for an entrance to the city.

Ten-Car Trains in New York Subway.—The Interborough Rapid Transit Company, New York, N. Y., has placed several 10-car trains in regular service on its subway express lines. The company has announced that the work of extending the station platforms to accommodate the 10-car trains is well advanced, and that the number of 10-car trains in service will be increased as fast as the facilities of the company will permit.

Prepayment Cars in Brooklyn.—The Brooklyn Rapid Transit Company has placed two pay-within cars in operation on its Fifth Avenue line to operate from Thirty-sixth Street to Bay Ridge Avenue, and will soon place two pay-as-you-enter cars in operation on the same line. One of the pay-within cars has cross seats and the other has longitudinal seats. One of the pay-as-you-enter cars will have cross and the other longitudinal seats.

Reply Made to Protest.—The United Railways & Electric Company, Baltimore, Md., sent a reply to the protest of State Senator James Young and others concerning the fare and service on the Middle River line. At present cars are operated on a half-hour schedule with a 10-cent fare to Back River and a 15-cent fare to Middle River. In the reply the company claims that the schedule is arranged to meet traffic conditions and that the fare is just.

Officers Organize Club.—The executive officers and the department managers of the Lehigh Valley Transit Company, Allentown, Pa., have organized a "Get Together Club," which will meet once a month for a dinner, after which a discussion of various matters pertaining to the welfare and improvement of the company's service will be taken up. The idea of the club is not only to discuss the affairs of the company, but also to create a closer friendship among the department heads.

Employees to Receive Increase in Wages.—The Philadelphia & Westchester Traction Company has announced that the wages of its employees will be increased 1 cent an hour, beginning Feb. 1, 1911. In the notice to the employees, A. Merritt Taylor, president of the company, said: "It becomes my pleasant duty to inform you that the increase in the business of our company this winter has been larger than I anticipated and that the time has arrived when we can announce a new wage scale."

Service in Atlanta.—The Railroad Commission of Georgia has adopted an order for a hearing in Atlanta on Feb. 2, 1911, at which the Georgia Railway & Electric Company has been asked to show why, among other things, a 5-minute headway should not be adopted on certain specified lines of the company during the rush hours, why a 2½-minute headway should not be adopted on other specified lines during the rush hours and why a properly regulated all-night service should not be inaugurated and maintained by the company.

Toronto Railway Situation.—As previously stated in the ELECTRIC RAILWAY JOURNAL, the Ontario Railway and Municipal Board on Dec. 19, 1910, ordered the suspension for one month of the pay-as-you-enter system on such cars of the Toronto Railway as were not equipped with a fare box upon the rear platform. The company obeyed the order of the board and the pay-as-you-enter system has since been in operation only on the Yonge Street and College Street lines. In the meantime A. B. Ingram, vice-chairman of the board, has been on a tour of the different cities in the United States collecting data in regard to prepayment systems so as to report to the board and have that tribunal decide upon the type of car to be used by the Toronto Railway.

Ruling by Maryland Commission.—In the case of the Old Frederick Road Improvement Association against the United Railways & Electric Company, Baltimore, Md., the Public Service Commission of Maryland has ordered the company to establish satisfactory connections between the present terminus of its Catonsville line at Stoddards and its Ellicott City line at a point one-half mile away. The commission in passing on the matter pointed out the inconvenience caused by the abandonment of the trackage. The commission was further asked to reduce the fare on the Ellicott City line and order certain changes in the routing of the cars operated over it, but declined to do so on the ground that the facts set forth did not warrant such action. It has, however, accepted the proposition of the company which was made voluntarily to grant transfers from eastbound Ellicott City cars to eastbound Towson cars.

To Save Human Life.—The great number of deaths due to railway accidents in California has caused Frederick S. Hughes, founder of the American Safety League, to organize a branch of the order in Southern California. The next two months will be spent in giving instruction to some 65,000 pupils in the schools and colleges throughout the district around Los Angeles, the whole expense of which will be borne by the Pacific Electric Railway and the Los Angeles Railway. The rules to be taught patrons as to how to ride in safety are: "Wait until the car actually stops before getting on or off." "Don't step off a car backwards. Broken heads have resulted from this indiscretion." "Wait a second before starting to cross a street. Look. Open your ears. Then cross safely and go home without the help of an ambulance." "Teach the children that streets are not public playgrounds. Keep them on the sidewalks. Tell them every day to look out for wagons, automobiles and street cars." "Don't put your head or your arms out of car windows." "Don't ride on street car steps unless you must, then be careful." "Warn children against stealing rides." "Eternal caution is the secret of safety."

Personal Mention.

Mr. Edwin A. Barnitz, who has been purchasing agent of the York (Pa.) Railways, has been elected treasurer of the company. Mr. Barnitz will also retain the position of purchasing agent.

Mr. Charles R. Scott has been appointed master mechanic of the Dedham & Franklin Street Railway and the Medway & Medway Street Railway, Westwood, Mass., to succeed Mr. J. H. Smith.

Mrs. Lena Irwin Sweeney has been elected vice-president of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., to succeed Mr. W. G. Irwin, who has been elected president of the company.

Mr. B. E. Parker, formerly division superintendent of the Indiana Union Traction Company at Marion, Ind., has been appointed superintendent of transportation of the Rockford & Interurban Railway, Rockford, Ill.

Mr. M. G. Stees, contracting agent for the Edison Electric Light Company, York, Pa., has been elected secretary of the York Railways. Mr. Stees will also continue as contract agent for the Edison Light Company.

Mr. W. G. Irwin, vice-president and purchasing agent of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has been elected president of the company to succeed his father, Jos. I. Irwin, deceased.

Mr. J. B. Hammond, who has been connected with the Galveston-Houston Electric Railway, Galveston, Tex., since the construction of the road was started, has been appointed assistant superintendent of the company in charge of construction.

Mr. Wm. P. Kellett has resigned as general manager and chief engineer of the Grand Valley Railway, Brantford, Ont., to become general manager and chief engineer of the Lake Erie & Northern Railway, Brantford, which will build an electric railway from Brantford to Port Dover.

Mr. W. A. Sigsbee, who has been assistant auditor of the Los Angeles & Redondo Railway, Los Angeles, Cal., for some time, has been transferred to the Southern Pacific Company as a special auditor, with headquarters in San Francisco, and the position of assistant auditor with the Los Angeles & Redondo Railway has been abolished.

Mr. W. G. Ross, fourth vice-president of the American Electric Railway Association, is spending January in Egypt. He left Montreal Nov. 12 on a trip abroad, and he does not expect to return until next June. While in London he completed financial arrangements for important extensions to the electric railway system of the Quebec Railway, Light & Power Company, of which he is president.

Mr. James F. Shaw, president of the Providence & Fall River Street Railway, Swansea Center, Mass., president of the Citizens' Electric Street Railway, Newburyport, Mass., and formerly president of the American Street & Interurban Railway Association, has been elected president of the Long Acre Electric Light & Power Company, New York, N. Y., which has recently passed to the control of New England interests.

Mr. George H. Hart, who has been foreman of the car house of the Pawcatuck Valley Street Railway, Westerly, R. I., for three years, has been appointed superintendent of the company. Mr. Hart was foreman of the New London (Conn.) Street Railway for seven years, and was also foreman of the New London & East Lyme Street Railway for two years. For several years previous to entering street railway work he was employed by the New London Northern Railroad.

Mr. Wilbur B. Foshay has resigned as manager of the Pacific Power & Light Company, Walla Walla, Wash., to become manager of the Washington-Oregon Corporation, Vancouver, Wash., which has taken over the Vancouver Water Works Company, the Vancouver Traction Company and the Vancouver Gas Company. Mr. Foshay was with the New York Central & Hudson River Railroad for about five years. He then entered the employ of the United Gas Improvement Company at its branch at Tarrytown, N. Y. He next became assistant to the manager of the water, light and gas company at Hutchinson, Kan. Subsequently he entered the employ of one of the subsidiary companies of the New Jersey Zinc Company at Depew, Ill. He was

also general manager of the gas and electric properties at Fort Dodge, Ia., and manager of the natural gas and electric properties at Wichita, Kan.

Mr. George B. Wheeler, who was elected president of the Wisconsin Electrical Association at the annual meeting of the association in Milwaukee on Jan. 18 and 19, 1911, was graduated from Bowdoin College. After engaging in journalism for a number of years Mr. Wheeler entered the electric railway field in 1891 as general manager of the Eau Claire Street Railway, Light & Power Company, Eau Claire, Wis. Subsequently he was receiver of the property in the United States Court, and after the reorganization he was elected secretary and general manager of the property, which has since been succeeded by the Chippewa Valley Railway, Light & Power Company. This company now owns all the



G. B. Wheeler

water power on the Menominee River and a valuable water power on the Chippewa River and supplies all the current used in Eau Claire, Chippewa Falls, Menomonie and Bloomer, Wis., Red Wing, Minn., and numerous small towns.

Mr. L. H. McCray, who was superintendent of the Atlantic Shore Line Railway, has been elected general manager of the Atlantic Shore Railway, Kennebunkport, Maine, which has succeeded the Atlantic Shore Line Railway. Mr. McCray entered the employ of the Atlantic Shore Line Railway in 1908 and shortly afterward was appointed trainmaster and assistant to Mr. E. B. Kirk, general manager of the company. Mr. McCray began his railway work with the Winnebago Traction Company, Oshkosh, Wis., which he served in various capacities from 1904 until 1907, when he resigned as assistant foreman of the transportation department of the company to become superintendent of the Sterling, Dixon & Eastern Railway, Sterling, Ill. Mr. McCray continued with the Sterling, Dixon & Eastern Railway, Sterling, Ill., until March 15, 1908, when he resigned from the company to become connected with the Atlantic Shore Line Railway.

Mr. E. B. Peck, Indianapolis, Ind., the newly elected president of the Central Electric Railway Association, was born in the western part of New York State in 1860 and



E. B. Peck

was educated in the common schools of that State. During his early business career Mr. Peck moved to Kansas City, Mo., where he was associated with the Barber Asphalt & Paving Block Company for several years. About 11 years ago he went to Indianapolis as secretary to Mr. H. J. McGowan, who had recently secured control of the properties in and around Indianapolis with which he is now associated, and gained his first railroad experience while acting as secretary to Mr. McGowan.

In 1900 Mr. Peck was appointed manager of the Broad Ripple Traction Company, Indianapolis, and since that time has had many executive duties in connection with the McGowan properties. In 1907 he was elected vice-president and comptroller of the Indianapolis Traction & Terminal Company, in which capacity he has general supervision of terminals and buildings owned and controlled by the company.

Mr. John Fennimore, who was appointed assistant general manager of the Joplin & Pittsburg Railway, Pittsburg, Kan., recently, was born in Pittsburg on July 15, 1881, and has

been connected with the Joplin & Pittsburg Railway for seven years. Prior to June 1, 1908, Mr. Fennimore served as a motorman and a conductor. On June 1, 1908, Mr. Fennimore was placed in the department of claims and served as head of the claim department till he was made assistant general manager of all the lines of the Joplin & Pittsburg Railway. Prior to June, 1910, Mr. Robert Biles was in charge of the south lines of the Joplin & Pittsburg Railway, covering about 75 miles of trackage, and Mr. L. H. Phillips was general manager and superintendent of the Pittsburg & Kansas City Railway, covering about 30 miles. Those two roads were consolidated in June, 1910, and Mr. Fennimore was subsequently given the position of assistant general manager of the 105 miles of trackage, as both Mr. Phillips and Mr. Biles resigned. The company also does a lighting business in the towns in Southwest Missouri in which it operates.

Mr. H. E. Chubbuck, executive vice-president and general manager of the Illinois Traction System, Peoria, Ill., was elected president of the Illinois Electric Railway Association at the meeting held in Chicago, Ill., on Jan. 19, 1911, at which the association organized permanently. Mr. Chubbuck is one of the most influential men in the electric railway field in the Middle West. For more than 12 years now he has been associated with Mr. William B. McKinley in the management of the Illinois Traction System and other properties familiarly referred to as McKinley properties. Biographical sketches referring at length to Mr. Chubbuck's railway and business career were published in the *ELECTRIC RAILWAY JOURNAL* of Oct. 17, 1908, and Feb. 19, 1910. The systems embraced in the Illinois Traction System and the Western Railways & Light Company aggregate about 700 miles of line and are greatly diversified. Despite this Mr. Chubbuck has been very successful in bringing them to a high state of operating efficiency and in preserving and fostering the friendly relations between the companies and the public and in maintaining an *esprit de corps* among the employees.



H. E. Chubbuck

OBITUARY

G. E. Schmelz, vice-president of the Newport News & Old Point Railway & Electric Company, Newport News, Va., is dead. Mr. Schmelz was a member of Schmelz Brothers, bankers, Newport News, Va.

Charles J. Hughes, Jr., Democratic United States Senator from Colorado, died at his home in Denver, Col., on Jan. 11, 1911, after nearly a year's illness. Mr. Hughes was born in Kingston, Mo., on Feb. 16, 1853. He was graduated from the University of Missouri in 1873 and taught school for a time, but abandoned teaching for the law in 1877, when he went to Colorado. Mr. Hughes was counsel for the Denver (Col.) Tramway Company before he went to Washington as Senator from Colorado.

Henry W. Brown, auditor to the receivers of the Metropolitan Street Railway, New York, N. Y., and president of the Transportation Equipment Company, died at his apartment in New York on Jan. 19, 1911. Mr. Brown was born at Wilkes-Barre, Pa., March 4, 1876. He was educated in the public schools of Buffalo, N. Y. When a young man he went to St. Paul and became connected with the St. Paul & Duluth Railroad, with which he continued until its acquisition by the Northern Pacific Railroad. He came to New York in 1900 and in 1906 was made comptroller of the New York City Railway. In 1907 he was appointed general auditor of the New York City Railway and controlled companies, and on Sept. 25, 1907, was made auditor to the receivers of the Metropolitan Street Railway. He was a member of the New York Railroad Club and the American Electric Railway Accountants' Association.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

*Willimantic & Stafford Street Railway, Stafford Springs, Conn.—Application for a charter has been made in Connecticut by this company to build an electric railway through Tolland and Windham Counties to connect Willimantic, Mansfield Center, South Willington, Spring Hill, Storrs, Mansfield and Stafford Springs. Incorporators: L. T. Storrs, A. W. Buchanan and C. W. Comstock.

*Indianapolis, Nashville & Southern Traction Company, Indianapolis, Ind.—Application for a charter has been made by this company in Indiana to build an electric railway to connect Indianapolis, Bloomington, Bedford, Mitchell, Nashville, Paola, French Lick and Evansville. Capital stock, \$150,000. Headquarters: Indianapolis. Incorporators: John A. Johnson, Thomas F. Wakeland, John A. Shaffer, Robert J. Espy and George W. Long.

Twin City Electric Company, South Bend, Wash.—Incorporated in Washington to build an electric railway from South Bend to Raymond, a franchise has been granted in South Bend and work will begin in the spring. Capital stock, \$10,000. Incorporators: J. D. Crary, Aberdeen, and J. B. Bridges. [E. R. J., Jan. 21, '11.]

FRANCHISES

Burbank, Cal.—The Pacific Electric Railway has received a 50-year franchise from the Board of Supervisors to build a line on Fourth Street in Burbank.

San Diego, Cal.—The San Diego Electric Railway has received a franchise from the City Council to extend its railway from Old Town to La Jolla.

Bridgeport, Conn.—The Bridgeport & Danbury Electric Railway, Bridgeport, will ask the Common Council for a franchise to build a single track line from the present terminal of the Connecticut company on North Main Street, in Bridgeport, to the Trumbull town line. A. W. Sperry, chief engineer. [E. R. J., July 9, '10.]

Terryville, Conn.—The Bristol & Plainville Tramway, Bristol, has asked the Secretary of State for an extension of its franchise so that it may extend its lines on Agency Avenue and South Main Street, in Terryville.

Louisville, Ky.—The Louisville Railway will ask the City Council for a franchise to extend its Main Street line to Thirtieth Street in Louisville.

East Orange, N. J.—The Public Service Railway, Newark, has asked the City Council for a franchise to connect the Orange and Passaic Valley line with the Orange road line, in Montclair, by means of a track through North Park Street.

Patchogue, N. Y.—The Suffolk Traction Company, Patchogue, has asked the Town Board for an extension of time on its franchise for the completion of its cross-island section between Patchogue and Port Jefferson.

Hamilton, Ohio.—The Cincinnati Traction Company will ask the City Council for certain franchises to build extensions of its lines in Hamilton.

Medford, Ore.—Dr. J. F. Reddy, representing a syndicate of capitalists who contemplate building an electric railway through the Rogue River Valley, will ask the City Council for a franchise to construct a railway in Medford. [E. R. J., Jan. 1, '10.]

*Chattanooga, Tenn.—C. E. James will ask the City Council for a franchise to build several interurban railway lines into Chattanooga.

Palestine, Tex.—The Corpus Christi & Interurban Railway, Corpus Christi, will ask the City Council for a franchise to build its railway through Palestine. V. S. Heinly, Corpus Christi, secretary.

TRACK AND ROADWAY

Mobile Light & Railroad Company, Mobile, Ala.—This company will build an extension of its Spring Hill Avenue line several miles long to connect with the Government Street line in Mobile.

***Arkansas Interurban Railway, Little Rock, Ark.**—This company is preparing plans for building a 70-mile railway from Little Rock to Hot Springs and a belt line at Little Rock. H. H. Edwards, 764 Oakwood Boulevard, Chicago, is interested.

Stockton Terminal & Eastern Railroad, Stockton, Cal.—This company advises that it is now constructing a 13-mile steam railway between Stockton and Linden, and that it will electrify this line next year. Nothing has yet been decided as to the necessary equipment. It also expects to build a railway from Bellota to Jenny Lind, a distance of 13 miles, during 1911.

Wilmington, New Castle & Southern Railway, New Castle, Del.—This company contemplates numerous improvements to its railway, and it is now surveying for several extensions.

***De Leon Springs, Fla.**—It is stated that Col. R. A. Hammond, New York, has organized a company to build an electric railway from De Leon Springs to De Land.

Illinois Traction System, Peoria, Ill.—During 1911 this company proposes to build from Morris to Joliet, via Minooka and Rockdale, a distance of about 22 miles. This will be an extension to the Chicago, Ottawa & Peoria Railway, one of the corporations of the Western Railways & Light Company, under same management and control as this company.

Bloomington, Pontiac & Joliet Electric Railway, Pontiac, Ill.—It is said that this company will build an extension of its line from Chenoa to Bloomington.

***Goshen, Ind.**—John M. Kinney is considering the construction of an interurban railway from Goshen to Albion and Kendallville. This will complete the gap between Butler and South Bend.

Ft. Wayne & Toledo Electric Railway, Harlan, Ind.—This company states that considerable grading has been done and some bridges are built. It expects to build its proposed 44-mile electric railway to connect Ft. Wayne and Marysville, Ind., and Hicksville, Bryan, Farmer and Toledo, Ohio, with a spur of 11 miles to Montpelier, Ohio, during 1911. R. T. Bastress, Harlan, general manager. [E. R. J., Nov. 12, '10.]

Indiana Northwestern Traction Company, Monticello, Ind.—Owing to the failure of Eugene Purtelle, of Chicago, who was interested in the Indiana Northwestern Traction Company, it is probable that the plans of this company to build an electric railway to connect Cedar Lake, Hammond, Crown Point and Chicago will probably be abandoned, especially as the company was unable to secure a franchise in Hammond. Surveys had been partially completed and four miles of grading had been done. [E. R. J., Sept. 17, '10.]

Boone (Ia.) Electric Company.—This company contemplates building a mile extension to its railway in Boone. It also expects to construct an amusement park at an initial cost of about \$15,000.

Charles City & Western Railway, Charles City, Ia.—This company completed and placed in operation on Jan. 1 its 14-mile railway between Charles City and Marble Rock. C. W. Hart, president.

Portland (Maine) Railroad.—This company has been asked to extend its electric railway line in Cape Elizabeth from its present stopping place at the Pond Cove School House to Crescent Beach.

Frederick (Md.) Railroad.—This company will build from Jefferson to Brunswick, a distance of 8 miles, during 1911.

***Crystal Valley, Mich.**—I. C. Harwood, Crystal Valley, and associates are said to be promoting plans for building an electric railway to connect Crystal Valley and Pentwater.

Lansing & Northeastern Electric Railway, Detroit, Mich.—It is stated that this company, which has nearly completed its 30-mile electric railway from Lansing to Owosso, will take over the Owosso & Corunna Electric Company's line and operate it in connection with its new line.

Meridian Light & Railway Company, Meridian, Miss.—About 2 miles of new track will be constructed by this company during 1911.

Metropolitan Street Railway, Kansas City, Mo.—This company has completed and placed in operation the extension

of its Roanoke line, known as the Forty-fifth Street loop, in Kansas City.

Helena Light & Railway Company, Helena, Mont.—This company is securing right of way for building a 2-mile extension of its railway in Helena.

Newark & Marion Railway, Newark, N. Y.—This company has under consideration a proposition to extend its railway from Marion to Williamson, N. Y., and thence to Lake Ontario, probably to Poultnerville. Such an extension will give this company a lake port as well as connection with the Rome, Watertown & Ogdensburg division of the New York Central lines.

New York State Railways, Rochester, N. Y.—About 2 miles of railway will be built by this company in Rochester during 1911.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—This company is now making surveys from a point just north of North Syracuse, at Stop 9, on the Bay Road, by way of Brewerton to Central Square. It is expected to extend this branch to Watertown.

Syracuse, North Shore & Northern Railroad, Syracuse, N. Y.—This company, which is building an extension of its railway from Fulton to Oswego, has been able to perform but little work owing to the extreme severity of the weather since Dec. 15, but it is expected that the line will be in operation by midsummer, when through limited service will be installed from Syracuse to Rochester.

Tidewater Power Company, Wilmington, N. C.—This company will build about 2 miles of track during 1911.

Carolina Traction Company, Winston-Salem, N. C.—Contracts will be awarded immediately by this company for building its 92-mile interurban railway to connect Winston-Salem, Rural Hall, Lawsonville and Danbury, N. C., and Floyd, Va. The company has secured water rights and will erect a power plant at Dan River. A. M. Clark, Southern Pines, N. C., president.

Columbus, Marion, Upper Sandusky & Toledo Traction Company, Marion, Ohio.—Frank M. Ohl, Toledo, is engaged in interesting local men at Tiffin and other places in the proposed electric railway to connect Marion, Tiffin, Upper Sandusky, Fostoria, Columbus and Toledo. [E. R. J., Feb. 19, '10.]

Hamilton & Buffalo Railway, Hamilton, Ont.—It is reported that this company is considering plans for the electrification of the Hamilton and Waterford branch of its railway.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—This company has completed and placed in operation its new line from Welland to Port Colborne, on Lake Erie. Passengers will be transferred temporarily at the Michigan Central Railway crossing south of Welland, pending permission from the Railway Commissioners to put in grade crossing, after which through cars will be operated.

Oregon Electric Railway, Portland, Ore.—During 1911 a 75-mile extension will be constructed by this company between Salem and Eugene.

Lancaster & York Furnace Street Railway, Lancaster, Pa.—George B. Atlee, of George B. Atlee & Company, Philadelphia, Pa., has arranged to take over this company and the Lancaster & Southern Street Railway, and proposes to make a number of changes in the route of the two railroads so as to make them continuous and also to build several extensions.

Aberdeen (S. D.) Street Railway.—From 2 to 4 miles of track will be built by this company in Aberdeen during this year.

Houston (Tex.) Electric Railway.—About 4 miles of new track will be built by this company in Houston during 1911.

***Malad, Utah.**—Earle M. Dives and Lewis D. Jones, Malad, are said to be completing the preliminary arrangements for building a 65-mile electric railway to connect Malad and American Falls.

Bellington-Skagit Railway, Bellington, Wash.—This company will construct its 32-mile railway from Bellington to Mount Vernon during 1911. A branch will be extended to Sedro Woolley. Charles M. Drummond, president. [E. R. J., Aug. 6, '10.]

Spokane (Wash.) Traction Company.—Preparations are being made by this company to extend its Corbin Park line a distance of 2 miles, and its North Howard Street line about a mile in Spokane.

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—The building of a 27-mile extension from Morgantown to Fairmont is being planned by this company. E. Herch, general manager.

SHOPS AND BUILDINGS

Los Angeles Pacific Company, Los Angeles, Cal.—It is reported that this company will build a new car house on the Southern Pacific Athletic Park. The company's new car house at Sherman is about completed.

Iowa City (Ia.) Electric Railway.—It is reported that this company has awarded the contract to T. S. Leabke & Company, 112 Clark Street, Chicago, for building a 1-story station at Murphysboro, Ill. The structure will be 24 ft. x 123 ft., and of brick construction. It is expected to begin work soon.

Old Colony Street Railway, Boston, Mass.—This company has completed and placed in operation its new car house at Brockton. It has a capacity of 75 cars, and has cement floors, pits and sand-dryers for the cars. It also has a steam-heated lobby for the men.

Detroit (Mich.) United Railway.—This company is preparing plans to build a depot at Royal Oak, Mich., in the spring.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—This company is said to be considering plans for building a 1-story station in Lakeville this summer. The cost is estimated to be about \$2,500. This company is also planning to build a station in Northfield.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company and the Minneapolis, St. Paul, Rochester & Dubuque Traction Company are considering plans for building a passenger station in Minneapolis, to be used jointly by both these companies. The cost of the structure will be about \$5,000.

Great Falls Electric Properties, Butte, Mont.—The car houses and repair shops of this company at Black Eagle Park, Great Falls, were destroyed by fire on Jan. 12. The loss is estimated to be about \$20,000, all of which is covered by insurance. It is expected that the company will build new car houses and repair shops on a new site to be selected and construction will begin as soon as the weather permits. A temporary building will be erected near the old site.

Morrisburg & Ottawa Electric Railway, Ottawa, Ont.—It is stated that this company will soon erect a freight and passenger terminal station at Main Street and Hawthorne Avenue, in Ottawa, in the near future. [E. R. J., Jan. 21, '11.]

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—A site in Waynesboro has been bought by this company upon which a new car house and warehouse will be erected during the present year.

POWER HOUSES AND SUBSTATIONS

Boone (Ia.) Electric Railway.—This company will install four 300-hp boilers, one 500-kw unit, 2300-volt, 60-cycle three-phase; one 200-kw motor generator set 500-volt d.c. for street railway and switchboard for above. It will also build a concrete stack 210 ft. high, 10 ft. at top. John Keynolds Boone, purchasing agent.

Lancaster & York Furnace Street Railway, Lancaster, Pa.—George B. Atlee, of George B. Atlee & Company, Philadelphia, Pa., has arranged to take over this company and the Lancaster & Southern Street Railway, and will operate these properties in the future as one, from a common power house.

Warren & Jamestown Street Railway, Warren, Pa.—This company expects to change the line and equipment of its railway from the present single-phase alternating current to the direct-current system, thereby necessitating the building of two new rotary converter substations, which will probably be located at Frewsburg and North Warren.

Manufactures & Supplies

ROLLING STOCK

City & Suburban Railway, Brunswick, Ga., will purchase one gasoline motor car.

Philadelphia & Easton Electric Railway, Doylestown, Pa., is in the market for two additional cars.

Manhattan City & Interurban Railway, Manhattan, Kan., will purchase three new interurban cars.

Union Street Railway, New Bedford, Mass., will purchase 32 new cars as authorized by the directors.

Norfolk & Portsmouth Traction Company, Norfolk, Va., has ordered from 8 to 15 pay-as-you-enter cars.

Sydney & Glace Bay Railway, Sydney, N. S., will purchase one four-motor equipment for snow plow.

Sioux Falls (S. D.) Traction System is in the market for two semi-convertible cars and one or two open cars.

Shawnee (Okla.) Electric Railway is in the market for eight interurban passenger cars and one baggage car.

Citizens Railway, Waco, Tex., is in the market for six 30-ft. 8-in. semi-convertible, single-end prepayment cars.

Winona Railway & Light Company, Winona, Minn., is in the market for four 20-ft. passenger cars, with complete equipment.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex., is in the market for four 32-ft. or 34-ft. semi-convertible cars.

Denver (Colo.) City Tramway has ordered 16 45-ft. closed cars, with Brill trucks, and 25 38-ft. trail cars, for city service, from the Woeber Car & Manufacturing Company, Denver, Colo.

Geary Street Municipal Railway, San Francisco, Cal., noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, as being in the market for 200 cars, will purchase only 20 steel cars of the pay-as-you-enter type.

Connecticut Company, New Haven, Conn., has ordered 200 GE-80, four-motor car equipments, with K-35 controllers and 20 GE standard straight-air brake equipments, with CP-27 compressors, from the General Electric Company.

Portland Railway, Light & Power Company, Portland, Ore., has placed an order with the General Electric Company for 40 70-hp, two-motor car equipments. Of these 25 will be GE-218, type B motors, with K-11-A controllers, while 15 will be GE-210, type E motors, with Sprague-General Electric type M control.

Lake Shore Electric Railway, Cleveland, Ohio, noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, as having ordered four passenger, baggage and smoking cars from the Jewett Car Company, Newark, Ohio, has specified the following details:

Seating capacity.....	64	Air brakes....	Westinghouse
Weight	30,000 lb.	Car trimmings.....	bronze
Length of body....	49 ft. 7 in.	Curtain fixt. ..	Curtain S. Co.
Over vestibule.....	59 ft.	Curtain material...	Pantasote
Width over sills....	8 ft. 4 in.	Hand brakes.....	geared
Over posts at belt..	8 ft. 4 in.	Heating system...	hot water
Sill to trolley base..	9 ft. 5 in.	Headlights.....	Mosher arc
Height, rail to sills....	40 in.	Sanders.....	De France Air
Body	wood	Seats.....	H. & K. 110 CE.
Interior trim.....	mahogany	Seating material.....	plush
Underframe	composite	Trolley retrievers..	Knutson

TRADE NOTES

Sangamo Electric Company, Springfield, Ill., has made a large shipment of integrating mercury flotation watt-hour meters to Manila, Philippine Islands.

McKeen Motor Car Company, Omaha, Neb., has shipped two 70-ft., 200-hp gasoline motor cars to the Southern Pacific Railroad under their own power.

Lackawanna Steel Company, New York, N. Y., has appointed H. H. Barbour district sales agent for the metropolitan district with offices at 2 Rector Street, New York.

Baldwin Locomotive Works and the Standard Steel Works Company, Philadelphia, Pa., have moved their St. Louis offices from 914 Security Building to 1613 Wright Building.

Carnegie Steel Company, Pittsburgh, Pa., announces that H. P. Bope, vice-president of the company, has been appointed general manager of sales, to succeed S. A. Benner.

McGuire-Cummings Manufacturing Company, Chicago, Ill., has appointed M. L. Kirschke, Jr., mechanical engineer of the company. Mr. Kirschke was formerly connected with the Pullman company.

Chicago Pneumatic Tool Company, Chicago, Ill., has acquired the gasoline hand-car business of the Duntley Manufacturing Company, Chicago, Ill., and in future will make these cars on a large scale.

Hall Signal Company, New York, N. Y., has appointed H. B. Taylor special designing engineer of the company. Mr. Taylor formerly held a similar position with the Federal Signal Company, Albany, N. Y.

Ackley Brake Company, New York, N. Y., has shipped a large number of brakes to the Sociedad Comercial de Montevideo and also to the Transatlantica Compania de Tranvias Electricos, Montevideo, Uruguay.

Perry Ventilator Corporation, New Bedford, Mass., has received an order to equip with its ventilating system 50 pay-within cars now being built for the Boston Elevated Railway at the works of the Laconia Car Company.

Pittsburgh Wood-Preserving Company, Pittsburgh, Pa., has elected Grant B. Shipley president of the company. Mr. Shipley recently resigned as engineer of mining and timber preserving machinery of the Allis-Chalmers Company, Milwaukee, Wis.

Indian Refining Company, Cincinnati, Ohio, has appointed William Stevenson special representative, with headquarters at Chicago, Ill. Mr. Stevenson has been connected with the McGuire-Cummings Manufacturing Company for a number of years.

Henry B. Seaman has opened an office as consulting engineer for railway, bridge and valuation work, at 165 Broadway, New York. Mr. Seaman resigned in September, 1910, as chief engineer of the New York Public Service Commission, First District, after serving three years.

National Brake & Electric Company, Milwaukee, Wis., has completed additions to its steel foundry which will now give a floor space of 80 ft. by 725 ft. The new machine shop and warehouse, which are now under construction, will be completed about April 1, 1911. With these new facilities the capacity of the plant will be more than doubled.

Edgar Allen & Company, Limited, Imperial Steel Works, Sheffield, England, whose principal American office and warehouse is at Chicago, Ill., announces that agency arrangements have been made with Roehm & Davison, Detroit, Mich., J. L. Osgood, Buffalo, N. Y., and John J. Greer & Company, Inc., Baltimore, Md.

American Ship Windlass Company, Providence, R. I., has sold eight Taylor stokers to the Springfield Street Railway which is making a determined effort to eliminate smoke in its power plant. Each stoker is to be used under a 375-hp B. & W. boiler. In addition to the elimination of smoke this company expects that the Taylor stokers will enable it to carry its entire load on one boiler room, whereas at present it is operating two boiler rooms, one of which is hand-fired and the other stoker fired. The present type of stoker is to be replaced by the Taylor.

William S. Turner has resigned as managing engineer of the northwestern office of W. S. Barstow & Company at Portland, Ore., having practically completed the work upon which he has been engaged in that city during the past three years. This has consisted in a considerable amount of interurban railway construction for the Oregon Electric Railway and supervising the contract which W. S. Barstow & Company had for underground electric conduit construction for the Portland Railway, Light & Power Company. Mr. Turner has had long experience in electric railway construction, having been a member of the firm of Woodbridge & Turner, which did a great deal of pioneer work in electric railroading. Later Mr. Turner built some electric railroads in New Zealand for J. G. White & Company, with whom he was connected for some eight years. After a short vacation in the East Mr. Turner expects to make Portland his home and possibly to engage in business there on his own account.

American Brake Shoe & Foundry Company, New York, N. Y., has issued its report for the fiscal year ended Sept. 30, 1910. According to Otis H. Cutler, the president, the company enjoyed the most profitable year in its history, the net earnings being \$1,022,684, after making the usual liberal provision for depreciation and reserve accounts. While the item of cost of melted metal showed a slight increase per ton for the year over the preceding year, the shop cost of brake shoes at all plants for 1910 was substantially the same as for the previous year. On Feb. 24, 1910, the stockholders of the company authorized an increase in the capital stock from \$3,000,000 preferred stock and \$3,000,000 common stock to \$5,000,000 of each class, immediately following which \$1,000,000 of preferred stock was issued and subscribed for by the stockholders at 105, and \$1,000,000 of common stock was issued for property acquired, making the total outstanding issue on Sept. 30, 1910, \$4,000,000 of preferred stock and \$3,600,000 of common stock. Subsequently the company acquired the patents and properties of the Featherstone Foundry & Machine Company and the National Brake Shoe Company, Chicago, Ill., thereby adding three foundry plants—one at Burnside, Ill., one at Melrose Park, Ill., and one by lease in Chicago. A new plant in the Chicago district is made necessary, however, by the sale by the company of its Chicago Heights brake-shoe foundry and plans have been made for a new plant which the company believes represent the most complete, efficient and economical brake-shoe foundry that it is possible to design at this time. A suitable site has been purchased and it is proposed to erect this plant, at a total expense for site, buildings and equipment of approximately \$300,000, with a guaranteed output of at least 100 tons of brake shoes per day.

ADVERTISING LITERATURE

N. W. Halsey & Company, New York, N. Y., has issued a booklet entitled "The Most Satisfactory Bonds."

Arthur S. Partridge, St. Louis, Mo., has issued list No. 36, of second-hand electrical and steam equipment for January, 1911.

Federal Storage Battery Car Company, New York, N. Y., has issued a catalog illustrating and describing Beach cars, which are equipped with Edison storage batteries.

Electric Storage Battery Company, Philadelphia, Pa., has recently issued bulletin No. 130, on the installation of the "Chloride Accumulator" for the Slate Belt Electric Street Railway, Pen Argyl, Pa.

Whiting Foundry Equipment Company, Harvey, Ill., has issued catalog No. 82, illustrating and describing "Whiting" cranes. The catalog also contains a number of views of installations and a list of principal users of these cranes.

Precision Instrument Company, Detroit, Mich., has issued catalog E, illustrating and describing the "Precision" pressure and vacuum recorders and indicators. The catalog also contains a number of tables pertaining to the instruments.

Paragon Sellers Company, Chicago, Ill., has issued the January, 1911, number of the "Paragon Bulletin," containing articles on "Grounding for Protection Against Electrolysis," "Grounding of the Common Battery," "Grounding Telephone Train-Dispatching Circuits" and "Railway Signal Installations."

Robert W. Hunt & Company, Chicago, Ill., has published a small pamphlet on the inspection and testing of cement. It is designed to give the purchaser some idea of the value of inspection by trained and reliable engineers. The pamphlet also contains a partial list of structures in which all the cement was tested by the company.

General Electric Company, Schenectady, N. Y., has issued bulletins Nos. 4685, 4784, 4785, 4793, 4798, 4804, 4807, 4808, 4809 and 4810, which have the following titles: "Belt-Driven Alternators," "Electric Drive in Pulp and Paper Mills," "Electric Drive in Wood-Working Plants," "Steady vs. Unsteady Voltage," "Straight-Air Brake Equipments," "Direct-Connected Generating Sets," "Small Plant Alternating Current Switchboard Panels," "Washington, Baltimore & Annapolis 1200-Volt D. C. Railway," "4500-Volt Oil-Break Switches" and "Portable and Stationary Air Compressor Sets."

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CONTENTS.

The Mid-Year Meeting	101
A Reduction in Costs of Injuries and Damages.....	102
Specialized Maintenance of Electric Heaters.....	102
The Boston Electrification Reports.....	102
Inter-Department Charges.....	103
The Annals of Electric Railway Transportation.....	104
Insulation of High Voltage Lines.....	105
Southern Pacific Electrification—Fruitvale Power and Substation at Oakland	106
New Cold Springs Car Shops of the Milwaukee Electric Railway & Light Company.....	204
Meeting of the Executive Committee of the Transportation & Traffic Association	209
Meeting of the Manufacturers' Executive Committee.....	210
Meeting of the Engineering Association Committee.....	210
Meeting of the Executive Committee of the Accountants' Association.....	210
The Adjustment of American Street Railway Rates to the Expansion of City Areas.....	211
Meeting of the Committees of the American Association.....	214
The Meeting of Committee on Shop Accounting.....	215
The American Electric Railway Association.....	216
Meeting of Committee on Equipment.....	218
Committees of the American Electric Railway Association.....	219
The Rate of Return.....	220
The Annual Banquet.....	223
Meeting of Indiana Operators and Commission.....	224
Report of the Massachusetts Joint Board on Electrification.....	225
Proposal by Mr. Sprague for a Rapid Transit System.....	228
Governors' Messages.....	229
Long Scale Switchboard Meters.....	230
Extended Trolley Ears.....	231
Mixed Pressure Turbo-Alternator Sets.....	231
Recent Contracts for Pay-Within Cars.....	231
High-Tension Condenser-Type Terminals.....	233
Oil Break Pole Line Switch.....	233
London Letter.....	234
News of Electric Railways.....	235
Financial and Corporate.....	237
Traffic and Transportation	240
Personal Mention.....	242
Construction News.....	243
Manufactures and Supplies.....	245

The Mid-Year Meeting

Two mid-year meetings of the American Association have now been held. Both have been as well attended as the annual meetings of the parent association and the plan of holding these mid-year meetings may now be considered as firmly established. The practice of holding a number of meetings of committees of the parent association and of some of the affiliated associations during the same week naturally brings to New York at this time many railway men, who thus combine attendance at the mid-year meeting with their committee work. The reports of these meetings, published in our issue of last week and of this week, show that a great many important topics will be taken up this year and that considerable progress on their consideration has already been made by many of the committees. The statement of the secretary and treasurer also shows that the membership of the association, both active and associate, is increasing, in spite of the fact that it is yet early in the year and the new committees on both classes of membership have not yet had an opportunity of doing very much active work.

We do not recall that in any other year recently the committee work of the different associations has been as far advanced as is the case this year. This is gratifying, but, of course, must be followed up by active work during the next six months if the results desired are to be obtained. The Engineering Association has asked this year that all of the committee reports should be completed and in the hands of the secretary one month earlier than formerly, and it would be well for the other associations to require an earlier delivery of reports to the secretary so that all members will have a chance to read them carefully before going to the convention. The plan adopted by the Transportation & Traffic Association to request the chairman of each committee to arrange for the discussion of the report of his committee by two individuals outside of the committee should also stimulate the discussion of these reports and is worthy of consideration by the other associations. Six committees met on Wednesday and meetings of 20 committees were held on Thursday. These were followed on Friday by the regular mid-year meeting of the American Association at which the four addresses previously announced in this paper were presented. Two of these, that by Mr. McCarter on "Return on Investments" and that by Mr. Davis on "The Adjustment of American Street Railway Rates to the Expansion of City Areas," are published elsewhere in this issue. We feel confident that all of those who attended the meetings on Friday felt repaid for their trip to New York, and it is significant that the attendance at the meetings was considerably larger than at the first mid-year meeting of the association, held last year. The day concluded with a banquet at which the speeches were in accord with the best traditions of the association.

A Reduction in Costs of Injuries and Damages

Earnest efforts to reduce accidents on the Cleveland, Southwestern & Columbus Railway have been a prominent feature of the operations of this system for several years. In the calendar year 1910 these efforts, as shown by the last annual report, had an appreciable result upon the total payments for claims due to accidents. With gross revenues from operation of \$1,015,627 the company charged in its operating expenses the sum of \$35,442 on this account. This is substantially $3\frac{1}{2}$ per cent of the gross revenue. Although the company paid during the year a total of \$16,646 for claims, this amount does not represent the expense incident to claims arising from accidents which took place during the period. The actual settlements for accidents which occurred last year and the estimated expenses which will accrue from the unsettled claims due to accidents in the year amount to \$15,000, or about $1\frac{1}{2}$ per cent of the gross revenue. As the company charged its operating expenses with approximately $3\frac{1}{2}$ per cent of the gross revenue, it completed the year with a credit in the accident fund of \$18,796. E. F. Schneider, the present general manager of the company, has maintained a successful campaign for the protection of life, limb and property, and the results which have been accomplished are indicative of the possible opportunities for improvement in operating methods and the training of employees which may well be grasped and made productive by other electric railway companies.

Specialized Maintenance of Electric Heaters

The committee on equipment of the American Electric Railway Engineering Association is to take up as one of its subjects for the 1911 convention report a study of car heating apparatus and its relation to car construction and operating speed. Of course, no report on this subject could be complete unless it included a consideration of the maintenance features of the several types of heating equipments. The usual car stove or hot-water equipment is simple in construction, and it is not likely to receive any abuse that would escape attention. The maintenance of electric heaters presents a more special problem. Nothing looks simpler than the groups of coils which make up an electric heater, but there is nothing easier than to misconnect those very coils in such a way that grounds and open circuits will make the heaters useless. The trouble then is not in the heaters, but in the haphazard ways of maintaining them. The fact that each heater is designed to take so many amperes per point means nothing to some shopman who either will insert the first spare coil that happens to fit into the heater frame or else reports a nonchalant "O. K." on a device which cannot "come back," like a neglected motor or controller. An obvious, yet uncommon, method of eliminating these abuses is to have one or two men specialize in heater maintenance. On one large system where this is done, the specialists are supplied with wiring diagrams of all types of heaters in service and with a voltmeter and ammeter for testing and calibrating the coils. By this means assurance is obtained that the heaters actually do heat the cars. At the same time a considerable reduction is effected in the total amount of current taken by the equipments. This experience shows clearly how easy it would be to draw false conclusions in making comparisons between the upkeep and operating costs of the different car-heating systems which are available for electric railway conditions at the present time.

THE BOSTON ELECTRIFICATION REPORTS

Few, if any, investigations in the reports by State commissions have been awaited this year with greater interest from the engineering point of view than that recently concluded in Massachusetts by the joint board of metropolitan improvements. This board was appointed last year to report among other things on the desirability of the enactment of a law requiring the steam railroads entering Boston to equip their lines electrically and was composed of the membership of the four commissions most fully acquainted with the general situation, namely, the Railroad Commission, the Transit Commission, the Park Commission and the Harbor and Land Commission. The area to which the study was to be confined was within the Metropolitan District, a somewhat arbitrary district included within a maximum radius of about 15 miles from the Boston City Hall.

As readers of this paper know, the companies concerned reported that the cost of the conversion would be about \$40,000,000, and in reports published in the issue of this paper for Nov. 19, 1910, unanimously protested against being required to adopt electricity at the present time on the double ground of expense and the absence of standardization in electrical systems. Interest in the report is enhanced by the fact that the joint board in its report submitted to the Legislature on Monday of this week was divided on the main question. A majority of nine upheld the contention of the steam railroads. Of the minority, five believe electrification is feasible, both financially and from an engineering standpoint, for at least portions of the systems at the present time, while the remaining two considered the majority report too conservative, but were not prepared to recommend immediate electrification without further study of the subject.

The conclusions of the majority of the joint board are, briefly, that while electrification is desirable for the public and possesses many advantages over steam for the railroad companies, it is not necessary on the ground of public safety, as was the case in New York. If capital should be expended for electrical equipment it would mean the postponement of improvements in other directions. Moreover, the local situation in Boston is such that it is doubtful whether the companies could recoup themselves for the added expenditures by an increase of the fares of those passengers who would most greatly benefit by the change, namely, the suburban passengers. The minority reports in favor of more prompt action are based upon the apparent success of electrification elsewhere, the public announcements of officers of the New York, New Haven & Hartford Railroad of their intention to equip portions of both the Boston & Maine and New Haven systems with electricity for a considerable distance near Boston, and the studies of the Boston & Albany Railroad for the electrification of certain portions of that line.

It is interesting to note in this connection that the members of the joint board favoring electrification are in the main the members of State tribunals which have had long-continued jurisdiction over railroads and electric railway properties. It is also notable that the entire board is united on the inevitable introduction of electricity on the system of railroads within the Metropolitan District within a comparatively small number of years. The only question which divides the committee is how soon the application should be made and whether for the pres-

ent at least the change should be left to the initiative of the companies themselves. Even the minority report of five does not declare in favor of setting a date for the electrification of all the roads within the district, but those signing the report do not believe that the matter should be left exclusively in the hands of the several railroad companies.

There is no doubt, as the minority report says, that similar legislation, such as that relating to automatic car couplers and prohibiting car stoves, has been found in the public interest and has accomplished good results. It is the tendency in all large corporations, especially those whose stock is very widely distributed, as with most steam railroad companies, for the management to assume a very conservative attitude regarding the expenditure of large sums of money for improvements from which an immediate monetary return is not evident. This is perhaps only natural. Where a board of directors consists in large part of the actual owners of a property, the management can easily learn the wishes of those whose final interests are involved in any important decision. Hence such a management can take risks which would seem injudicious for the management of a large corporation in which the stock ownership is largely distributed and the board of directors often represents directly only a minority ownership in the property. We believe that this is one of the important reasons why there has not been a greater development in the electrification of steam railroads, and that in many cases steam railroad managers would long ago have introduced electric traction if it were merely a question of personal risk. Undoubtedly, in such cases, the spur of legislative requirement will often be welcomed as giving a good excuse for making an improvement which, purely on its merits, had been long justified in the minds of the management.

While this generally may be true, we hardly believe that it applies in the Boston case. The company most concerned in the proposed electrification in Boston is the New York, New Haven & Hartford Railroad. This road, for itself and for the Boston & Maine Railroad, which it controls through stock ownership, would be called upon to expend for the electrical equipment of its passenger service about \$33,000,000, or approximately 80 per cent of the total amount required to electrify all the steam railroads entering Boston. But it is well known that the New Haven road has already shown its keen appreciation of the merits of electric traction. No part of its New York electric zone was equipped because of legislative requirement, since the New Haven road could have fulfilled the demands of the New York State law by turning over its trains at Woodlawn to the New York Central Railroad and having them hauled from there to Forty-second Street by New York Central electric locomotives. In addition, the company is now equipping its Harlem River division line with electricity, has announced its intention of voluntarily extending its main line electric system to New Haven, is electrically equipping the Hoosac Tunnel, and has offered to equip electrically the Boston, Revere Beach & Lynn Railroad if it is authorized by the Massachusetts Legislature to acquire that property. It is also well known that the construction of a railroad tunnel between the North Station and the South Station in Boston is being very seriously considered. If this tunnel should be constructed, it would necessarily have to be equipped with electric power, and this fact would have a very important bearing upon the type of electric system and the general plan of electrification to be

used at each terminal of the line. With these undertakings in mind or in serious contemplation, and until more definite knowledge can be secured from them in regard to their engineering features and financial results than is now available, it is not surprising that the New Haven road should not wish to be committed to electrify all, or even any considerable part, of its Boston Metropolitan railroad system by a certain date.

In spite of these facts, it is significant that the report of Mr. McHenry, submitted last November by Mr. Mellen as the New Haven's answer to the joint board, by no means excludes the idea that the company would consider favorably the installation of electric power on some of its Boston lines. The statement is made in this report that: "In general it would seem altogether more practicable at first to restrict the substitution of electricity for steam to a few of the more important routes, subsequently extending the system as rapidly as consistent with the financial conditions and the public needs."

For these reasons, although we believe that the abolition of the steam locomotive in all large cities is inevitable and that it will come soon, we feel that it would be premature at the present time to set any definite date at which the electrification of the Boston lines should be begun.

INTER-DEPARTMENT CHARGES

In deciding to take up the subject of inter-department charges the joint committee on shop accounting appointed for the year 1911 by the Accountants' and Engineering Associations is likely to render very good service in a virgin field of electric railway economics. There exists in many minds the strange impression that it is as needless to keep inter-department accounts on a money basis as it would be for a man to transfer his cash from one pocket to another. This feeling is well reflected in the franking privilege accorded by the United States post office to other departments of the government. It is safe to say that if the beneficiaries of this system were obliged to use a special stamp which indicated the value of the service rendered there would be a most desirable decrease in free mail—especially in the output of those legislators who are fond of asserting that the post office deficit is due to the low rate for second-class matter.

This "It's all in the family" sentiment is equally strong in the administration of many electric railway properties. On the one hand, the power station engineer lies awake nights speculating whether the directors will let him install that economizer, carbon dioxide recorder or other refinement which he hopes will add another 5 per cent or 10 per cent to the output of the plant; on the other hand, the transportation department may be wasting so much current by burning car house and passenger station lamps for 24 hours in the day that the increase in generating efficiency would be wholly absorbed without any resulting benefit to the company. The ratio of kw-hours to car miles should be carefully compared, not by lump totals, as is often done, but by checking up each feeder division and even each line at periodical intervals. Even the temporary installation of wattmeters in shops and car houses would have a most salutary effect in bringing both the department heads and their subordinates to realize that electricity is a very palpable thing when viewed from the standpoint of the consumption of fuel. Unscientific car operation is responsible for a much greater waste of electric energy than wasteful illumination, but

its meaning in dollars and cents can be judged only by some form of checking instrument placed directly on the cars.

There are losses in inter-department relations in other things than power. For instance, the track department will have one or more men spend a great deal of valuable time taking to the blacksmith shop of the car maintenance department a large number of tools which could be renewed at a nearby smithy for a lower total cost. The overhead line and power departments also are sinners in this respect because they realize that their maintenance accounts will look far more modest when an accommodating master mechanic helps them out than when they have to pay cold cash to an outsider for services rendered. The value of accurate accounting of inter-department charges becomes evident when, for example, a new and well-equipped repair shop is built to replace one or more old or widely scattered shops. Before the shop is built the head of the mechanical department is able to prove to his own satisfaction and the satisfaction of the directors who are asked to appropriate the money that a large saving in maintenance costs can be effected. Strange to say this saving seldom materializes and the shop expenses may even increase. The output of the shop grows, but without a system of cost accounting by which each department can be charged with the full cost of the additional work which is being done for it by reason of the enlarged facilities available, the shop department is obliged to bear the whole burden of operating and overhead charges. The cost of doing miscellaneous small repair work should rightly be charged against the proper department just as accurately and in as much detail as the cost of manufacturing repair parts in large quantities on stockroom orders.

In general, where competitive repair or manufacture is concerned, it is but proper that while one department of a railway should enjoy another department's facilities the charge for the service should include something more than the bare labor and material expenses. This is one subject which the joint committee on shop accounting has selected to consider as part of its work for the coming year, that is, to determine just what overhead charges should be considered in order to place inter-department work on a businesslike basis, and in the accomplishment of this object it will do a great deal of good.

THE ANNALS OF ELECTRIC RAILWAY TRANSPORTATION

In the issue of the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, page 126, we published a brief descriptive reference to each article contained in the "Annals of the American Academy of Political and Social Science" for January, 1911. The subject of this publication, "Electric Railway Transportation," was treated in 17 articles contributed by various engineers, railway officials and others interested. The topics of the individual papers were divided between traffic and financial problems, on the one hand, and public regulation of electric railways, on the other. These problems are not easily or wholly inseparable one from the other and, as might be expected in view of the conditions now existing, several of the articles which treat of the traffic and financial problems of the industry relate also to the allied subject of regulation.

Of the articles which suggest this dual nature of the problems the first is by Bion J. Arnold. While this was written in connection with the study of the Pittsburgh traffic situation in which Mr. Arnold has been engaged, it is applicable in princi-

ple to conditions that prevail in other large cities. Mr. Arnold's discussion is more suggestive than conclusive on some points, but his summary is a concrete presentation of several leading issues. For instance, there are references to fares, taxes and depreciation. His conclusion, that the result of experiments with 3-cent fares has been to prove that cheap fares and good service cannot be secured at the same time, is one which accords with the prevailing judgment of those who have investigated the subject. The public of this country is far less tolerant of poor service than of high rates, and its attitude in this respect toward railway service is not different from its attitude toward hotel and restaurant service.

Mr. Arnold states that the fact is becoming apparent that there is very little surplus left for taxes, particularly for the payment of a franchise tax. We have expressed frequently our opinion that the large percentages of gross earnings which companies are required to pay in taxes and public benefits of similar nature are demonstrable and that their reduction is a simple method of lessening the burden. Although Mr. Arnold points out that the problem of what should be done with past obligations due to accumulated depreciation is receiving much consideration, he does not offer a solution. That this problem should receive the serious consideration of the industry is clear. Observance of the lessons of the past should make future practices more wholesome.

The paper of Thomas Conway, Jr., on the decreasing financial returns upon urban properties is an even more comprehensive review of present-day conditions than the title indicates. It not only presents the surface point of view of the companies, but it goes further and teaches the duty which rests upon the officials of properties to take the public into their confidence. It is but fair to accept the conclusion which this study emphasizes, which is that the company can secure justice only if the public possesses a full understanding of the difficulties and limitations of the industry. This is a truth upon which the most progressive managers found their policies.

With the conclusion of Professor Conway that the problem is a serious one only in the case of urban properties we may be permitted to differ. Interurban passenger rates are sometimes limited by local franchise conditions and are frequently determined by the rates of existing competitive steam railroads, whose rates are limited in many States by legislative action.

The article by William B. Jackson is a recognition of the need of provision for the loss due to depreciation. It calls attention to the fact that in connection with revision of rates a full understanding of the elements which make up the cost of furnishing the service is necessary. It deals less with the practical methods of determining the life of varying elements of property than with the necessity of making provision for this loss. Integrity of both capital and operating accounts is involved in the consideration of this subject. Since the topic is not one of purely academic interest the discussion should help to a clearer understanding of the situation.

It is a valuable addition to the literature upon the economic waste of strikes which Daniel T. Pierce contributes in his review of the developments which culminated in the strike of 1910 on the lines of the Philadelphia Rapid Transit Company. Mr. Pierce has sought deeper than the direct issues involved for the general reasons which could permit so serious a strike to occur as that which caused the loss of property and wages aggregating many hundreds of thousands of dollars in Phila-

delphia. His answer is that a fairly permanent body of employees should be maintained. This it has been the effort of managers to do, but it is still an unsolved problem.

It is an indication of a controlling tendency of the times that the article by Frank R. Ford on the subject of valuation states that the importance of an accurate appraisal is now universally recognized and that intelligent regulation depends upon the possession of accurate information concerning the value of the property under investigation. The article includes studies made by Mr. Ford in connection with prominent valuations which have been reported in detail in the issues of the *ELECTRIC RAILWAY JOURNAL*. To discuss both tangible and intangible elements, as Mr. Ford does, is to demonstrate the mistaken policy of the public in calling one element of property physical property and the other element franchises. Now, it has been perfectly clear in the past to all who are at all familiar with the subject that there are actual elements of property which represent proper investments and are properly capitalized, but, strangely enough, it has remained for this latter-day period of regulation to witness the development of scientific analyses of values other than those of a purely physical nature.

One of the strongest and most important features of the discussion in which William Osgood Morgan calls the indeterminate permit a satisfactory franchise is his denunciation of the limited-term franchise. Mr. Morgan says the theory of the contract on which the limited franchise is based is in itself wrong. It allows the municipality to treat a grant of franchises in its streets as an asset to be bargained for. The strongest argument against the limited-term franchise from a business point of view lies in the fact that, as a rule, it has not made any proper provision for the protection of the capital invested in the property. No contract that fails to safeguard the capital investment can be justified by public policy.

This short review of the controversial elements does not touch many interesting subjects that are treated. For the publicity given to its problems by the academy the industry should be grateful.

INSULATION OF HIGH-VOLTAGE LINES

Two very important papers read at the last meeting of the American Institute of Electrical Engineers deal with the theory and practice of extremely high-tension lines, especially with reference to the properties of air as an insulator. Very fortunately in most railway work comparatively moderate voltages, say, 25,000 volts to 40,000 volts, suffice, so that for the present at least the railway engineer does not find himself confronted with the failure of air as an insulator and can confine his attention chiefly to the much simpler problem of securing adequate insulation at the supports. The introduction of the suspension insulator has greatly simplified the securing of adequate insulation at high voltage, and, in fact, this system of support has mechanical advantages which render it useful at voltages below those which give it its chief electrical importance. A line carried on suspension insulators has a certain flexibility about it which is in itself highly advantageous. A broken wire is unlikely to pull over poles or towers when carried on suspension insulators, but simply can be allowed to run through them and relieve the strain.

Up to 50,000 volts or 60,000 volts the losses on a transmission line due to coronal discharge, resulting from the weaken-

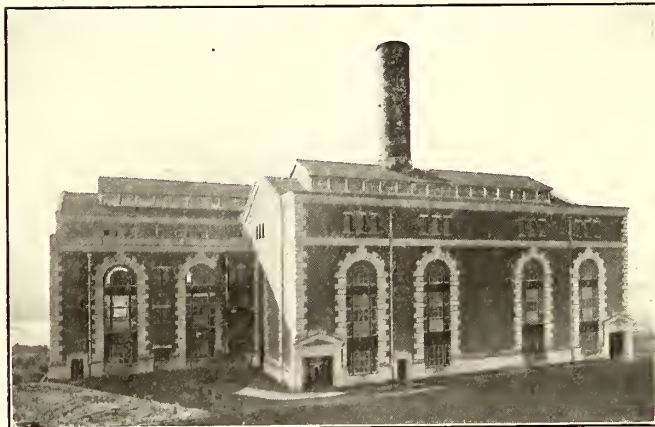
ing of the air as an insulator, are comparatively slight with the ordinary sizes of wire used, say, No. 1 or larger. The coronal effect shows far below this, chiefly at points and irregularities in the wire, but the losses themselves are not great. On the other hand, the actual power losses found on the transmission lines of the Central Colorado Power Company at voltages in the vicinity of 100,000 are liable, according to the paper by Mr. West read at the last Institute meeting, to rise to formidable magnitudes. In these tests the turning point of the curve showing the relation between voltage and loss was between 75,000 volts and 80,000 volts. Beyond this point the line losses increased with great rapidity, particularly under no-load conditions, when the voltage toward the end of the 180-mile line tested rose considerably. Most of the line in this case was of No. 1 wire, 289 mils in diameter, a size anything but well suited for the extreme voltages tried, inasmuch as with wire of so small radius the coronal discharge which indicates the breaking down of air as an insulator begins much lower than would be the case with a No. 000 or a No. 0000 wire. Once the coronal discharge is well established the striking distance over which the spark will leap between the points increases very rapidly. In the test in question the striking distance at 75,000 volts on the station instruments was 5 in., while at 100,000 volts it had risen to 1 ft. The same rise in voltage under no-load conditions increased the kilowatts lost on the line in the ratio of something like 5:1.

The figures given in Mr. West's paper were of a very striking character and worth careful investigation by anyone who contemplates dealing with exceptionally high voltages. The facts indicated seem to be about as follows: Up to 50,000 volts or 60,000 volts the line losses even on so long a line as 180 miles are not at all serious, even when the wire is as small as No. 1. There would be still less loss were the diameters of the wires greater by reason of a larger capacity of plant. With wires of this size, even when strung about 10 ft. between centers, as they were in this case, the critical point in the voltage is reached at about 75,000 volts and beyond this point the losses, especially at no-load, go up very rapidly. In working near 100,000 volts the energy losses in the unloaded line are serious and increase rapidly on account of rise in voltage toward the end of the line. They are large enough, in fact, at moderate loads to be a very serious matter were power being delivered from a steam-driven station. Such high-tension line losses become of less and less importance as the amount of energy transmitted grows larger so as to demand conductors of greater diameter and to give a heavy distributed load along the system. The difficulty would be most severely felt on extensive distributing networks covering large areas of territory at high voltage with relatively small conductors. It probably exists on such systems to a much greater extent than is generally supposed, but the added load due to high-voltage line losses would usually be, so to speak, lost in the shuffle and would not be recognized as such unless it rose to a considerable amount.

In railway power service over any distance at present attempted the difficulty is not likely to be a serious one, but it should nevertheless be borne in mind in laying out some of the projects which are being considered, especially in those in which the use of steam as a motive power is being considered, because the energy losses in such installations have to be paid for directly in a sense not true in a hydroelectric plant.

SOUTHERN PACIFIC ELECTRIFICATION AT OAKLAND, FRUITVALE POWER AND SUBSTATION

As is well known, the Southern Pacific Company is engaged in the electrification on the 1200-volt system of its Oakland, Alameda and Berkeley suburban lines. In connection with this work a power-generating station has been installed at Fruitvale, Alameda County, Cal., with present capacity for the lines whose electrification has been authorized and with an ultimate capacity designed to furnish power to all of the future extensions to this system as far as the San Francisco Bay dis-



Southern Pacific Power Station—Power House from North

trict is concerned. A contract has also been made for the supply of a small block of power (about one-tenth the ultimate capacity of the station) with the Great Western Power Company.

The general fuel conditions on the West Coast are so different from those of any other section of the country that Eastern engineers will find in this statement an explanation of why many of the usual refinements to produce economic operation have been suppressed. They will understand readily that the fixed charges on the apparatus necessary to secure these elaborate refinements would wipe out the small difference in fuel consumption produced by them under West Coast conditions. It is not considered at all likely that the present supply of fuel oil will be diminished in the next 10 or 15 years; hence all estimates as to relative economies in the station apparatus were based on this assumption. Provision has been made, however, in the design of the building for the installation of coal-handling apparatus whenever the market conditions shall make the change desirable.

The general scheme of the power house installation may be stated very briefly as follows:

First—A 13,200-volt, 25-cycle, three-phase generating system for distribution to substations at various points along the line and also, eventually, for the supply of a high-tension transformer house which will be located adjacent to the east end of the building whenever the extensions to the suburban system shall require an extra high voltage transmission.

Second—Within the generating station and entirely independent of all of the large unit generating apparatus is installed a 110-250-volt, three-wire, direct-current system to which are connected all of the generating excitation circuits, the station lighting circuits, the crane and all the station

auxiliary circuits. Since this system is reinforced by a storage battery a continuous supply of power for the station auxiliaries and lights is insured, independent of any accident to the main generators.

Third—A 1200-volt direct-current substation, with its conversion and control apparatus, is located within the main station, to supply power to the trolley lines that are within economic reach of this point.

GENERAL ARRANGEMENT OF POWER STATION

The power station is situated upon the San Antonio Estuary, a part of the bay of San Francisco, about 3 miles distant from the business center of Oakland.

The main station is designed for four units of approximately 5000 kw capacity, normal rating. The ratio of the rated horsepower of the boilers to that of the turbo-generators is approximately one-half. The station is equipped for oil fuel with provision for conversion to coal firing later, if necessary. Extension of the turbine and boiler rooms can be made by uniformly lengthening the building. Salt water for condensing purposes is obtained by gravity from the estuary. The maximum temperature of the circulating water is 65 deg. Fahr., and the minimum is about 55 deg. Fahr. A substation is combined with the main steam station. The foundations of the building and the circulating tunnels are of reinforced concrete; no piling is used. Provision has been made in the ends of the tunnels toward the extension end of the building for the introduction of gates so that the tunnels and building can be extended without closing down the condensing system. The superstructure is a steel frame covered with concrete up to 7 ft. above the ground and from there with red brick trimmed with sand-lime brick. The main roof is covered with terra cotta tile supported on an angle-iron frame. The flat roofs are concrete with mastic finish.

A permanent track permits the use of the 60-ton crane when handling material on cars. On account of the temperate climate no provision has been made for heating the building.

TURBO-GENERATORS

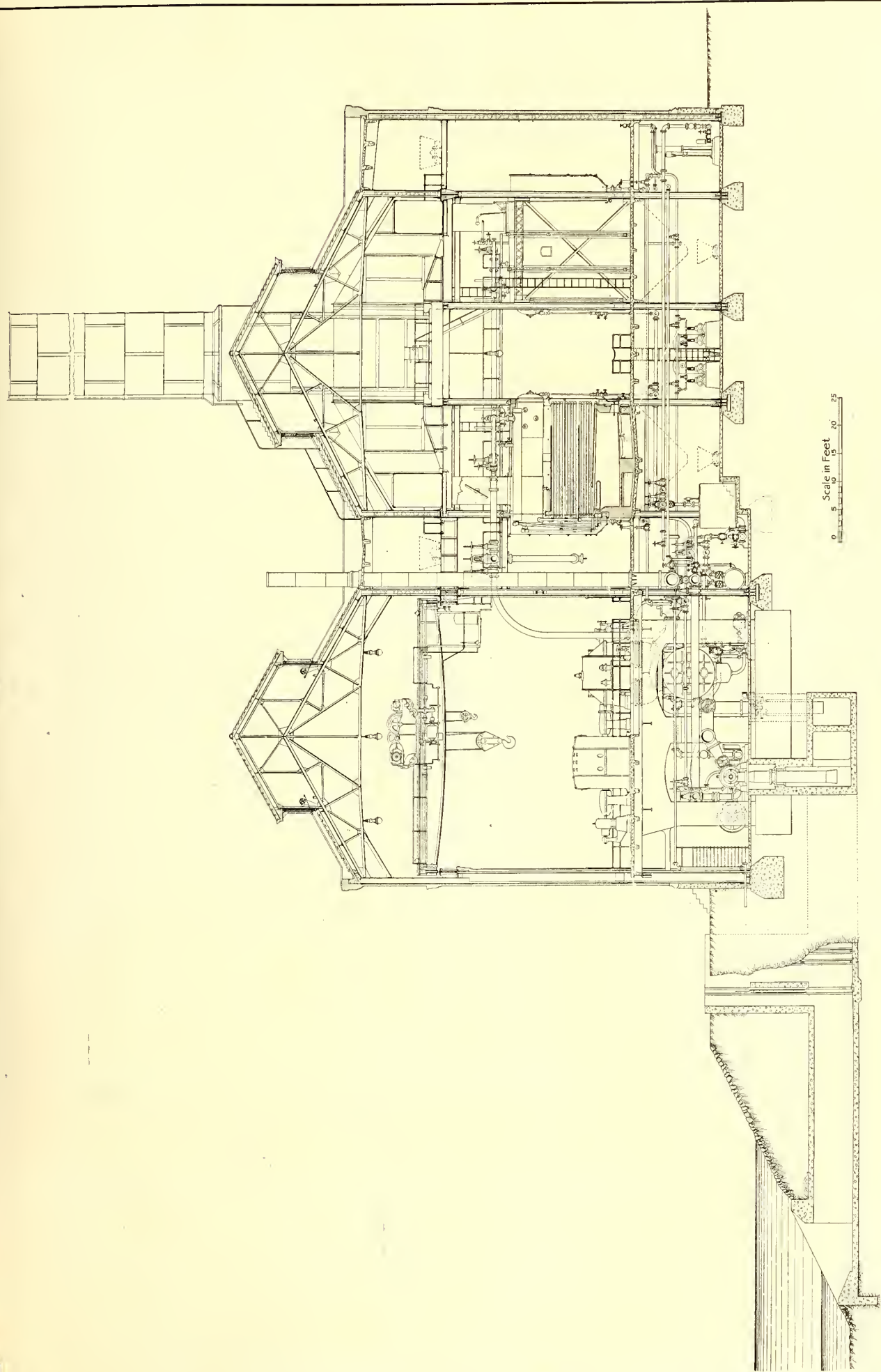
Two Westinghouse double-flow turbo-generators of 5000 kw rated capacity, guaranteed for twice their rated load for one minute, and for 7500 kw for two hours, supply three-phase, 25-



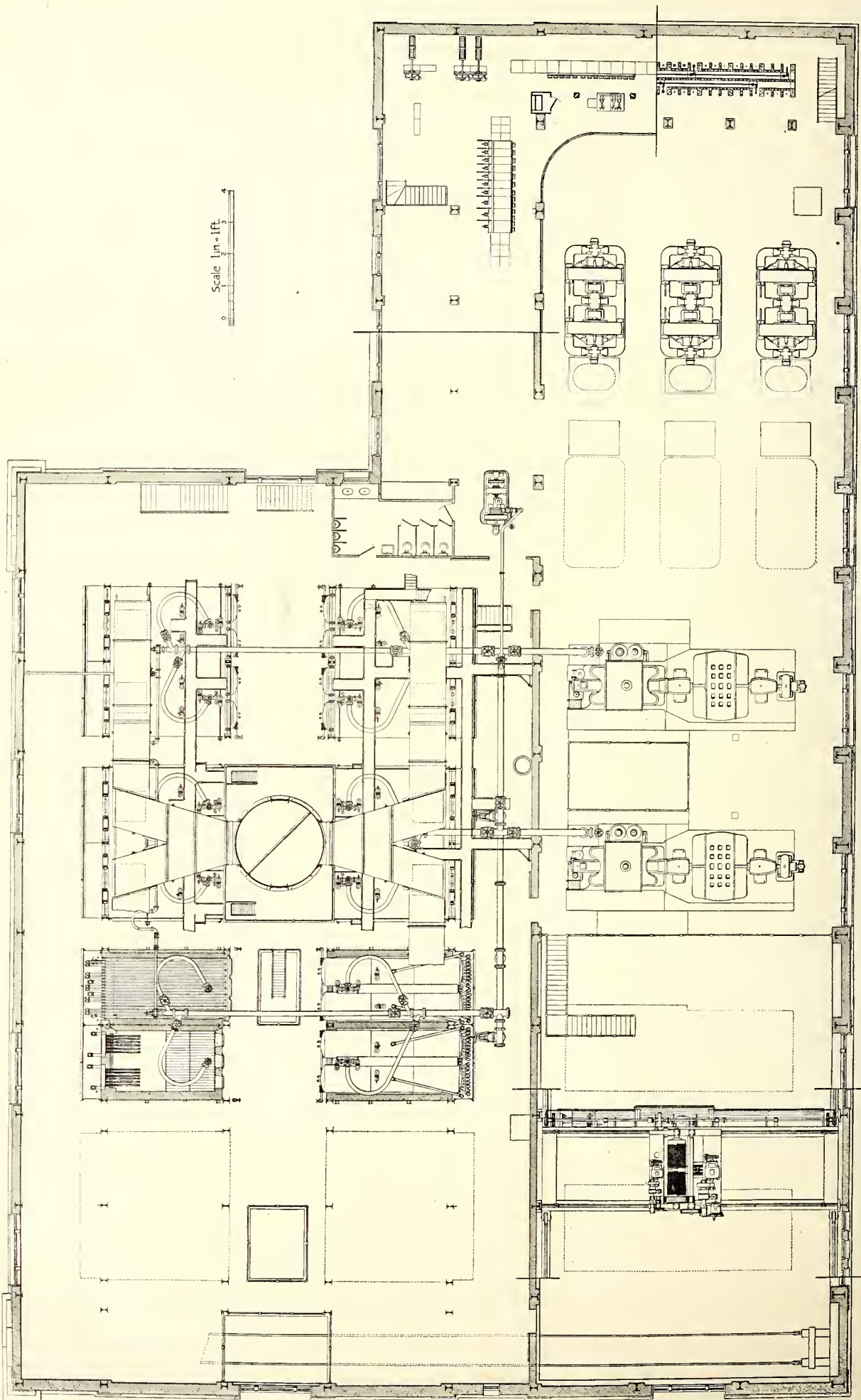
Southern Pacific Power Station—Power House from South

cycle alternating current at 13,200 volts, when operating at 1500 r.p.m. The steam consumption at rated load was guaranteed not to exceed 15.9 lb. per kw-hour with superheated steam and 18.2 lb. with saturated steam; 1.10 load is guaranteed when operating non-condensing. The turbines are designed to operate with steam at 175 lb. gage pressure with 150 deg. Fahr. superheat at the throttle valve. The turbines can be started, synchronized or stopped from the switchboard.

The air for ventilating the generators is taken from the



Southern Pacific Power Station—Section of Station Through Boiler Room and Engine Room



Southern Pacific Power Station—Plan of Power Station

outside of the station through screened galvanized iron ducts, but in foggy or damp weather the air can be taken from the turbine room basement, to avoid drawing moisture through the machines. Each turbine is provided with a 125-kw, 250-volt exciter mounted on an extension of the main shaft. Each exciter has sufficient capacity to excite at least two turbines under any probable conditions of overload.

In addition to the automatic oiling system of the turbo-generators there is an auxiliary oiling system with an independent steam pump, gravity tank, Turner oil filter and oil stations at which oil cans may be filled.

SURFACE CONDENSERS

Two Henry R. Worthington surface condenser units are connected to the underside of each turbine and are designed to maintain 28 in. of vacuum, referred to barometer at 30 in. Each condenser has 12,000 sq. ft. of cooling surface. The tubes are not tinned. Should the need of tinned tubes arise, they will be installed when defective tubes have to be replaced.

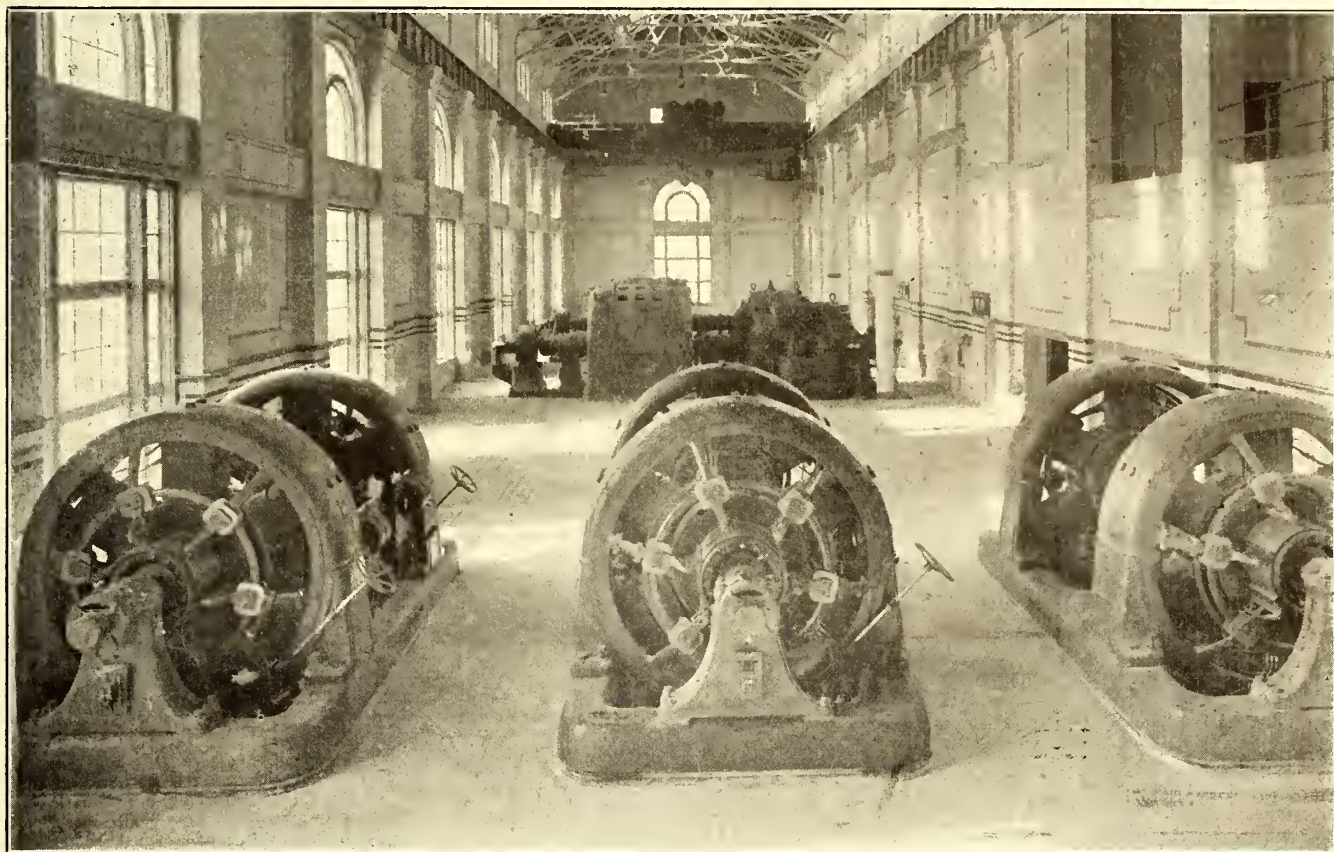
machinery if required. The boilers have been designed so that in case it should be found desirable to burn coal, stokers or grates can be installed at both ends of the boilers. The building and steel work are designed so that automatic coal and ash-handling apparatus can be installed. The present boiler room is designed for an installation of 16 boilers.

The original installation contains 12 645-hp Parker boilers, which are so-called self-cleaning because they deposit the scale in a pocket in the drum instead of in the tubes. Check valves in the headers and drums prevent the reversal of the flow.

Three burners are located in front of every boiler. The superheater is placed in the rear of the furnace. It maintains an even superheat. Walkways are installed over and between the boilers.

STACK

The stack is of unlined steel and is arranged for natural draft under oil firing. It is 125 ft. high above the boiler room



Southern Pacific Power Station—Generator Room, Looking West

The two circulating pumps are the H. R. Worthington high-speed turbine type, each with a capacity of 10,000 gal. per minute, under a maximum suction lift of 16 ft. They are driven by Terry steam turbines direct-connected to the pumps.

The hot well pumps are motor-driven and of the H. R. Worthington turbine type. The dry vacuum pumps are the Laidlaw-Dunn-Gordon type.

The only provision for priming the circulating system is by means of a steam ejector mounted on the condenser at the top of the circulating water system. Provision is made at the top of the circulating system for removing pocketed air by the insertion of piping, which acts upon the principle of the injector.

An electric high-water alarm is mounted on the hot well of each condenser and, as an additional precaution against the flooding of the condensers, a red lamp is installed on each pump, to indicate stoppage of the hot well pump.

BOILERS

California crude oil is used at present for fuel. The boiler room has a basement containing space for future coal-handling

floor and is 14½ ft. in diameter. To secure maximum boiler room floor space the stack is supported upon a concrete deck above the top of the boilers, as shown on page 198. It is no larger than is necessary to obtain economical results in burning oil.

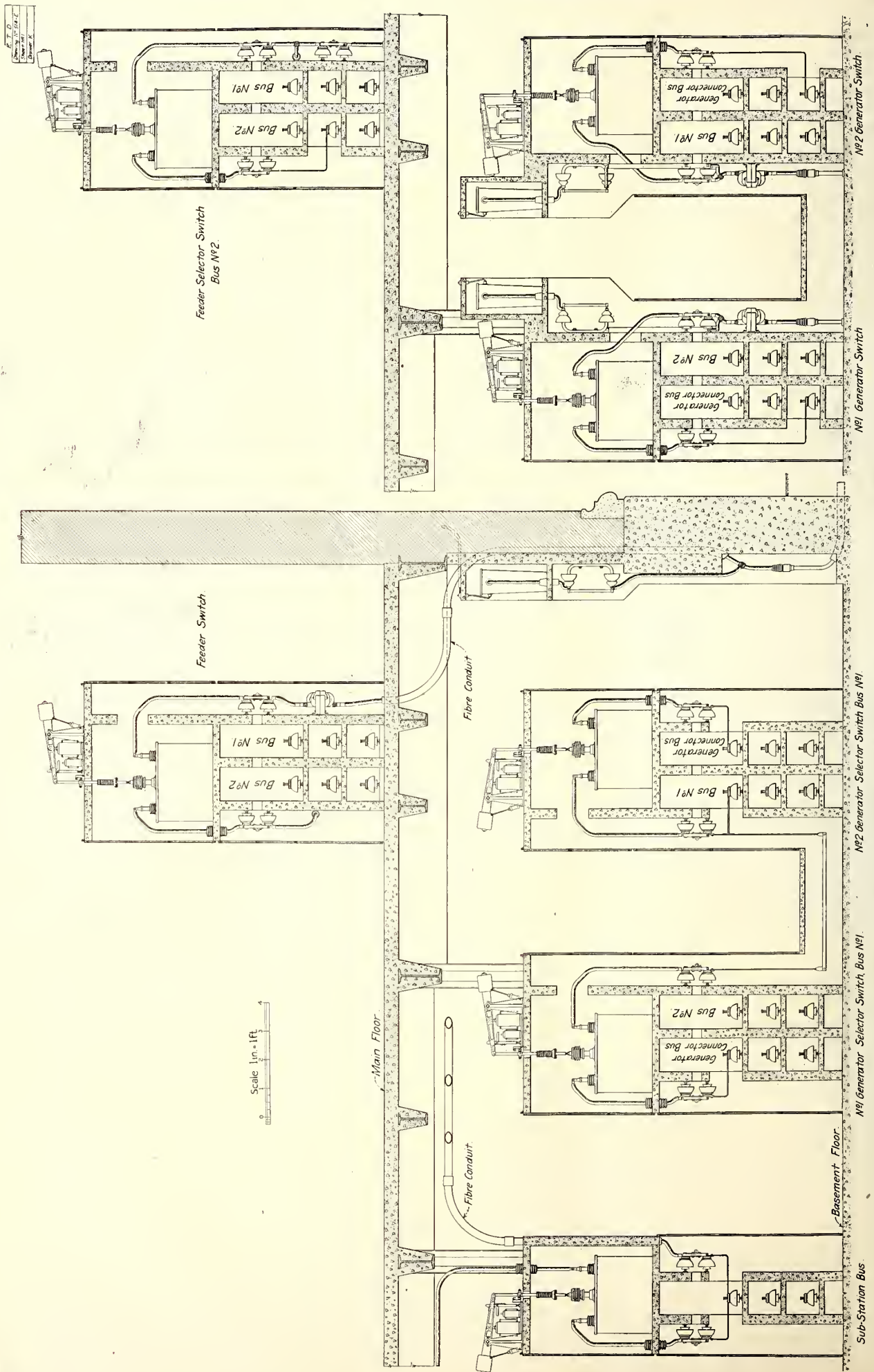
Provision has been made for the possible future use of coal as fuel by reserving sufficient storage space, and by designing the structural steel of the building and the flues to provide for the installation of a mechanical draft system. The dampers are regulated by hand, with provision for automatic control if found desirable.

OTHER EQUIPMENT

A 60-ton Shaw electric traveling crane with a 15-ton auxiliary hoist is installed.

A 1000-gal. fire pump and auxiliary, with hose racks at different points in the building, provides adequate fire protection. The piping is designed so that in emergency the fire pump can be used as a boiler feed pump.

One Alberger high-speed turbine-driven centrifugal pump and one Worthington reciprocating double-acting pump supply



Southern Pacific Power Station—Vertical Sections Through the 13,200-Volt Bus Structures

the boilers with feed water, which is heated by the exhaust steam from the auxiliaries in a Wainwright type closed feed-water heater.

A small intercommunicating telephone system with extensions is installed. It is connected with the main operating telephone lines of the Southern Pacific Company.

stalled by the Magnesia Asbestos Company, is 85 per cent magnesia. A Westinghouse motor-driven air compressor is located in the substation basement.

FUEL OIL AND WATER SUPPLY

A six weeks' supply of fuel oil can be carried in the fuel oil storage tank, which is of 55,000 bbl. capacity and into which



Southern Pacific Power Station—Switchboard from South End of Gallery

On the main floor is a machine shop with the necessary tools for making repairs.

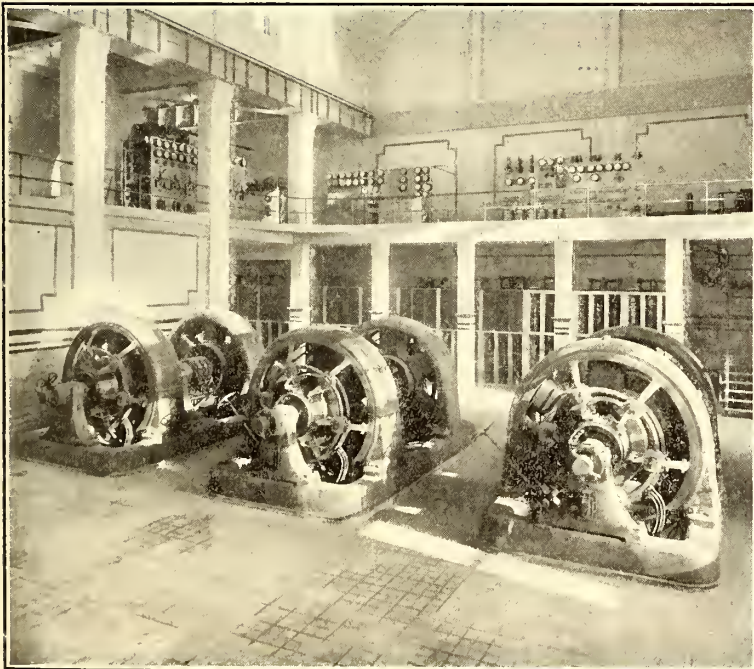
PIPING

The piping systems were installed by the Pittsburgh Valve Foundry & Construction Company. The steam piping is



Southern Pacific Power Station—Oil Switches and Bus Structure

eight cars can be unloaded simultaneously. The oil is pumped directly from the cars into the storage tank by two direct-acting steam pumps located in the boiler room basement and drains by gravity from the tank (through a steam oil heater in cold weather) to the fuel oil pumps which provide pressure



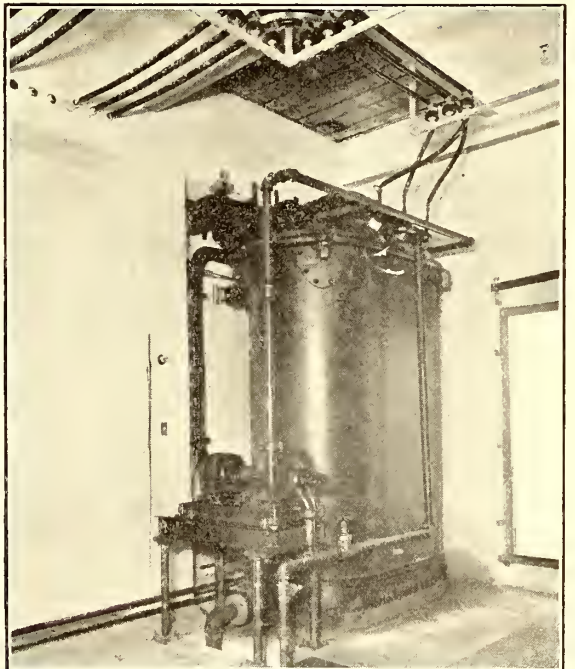
Southern Pacific Power Station—Rotary Converter Equipment and the Switchboard Gallery as Seen from the Main Floor—Transformer with Oil-Circulating Pump

wrought iron with Van Stone type flanges; the joints are made with corrugated steel gaskets and Smooth-on. The high-pressure steam valves are of the outside screw type with bodies of cast steel. The high-pressure and low-pressure water valves are cast iron with bronze stems. No expansion joints are used in the piping systems. Provision for expansion has been made by the use of long turns and bends. The pipe covering, in-

of about 80 lb. at the burners. A duplicate pipe line is installed from the tanks to the pumps.

A steam line for smothering fire encircles the top of the tank, and for safety in case of fire the tank is placed within an earthen dike that incloses a space equal to the volume of the tank.

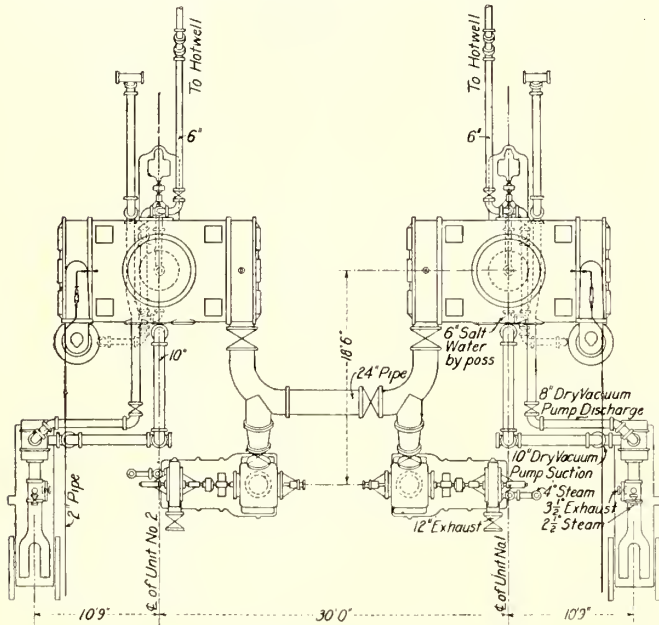
Beside the usual connection to the city water supply there



are installed in the basement two vertical direct-acting deep-well plunger pumps, each having a capacity of 130 gal. per minute when delivering the water to a tank on the roof.

EXCITATION

Beside the 125-kw exciters mounted on the extension of the turbo-generator shafts, a 125-kw General Electric steam-turbine-driven exciter is installed. On the excitation system is in-



Southern Pacific Power Station—Plan of Condensing Apparatus

stalled a 136-cell storage battery with a one hour capacity of 280 amp. It is charged from either of the two 250-volt buses by means of a motor-driven, 90-volt shunt booster. At present 15 plates are installed in a 27-plate lead-lined tank with provision for an increase to 23 plates, or an ultimate capacity of 440 amp for one hour. Sixteen of the cells are end cells and are controlled by means of an electrically operated end-cell switch. The battery and the end-cell switch were furnished by the Electric Storage Battery Company.

13,200-VOLT WIRING

In general, all 13,200-volt wiring in the building is run in Orangeburg fiber conduit, embedded in concrete. The generator leads and the outgoing feeders are No. 0000 single conductor cable with lead-covered varnished cambric insulation, terminating in Davis station terminals. The main generator leads are carried in conduit along the basement wall to the main generator switches.

There are two sets of 13,200-volt buses, so that by means of its main generator switch and its two selector switches any generator may be connected to either bus. The generator connector buses and main generator buses are located on the main floor. The half-tone on page 201 and the wiring diagram here-with show the arrangement of buses and the scheme of the 13,200-volt wiring. The station is designed so that any generator or any outgoing feeder may be connected to either or both buses.

The local substation bus is located in the basement near the main generator buses. By means of two selector switches it may be connected to either main feeder bus. The outgoing 13,200-volt distribution system consists of four feeders, two of which run north through Oakland to the West Oakland substation and the other two south through Alameda to the same substation. The north, or "First Street," feeders run in conduit from the feeder bus to an outlet tower near the power station and from there run overhead. The south, or "Estuary," feeders run to an underground switching chamber, thence by submarine cables under the estuary to a switching tower on the Alameda side, and from there overhead.

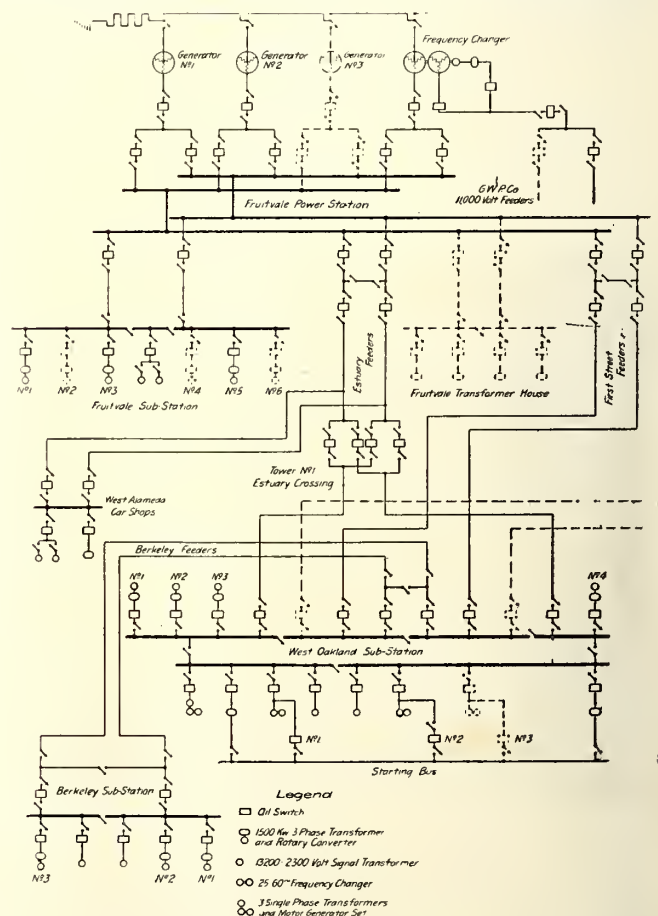
Provision has been made for a future high-tension transformer house located at the east end of the power station.

All 13,200-volt circuits are controlled by electrically operated Kelman oil switches. The generators, generator selector switches and feeder selector switches are non-automatic, while the outgoing feeder and rotary converter feeder switches are automatic.

The generators are star-connected with the neutrals brought out for grounding. Only one generator at a time will be connected to the neutral bus, which is connected to ground through 13 ohms resistance. As shown in the line engraving on this page every generator neutral is connected to a single-pole, double-throw switch. The practice will be to run with all neutral switches in the down position, except the one on the grounded generator, which will be in the up position. When it is desired to shift the neutral connection the switch on the generator to be grounded is thrown up, after which the switch on the generator to be disconnected from ground is thrown to the down position. The system will be un-grounded only during the time it takes to throw a switch from the "up" to the "down" position.

SUBSTATION

The local substation is placed in an extension of the turbine room. The present installation consists of three General Electric 1500-kw, 1200-volt rotary units and transformers. Space is left for three additional units. A rotary unit is two 750-kw, 600-volt rotaries, connected permanently in series on the d.c. end, mounted on a common base and with shafts carried in a common center bearing but free to revolve independently of



Southern Pacific Power Station—Diagram of 13,200-Volt Connectors

each other. Power is supplied by one General Electric 1500-kw, three-six-phase transformer with a double secondary winding per unit.

The transformers are the forced-oil, water-cooled type, 13,200 volts to 440 volts. They are located in a fireproof room in the basement. Removal of a reinforced concrete hatch above any transformer permits the crane to reach that transformer.

The rotaries are started from the a.c. end from one-third

and two-third voltage taps on the transformers, through t.p. d.t. General Electric K-3 oil switches. The 440-volt switches are the t.p. s.t. General Electric K-2 oil switches. The operating handles of these switches, together with the field break-up switches, negative and equalizer switches and polarity indicators, are mounted on slate panels, mounted on the rotary bases as shown in the engraving on this page.

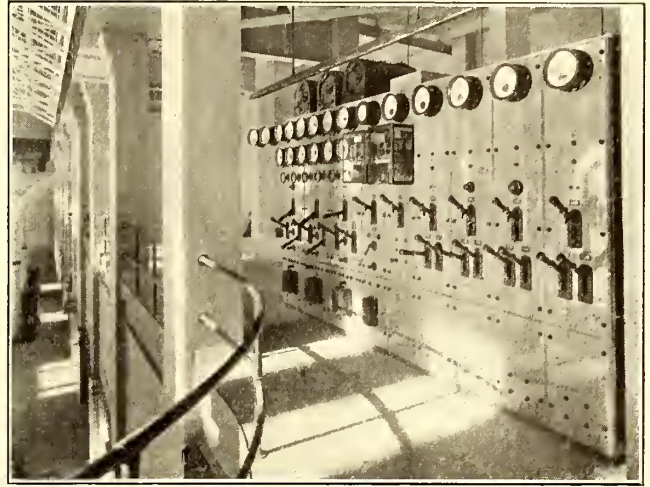
The cast-iron rotary bases are mounted on oak insulating frames and, to limit insulation strains and to protect operators, the bases are connected through a resistance of 10 ohms to the 600-volt interconnection between the two halves of the unit. Additional protection is afforded the operator by the installation of tile insulated floor in the substation.

SWITCHBOARD

The switchboard is located on a gallery at the east end of the turbine room extension. The power station board is of standard construction designed in three sections, i.e., bench-board, generator and feeder instrument boards and exciter and auxiliary d.c. boards. The generator rheostats and speed-changing devices are motor-operated from the benchboard. A totalizing panel is provided for metering the total output of the generating station by means of curve-drawing watt, volt and frequency meters.

The substation 1200-volt board is installed at right angles to and near the power station board. Double-panel construction is used, with the front and the rear panels 4 ft. apart. All switches and circuit-breakers are the remote-control, hand-operated type. The front panels contain the instruments and switch-operating levers. The switches and circuit-breakers are mounted on the rear panels. Spare rotary and spare feeder breakers are provided, with their switches connected to the spare breaker buses mechanically interlocked so that only one rotary or feeder at a time can be connected to its respective spare breaker bus. While the angle-iron frames of the front and rear panels are insulated from ground and from each other, the station will be operated with the front frame

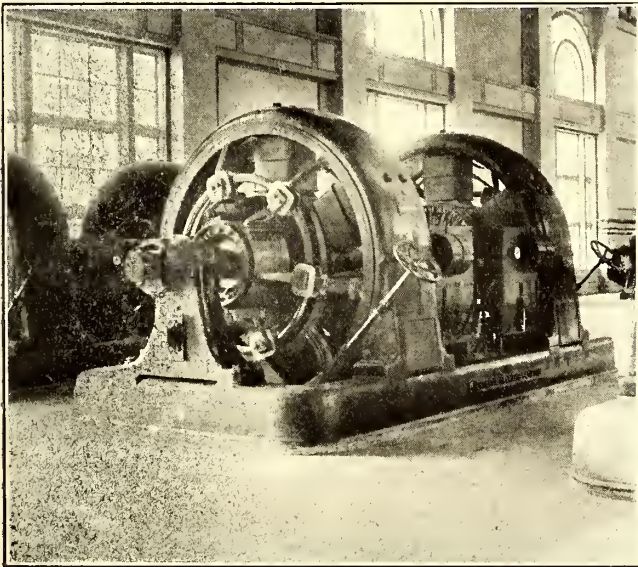
The station is lighted from the 250-volt excitation bus, across which a balancer set is connected to produce a three-wire system. For emergency use taps brought out from the middle cells of the storage battery are connected to a 9-point end-cell switch. The turbine and the boiler rooms are lighted by General Electric 6.5 amp luminous arc lamps suspended from the steel work. For other lighting around the generating station building individual 16-cp lamps are generally installed.



Southern Pacific Power Station—Front of 1200-Volt Board

AUXILIARY POWER SUPPLY

The Great Western Power Company has installed temporarily on the No. 4 turbo-generator foundation a General Electric 2500-kw frequency changer consisting of an 11,000-volt, 60-cycle synchronous motor, direct-connected to a 13,200-volt, 25-cycle generator. Its oil switches and switchboard for

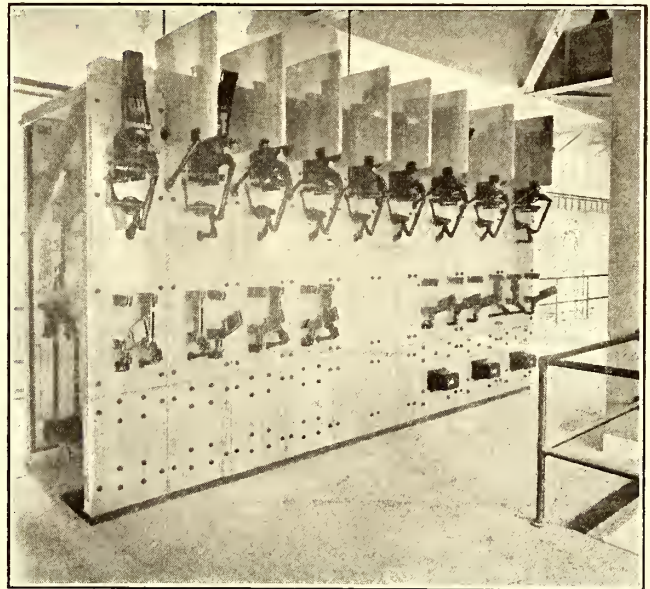


Southern Pacific Power Station—Rotary Unit Showing Starting Panel

grounded and the rear frame insulated. Soapstone slabs placed across the top brace the front and the rear panels.

The 1200-volt bus is carried in a fireproof compartment above the soapstone slabs. The rotary rheostats are mounted on the soapstone slabs above the panels. A Thomson watt-hour meter and a Westinghouse graphic recording wattmeter are installed to measure the total output of the substation. The entire switchboard was furnished by the Westinghouse Electric & Manufacturing Company.

Two 30-kw, 13,200-2300-volt Allis-Chalmers transformers furnish 25-cycle current for the operation of the local block signal system.



Southern Pacific Power Station—Rear of the 1200-Volt Switchboard

its 25-cycle end and for its exciter will occupy temporarily the space intended for No. 4 generator panels. A zero center scale curve-drawing wattmeter is installed to show the output from, or the input to, the 25-cycle end.

ENGINEERING

All of this installation has been carried out under the general direction of E. E. Calvin, vice-president and general manager Southern Pacific Company.

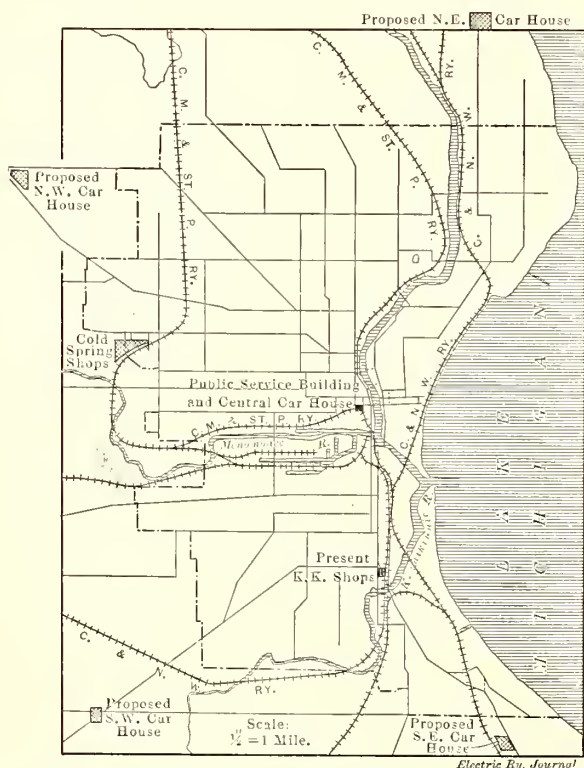
The construction details are under the direction of J. Q. Barlow, assistant chief engineer, who has for his representative in the field R. T. Guppy, engineer of suburban lines, and for his architect D. J. Patterson, who is responsible for the extremely

artistic superstructure, which is built of ordinary and inexpensive materials. The entire work, other than the superstructure, was designed, planned and specified under the direction of A. H. Babcock, electrical engineer of the Harriman lines, who accords to W. C. Miller, engineer of power stations, who supervised the entire mechanical and steam installation, assisted by J. C. Lathrop, who designed the steel building frame, and to H. Y. Hall, assistant electrical engineer, who designed and planned the switchboards, the station wiring, the bus structure and all the minor electrical details of the plant, their full share of whatever credit may be earned by the Fruitvale power plant.

NEW COLD SPRINGS CAR SHOPS OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

Plans have been perfected and construction work is now well advanced on the large new repair and construction shops of the Milwaukee Electric Railway & Light Company. The old shops in the southern part of the city have long been overcrowded and these new shops will be the first of several groups of new car-maintenance buildings, all planned to improve operating conditions. The accompanying map of Milwaukee shows the location of the present and proposed operating car houses and shops, together with the location of the Milwaukee Public Service Building, which includes trackage for housing a large number of interurban cars. This building is at the center of the congested district of Milwaukee and includes very extensive terminal facilities with arrangements for operating interurban and suburban cars through the building and for housing, inspecting and making light repairs on large or small equipment.

This building with its terminal facilities at the heart of the



New Milwaukee Shops—Map Showing Location of Different Shops and Car Houses in Milwaukee

street and interurban railway system is an important part of the ultimate arrangement of buildings for constructing, repairing and housing cars. This general plan, so far as now determined, calls for the housing and storage of city cars in existing or new car houses at the extreme northeast, northwest, southeast and southwest corners of the city and the repairing of those cars at the new shops here described. The location

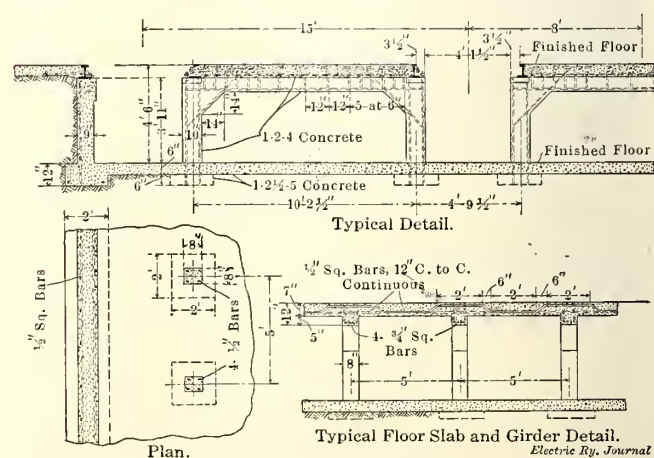
of the new shops is close to the geographical center of the city and within fifteen minutes' running time from the center of the business district. With the operating car houses located in the four quarters of the city near the outer ends of the car lines, the extra equipment required for morning and evening rush hours can be put in and taken out of service with a minimum dead mileage. Housing and storage of the cars away from the center of the city will permit the morning trippers to commence loading shortly after leaving the car houses; likewise, in the afternoon, when the trippers have discharged their loads they will be in the vicinity of the car houses from which they operate. With shops near the center of the railway system a disabled car may quickly be taken to the repair headquarters.

COLD SPRING SHOP PROPERTY

The group of buildings now being erected is designed to be a car repair and construction plant. No facilities will be provided here for car storage. It is intended that the four outlying car houses and the new shops will be complementary and car operation will be planned so that full advantage may be taken of the geographical location of the shops with regard to the locations of the car houses.

The new shop property extends for several thousand feet along the main line of the Chicago, Milwaukee & St. Paul Railroad, a siding of which connects with the loop track which incloses the shop yards. From this loop two material tracks lead to a storage yard of about 10 acres in extent. The Electric Railway & Light Company plans to take advantage of this centrally located property for storing all its construction materials. From there distribution to any part of the city railway system can be made with a minimum mileage.

The general arrangement of the shop buildings is shown on page 206. The property is reached by one double-track street railway line and one single-track line on parallel streets two blocks apart. Both of these lines connect with a double-track trunk line on Vliet Street, one block north of the shops. Double tracks entering the northeast corner of the shop property extend along the east and south sides of the shops. Near the entrance of these tracks a "Y" is formed and an additional track is led along the north side of the shop property to form one side of a loop track which encircles the entire group of shop buildings. Maximum switching facilities are obtained by double-tracking certain portions of the loop and joining two sides of the loop by transfer tables. The arrangement of tracks is such that loaded supply cars may be spotted at any point on the shop tracks without backing. Shop supplies received by steam or electric railway



New Milwaukee Shops—Detail of Repair Pits and Intervening Floor Slabs

will be taken onto the transfer tables and delivered direct to the storerooms or any desired part of the shops. Heavy materials received in flat or gondola cars may be run under a yard crane spanning the aisle between the machine and forge shops or may be run directly under cranes in buildings.

REGRAIDING OF PROPERTY

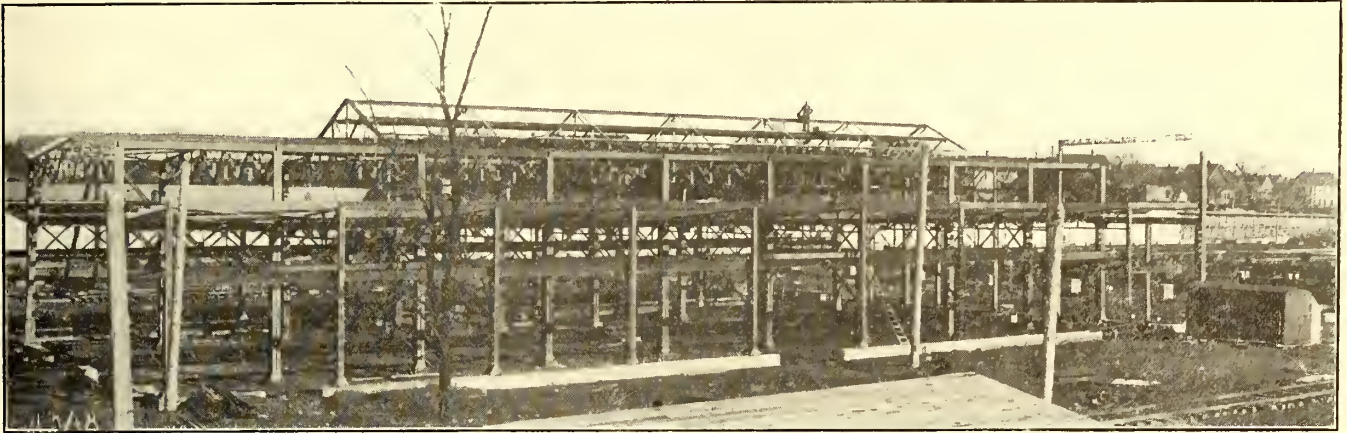
The property on which the new shops are being erected was

formerly used as a brickyard and was for the most part already on the desired level, but in some places grading was necessary. This grading, together with excavation for drains, foundations, retaining walls, pits, etc., necessitated the moving of about 64,000 cu. yd. of earth. This was excavated with steam shovels and the excess earth from the excavations and high places was transferred to the lower end, thus making the shop

being used to the yard of concrete. In the calculations for the walls the reinforcing steel was assumed to have a tensile stress of 16,000 lb. per square inch.

DRAINAGE

A comprehensive drainage system has been installed to care for the surface water and the water collected from the roofs of the buildings. The trunk line of this drainage system is a



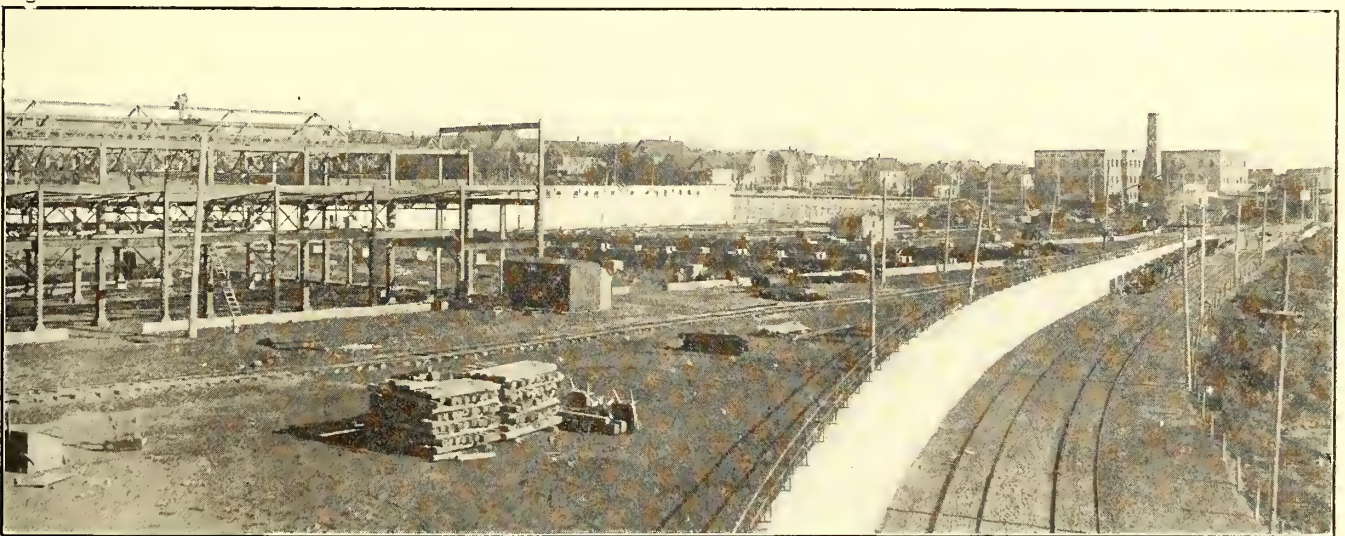
New Milwaukee Shops—Recent View of Steel Work for Forge Shop

property practically level except for the slope required for drainage.

On its west side and on part of the north side the shop property adjoins city streets and the marked change in grade made necessary the erection of about 2300 lin. ft. of retaining walls at the property lines. The walls vary in height from 7 ft. to 28 ft. and are constructed of reinforced concrete. A typical plan and section of one part of the wall is reproduced. In general all walls less than 20 ft. high are of the cantilever type and higher walls of the counterfort type. Expansion joints are placed every 50 ft. These are made by completely separating the two sections of walls by introducing layers of tar paper. The retaining wall along the north side of the property is surmounted by a 5-ft. concrete fence to protect the street traffic. The wall along the west side of the property av-

20-in. sewer, with a fall of 2.75 per cent, which extends along the south side of the shop property to connect with a large city sewer near by. Curb catch-basins have been placed throughout the yard to collect the surface water. All the roof drains are to be inclosed within the buildings and provision is thus made to assure freedom from freezing. The roof and surface sewers are subdivided into three main lines from which extend branches not less than 6 in. in diameter. Catch-basins have been built under the shop floors at important sewer junctions and these basins are large enough to admit of a man going inside for cleaning them. Three curb catch-basins are installed in each transfer table pit.

The underground piping for the plumbing system is carried to the main outfall sewer and all connections between the main sewer and the water drainage system have been trapped to pro-



New Milwaukee Shops—Part of Shop Site Showing Retaining Walls

erages 25 ft. in height. Of this wall the railway company built 252 ft. and the city 200 ft. The retaining wall on the south side of the property separates the grades of the double tracks leading to the material storage yard from the shop loop track.

In all 5300 cu. yd. of concrete were used in constructing the company's portion of the retaining walls. This concrete was a 1:2½:5 mixture which was assumed to withstand 650 lb. per square inch under compression. The tension stresses in the walls are cared for by Johnson corrugated bars, about 90 lb. of steel

tect against gases from the plumbing sewer system entering the buildings by way of the water drainage system.

GENERAL ARRANGEMENT

The ground plan here reproduced shows the general arrangement of the new shop buildings. The group includes a machine shop 180 ft. x 124 ft. and a forge, track and special workshop 180 ft. by 93 ft. These two buildings are separated by an open space 31 ft. wide, which will be served by an overhead traveling crane and will afford space for storage of

molded concrete. The skylight frames also are of sheet-metal construction. Wired glass will be used throughout.

A detached power house and pumping station is being erected to furnish water, heat and compressed air for all the new shops. The sprinkler system will be fed from an elevated tank located in the turning loop at the southwest corner of the shopyard not far from the power house. All shop service pipes, wires and cables will be installed in a concrete tunnel which has been built to connect the power plant with each shop building. This tunnel is 6 ft. wide, 6 ft. 6 in. high and 1200 ft. long.

TRANSFER TABLES

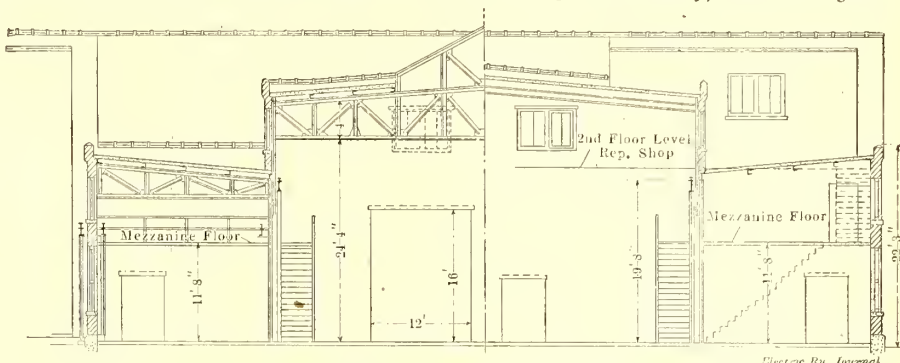
The two large transfer tables will form a most important part of the shop track arrangement. The west transfer table connects the working tracks in the general repair shop with those in the erecting shop and wood mill. The east transfer table connects the tracks in the erecting shop with the yard space later to be occupied by a paint shop. Both transfer tables connect with the loop tracks extending around the shop property and with the storehouse tracks, which are located at the north end of the principal shop buildings.

Each transfer table is 80 ft. long and is carried on five rails equally spaced in a pit. Each rail is anchored to a heavy concrete stringer extending 18 in. above the ground, thus allowing for freedom of movement with snow 18 in. deep on a level. The height of the transfer table from the top of the running rails to the top of the track rails on the table is $16\frac{1}{2}$ in. and all portions of the transfer table frame are above the tops of the pit rails. This design makes it possible to construct walkways across the pit and sloping runways are provided at each side of the pit so that shop materials may be trucked across from building to building.

The capacity of each transfer table is 65 tons and the speed of travel 300 ft. per minute loaded. The walls of the buildings facing the transfer pits are approximately 100 ft. apart, thus giving a clear space of 10 ft. at each end of the transfer tables. It was not thought desirable to run the trolley wires from the

FORGE SHOP

The plan and a sectional elevation of the forge shop are shown. This shop has runways for three cranes and an entrance track for bringing heavy materials through the center bay. The characteristics of the crane in the center bay of the forge shop are as follows: Capacity, 10 tons; span, 48 ft. 4 in.; distance from crane rail to floor, 20 ft.; speed of bridge, 350 ft. to 400 ft. per minute; speed of trolley, 100 ft. to 150 ft.



New Milwaukee Shops—Section of Forge Shop

per minute; speed of hoist, 20 ft. to 50 ft. per minute. This crane is operated from a cage. Each of the cranes in the two side bays of the forge shop is of 5 tons capacity. Their characteristics are as follows: Span, 18 ft. 4½ in.; distance from rail to floor, 14 ft. 4 in.; bridge speed, 300 ft. to 350 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 20 ft. to 60 ft. per minute. These cranes also are to be operated from cages.

Toilet facilities are provided on two mezzanine floors at the end of the forge shop adjoining the repair shop.

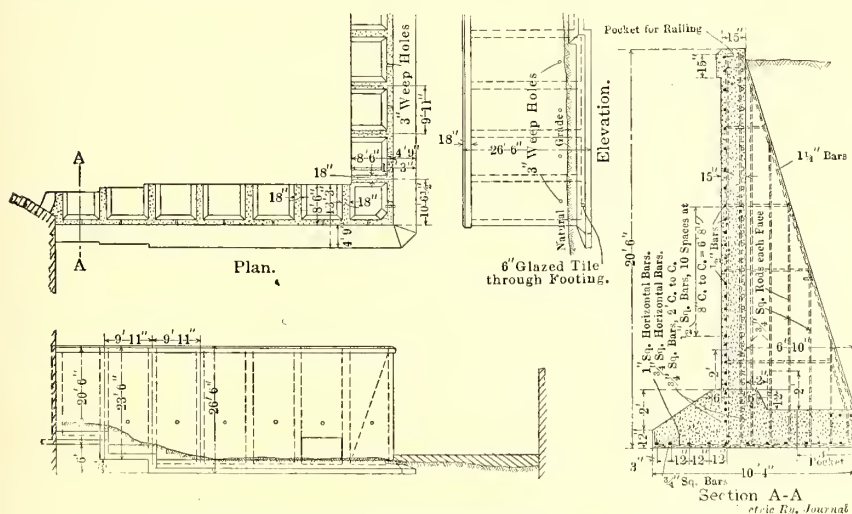
MACHINE SHOP

The machine shop is located 31 ft. distant from the forge shop and also connects at one end with the general repair shop. A sectional view of the machine shop is shown. This building has a gallery floor 21 ft. above the ground floor; also mezzanine floors located 12 ft. above the ground floor. The toilet facilities for both machine and repair shops will be placed on these mezzanine floors, which adjoin the common wall between the two shops.

The machine and repair shops will be connected by four doors on the ground floor and one door on each side of the machine-shop gallery floor. The mezzanine floor in the machine shop will be used for locker and wash rooms. On account of the depression in grade the employees' entrance from Fortieth Street will be on a level with the second floor of the shop buildings. As the men pass through the entrance they will walk through a corridor on the second floor to the locker and wash rooms, from which they can pass down to either the machine shop or the repair shop.

A standard-gage industrial track has been built through both machine and forge shops and is intersected by a lead from the yard loop track which extends through the machine shop into the general repair shop. Practically the entire ground floor of

the machine shop will be served by an equipment of three cranes. The crane in the center bay has the following characteristics: Capacity, 15 tons; span, 60 ft.; height from crane rail to floor, 31 ft. 8½ in.; bridge speed, 400 ft. to 450 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 20 ft. to 50 ft. per minute; cage operated. The two cranes serving the side bays of the machine shop under the gallery floor have the following characteristics: Capacity, 5 tons; span, 28 ft. 5 in.; height from rail to floor, 14 ft. 4 in.; bridge speed, 300 ft. to 350 ft. per minute; trolley speed, 100 ft. to 150 ft.



New Milwaukee Shops—Sections of Retaining Walls

shop tracks directly to the edge of the pit and therefore they were stopped at the building line and the transfer table trolley wire is extended 10 ft. in each direction beyond the table, being carried on structural steel brackets. Current for propelling the transfer tables is received from an overhead trolley wire supported along the outside of one of the buildings facing the pit. These transfer tables were built by George P. Nichols & Brother, Chicago, and installed by the railway company.

Attention is directed to the general relation of one shop to another and the principal features of design of each shop.

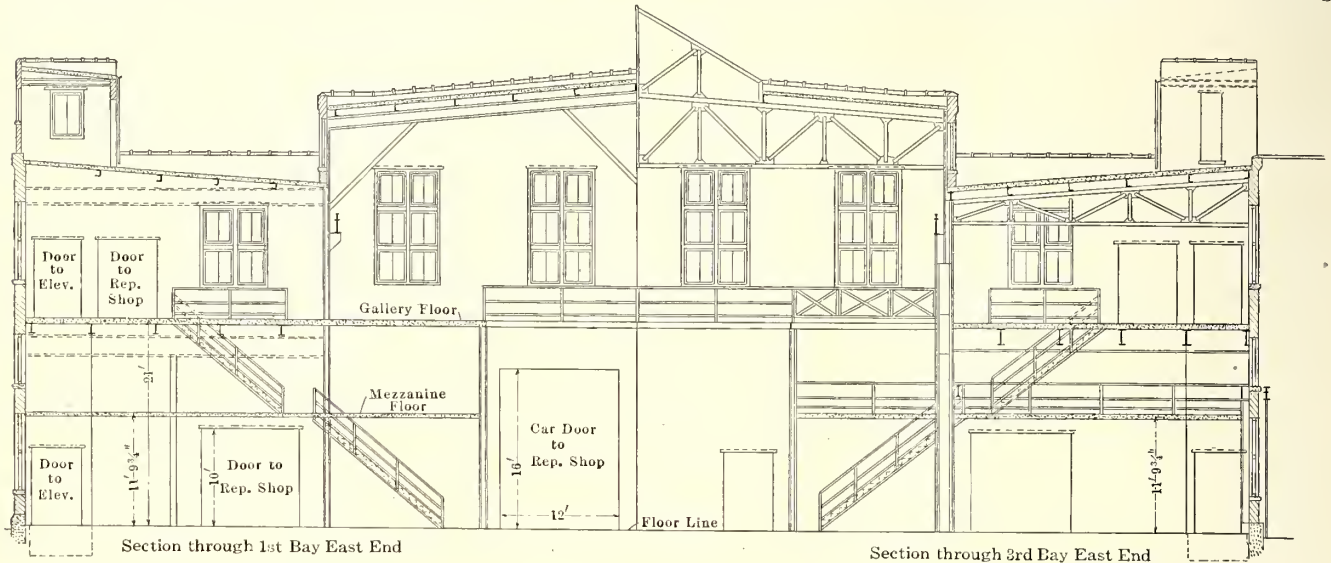
per minute; hoist speed, 24 ft. to 60 ft. per minute; cage operated.

GENERAL REPAIR SHOP

The general repair shop incloses 20 tracks with open car pits, each long enough to accommodate two cars. The tracks are spaced alternately on 15-ft. and 16-ft. centers. A cross-section through the pit tracks showing the open construction

runways. The span of the car-body cranes will be 56 ft. 11 in.; height from floor to crane rail, 21 ft. 4½ in.; bridge speed, 400 ft. to 450 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 20 ft. to 50 ft. per minute. These cranes are all cage operated.

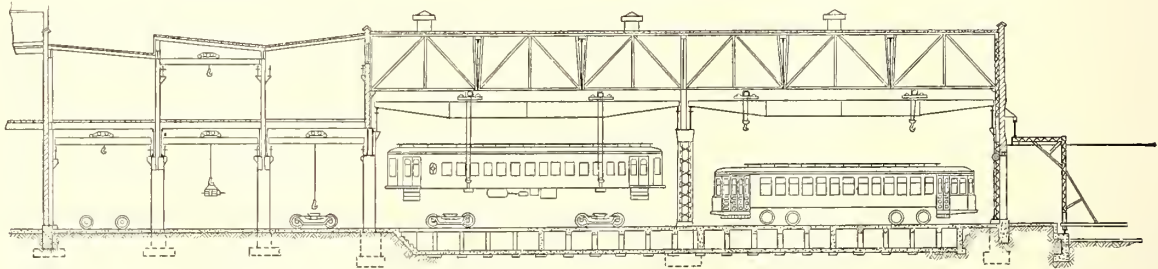
The car-pit section of the general repair shop will occupy about two-thirds of the ground-floor space. The remaining



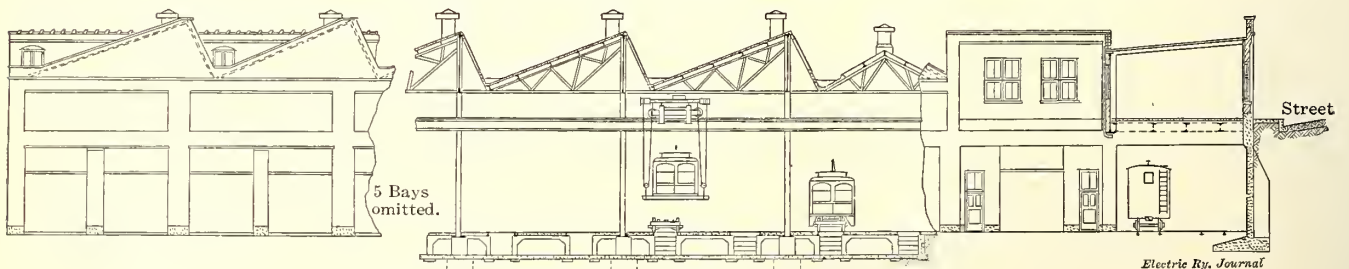
New Milwaukee Shops—Section and Elevation of Machine Shops

adopted is reproduced on page 204. The floor between the car pits has a thickness equal to the height of the pit track rails, 7 in. These rails are carried on reinforced concrete posts spaced on 5-ft. centers. The posts are 8 in. square in section. Each post is surmounted by a cap made of a section of channel iron through which pass the anchor bolts for holding the rails. The design of the floor between the pits is such that it will withstand the load brought on by pulling a heavy interurban truck across it. The space between pits is subdivided into four sec-

one-third of the first floor will be used as truck repair space, each car pit track extending entirely across it and one of these tracks extending into the machine shop and another into the forge shop. Above this track space will be a gallery floor on which the electrical department will be located. Elevators will connect the two floors. The truck repair space on the first floor will be lighted by shafts extending through the gallery floor to the roof, as shown by the dotted lines in the general plan shown on page 206.



New Milwaukee Shops—Longitudinal Section Repair Shop



New Milwaukee Shops—Cross-Section Repair Shop

tions by three concrete diaphragm walls extending across the open space underneath the repair shop floor. Car bodies will be handled by either of two specially designed car-lifting cranes installed to serve all pit tracks. The cranes have the following characteristics: Each has two 15-ton travelers. Each traveler is arranged with two traveling drums and two hooks, each with a capacity to lift seven and one-half tons. The hooks will be spaced 9 ft. apart in a direction parallel with the

The truck section of the repair shop will be served by five 5-ton cranes operating on three runways, each with a span of 17 ft. 8½ in. and with crane rails 16 ft. 3 in. above the floor. The cranes will have a bridge speed of 250 ft. to 300 ft. per minute; a trolley speed of 100 ft. to 150 ft. per minute and a hoist speed of 24 ft. to 60 ft. per minute. They will be controlled by pendent switches. The electrical shop on the second floor will be served by one 3-ton crane with a span of 18 ft. 1 in.

This crane will have a hoist arranged to lift materials from the ground floor to the second floor, but normally will serve the electrical shop. The height from the ground floor to the crane rails on the second floor will be 31 ft.; the bridge speed of the crane, 250 ft. to 300 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 50 ft. to 100 ft. per minute.

The erecting and paint shop will have three four-track bays. Runways will be provided for cranes in two of these bays. A portion of this building, 30 ft. wide and 186 ft. long, is to be two stories high. The erecting and paint shop is to be joined on the south by a mill shop and on the north by one of the storerooms earlier described.

MEETINGS OF THE EXECUTIVE COMMITTEE OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

Meetings of the executive committee of the American Electric Railway Transportation & Traffic Association were held Jan. 26 and 27. Those present were President Henry C. Page, Worcester; First Vice-President John N. Shannahan, Baltimore; Second Vice-President C. E. Learned, Boston; Third Vice-President Dana Stevens, Cincinnati; C. D. Emmons, Fort Wayne; J. V. Sullivan, Chicago, and A. Gaboury, Montreal. At the first meeting President Page stated that the association had been officially represented at recent meetings of State and sectional associations held to discuss transportation and traffic subjects and that R. I. Todd, Indianapolis, and W. H. Collins, Fonda, had represented it respectively at the recent meetings of the Central Electric Railway Association and at the Syracuse meeting of the New York State railways.

BUDGET

The first subject discussed by the committee was the budget for the ensuing year. Mr. Page stated that the association had this year two more committees than last year, namely, the joint committee on signals appointed to act with the Engineering Association and the joint committee on freight and express accounting to act with the Accountants' Association. It was therefore decided to ask for an appropriation of \$1,800 during the year, or \$300 more than requested last year. President Page thought that the services which the two additional committees could render the association warranted the association in the additional expense.

INTERURBAN RULES

J. W. Brown, Wheaton, Ill., chairman of the committee on interurban rules, then asked whether the executive committee had any special instructions as to the direction in which the association wished the committee to work during the coming year. He said that he had sent inquiries to some 18 managers in different parts of the country, asking which code they preferred, the Denver code, the Atlantic City code or the A. R. A. code. Opinions were about equally divided between the three. After discussion the executive committee voted, upon motion of Mr. Shannahan, that the rules committee should endeavor to draw up the best possible set of rules which would be adopted by a majority of the member companies of the association.

BLOCK SIGNALS

C. D. Emmons, Fort Wayne, a member of the joint committee on block signaling, then reported the action taken by that committee at its meeting on Jan. 25. An account of this meeting was published on page 169 of the issue of this paper of Jan. 28.

TRANSFERS AND TRANSFER INFORMATION

J. V. Sullivan, Chicago, a member of the committee on transfers and transfer information, then asked the executive committee whether it had any further instructions to make to that committee. Secretary Donecker stated that the association had received a suggestion from the Los Angeles Railway Company suggesting as a topic the consideration of the best method of collecting fares on prepayment cars, and if a fare-receiving device was used whether it should be so arranged that the money received for fares could be used by the conductor for making change. A discussion arose in the executive committee as to the committee of the association to which this subject

and others relating to the method of collecting fares should be referred. The conclusion was finally reached that the manner of collecting fares was so closely allied to that of issuing and collecting transfers that it would be well to enlarge the scope of the committee on transfers and transfer information to include this subject and to change the name of the committee to the "committee on fares and transfers." This was then done and the subject suggested by the Los Angeles company was referred to the committee on fares and transfers, whose instructions were briefly to investigate all matters relating to the collection of fares, the issue and acceptance of transfers, the registration of the same and the need of fare boxes in connection with the use of prepayment cars. The committee was also instructed to continue the subject referred to last year of whether transfers should be registered and, if so, whether two registers, one for cash fares and one for transfers, should be used.

EXPRESS AND FREIGHT TRAFFIC

H. E. Reynolds, Boston, chairman of the committee on express and freight traffic, then reported that the membership of that committee had not yet been completed and that it had been impossible yet to have a meeting.

SCHEDULES AND TIMETABLES

The committee on schedules and timetables reported that among other subjects in its forthcoming report the committee expected to take up that of defining some of the most common terms used in city and interurban railway operation. It had found that terms used for the same things varied greatly in different parts of the country and it would attempt to begin the standardization of some of the terms used in the construction of schedules and timetables. This was approved by the committee and at Mr. Learned's suggestion all committees were authorized to define the technical terms used in the field in which their committee work was directed if definitions seemed advisable.

CITY RULES

H. W. Fuller, chairman of the committee on city rules, reported as follows: "The committee met at 9:30 a. m. Thursday, Jan. 26, and reviewed the report of the 1909-1910 committee and the action of the association at the 1910 convention. Several letters and suggestions submitted were also considered and a conference was had with the interurban rules committee. The city rules committee is now prepared to submit recommendations covering changes in certain rules (Nos. 2, 10, 21, 29, 116, 122, 209, 210 and 213). The committee plans to hold another meeting and formulate recommendation of rules covering the operation of prepayment cars. The committee also plans to submit all recommended changes and additions to member companies by circular, so that a comprehensive report may be submitted to the next convention."

SUBJECTS

The committee on subjects reported through Mr. Shannahan that it believed that the time of the association at the next convention would be so fully occupied with considering the reports of committees that there would not be time to take up individual papers. Mr. Emmons suggested that instead of outside individual papers the chairman of each committee should arrange to have at least two persons not connected with the committee present oral or written discussions on the report, these discussions to occupy not more than 10 minutes. The suggestion was adopted and the secretary was instructed to advise the chairman of each committee of this action.

NEW MEMBERS

The secretary then presented to the executive committee the names of some 50 associate members of the American Electric Railway Association who had answered the recent circular sent out by the association by expressing their wish to ally themselves with the Transportation & Traffic Association. Upon motion the list was approved.

TRAINING OF TRANSPORTATION EMPLOYEES

The committee on the training of transportation employees reported, through Mr. Nagle, that it had met and discussed the instructions issued to it by the executive committee, namely, to

consider methods of keeping permanent records of employees, the minimum breaking-in periods in both city and interurban operation and the development of uniform records for use during the breaking-in period, and to tabulate the State laws relating to the employment of trainmen. These subjects had been assigned to several members of the committee with the exception of the last, which is to be taken care of by the secretary of the association, who will send a circular letter* to two railway companies in each State requesting that copies of any new bills presented to or laws passed by the Legislatures or any order issued by the railroad or other public utility commissions in their respective States be sent to the committee to aid it in its work.

PASSENGER TRAFFIC

L. D. Pellissier, Holyoke, chairman of the committee on passenger traffic, reported that no other members of the committee had been to the meeting in New York and that it was therefore impossible to make a report.

JOINT COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTING

The secretary reported that P. P. Crafts, chairman of this committee, was preparing to call a meeting soon.

MEETING OF THE MANUFACTURERS' EXECUTIVE COMMITTEE

The executive committee of the American Electric Railway Manufacturers' Association held a meeting in the Engineering Societies Building at 10:30 a. m. on Jan. 26 for the consideration of routine business and to dispose of certain details pertaining to the arrangements for the annual dinner. The report of the entertainment committee, which had this latter matter in charge, was received and unanimously approved.

An interesting incident of the meeting was the presentation to the past president, Joseph R. Ellicott, of a set of resolutions, handsomely engrossed, expressive of the appreciation and esteem in which he is held by his fellow members of the executive committee and by the entire membership of the association. The resolutions, which had been suitably framed, were presented by Charles C. Peirce in an appropriate speech.

A special committee to act upon selecting the time and place of the next convention was appointed, consisting of the president, Charles C. Castle; the secretary, George Keegan; the vice-president in charge of the entertainment committee, W. L. Conwell; the vice-president in charge of exhibits, K. D. Hequembourg, and two alternates to be named later. This committee is to confer and co-operate with a similar committee of the American Electric Railway Association with regard to the time and place of holding the next annual convention.

A report was received from the special committee appointed to consider the subject of a permanent office in New York for the Manufacturers' Association. This report was made by the chairman, Mr. Ellicott, and favored the establishment of such an office. After protracted discussion it was decided that the association should have an office where all of its business might be transacted and where the work of the various committees might converge. A resolution was adopted authorizing the president and secretary to engage rooms and establish an office in the downtown district of New York.

MEETING OF ENGINEERING ASSOCIATION COMMITTEE

The special committee appointed to frame rules for the guidance of the standards committee of the Engineering Association held a meeting at the office of the *ELECTRIC RAILWAY JOURNAL* on the afternoon of Jan. 26. Those present were Paul Winsor, Boston Elevated Railway, chairman; C. B. Voynow, Philadelphia Rapid Transit Company; Rodney Hitt, *ELECTRIC RAILWAY JOURNAL*, and H. H. Adams, Metropolitan Street Railway, New York. An informal discussion of the subject assigned took place and the meeting adjourned for two weeks, during which

time each member of the committee is to prepare a set of rules as a basis for discussion at the next meeting.

MEETING OF THE EXECUTIVE COMMITTEE OF THE ACCOUNTANTS' ASSOCIATION

At the meeting of the executive committee of the Accountants' Association on Jan. 26 the following were present: W. H. Forse, Jr., Anderson, Ind., president; M. R. Boylan, Newark, N. J.; H. E. Weeks, Davenport, Ia.; C. N. Lahr, Akron, Ohio; F. B. Lasher, New York, N. Y.; C. L. S. Tingley, Philadelphia, Pa.; W. B. Brockway, New York, N. Y.; Henry J. Davies, Cleveland, Ohio; P. S. Young, Newark, N. J.; W. F. Ham, Washington, D. C.; L. T. Hixson, Indianapolis, Ind.; Frank J. Pryor, Jr., Philadelphia, Pa.; H. E. Smith, Montreal, Que., and Robert N. Wallis, Fitchburg, Mass.

The subject of a campaign to increase the number of active members of the association was discussed and various suggestions were considered.

In connection with a discussion of the subject of the "get-together" luncheon, which has been held by members of the association at the recent annual meetings, various plans were considered for getting the members, and particularly the new delegates, better acquainted. It was decided to appoint a "sociability" committee to act in regard to this matter at the next annual meeting.

President Forse called attention to the facts that the association will have five committee reports at the next meeting instead of three as heretofore and that there will be two joint sessions with other affiliated associations instead of one, as was the case last year. The two new committees are the one on car miles and car hours and the joint committee with the Transportation & Traffic Association.

It was decided that the association will publish the standard classification of accounts and the decisions on questions regarding the classification which have been made in conjunction with the Interstate Commerce Commission. The decisions on the cases will be provided with an index or marginal notes. The pamphlet will be placed on sale by the association.

It was decided tentatively to have papers presented at the next annual meeting on the subjects of overhead charges, statistical compilations, accounting for a small property, and fare boxes, with an exhibit of sample fare boxes. A committee of three accountants will be appointed to prepare a list of articles giving data regarding the life of railway physical property.

President Forse has announced the following membership of committees:

Standing committee on classification of accounts—W. F. Ham, Washington, D. C., chairman; H. L. Wilson, Boston, Mass.; W. B. Brockway, New York, N. Y.; W. H. Forse, Jr., Anderson, Ind.; F. E. Smith, Chicago, Ill.

Joint committee on shop accounting with Engineering Association—P. S. Young, Newark, N. J., co-chairman; N. E. Stubbs, Baltimore, Md.; F. B. Lasher, New York, N. Y.; C. E. Thompson, Chicago, Ill.; A. F. Elkins, Columbus, Ohio; representing Engineering Association—A. D. McWhorter, Memphis, Tenn., co-chairman; Chas. Hewitt, Philadelphia, Pa.; H. H. Adams, New York, N. Y.; E. O. Ackerman, Columbus, Ohio; John W. Corning, Boston, Mass.

Joint committee with Transportation & Traffic Association on freight and express accounting—W. Shroyer, Anderson, Ind., co-chairman; E. L. Kasemeier, Springfield, Ohio; J. C. Collins, Rochester, N. Y.; representing Transportation & Traffic Association—P. P. Crafts, Clinton, Ia., co-chairman; W. S. Whitney, Cincinnati, Ohio; Geo. H. Harris, Birmingham, Ala.

Committee on car miles and car hours—S. C. Rogers, Youngstown, Ohio, chairman; C. S. Mitchell, Pittsburgh, Pa.; W. J. Tharp, Little Rock, Ark.

Committee on interline accounting—L. T. Hixson, Indianapolis, Ind., chairman; Irwin Fullerton, Detroit, Mich.; E. L. Schmock, Willoughby, Ohio.

THE ADJUSTMENT OF AMERICAN STREET RAILWAY RATES TO THE EXPANSION OF CITY AREAS *

BY GEORGE H. DAVIS, OF FORD, BACON & DAVIS, CONSULTING ENGINEERS, NEW YORK, N. Y.

The modern city is an organized unit having its residence, financial, commercial and other districts all within its limits of transportation, while the ancient city without transportation was at best a group of communities, each having its centers of interest within walking distance. City areas per capita in typical cases in America are more than twice those of European cities of corresponding size. The factor creating this condition is the flat-rate system of payment for street transportation as opposed to the quantity or distance rate system abroad.

Considering all industries, we now have in America only a few remaining examples of the flat-rate plan of charge which was almost universal in early industrial history. Considering common labor, when the employer bought the services of the laborer at one time for a given amount he claimed his entire time for an indefinite period and possibly the laborer himself. At present a laborer does a certain kind of work during fixed hours under stipulated conditions at a given rate. In professional and higher grade service the flat-rate method of charge appears only in the salary or retainer, while for all special services special fees are paid. Commodities are universally produced and sold at a per unit price. Restaurants, for example, have almost entirely abandoned the flat-rate system of charge known as the "American plan." City supply services such as telephone, telegraph, water, gas, heat and electricity were placed on the flat-rate basis of charge when first established, while at present it has been necessary not only to make a quantity charge for amounts as measured, but to establish other bases of charge, such as time of service and readiness to serve. For some reasons the basis of charge for a product or service should be in general accord with the basis of cost of production. For illustration, if in transportation service items of operating cost and other corporation expenditures on account of conducting the business are proportional to ton miles, then rates should have the same basis. Rates cannot be so arranged as to be absolutely just to each individual patron. It is apparent that not only the statutes of governments but the laws of nature are made for classes and the most that can be hoped is an equitable class rate plan. Rates of charge for products or services are of most vital importance to the business or industry under consideration, and feasibility and adaptability are prominent features to consider.

In analogy to successful rate systems of other industries, a rate plan for street railway service charge would suggest itself in which not only convenience of fare collection is taken into consideration as in

- (1) The American flat-rate plan, and as in
 - (2) The European zone plan, in which quantity of service is considered,
- but other factors such as:
- (3) Readiness to serve, including a consideration of:
 - (a) Availability of routes and transfers.
 - (b) Quality and condition of cars and roadway.
 - (c) Reliability of service.
 - (d) Speeds and headways.
 - (e) The guarantee of safe transportation.
 - (f) Perpetuity of service.
 - (4) Time of service, including:
 - (a) Rush-hour service.
 - (b) Day service.
 - (c) Theater and other amusement service.
 - (d) All-night service.
 - (e) Excursion service.
 - (5) Risks of the service, including:
 - (a) Damage claims.

- (b) Public demands.
- (c) Franchise requirements.
- (d) Labor controversies.
- (e) Changes in the art.

Since 1905, following a 10-year development period, there has been a pronounced reawakening to the advantages of light car equipment in the reduction of operating costs. This came about on account of the marked advantage observed in operating expenditures of companies using only light cars as compared with those operating heavier types. This led to a careful consideration of the subject, resulting in demonstrations both in theory and practice showing the extent to which operating costs are influenced by car weight or load weight carried.

This subject is mentioned here only in connection with weight, miles and rates. In theory it has been shown that by the elimination of weight transported, either in car units or live passenger loads, savings in operating and other items of expenditure can be made amounting to from 5 cents to 10 cents per pound per year, based upon the assumed distance of transportation of a car, for the period amounting to approximately 50,000 miles. The exact savings per pound will depend upon location, climate, grades and other road conditions, as well as efficiency of management and equipment. Among the items of expenditure influenced by weight transported are maintenance of roadway, power plant, cars and equipment, operating costs, as power plant wages, fuel, water and miscellaneous, together with interest, taxes and depreciation on the property affected. Transportation and general expense items are not included. It is assumed that freight transportation rates of steam railroads in the United States are \$0.007 for one ton hauled one mile, which if hauled 50,000 miles would amount to \$350, equivalent to \$0.175 per pound. With an operating ratio of 86 per cent, including the usual operating items, together with interest, taxes and depreciation, the cost to the steam railroads of this transportation would be \$0.1505 per pound for 50,000 miles.

Considering the expenditures for 1910 of a typical street railway of the group of smaller cities in the statements of which abstracts are published herewith, the items of operating costs amounted to \$240,000; interest, \$100,000; taxes, \$25,000; depreciation, in addition to 10 per cent of gross earnings for maintenance, \$25,000; a total of \$390,000. This company operates a light, uniform type of single-truck car, seating 32, and in the period its schedule mileage amounted to 2,000,000 car miles, and on the basis of 50,000 miles per car per year would be equivalent to 40 cars at an average weight of 26,000 lb., including live load. This would amount to 1,040,000 lb. of car unit and load weight used in the service, which is equivalent, with expenditures of \$300,000, to \$0.375 per pound.

In a group of street railway properties having for 1910 gross earnings of approximately \$5,700,000, of the 92.33 per cent of gross earnings expended for all purposes except dividends, including operating expenses, 54.47 per cent; interest, 24.74 per cent; taxes, 7.12 per cent; depreciation, 6 per cent, only 53.08 per cent is affected to any extent whatever by weight of car or live weight transported, and of this the items particularly affected are cost of power, car repairs, track repairs, interest and depreciation, which in the aggregate do not exceed 15.22 per cent of gross earnings.

From a consideration of a large number of typical examples it would appear that the addition or subtraction of passenger weight at the rate of \$0.075 per pound per year may not influence the total expenditures to a greater extent than 20 per cent.

The American 5-cent-fare flat-rate plan of charge had its origin from considerations of convenience, and a half century ago in small cities having limited car routes the amount was no doubt equitable, but to meet the conditions existing in large cities where great territories are served it is inadequate.

Passenger weight miles, or passenger miles, since the weight of passengers is approximately uniform, may be considered as the unit of quantity of street railway service, and the European zone system of rates is established on this unit. Since this unit covers only a part of the costs of conducting the business it should not form the entire basis of rates for service.

*Abstract of paper read before the American Electric Railway Association, New York, N. Y., on Jan. 27, 1911.

Regarding the readiness-to-serve rate factor in a rate plan in all large cities from the completion of initial construction to the expiration of the franchise street railway service is constantly available. The extremes of service requirements are shown in the maximum service of a typical company at 6 p. m. and minimum service at 3 a. m. as indicated by cars upon the system, which are in the ratio of 15 to 1.

Public utility businesses are unique among industrial undertakings in that they are required through ordinance contract and public demand to perform continuous service and to all applicants without discrimination. If a car service could be suspended during hours of minimum requirements, expendi-

000,000 and \$100,000,000, which is of sufficient magnitude to demand recognition in any rate plan.

The time of day or hour of day of service is one of the most important elements of consideration in an equitable rate. In a system furnishing extra cars for daily peak service there is expended in principal items only, including interest, taxes and depreciation on \$10,000 investment per car, at least \$2,000 per car per year. This would indicate the great injustice in the requirement that transportation be sold in rush hours through tickets at a cheaper rate than the base rate.

In the preceding considerations it has been the aim to suggest matters which would have a bearing on an equitable rate

TABLE I.—AREA OF CITY WITHIN CORPORATE LIMITS.
(SQUARE MILES.)

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
1						
2	23.11	27.76	27.76	28.06	47	41.35
3	10.95	13.67	20.16	27.26	46	39.72
4	10.25	14.75	20.50	21.50	12	24.00
5	16.36	18.16	18.16	18.94	23	23.40
6	20.99	31.96	108.44	108.45		108.44
7			15.00	28.00	28	33.70
8	2.78	4.28	5.60	16.60	16	19.30
9	18.70	19.00	19.20	19.50		19.50
10			8.50	12.20	110	25.60
11	38.00	38.00	38.00	38.00		38.00
12	17.50	17.50	12.50	12.50	40	17.50
13	.47	.47	12.04	12.04	300	50.10
14	1.81	1.81	3.96	3.96		3.96
15	129.50	129.50	129.50	129.50		129.50
16	8.00	8.50	11.45	18.45	-38	11.45

TABLE II.—ESTIMATED AREA OF CITY DEVELOPED AND SERVED.
(SQUARE MILES.)

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910
4	6.00	9.00	16.00	21.50	12	24.00
5	7.50	9.50	10.20	11.40	44	16.40
6			37.95	43.38	37	59.52
8	1.67	2.78	4.20	9.96	45	14.48
9			6.73	7.80	70	13.26
12			11.00	12.00	30	15.50
13	.47	.47	12.04	12.04	66	20.00
14			9.00	18.00	40	25.00
16	8.00	8.50	11.45	18.45	*38	11.45

* Decrease.

TABLE III.—POPULATION SERVED INSIDE CORPORATE LIMITS.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
2	86,076	156,383	238,617	321,616	63	533,905
3	79,557	116,342	205,876	285,704	66	465,786
4	14,000	83,200	184,000	285,315	30	373,740
5	105,059	136,508	181,830	246,070	41	347,469
6		88,360	297,894	365,783	42	516,152
7	48,244	75,056	105,436	169,164	38	233,650
8	40,226	33,592	64,495	102,320	28	131,105
9	35,092	45,850	72,215	102,026	27	129,867
10		37,000	65,000	89,000	74	155,000
11	26,703	33,340	44,179	62,059	43	88,926
12			31,200	38,415	35	51,521
13	1,000	3,800	26,178	38,415	245	132,685
14			22,535	32,637	11	36,346
15	674,022	847,170	1,046,964	1,293,967	20	1,549,008
16	8,230	13,138	26,874	39,000	18	46,000

tures, with the exception of interest, taxes, depreciation and certain general items, would be correspondingly reduced.

In general practice, cars are furnished when the people want to ride and they are not required to ride when it is profitable to furnish cars. The service given is equivalent to that of a private conveyance at or near the door of every house, available every hour for 25 years, 50 years or even in perpetuity. This rate factor, if applied to one-quarter of the car hours furnished to the urban population of the United States reached by street car service as reported in 1907, would amount to an expenditure on the part of the operating companies of between \$50-

TABLE IV.—POPULATION SERVED OUTSIDE CORPORATE LIMITS.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
4	0	8,000	10,000	20,000	50	30,000
5	38,780	53,421	74,268	112,983	46	165,417
7				20,000	-95	1,000
8	5,000	10,000	15,000	20,000		20,000
9				130,000	-33	87,000
10		5,000	12,000	25,000	20	30,000
12			2,000	3,500	157	9,000
13			42,800	61,585	-72	17,315
14			11,000	17,943	100	35,000
15	263,156	304,372	358,045	400,642	19	444,392
16		300	400	500		500

TABLE V.—TOTAL POPULATION SERVED.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
2	262,204	355,869	551,959	775,058	31	1,018,463
4	14,000	91,200	194,000	305,315	32	403,740
5	143,839	189,929	256,098	359,053	43	512,886
6		88,360	297,894	365,783	41	516,152
7				171,164	37	234,650
8	47,226	43,592	79,495	122,320	24	151,105
9				232,026	-6	216,867
10				114,000	62	185,000
12		42,000	77,000	41,915	45	60,521
13			33,200	68,978	40	140,000
14	1,000	3,800	33,535	50,580	42	71,346
15	937,178	1,157,902	1,405,009	1,694,339	18	1,993,400
16		13,438	27,274	39,500	18	46,500

TABLE VI.—MILES OF SINGLE-TRACK EQUIVALENT.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
1			256.79	370.16	31	485.22
2			89.00			585.00
3						208.18
4	25.00	50.00	100.00	116.00	26	136.00
5						101.65
6			181.00	230.80	33	306.60
7			*95.19	108.83	28	139.66
8				68.61	62	110.37
9				76.67	13	86.83
10				110.00	70	186.00
11	2.71	6.60	21.40	72.69	78	129.38
12				42.00	38	58.00
13			81.00	94.00	41	133.00
14			1.00	26.00	60	41.60
15	219.25	361.57	411.20	444.83	41	627.65
16		4.00	22.00	26.00	27	33.00

* 1894.

plan, and such a plan would appear to include payment in proportion to the length of ride and according to the time service.

Owing to the rapid growth of cities the majority of companies are facing a definite problem resulting from the constant increase of city areas, the extension of their traffic systems and the expansion of five-cent fare limits to correspond with corporation limits. To obtain information so far as is available covering actual present conditions, inquiries were addressed to a large number of companies in the United States, nearly all having gross annual earnings in excess of \$1,000,000. [Tables published herewith, numbered "I" to "XI" inclu-

sive, present part of the information furnished by the 16 companies, which are designated by numbers.—Eds.] These companies represent both geographically and politically nearly all sections of the United States and all conditions of operation. No attempt has been made to average the data, as there is a wide variation of conditions, and a clearer idea can be obtained from a study of the individual cases than through averages.

Of the 21 largest street railway companies in the United States only six are required to make mandatory extensions of tracks, and of these four have neutralizing conditions. Approximately one-half of the companies replying state that their franchise provisions necessitate the extension of their five-cent fare limits to coincide with the extension of city limits. Of the remaining companies, nearly one-half or one-quarter of the total reporting have additional five-cent fare zones beyond the original five-cent zone. The question of extension of fare limits is under litigation in two cases.

It is axiomatic that there is a limited distance to which a five-cent fare can be applied profitably. A city might annex a

the expansion of city boundaries and distance hauled. There appears to be very little definite information regarding the length of the average passenger ride. Few companies have made a traffic count, but available data, however, would indicate that this is from 2 miles to 4.5 miles, an average of approximately 3 miles.

In general, the tables presented reflect the average conditions of the industry and are self-explanatory. There are, however, four or five typical companies which it may be useful to consider in detail.

Company No. 3, for example, is operating in a city which in 1870 had 10.95 sq. miles within corporate limits. This city has steadily increased its corporate limits by 25 per cent, 48 per cent, 35 per cent, 46 per cent, until at present the area is approximately 40 sq. miles, an increase in 40 years of 300 per cent. The total population served by its railway system, which is apparently entirely included within corporate limits, has increased from nearly 80,000 in 1870 to 465,786 in 1910, 482 per cent. The average revenue per passenger was in 1901 3.38

TABLE VII.—CAR MILES OPERATED.

Co.	1900.	1905.	1908.	1909.	1910.
1	38,353,514	48,273,622	51,857,889	51,127,681	53,362,500
2	33,562,699	30,857,647	34,323,796	37,537,433	
3	17,694,708	20,888,366	22,846,879		
4	8,395,323	10,521,760	12,144,642	12,887,776	13,812,813
5			14,439,017	15,179,426	15,377,000
6	13,530,829	15,136,019	21,683,889	22,441,312	24,229,010
7	6,581,897	4,840,080	8,301,504	8,683,104	9,346,183
8			6,284,291	6,423,159	6,895,421
9	3,054,950	3,737,364	3,825,756	3,896,339	4,068,502
10		6,549,802	8,444,508	9,020,897	9,538,867
12			2,587,612	2,464,181	
*13		4,794,620	5,574,550	5,672,867	6,194,583
14	1,021,046	1,275,628	1,679,067	1,759,533	2,045,703
15	56,510,922	69,743,770	81,161,348	73,340,404	70,943,404
16	810,458	1,392,930	1,704,819	1,741,709	1,790,722

* Passenger
† Estimated.

TABLE VIII.—CAR HOURS OPERATED.

Co.	1900.	1905.	1908.	1909.	1910.
1	5,529,923	5,842,847	5,313,792	4,998,292	5,109,993
2		3,871,567	3,617,831	4,025,097	4,416,117
3		1,738,872	2,091,713	2,304,493	2,678,391
4	997,783	1,198,319	1,367,793	1,433,060	1,546,513
5			1,702,371	1,796,761	1,833,000
6	1,379,140	1,762,704	2,367,510	2,442,391	2,628,627
7		875,158	928,293	976,422	1,059,376
*8			748,083	786,135	853,954
9	401,542	511,185	534,340	528,599	554,210
10		739,127	957,398	996,650	1,044,439
12			292,263	266,300	
†13		464,859	595,020	609,001	700,117
14		165,841	201,574	206,272	239,168
15	7,463,564	9,047,716	10,263,770	9,126,695	8,710,076
16		174,974	202,976	209,679	222,727

* Basis changed in 1905.
† Passenger.
‡ Estimated.

neighboring city 100 miles distant and through its franchise provisions demand a five-cent fare. The question is one that must be settled in a manner to result in profitable operation. This involves a consideration of rates by city governments at least, possibly by commissions and the courts.

Of the appended tables, Table I shows the areas within the corporate limits of each of the cities for each of the decades from 1870 to 1910, with rates of increase in each decade. Between 1870 and 1880 the increase in city areas varied from 11 per cent to 53 per cent; for the decade ending in 1890 from —30 per cent to +240 per cent; in the next an increase of from 4 per cent to 200 per cent, and in the last from 12 per cent to 300 per cent.

Table II shows the estimated area of the city developed and served. The statement was prepared for the purpose of comparison between the political and actual expansion of cities and shows in conjunction with population tables III, IV and V that the density of traffic has not kept pace with

TABLE IX.—PASSENGER EARNINGS PER CAR MILE AND PER SEAT MILE—(CENTS)

Co.	Cents per Car Mile.							
	1900.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
1	26.00	24.90	25.70	26.20	26.10	26.40	27.50	27.80
2		26.46	27.25	28.62	28.82	29.10	28.15	28.77
3		20.52	21.52	22.34	22.24	22.46	23.20	
4	22.04	25.75	25.38	25.88	26.21	26.54	26.90	27.42
5						27.89	30.21	31.50
*6	24.75	31.11	31.40	31.71	29.82	29.21	30.73	30.75
7	17.85	22.87	25.08	26.38	27.37	27.84	28.29	28.86
8				22.96	24.35	25.88	26.75	26.14
9	19.12	24.50	25.45	25.60	27.30	29.20	29.30	28.70
10			21.40	22.34	21.56	22.32	23.21	23.84
11						23.81	26.22	26.14
12						21.19	21.61	
13		19.36	21.76	23.25	25.07	24.90	25.50	26.32
14	10.92	19.28	21.50	22.87	23.20	22.38	23.04	23.29
15	22.98	22.72	23.20	23.12	22.26	22.53	24.96	25.34
16	13.77	21.13	23.69	24.10	24.00	25.04	26.55	27.42

* Figures based on motor car miles.

Cents per Seat Mile.

Co.	1900.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
4	.51	.60	.59	.60	.61	.62	.63	.64
8				.68	.67	.69	.70	.70
9	.76	.80	.80	.75	.80	.86	.89	.87
13		.49	.54	.58	.62	.62	.64	.67
16	.68	.63	.62	.72	.81	.79	.81	.81

cents and in 1909 3.25 cents. The length of the longest ride possible for one fare was in 1901 12.30 miles and is in 1910 13.50 miles.

Company No. 4 shows in the period of 40 years an increase in area of from 10.25 sq. miles to 24 sq. miles. The population has increased in the same period from 14,000 to 403,740. Trackage has increased from 25 miles in 1870 to 136 miles in 1910. In the first two decades the trackage increased 100 per cent in each decade, while the population served increased 550 per cent in the first decade and 113 per cent in the second. The seat-mile earnings increased from 0.51 cent in 1900 to 0.64 cent in 1910; the average revenue per passenger has decreased from 3.76 cents in 1900 to 3.12 cents in 1910. The longest ride possible for one fare was 10 miles in 1900; it is 12.14 miles in 1910.

Company No. 8 had a city area in 1870 of 2.78 sq. miles; in 1910 the area of this city is 19.3 sq. miles, showing an increase in each of the four decades of 53 per cent, 30 per cent, 200 per cent and 16 per cent respectively. The population has increased from 40,226 in 1870 to 131,105 in 1910, showing a decrease of 16 per cent in the first decade, an increase of 94 per cent, 59 per cent and 28 per cent in the three following decades. Its seat-mile earnings have increased from 0.68 cent in 1906 to 0.70 cent in 1910. Its average revenue per passenger, including

transfers, has increased from 3.957 cents in 1905 to 4.092 cents in 1910. The longest ride for a single fare has increased from 9.64 miles in 1900 to 16.14 miles in 1910. This company, under its franchise provisions, is required to extend its five-cent fare limits as the city limits are extended, which extension is the subject of continuous controversy.

The most pronounced example of the extension of city limits is shown in company No. 13, operating in a city which in 1870 had an area of 0.47 sq. mile and now has an area of 50.1 sq. miles, while the developed portion of the city amounts to only 20 sq. miles of the 50 sq. miles included within corporate limits. The trackage has increased from 81 miles in 1890 to 133 miles in 1910. The earnings per seat mile have increased from 0.52 cent in 1902 to 0.67 cent in 1910. The average revenue per passenger has decreased from 4.61 cents in 1902 to 4.08 cents in 1910. The longest ride possible for a single fare has increased from 7.3 miles in 1900 to 13.6 miles in 1910. This company operates under a definite franchise provision that the original fare limit or first zone shall remain constant, no matter what

TABLE X.—AVERAGE REVENUE PER PASSENGER, INCLUDING TRANSFER.

Co.	1900.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
*1	3.982	.....	.....	.....	.....	.....	3.105	.....
2	.....	4.35	.....	4.33	4.31	4.27	4.31	4.34
3	.....	3.32	3.31	3.25	3.26	3.25	3.25	.....
4	3.76	3.71	3.27	3.22	3.18	3.15	3.17	3.12
5	.....	.....	.....	.....	.....	3.57	3.59	3.62
6	4.06	3.95	3.90	3.97	3.94	3.88	3.83	3.89
7	\$3.29	.....	.....	.....	.....	.....	.....	.....
†8	.....	.....	3.957	4.047	4.054	4.068	4.090	4.092
9	4.13	4.15	4.17	4.11	4.10	4.10	4.11	4.10
10	.....	4.23	4.23	4.19	4.11	4.07	4.09	4.09
11	.....	.....	.....	.....	.....	4.98	4.95	4.90
12	.....	4.95	4.95	4.95	4.94	4.94	4.94	4.94
‡13	.....	4.36	4.29	4.21	4.15	4.12	4.09	4.08
§14	.....	4.25	4.26	4.28	4.28	4.24	4.21	.....
15	4.44	4.07	4.02	3.89	3.68	3.57	3.94	4.15
16	4.85	4.11	4.00	3.88	3.92	3.96	4.05	4.07

* 1909 includes bodily transfers:

† Including passes.

‡ Revenue passenger.

§ No special date.

TABLE XI.—LENGTH OF LONGEST RIDE POSSIBLE FOR ONE FARE (MILES).

Co.	1890.	1900.	1905.	1906.	1907.	1908.	1909.	1910.
1	18.00	.....	.....	.....	.....	.....	20.00
2	14.37	14.37	14.37	14.37	14.37	14.37	14.37
3	12.50	12.50	12.50	13.50	13.50	13.50
4	10.00	.....	.....	.....	.....	.....	12.14
5	14.63
6	6.00	.....	.....	.....	.....	.....	17.70
7	12.59
8	9.64	12.12	12.12	12.12	15.23	15.23	16.14
9	8.30
10	18.00
11	14.00
12	6.50	.....	.....	.....	.....	.....	7.76
*13	7.30	13.60	13.60	13.60	13.60	13.60	13.60
14	9.50
15	19.50
16	6.00	8.79	8.79	8.79	8.79	8.79	8.79

* Not five-cent fare.

extensions are made in the city limits. Owing to the city's great area in proportion to the population the company has three five-cent fare zones. The three zones include from the center of the city an aggregate radial distance of 13 miles. Again the elimination of one after the other of the zones in question is the subject of constant controversy.

Instead of duplicating in America the multiplicity of narrow zones and frequent fare collections existing in cities abroad it would appear practical and expedient that American companies maintain a limited five-cent fare zone of present radius and as the length of haul is extended new zones of narrow limits and smaller fare be established. Those negotiating with municipalities with new operating contracts in view may find it advantageous to incorporate "on-peak" and "off-peak" fare rate provisions.

The steam railroad companies with electrically equipped terminals are now performing, in a sense, a long-distance city

transportation service, together with an interurban service. They have based their fare rates on the zone system for all services. In their city and suburban service commutation tickets have been issued, good for given stations in given zones.

Companies are constantly implored for and often driven to concessions. There is, however, at least one general demand upon which there is no possible compromise—the indefinite extension by American street railway companies of their single-fare limits.

MEETING OF THE COMMITTEES OF THE AMERICAN ASSOCIATION

A meeting of the executive committee of the American Electric Railway Association and meetings of a number of the other committees of the association were held on Thursday and Friday, Jan. 26 and 27, at the association headquarters. Those in attendance at the meeting were Arthur W. Brady, president; Thomas N. McCarter, first vice-president; General George H. Harries, second vice-president; W. H. Forse, Jr., president Accountants' Association; W. J. Harvie, president Engineering Association; H. V. Drown, president Claim Agents' Association; H. C. Page, president Transportation & Traffic Association, and H. H. Littell, H. H. Vreeland and James F. Shaw, past presidents.

The meeting was held principally to hear the reports of the committees of the association and to lay out the work for the current year. The reports of these meetings are published below.

The executive committee also considered the question of the location of the 1911 convention. The secretary reported that invitations had been received from Rochester, N. Y.; Toronto, Canada; Washington, D. C.; Minneapolis, Minn.; Atlantic City, N. J.; Niagara Falls, N. Y., and Richmond, Va. A representative of the latter city was present to extend the invitation of Richmond in person. As has been the custom in the past, the executive committee authorized President Brady to appoint a special committee to consider this matter. The membership of this committee will be announced later and it will act with a similar committee which was appointed at the last meeting of the Manufacturers' Association.

The secretary reported that the total active membership of the association was 359 and that the total associate membership was 1153. This is an increase of nine active members and 74 associate members since Sept. 30, 1910, the date of the report of the secretary and treasurer, presented at the last Atlantic City convention.

President Brady then announced the personnel of the committees of the American association to serve during the present year. This list is given elsewhere in this issue.

Another matter considered was that of the standard transfer law recommended by the Transportation & Traffic Association at the 1910 convention. After a thorough discussion the executive committee ordered that this law be printed and copies of it sent to member companies.

Another subject considered was that of insurance, which was taken up with the committee on insurance, as mentioned below. Representatives of several bureaus engaged in fire insurance matters appeared before the committee and the question of acting on the recommendations contained in the 1910 report of the committee on insurance was finally left in the hands of the president and vice-presidents of the American Association.

Brief statements of the action taken by the different committees of the American Association follow.

COMMITTEE ON SUBJECTS

Those in attendance at the meeting of this committee were: Thomas N. McCarter (chairman), H. G. Bradley, C. L. S. Tingley, W. H. Forse, Jr., W. J. Harvie, H. V. Drown and H. C. Page. The committee outlined a tentative program for the American association and considered similar matters for the various affiliated associations. The details of these programs will be published later.

COMMITTEE ON COMPENSATION FOR CARRYING UNITED STATES MAIL

Those in attendance at the meeting of this committee were: Edgar S. Fassett (chairman), H. A. Nicholl, C. H. Hile, C. L. S. Tingley and J. K. Choate. The committee gave further consideration to the data which had been collected by the committee last year and outlined a plan of work for the coming year which, it is hoped, will result in substantial good to the member companies.

COMMITTEE ON FEDERAL RELATIONS

Those in attendance were General George H. Harries (chairman), F. R. Ford, C. S. Sergeant, F. W. Brooks, R. I. Todd and L. S. Storrs. This committee took up many matters within its jurisdiction but no report was made public.

COMMITTEE ON PUBLIC RELATIONS

The members of this committee in attendance were Charles O. Kruger (chairman), Thomas N. McCarter, General George H. Harries, E. C. Foster, Calvert Townley, D. A. Belden and J. H. Pardee, president Street Railway Association of the State of New York; Charles H. Hile, president New England Street Railway Club, and R. L. Rand, president Alabama Light & Traction Association. This committee considered general publicity matters and decided to compile and distribute in pamphlet form to the member companies a digest of the material gathered by the committee on the subject of laws and regulations affecting electric railways.

COMMITTEE ON DETERMINING THE PROPER BASIS FOR RATES AND FARES

The members of this committee present at the meeting were: Frank R. Ford (chairman), H. J. Davies, H. G. Bradlee and James F. Shaw. This committee met for the first time and outlined a plan to secure data to enable the members to make definite recommendations at the next meeting of the association.

COMMITTEE ON INSURANCE

Those in attendance were: H. J. Davies (chairman), A. H. Ford and F. A. Healy. After a discussion of the recommendations contained in its report to the 1910 convention, the committee met with the executive committee, as mentioned above.

COMMITTEE ON TAXATION MATTERS

Those in attendance were: Calvert Townley (chairman), Guy E. Tripp, C. L. S. Tingley and J. H. Pardee. This was the first meeting of the committee and plans were drawn up for the current year. No report, however, is available for publication at this time.

ELECTRIC RAILWAY DICTIONARY SUPERVISING COMMITTEE

The committee appointed by the American Electric Railway Association to supervise the preparation of the *Electric Railway Dictionary* held a meeting at the office of the *ELECTRIC RAILWAY JOURNAL* on the afternoon of Jan. 26 to examine the proofs and approve the contents of the book before its publication. The full committee, consisting of H. H. Adams, Metropolitan Street Railway, New York (chairman); Paul Winsor, Boston Elevated Railway, and Richard McCulloch, United Railways of St. Louis, was present. Rodney Hitt, editor of the dictionary, submitted page proofs of the book, which were duly approved by the committee. The book will be sent to press immediately and it is expected that copies will be ready for distribution about March 1.

TITANIUM RAIL ORDER OF THE NEW YORK CENTRAL

The New York Central Lines have ordered 41,500 tons of titanium Bessemer rails for 1911. In addition they have specified the use of 1 per cent of the 10 per cent titanium alloy (or equivalent titanium), which will, therefore, require more than 400 tons of the 10 per cent alloy. The strength of the titanium content may be increased to 15 per cent, thus requiring a proportionately smaller quantity of alloy, but, in any event, this requisition will make the largest single order ever placed for alloy steel rails. This large order is of particular interest in view of earlier rumors that no more titanium rails would be ordered.

THE MEETING OF COMMITTEE ON SHOP ACCOUNTING

The first meeting of the 1911 joint committee on shop accounting was held Thursday, Jan. 26, at the headquarters of the American Electric Railway Association. For this year the membership of the committee was increased from six to ten, and is now made up of members of the Engineering and Accounting Associations as follows: Co-chairman, P. S. Young, comptroller Public Service Railway, Newark, N. J.; co-chairman, A. D. McWhorter, master mechanic, Memphis Street Railway, Memphis, Tenn.; Charles Hewitt, superintendent of motive power, Philadelphia Rapid Transit Company, Philadelphia, Pa.; H. H. Adams, superintendent of rolling stock and shops, Metropolitan Street Railway Company, New York; E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio; John W. Corning, electrical engineer, Boston Elevated Railroad Company, Boston, Mass.; F. B. Lasher, traveling auditor, New York State Railways, New York; N. E. Stubbs, auditor, United Railway & Electric Company, Baltimore, Md.; C. E. Thompson, auditor, Chicago & Milwaukee Electric Railroad, Chicago, Ill.; A. E. Elkins, auditor, Columbus, Delaware & Marion Railway, Columbus, Ohio. The committee members at the meeting were Messrs. Young, Adams, Lasher, McWhorter, Hewitt and Ackerman. W. H. Forse, Jr., president Accountants' Association, was also present.

Mr. Young was re-elected chairman of the joint committee. Mr. Forse said that the Accountants' Association had been asked to take up the study of the life of materials as a subject for the 1911 convention. He would, therefore, appreciate any suggestions from the committee as to how this information could be secured, because the data necessarily would come jointly from the engineers and the accountants.

Upon the suggestion of Mr. Hewitt a sub-committee consisting of Messrs. Hewitt (chairman), Ackerman and Lasher was appointed to report on "What Constitutes Maintenance." This sub-committee will endeavor to draw the line between ordinary replacements and those which constitute a proper addition to capital account.

Mr. Lasher submitted the remarks on shop accounting which were made by Messrs. Joel, Belleville and Ingle at the quarterly meeting of the Street Railway Association of the State of New York Dec. 7, 1910, and published in the *ELECTRIC RAILWAY JOURNAL* on page 1160, Dec. 10, 1910. These papers were in the nature of comments and elaborations of certain points in the 1910 report of the joint committee on shop accounting. Mr. Lasher thought that they could profitably be considered in connection with any review of this report.

Mr. Adams and Mr. McWhorter further suggested the advisability of elaborating some of the subdivisions of the maintenance accounts, such as those relating to track and line, which were not as extended as those on rolling stock. It was therefore decided to appoint as a sub-committee on the "Review of 1910 Report" Messrs. Adams (chairman), Corning and Stubbs.

There was considerable discussion on the advisability of one department charging more than bare labor and material costs for work done for another department. It was decided that while fixed percentages ought not to be specified for all cases to cover overhead charges it would be desirable at least to determine how many overhead charges should be taken into consideration. This subject was turned over to a sub-committee on "Interdepartment Charges," consisting of Messrs. McWhorter (chairman), Thompson and Elkins. This committee will also endeavor to formulate some suggestions on the elimination of waste in the manufacture and use of materials made at home.

Upon the suggestion of Mr. Adams the committee as a whole decided to make a study of efficiency and incentive systems in the shops, such as premiums, piecework and bonuses. In closing the proceedings Mr. Young suggested that each sub-committee conclude its report with a set of definite recommendations which could be considered at the next meeting of the entire committee, which would probably be held next May.

THE AMERICAN ELECTRIC RAILWAY ASSOCIATION*

BY ARTHUR W. BRADY, PRESIDENT

To-day, for the first time, those interested in electric railway affairs have met under a name sufficiently broad to make it co-extensive with the industry itself. What, in its origin, was the American Street Railway Association, and afterward was the American Street & Interurban Railway Association, has now become the American Electric Railway Association. These changes in name typify the growth and development of the industry to which that name applies. When in 1882 a small group of street railway men met for the purpose of forming what has now become the American Electric Railway Association one of them had the temerity to prophesy that in a few years the horse and the mule would be displaced in street railway operation by electric power. That meeting was held less than a third of a century ago but, nevertheless, that suggestion was received with smiles and its proponent was looked on as an enthusiast whose judgment his dreams and hopes had temporarily obscured. Yet so great have since been the growth and development of electric traction that not only have the horse and the mule been emancipated from street railway service but the very name of the association then formed has finally been changed to indicate the inseparable bond between the organization and the power then ignored and practically unknown. To-day in the membership of the successor to the association then born are included electric railways of all kinds, surface street railways, elevated railways, underground railways, underwater railways, interurban railways and electrified parts of steam railroads.

However great the difference among these various kinds of railroads, they are all alike in one respect—the power which propels their cars and upon which they rely for ability to accomplish their purposes is electricity. It is this which creates in them all a common interest, presenting similar problems, both of internal administration and of external relation, differing in important respects from the problems of other transportation agencies and other public utilities. This common interest not merely justifies but, if the greatest effectiveness is to be obtained, compels consultation and co-operation, opportunity for which the American Electric Railway Association is intended to offer.

To the extent to which that association has already accomplished the purposes for which it was formed I shall merely allude. Many in this room are familiar with the large quantity and the high quality of the work which it has done in the past. As now organized much of its work is done through affiliated associations representing the engineering, the accounting, the transportation and traffic and the claim agents' departments of work and dealing with the many practical questions constantly arising in connection with these important branches of electric railway operation. To this list of affiliated associations should be added as not less important that of the manufacturers to whose kind offices we owe our entertainment to-night. Not the least of the advantages which have arisen from this association are found in the increased spirit of harmony and intelligent co-operation between operators and manufacturers brought about through the existence of the affiliated Manufacturers' Association.

But it is not to the accomplishments of the past that my remarks will be devoted to-night but to the work of the future, for it is on future labors and results that the association must depend for continued growth, prosperity and influence.

Now, the work of our association has a twofold aspect, one, as it were, facing within and the other facing without. Every electric railway company has to deal with the same two classes of questions, one relating to its internal affairs and the other to its external affairs; one involving all of the difficulties connected with the efficient and economical operation and administration of the property, the other having to do with public

and governmental relations. The work of the American Electric Railway Association, which is nothing but the combined co-operative work of its several hundred member companies, follows the same line of cleavage, and it is chiefly to the class of questions last stated that my words to-night will be addressed. It is in this direction that some of the most fruitful and necessary work of the immediate future lies.

No thoughtful student of the time can fail to conclude that the present is a period of political ferment and to look with some degree of fear and foreboding for the developments of the future. Doctrines that a few years ago were regarded as radical if not revolutionary are now the shibboleth of great parties or at least of important factions of great parties. In high places the wisdom of our forefathers is questioned. That great instrument, the Constitution of the United States, which for more than a century has attracted the praise of publicists, foreign and domestic, and has given to the American people the strength of a powerful nation without at the same time taking away the blessings of local self-government, is pronounced antiquated and out of date.

Our courts are called on not to interpret it according to its letter and its spirit but to trim it here and add to it there until it corresponds to the twentieth century model which its critics set on the fashion plate before them. Nay, more, the decisions of our courts upon which each one of us must depend for the preservation and safety of every liberty and right that is dear to a freeman are criticised. This criticism is applied not in the spirit and within the limits of fairness and self-restraint wherein an enlightened and self-governed people has a right to discuss every one of its institutions and every act of its servants. On the contrary, they are treated as objects of attack whenever the view of a judge, sworn to administer the law as it is and not as he would have it, differs from the latest theory or "ism" of the critic.

There is no cause for wonder that an important phase of the campaign carried on by the men who profess and preach and endeavor to put into practice the doctrines spoken of has to do with the relations between public service corporations and the public. While these men do not, perhaps, make of electric railways an especial target for their assaults, they are impartial enough not to grant them exemption therefrom and consequently they lay at their doors every one of the sins which they charge against any other class of public utilities. The various directions which these attacks have taken are so well known as to call for little specification here. They may be summed up in the statement that through them a large part of the public has been taught to believe that every public service company is not merely a mine of wealth for its owners but also that that wealth has been filched, or forced, or otherwise improperly taken from the public. The natural effect of this belief is seen in various directions. Unfair demands are made and unfair treatment administered without other justification than the assumption, implied or expressed, that thereby the public will regain some part of its own. Or, perhaps, the basis is the selfish and corrupt desire of some individual or individuals to share in those riches which it is thought the company is improperly enjoying.

Now, it is inevitable that so rapid a development as has taken place in the field of electric railroading could not have been effected without the commission of many and costly blunders. Furthermore, without doubt, instances have existed wherein wrong was done in methods employed or results obtained. Bear in mind, however, in considering all this, the magnitude of electric railway development. In 1882 the man who suggested even the probability of electric traction was laughed at. In 1907, according to the United States Bureau of Census, the net capitalization of the electric railways of the United States, exclusive of partially electrified steam railroads, approximated \$3,400,000,000 and the gross annual income of such properties approximated \$430,000,000. Of all the marvels of our past most marvelous century none is greater than this, and none of a material kind has done so much in so short a time to increase the convenience, comfort and welfare of the people.

*Abstract of speech delivered at the banquet given by the Manufacturers' Association to the American Electric Railway Association, New York, Jan. 27, 1911.

That so magnificent a development could have taken place so quickly without mistakes, many and grievous, and without cases of actual wrong is contrary to all human experience. But the mistakes were due in the main to the novelty of the art, to the fallibility of human judgment, to the over-sanguineness of promoters and, more often than is credited, to a sense of local pride and public spirit on the part of those who controlled capital. The actual wrongs done were sporadic and exceptional. The fact is that in every respect this development is typical of the development of other great branches of American industry. It all has exhibited that same bold and aggressive spirit and enterprise on the part of men of affairs that was exhibited by those earlier generations which in less than 100 years after the close of the American Revolution pushed the frontier of these United States westward from the Alleghenies across the Mississippi and over the Rocky Mountains to the coast of the Pacific Ocean. If that development is weak and unsound, if it is permeated with fraud and corruption, if the foundations on which it rests are rotten and crumbling, then is the fabric of American industry throughout slight and weak indeed.

Let me allude briefly to two or three of the fallacies with which, through false teachings, some considerable part of the public mind is imbued. One is the theory that a public service industry differs from every other branch of business in that no profits are to be gained therefrom beyond interest on the actual investment and a very low rate of interest at that. No account is to be taken of the hazards incurred by the projectors of these necessary undertakings, of the uncertainty in which at the outset their future is shrouded and often long after enfolded, of the years of constant care and attention required to keep these enterprises alive, much less profitable. Every public utility is treated as though it was an assured success from the beginning. The successful promoter is likely to be called a grafter and the unsuccessful one a fool. The need of continual supplies of fresh capital to keep pace with increased public wants and demands is overlooked or it is assumed that the owners will be driven to supply all capital requirements. But let us listen as closely as we may we find no one to tell us how capital will be lured from fields where it has at least a chance at the fleshpots of Egypt by an offered diet of starvation. Nor can the student of history be found who will point to the instance where capital has been driven from more inviting to less inviting channels of investment.

Coupled with the fallacy just referred to are others, such as the theory that the amount of investment upon which a minimum return shall be allowed is the present physical value or the replacement value of a property; that the value so determined is not merely one of the factors to be considered in determining the reasonableness of a rate or a return but is the sole or principal factor; that all mistakes of past construction and operation, even when based on the best expert advice at the time available, must be borne by the investor alone and no part of it shifted to the shoulders of the public; that losses incurred in the improvement of a property to enable it better to meet public needs and convenience shall likewise be borne by the investor alone; that the shorter the term of a franchise the better, forgetful of the fact that the less the term the greater the rate or the less the service, in order that the investor may protect himself within the period; that heavy burdens imposed in the way of taxes and assessments or by franchise exactions are legitimate and in the public interest.

Now, if these various doctrines are fallacious, if they are unfair and unjust, if they are opposed to the real and permanent interest of the public as they are opposed to our interest, it is our duty to combat and overcome them. The law of self-preservation dictates this, and our responsibility as citizens of a common country confirms the view. In this direction a chief part of the future work of this association must lie. We cannot as individuals gain the desired end. We cannot because the attacks are not merely by individuals or merely upon individuals. The firing is all along the line and every electric railway is a target, even though in many cases the bullets have

not been felt or even heard. If doubt exists in your minds read the popular magazines that cover the newsstands everywhere. Read the speeches in Congress and State legislatures, the messages of presidents and governors, the reports of committees and commissions, the platforms of political parties, lectures delivered at Chautauqua and harangues spoken upon the stump. You will find constant demonstration of my assertions. We must meet these attacks. We must meet them unitedly as they are made. We must first of all clear up our own minds. We must see wherein truth lies, for we cannot expect and do not want to displace one delusion by another.

Herein lies the opportunity and herein lie the duty and the work of this organization—that is, that the association shall, through investigation, consultation and co-operation, arrive at the true doctrines and, having found them, play its part in the campaign for a return of safe and sound views.

And what is the truth? We electric railway men believe that we know our business far better than our critics know it. We are certain that we know and appreciate the difficulties of our business much better than our critics do. We daily feel the diminishing gap between our income and our expenses. The public does not. We recognize the seriousness of the problem which constantly increasing rates of expense combined with constantly diminishing or at least non-increasing rates of return offer. The public does not even know that such a problem exists. We do not claim infallibility. We do not assert our freedom from error. We do not doubt that at times our views of questions involving our public relations have been colored by our own apparent interest. We know that at times arrogance has marked the acts of some of us; that the castigation administered to some of us has not in every instance been undeserved. But we do claim that, on the whole, our properties have been wisely and properly administered, with a due regard to the public interest, including fair and even liberal treatment of our patrons. Wiser men might have done better, but nothing in our observation of governmental operation of public utilities or even of the ordinary course of public administration leads us to believe that through government operation or a more thorough-going system of governmental regulation these same properties would have been made nearly as useful, as efficient or as inexpensive to the public as they have been in our hands. Furthermore, we claim that, conceding for the sake of the argument all that our critics allege concerning undue profits and exploitation and even wrong-doing, yet all this has been many times outbalanced by the public benefits which our properties have conferred in increased values, taxes paid, added comfort and convenience, the scattering of congested population, new opportunities for rest and recreation and other ways.

We do not object to proper public regulation. We recognize our position as semi-public agencies which the State has a right to control. We do view with dread the spectre of improper regulation. We strenuously deny the right, the duty and the interest of the State to cross the line which separates regulation from management. We fear the result of direction freed from responsibility for results. We insist that it is our right and the public interest that we be permitted to secure, if possible, sufficient earnings from our properties to pay present owners a return commensurate with that received in the general run of other classes of successful industry, affected by similar hazards, and also sufficient to attract freely the additional supplies of capital which we constantly need. We insist also that losses borne in our efforts to give the public the benefit of the latest advances in the art of transportation are a legitimate part of our capitalizations on which we are entitled to earn a fair return.

Furthermore, the fact has been borne in upon us through repeated observations and experiences that unfair burdens imposed on our properties, whether in the form of unduly limited franchises or in the form of taxes, franchise exactions, or what not, will incapacitate us by just that extent from giving to the public some one or more of the things for which it is constantly asking. These burdens are, therefore, in fact in the long run borne by the public itself.

These are some part of the truths which we of the electric railway world must see infiltrate the public mind. The only agency through which this can be accomplished on a scale sufficiently broad to meet the situation as it exists is the American Electric Railway Association. The newspapers, the technical press, the periodical press and our own association addresses, papers and reports must be relied on to attain this end. But these must be supplemented by the intelligent and informed labors of our members, active and associate, including especially our associate members of the Manufacturers' Association.

Think for a moment of the advantages which surround our industry in the forwarding of such a movement. We are in touch with our patrons. They deal with us daily, perhaps several times a day, not occasionally or at long intervals as in the case of the ordinary patron of a steam railroad. Our managements and often our ownerships are nearer in residence and closer in interest to the public we serve than are those of any steam railroad. The human element enters into all our transactions. The stage has not been reached in electric railway transportation when the service we offer can be had by pushing a button or turning a key. Moreover, the vast public benefits which our industries have conferred and are continuing to confer are in many if not most cases fresh in the public mind, or at least are not so far forgotten as to forbid a renewed recognition of them. Still further, it is not too much to assert that, by reason of the very facts just referred to, in no public service industry have greater efforts been made, or with greater success, or with more general recognition of efforts and success, to treat its patrons fairly and generously, than in ours. These various matters are advantages of the utmost importance in the campaign that is proposed. They will greatly aid in securing the open ears we ask for our arguments. And what of the result? Can there be doubt? The court to which we must appeal, to whose judgment we must finally submit, is the American people. When informed, that tribunal is fair. Thus far our opponents have shouted their arguments into the ears of that court, while our voices have been barely raised above a whisper. Let us lose fear of our shadows, turn the light on and speak forth boldly and truly. That done we can safely rest our cases, relying on the justice of our cause and confident of the fairness of our judges.

DECISION IN UNDERGROUND RAILWAYS ARBITRATION

A decision was rendered in London, Jan. 12, by the Lord Chief Justice and two other judges sitting as a divisional court, in the arbitration case of the British Westinghouse Company against the Underground Electric Railway Company, of London. The case was brought before the court by Alfred Lytleton, arbitrator, and arose through disputes as to the value of the turbines built by the manufacturers for the Lots Road power station of the railway company some seven or eight years ago. These were the first very large turbines that were designed, and the railway company claimed that they did not work efficiently and substituted other turbines for them.

The first point on which the arbitrator asked the opinion of the court was whether the claimant's contention was correct that the commercial life of the first turbines had expired at the time of the purchase of the later machines; if this was correct the respondents could not claim any further damages from the plaintiffs after the latter machines were installed. The second point was whether the plaintiffs were responsible for the purchase and installation cost of the latter machines. The Chief Justice stated that the question was in some respects a novel one, but that he considered a person relying upon breach of contract must do what was reasonable so as not to make the damages greater than they would otherwise be. It might be true that at the time the first turbines were built the type of turbines installed later by the railway company were not available, but this fact did not show that the early turbines had reached the end of their commercial life at the time they were removed. Hence, both questions were decided in favor of the railway, and the matter was returned to the arbitrator.

MEETING OF COMMITTEE ON EQUIPMENT

The first meeting of the 1911 committee on equipment, American Electric Railway Engineering Association, was held at the New York office of the association Saturday, Jan. 28. The committee members present were M. V. Ayres (chairman), electrical engineer Boston & Worcester Street Railway, Boston, Mass.; H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J.; A. T. Clark, superintendent of rolling stock and shops United Railways & Electric Company, Baltimore, Md.; F. R. Phillips, superintendent equipment Pittsburgh Railways, Pittsburgh, Pa.; W. Thorn, division engineer of cars Board of Supervising Engineers, Chicago Traction, Chicago, Ill., and F. G. Grimshaw, master mechanic Pennsylvania Railroad, Camden, N. J.

There were also present W. J. Harvie, chief engineer Utica & Mohawk Railway, Syracuse, N. Y., and Norman Litchfield, engineer car equipment Interborough Rapid Transit Company, New York, N. Y., respectively president and secretary of the Engineering Association.

Mr. Ayres outlined the work which had been suggested to the committee by the executive committee as follows: Method of heating cars; design of car body, trucks, motors and equipment parts, having in mind reduction in weight without the sacrifice of strength; unit basis comparison of weights; coupler report of the Central Electric Railway Association, including signal, air and control connections as proposed for general standardization.

The first subject discussed by the committee was the method of heating cars. Mr. Ayres thought that an investigation of this subject naturally should include a discussion of ventilation. There was considerable interchange of opinion of the experiences which the members of the committee had had with various types of stoves and electric heaters, also on the radiation losses of various types of cars having large window areas, single or double sash and steel panels. It was pointed out that the speed at which cars operated was also an important factor in considering the amount of heat necessary to keep the car comfortable. The use of insulators to prevent the rapid dissipation of heat in metal cars was also taken up. An interesting point in connection with heating and ventilating was mentioned by Mr. Thorn, who said that he had found that it took less heat to warm a car when fresh air was drawn in all the time than when the dead air was used again and again. He thought that this surprising result might be ascribed to the fact that fresh air is much richer in oxygen.

Mr. Phillips described some personal experiences with the use of electric blowers over heaters. The sub-committee appointed by Mr. Ayres to report on the subject of electric, hot-water and hot-air heating and on ventilation is composed of Mr. Thorn (chairman), Messrs. Benedict and Clark.

The next subject discussed was the design of car body, truck, motor and other equipment parts, with a view to the reduction of weight; also providing a unit basis for the comparison of car weights. Mr. Ayres pointed out that these subjects would be a continuation of the work done the two preceding years.

Mr. Thorn stated that the Board of Supervising Engineers, Chicago Traction, was studying the merits of plate-girder underframes as compared with truss designs.

One member said that some of the studies which he had made convinced him that the weight of the actual structural members of a car forms a smaller part of the total than is generally supposed. This fact applied to all classes of cars, whether wood, composite or steel.

Mr. Thorn mentioned the savings which were being obtained in the weight of bolsters. A cast-steel bolster weighed about 100 lb. less than the original built-up bolster and a saving of another 100 lb. was possible by building the bolsters of structural steel members.

Mr. Grimshaw mentioned that the Pennsylvania Railroad was now building some steel cars for electric motor and trailer service. These cars were about 9 ft. longer and carried 18 to 20 seats more than the 58-passenger wooden cars. The latter

cars weighed 96,000 lb., whereas the steel motor cars weighed but 100,000 lb. despite their greater capacity. The new cars are similar in design to the present Long Island electric motor cars, which weigh 106,000 lb. each. The saving in weight was due principally to the use of a lighter truck.

Mr. Thorn brought up the question of corrugated bumpers or other construction to prevent colliding cars from climbing over one another. One member believed that the principle of the anti-climber was all right as the underframe of modern cars should be strong enough to stand severe shocks. He indorsed Mr. Grimshaw's suggestion that the subject of lighter trucks should be considered by the committee.

Mr. Thorn mentioned the objections which truck manufacturers had first offered when lighter trucks were suggested by the Chicago engineers. He said that eventually they were convinced that it was not necessary to use the same class of construction for city service as for high-speed suburban and inter-urban service.

There was a brief discussion on short wheelbase and long wheelbase trucks in relation to motor hanging and car speed. Mr. Phillips mentioned the interesting fact that the temperatures of inside-hung motors are more nearly uniform than of outside-hung motors. When the motors are outside-hung Nos. 2 and 4 are bound to heat faster because they carry 15 per cent to 20 per cent more load. The numbers of the motors as mentioned by Mr. Phillips are based on operation from the No. 1 end of the car.

Mr. Clark stated that while every traction system would doubtless continue to seek the type of car best suited to its needs yet the committee might do much good work if it were to lay down a series of designs each of which could be used as a basis for a given class of service. One member added that it would be very desirable to incorporate in such a report a standard method for figuring the strength of car framing parts; in other words, to present an essay on car design and calculation.

The committee determined that it would be advisable to divide the subject of car weights into three parts, namely, bodies, trucks and equipments. The sub-committee on design of car weights will consist of Mr. Phillips (chairman) and Messrs. Thorn and Homer McNutt, master mechanic San Diego Electric Railways, San Diego, Cal. This sub-committee will also take up the matter of a possible standard data sheet for determining the proper methods of comparison between cars. The design of car trucks with reference to reducing weight was assigned to a sub-committee consisting of Mr. Benedict (chairman) and Messrs. Phillips and Clark. Mr. Ayres personally will take up with the manufacturers the question of weight reduction of electric equipment and air compressors.

Mr. Thorn asked that the manufacturers be requested to prepare a schedule showing the horse-power capacity of the motors which should be used for cars of given weights and speeds.

The fourth subject considered was the standardization report submitted by the Central Electric Railway Association's standardization committee at the Indianapolis meeting of that association, Sept. 22, 1910. This report had been transmitted to the standardization committee of the American Electric Railway Association for its consideration and in turn had been sent for discussion and comment to the committee on equipment of the Electric Railway Engineering Association. Particular attention was devoted to the recommended standards for train couplings, including electric, air and signal connections. It was pointed out by Mr. Ayres that the Central Electric Railway Association standard had in mind very evidently a condition which would permit interoperation with steam railroad rolling stock. It was also found that some of the other standards of the Central Electric Railway Association, such as the brake shoes and axles, differed so little from those of the American Electric Railway Association that it was difficult to understand just why the variations should have been made. A case in point was a variation of $\frac{1}{8}$ in. in cast-iron brake shoes.

Mr. Ayres, Mr. Benedict and other members of the com-

mittee thought it very desirable that a strong effort should be made to harmonize these conflicts in standards and to point out clearly for what conditions of service each design was recommended. It was considered especially desirable to follow the present procedure in adopting standards whereby the work of the equipment committee must be approved by the standardization committee at the following convention and then submitted to the association as a whole the following year before it is formally adopted as a standard. The subject of train line connections, including interchanging equipments with steam railroads, was assigned to a sub-committee consisting of Mr. Grimshaw, (chairman), J. M. Bosenbury, superintendent of motive power Illinois Traction System, Champaign, Ill., and H. L. Patterson, chief engineer Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

A motion was made and carried that the chairman of the equipment committee call the attention of the standardization committee of the American Electric Railway Engineering Association to the variations in the standards of the Central Electric Railway and American associations.

COMMITTEES OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

At the meeting of the executive committee of the American Electric Railway Association on Jan. 26 President Brady announced the membership of the committees of that association for 1910-1911. The list follows:

COMMITTEE ON SUBJECTS

Thomas N. McCarter, chairman, president Public Service Railway, Newark, N. J.

J. F. Calderwood, vice-president and general manager Brooklyn Rapid Transit Company, Brooklyn, N. Y.

Howard E. Huntington, general manager Los Angeles Railway Corporation, Los Angeles, Cal.

C. C. Smith, president Wisconsin Electric Railway, Milwaukee, Wis.

H. G. Bradlee, president Stone & Webster Management Association, Boston, Mass.

C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa.

W. H. Forse, Jr., president Accountants' Association and secretary and treasurer Indiana Union Traction Company, Anderson, Ind.

W. J. Harvie, president Engineering Association and chief engineer Syracuse Rapid Transit Railway, Syracuse, N. Y.

H. V. Drown, president Claim Agents' Association and general claim agent Public Service Railway, Newark, N. J.

H. C. Page, president Transportation & Traffic Association and general manager Worcester Consolidated Street Railway, Worcester, Mass.

COMMITTEE ON ACTIVE MEMBERSHIP

W. Caryl Ely, chairman, president Ohio Valley Finance Company, Buffalo, N. Y.

H. C. Page, general manager Worcester Consolidated Street Railway, Worcester, Mass.

D. H. Lovell, superintendent West Jersey & Seashore Railroad, Camden, N. J.

J. N. Shannahan, vice-president and general manager Washington, Baltimore & Annapolis Electric Railway Company, Baltimore, Md.

H. W. Plummer, secretary and general manager Asheville Electric Company, Asheville, N. C.

Jos. H. DeGrange, vice-president New Orleans Railway & Light Company, New Orleans, La.

E. B. Stichter, general manager Texas Traction Company, Dallas, Tex.

E. C. Faber, general manager Aurora, Elgin & Chicago Railroad, Wheaton, Ill.

Dana Stevens, vice-president Cincinnati Traction Company, Cincinnati, Ohio.

Jos. S. Wells, general manager Utah Railway & Light Company, Salt Lake City, Utah.

J. D. Fraser, secretary and treasurer, Ottawa Electric Railway, Ottawa, Ont.

Thos. Finigan, purchasing agent United Railroads of San Francisco, San Francisco, Cal.

COMMITTEE ON ASSOCIATE MEMBERSHIP

James F. Shaw, chairman, president Citizens' Electric Street Railway, Boston, Mass.

D. A. Hegarty, general manager Little Rock Railway & Electric Company, Little Rock, Ark.

E. S. Fassett, general manager, United Traction Company, Albany, N. Y.

R. H. Sperling, general manager British Columbia Electric Railway, Vancouver, B. C.

C. E. A. Carr, general manager Quebec Railway, Light & Power Company, Quebec, Can.

E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.

John A. Beeler, vice-president and general manager Denver City Tramway, Denver, Col.

R. P. Stevens, president Lehigh Valley Transit Company, Allentown, Pa.

G. H. Clifford, general superintendent Northern Texas Traction Company, Fort Worth, Tex.

Joel Hurt, Equitable Building, Atlanta, Ga.

W. F. Kelly, general manager San Francisco, Oakland & San José Consolidated Railway, Oakland, Cal.

COMMITTEE ON PUBLIC RELATIONS

Chas. O. Kruger, chairman, president Pennsylvania Street Railway Association and president Philadelphia Rapid Transit Company, Philadelphia, Pa.

W. Caryl Ely, president Ohio Valley Finance Company, Buffalo, N. Y.

W. G. Evans, president Denver City Tramway, Denver, Col.

Frank Hedley, vice-president and general manager Interborough Rapid Transit Company, New York, N. Y.

J. B. Foraker, Jr., vice-president Ohio Electric Railway, Cincinnati, Ohio.

Thos. N. McCarter, president Public Service Railway, Newark, N. J.

Geo. H. Harries, vice-president Washington Railway & Electric Company, Washington, D. C.

J. D. Callery, president Pittsburgh Railways, Pittsburgh, Pa.

J. M. Roach, president Chicago Railways, Chicago, Ill.

J. C. Hutchins, president Detroit United Railway, Detroit, Mich.

Chas. N. Black, vice-president and general manager United Railroads of San Francisco, San Francisco, Cal.

E. C. Foster, Sanderson & Porter, New York.

Russell Robb, president Tacoma Railway & Power Company, Boston, Mass.

W. G. Ross, managing director Montreal Street Railway, Montreal, Que.

B. S. Josselyn, president Portland Railway, Light & Power Company, Boston, Mass.

E. H. Davis, secretary, treasurer and manager Williamsport Passenger Railway, Williamsport, Pa.

A. E. Lang, president Toledo Railways & Light Company, Toledo, Ohio.

T. H. Tutwiler, president Memphis Street Railway, Memphis, Tenn.

John J. Stanley, president Cleveland Railway, Cleveland, Ohio.

Calvert Townley, vice-president Connecticut Company, New Haven, Conn.

D. A. Belden, president New Hampshire Electric Railways, Haverhill, Mass.

Geo. B. Wheeler, president Wisconsin Electrical Association, Eau Claire, Wis.

John H. Pardee, president Street Railway Association of the State of New York, New York, N. Y.

W. B. Tuttle, president Southwestern Electrical & Gas Association, San Antonio, Tex.

Ed. C. Reynolds, president Oklahoma Public Utilities Association, Sapulpa, Okla.

Chas. H. Hile, president New England Street Railway Club, Boston, Mass.

R. J. Irvine, president Missouri Electric, Gas, Street Railway & Water Works Association, Marshall, Mo.

M. T. Flynn, president Kansas Gas, Water, Electric Light & Street Railway Association, Kansas City, Kan.

Duncan McDonald, president Canadian Street Railway Association, Montreal, Que.

L. D. Mathes, president Iowa Street & Interurban Railway Association, Dubuque, Ia.

H. L. Corbett, president Colorado Electric Light, Power & Railway Association, Georgetown, Col.

Geo. Whysall, president Central Electric Railway Association, Marion, Ohio.

B. C. Fowles, president Arkansas Association of Public Utility Operators, Pine Bluff, Ark.

R. L. Rand, president Alabama Light & Traction Association, Anniston, Ala.

E. A. Heron, president California Electric Railway Association, Oakland, Cal.

COMMITTEE ON COMPENSATION FOR CARRYING UNITED STATES MAIL

Edgar S. Fassett, chairman, general manager United Traction Company, Albany, N. Y.

H. A. Nicholl, general manager Indiana Union Traction Company, Anderson, Ind.

C. H. Hile, assistant to vice-president Boston Elevated Railway, Boston, Mass.

C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa.

A. R. Piper, general freight agent Brooklyn Rapid Transit Company, Brooklyn, N. Y.

J. K. Choate, general manager Otsego & Herkimer Railroad, Hartwick, N. Y.

J. McMillan, general manager Pacific Electric Railway, Los Angeles, Cal.

COMMITTEE ON INSURANCE

H. J. Davies, chairman, secretary Cleveland Railway, Cleveland, Ohio.

A. H. Ford, president Birmingham Railway, Light & Power Company, Birmingham, Ala.

S. L. Tone, second vice-president Pittsburgh Railways, Pittsburgh, Pa.

F. A. Healy, secretary and treasurer Ohio Electric Railway, Cincinnati, Ohio.

A. W. McLimont, third vice-president and general manager Michigan United Railways, Lansing, Mich.

COMMITTEE ON WELFARE OF EMPLOYEES

Jos. H. DeGrange, chairman, vice-president New Orleans Railway & Light Company, New Orleans, La.

A. A. Anderson, vice-president and general manager Springfield Consolidated Railway, Springfield, Ill.

D. H. Lovell, superintendent West Jersey & Seashore Railroad, Camden, N. J.

L. C. Bradley, manager Galveston Electric Company, Galveston, Tex.

J. F. Porter, president Tri-City Railway & Light Company, Davenport, Ia.

COMMITTEE ON FEDERAL RELATIONS

Geo. H. Harries, chairman, vice-president Washington Railway & Electric Company, Washington, D. C.

F. R. Ford, Ford, Bacon & Davis, New York, N. Y.

C. S. Sergeant, vice-president Boston Elevated Railway, Boston, Mass.

F. W. Brooks, general manager Detroit United Railway, Detroit, Mich.

L. S. Cass, president Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.

R. I. Todd, vice-president and general manager Indianapolis Traction & Terminal Company, Indianapolis, Ind.

L. S. Storrs, president Springfield Street Railway, Springfield, Mass.

Richard McCulloch, vice-president and assistant general manager United Railways of St. Louis, St. Louis, Mo.

COMMITTEE ON EDUCATION

H. H. Norris, chairman, professor of electric railway engineering Cornell University, Ithaca, N. Y.

A. S. Richey, professor of electrical engineering Worcester Polytechnic Institute, Worcester, Mass.

W. F. Kelly, second vice-president Oakland Traction Company, Oakland, Cal.

J. F. Calderwood, vice-president and general manager Brooklyn Rapid Transit Company, Brooklyn, N. Y.

D. C. Jackson, professor of electrical engineering Massachusetts Institute of Technology, Boston, Mass.

SUPERVISING COMMITTEE TO CO-OPERATE IN THE PREPARATION OF THE M'GRAW ELECTRIC RAILWAY DICTIONARY

H. H. Adams, chairman, superintendent of rolling stock and shops Metropolitan Street Railway, New York, N. Y.

Paul Winsor, superintendent of motive power and rolling stock Boston Elevated Railway, Boston, Mass.

Richard McCulloch, vice-president and assistant general manager United Railways of St. Louis, St. Louis, Mo.

JUROR TO REPRESENT THE ASSOCIATION IN THE MATTER OF THE J. G. BRILL COMPANY PRIZE

W. A. House, president United Railways & Electric Company, Baltimore, Md.

COMMITTEE ON DETERMINING THE PROPER BASIS FOR RATES AND FARES

Frank R. Ford, chairman, Ford, Bacon & Davis, New York.

C. S. Sergeant, vice-president Boston Elevated Railway, Boston, Mass.

John I. Beggs, president Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

H. J. Davies, secretary Cleveland Railway, Cleveland, Ohio.

Wm. J. Clark, General Electric Company, New York.

H. G. Bradlee, president Stone & Webster Management Association, Boston, Mass.

James F. Shaw, president Citizens' Electric Street Railway, Boston, Mass.

Wm. Northrop, president Virginia Railway & Power Company, Richmond, Va.

COMMITTEE ON TAXATION MATTERS

Calvert Townley, chairman, vice-president Connecticut Company, New Haven, Conn.

Guy E. Tripp, vice-president Stone & Webster Management Association, New York.

C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa.

J. H. Pardee, operating manager J. G. White & Company, New York.

John Blair MacAfee, president Norfolk & Portsmouth Traction Company, Norfolk, Va.

C. L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

G. L. Estabrook, secretary and treasurer East St. Louis & Suburban Railway, Philadelphia, Pa.

Albion E. Lang, president Toledo Railways & Light Company, Toledo, Ohio.

A recent report from Henry P. Coffin, United States consul at Rosario, Argentina, states that the Rosario Electric Tramway Company has forwarded to the municipality a petition asking for an extension in its concession for 25 years, up to Sept. 15, 1985. In return the company offers to construct 30 km (18.6 miles) of new line in accordance with the plans of the municipality, and add 10 km (6.2 miles) for every increase of \$1,000,000 in receipts. The company also offers to reduce the fare to a uniform rate of 10 cents, to construct a double line in the Avenida Central and to give to the municipality \$241,250 for building purposes.

THE RATE OF RETURN*

BY THOMAS N. M'CARTER, PRESIDENT PUBLIC SERVICE CORPORATION OF NEW JERSEY

I have had no opportunity to prepare a carefully analyzed paper on the important topic about which I have been asked to speak, nor had I the inclination. My remarks, therefore, will be more of a desultory nature and I will give expression to the views which I have formed on this important branch of our work after years of experience and after ripe thought.

The subject which I have been asked to start a discussion about—for that is more properly what my talk may be called—is "The Rate of Return."

I have thought it wise to put it before you from what I consider to be the practical standpoint and not to delve into the theories of what *ought* or *might* be, but what *can* be with the conditions as we find them. As Grover Cleveland said many years ago, "We are confronted by a condition and not a theory," and that situation pertains to us to-day in the matter of the return on our business.

The first thought I would endeavor to lodge with you is this: that our hope should be—speaking now of urban and suburban properties—that the 5-cent, the flat 5-cent, fare shall be and remain the unit. I know that in some places, notably in the neighborhood of Boston, companies have been able to procure from the Massachusetts commission the authority to charge 6-cent fares, and it has worked very well, probably in some instances saving those companies from misfortune. But I believe that experience to be the exception rather than the rule. We all know that the difference between the 5 cents received and the outgo which it costs to carry the person who pays the 5 cents is fast diminishing. Mr. Sergeant's description of the disappearing difference, made some time ago, was illuminating. The increased cost of operating is continuing, and if I am right in my postulate that the flat 5-cent fare should be our hope the first thing to do is to withstand the onward march of operating expenses to the limit. It is apparent that if the operating expenses are to be further substantially increased, either by the increased cost of new materials, increased cost of labor or the one thousand and one matters that enter into the operation of a street railway enterprise, the slight difference now remaining between receipts and outgo will disappear and bring chaos to the entire business.

I do not believe it will ever be practical, even should operating expenses continue as they now are or increase, generally to increase the unit of the 5-cent fare except indirectly. I do not believe the American people, so long as we have the zone system, will, generally speaking, go to a 6-cent, 7-cent or other rate of fare. I think the 5-cent fare has come to stay in this industry, as far as we can see it, rather as a maximum than as a minimum. But our endeavor should be, the country over, to insist upon no curtailment of that fare by selling tickets six for a quarter, or workmen's tickets, or any other similar device. If that 5-cent fare does not suffice to give us profit the only daylight I see is the indirect raising of the fare by the curtailment of the transfer privilege, which, as we all know, is much abused throughout the land. I do believe that should a serious situation arise over the country, in which it could be made to appear that the difference between income and outgo has disappeared, it would be practical to convince commissions or other authorities, or even the public, of the propriety of a curtailment of the transfer privilege, rather than convince them of the propriety of the 6-cent fare. So I propose to stand pat on the flat 5-cent fare, without modification of any character, nursing the hope of reducing transfer facilities if it ever becomes necessary to do anything in the line of fares to enable the company to obtain a reasonable profit.

So much, therefore, for the practical thought with reference to what we can get out of this business and what we must give for it.

I now reach a different branch of the same subject, and that

*Abstract of remarks before the American Electric Railway Association, New York, N. Y., Jan. 27, 1911.

is the capitalization of these companies and the rate of return thereon to those who own them, assuming the fare question to be settled. That is the real question that underlies the rate of return to-day and which is so serious the country over.

At the present time there are many divergent views on this subject; they are hard to reconcile; they are part and parcel of the radicalism sweeping over the country to-day in all matters relating to political and economic conditions. The radicals, as exemplified by Senator La Follette, believe that properties of this character should be valued by the government and, that value having been reached, the rate should be so fixed that those who own them shall be entitled to earn what they call interest on the property—say, 6 per cent—and that no rate shall be allowed to remain in force that will permit an earning of the property in excess of the interest rate to which I have referred.

As I have already stated in discussion of this subject—I think at Atlantic City—any such proposition seems ruinous to the investor and disastrous to the country. There certainly will be no further expansion of properties of this character, whether steam or electrical railroads or gas or electric light properties. There is nothing in it, as we all know—we who are familiar with the intricacies of this business, and we certainly know better than anyone else that there is nothing in the business if there is only to be a return of that character. But we must recognize conditions as we find them, and the question is what, all things considered, is perhaps the best solution of this question? What is the happy medium between the radicalism of La Follette on the one side and the reactionary on the other, who believes it is private business and that it is nobody's business what anybody makes out of it? There is a middle ground between those two which can be safely relied upon. That ground depends on a multitude of circumstances. It depends on whether it is a brand new and untried proposition or whether it is a going concern, whether a suburban or urban or interurban proposition. All these things must be considered in this discussion, so in this short talk I am undertaking to start we can only mention generalities. Let us assume, if you please, that it is a new property which we are about to finance—I don't use the word "exploit," for perhaps that word had better be forgotten in connection with enterprises of our character; but I use advisedly the word "finance," which includes something besides the actual dollars and cents which rails and equipment cost.

Now, the first thing that will arise at the time the new enterprise is launched to confront the projectors and the promoters is: "What times are we in and what is money worth?" Take to-day, for example: My sympathy would go with anybody who went to Wall Street with any such new enterprise, no matter where it was located or on what terms he sought capital. Again, times will be with us when money will be easier, the country prosperous and it will be possible to project such an enterprise, whereas it would not be possible to do so to-day. So we can only look at the average conditions that will by and large prevail. So I lay down the proposition that the first money which goes toward starting an enterprise should receive bonds for it to the extent, say, of one-half the cost, and they will cost the enterprise in one way or another 8 per cent—by and large. I do not believe year in and year out these enterprises can be projected and in the main added to as time goes on through the medium of the bankers or investors if they do not net such banker or investor approximately 8 per cent.

You sell a 5 or 6 per cent bond, but you do not sell it at par, or if you sell at par they require a bonus of stock to go with it, so that the net result is 7 or 8 per cent. But as the industry has settled down, and, trying to average the situation between the two extreme poles I spoke of, I am satisfied that 8 per cent is what you have got to reckon on with the banker before you get through with him. Now, in the supposititious case, such as I have assumed, we have taken care of one-half of the money which went into the enterprise—sometimes more than half can thus be realized—

but the banker will make you show earnings, or expected earnings, for twice the amount of his interest. If that is true, the other half of the money must come from somewhere else.

Having disposed of the money which is on an 8 per cent basis, what about the man who puts his time or money into the enterprise behind the banker? When I say the man who puts in his time I mean this: I think we are all agreed that the old-fashioned stock-watering day is over, but a reasonable fee, either in cash or in securities, to the man who has given months and years to the projection of an enterprise, is not watering your stock—it is compensating effort just as you compensate the steel mill that rolls the rails for you. However, there is a line beyond which you cannot go without stock-watering; but on the right side of that line the payment of the stock promoter is as legitimate an expense as any other connected with the enterprise.

So, having arrived at the real capitalization, which represents the cost of the enterprise, what of the man who owns the securities behind the bonds? I say that that man in my judgment—perhaps the public won't follow in this view—but I think that man is entitled to 12 per cent before we begin to talk about lowering rates. I do not mean it is wise for the company to pay 12 per cent even if it has it, but before the agitation for lower fares comes that man is entitled to his 12 per cent. Average that 8 per cent to the banker and the 12 per cent to the stockholder and you get an average of 10 per cent for the whole property, which, all things considered, as a practical matter, I maintain is a perfectly legitimate distribution of earnings, free from criticism on the part of the just-minded public.

In most enterprises it will be a long time before such earnings can be achieved. The longer the wait the more surely it should be allowed when it comes. As I said, the dividends should not be declared, even if earned, until certain things have been accomplished. I do not think it prudent for a company to declare dividends in excess of 8 per cent until two or three things are reasonably certain. First, that you have got, what so many of us have not got, a large cash surplus in the company's pocketbook ready for a rainy day. Second, that you have got assets and funds which protect you from unexpected contingencies, such as a panic or a strike. It is very wise also for a corporation not to be compelled to go back to the banker every year for renewals; the corporation will be more welcome if it has failed to call on the banker for a year or two. So, before we distribute earnings in excess of 8 per cent I think it is wise to have a cash surplus on hand for such a contingency as the strike in Philadelphia, which cost the company there over \$1,000,000, and also a cash surplus for panicky years. Third, we must consider whether the public is in a frame of mind to receive it—that is, whether the public agrees with the views which I have been urging. Get the public to see the wisdom of a 10 per cent dividend and then more particularly the wisdom of a 12 per cent dividend before you declare it.

I believe that is entirely practical. The Union Pacific Railroad is now on a 10 per cent basis. The Lehigh Valley Railroad within a few weeks has gone on a 10 per cent basis. The Lackawanna business regularly pays a very high dividend, 20 per cent, I think, and there are extra dividends besides. It parallels the Erie Road, and the Erie Road, with its enormous capitalization, barely gets along.

These are the sober, practical views which I hold after much reflection, sobered by the serious responsibility of a corporation of \$250,000,000 capital under my direction and that of my fellow-directors.

An American consul in an Asiatic city reports that the letting of tramway and other concessions is being considered by the municipal authorities. A map showing the plan of the entire city and the principal streets accompanied the report and can be obtained from the United States Bureau of Manufactures, subject No. 6009.

THE ANNUAL BANQUET

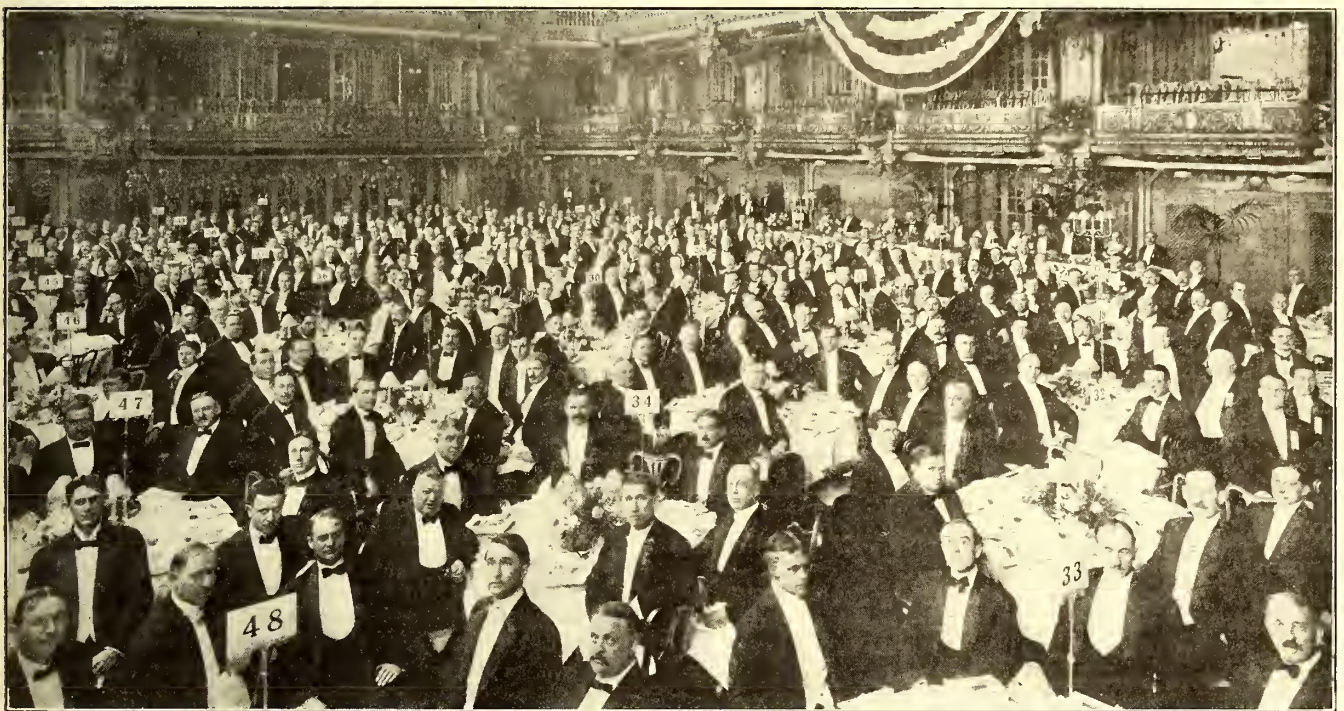
The annual banquet given by the American Electric Railway Manufacturers' Association to the American Electric Railway Association in connection with the mid-year meeting was held on Jan. 27 at the Hotel Astor, New York. The function was a great success, from the standpoints of both attendance and sociability. There were over 500 people present, most of whom were divided into parties of nine or ten seated at round tables. While dining the guests were entertained by selections given on the splendid organ with which this banquet room is furnished.

Five speakers were scheduled, but one of them, Hon. John A. Dix, Governor of New York, was unable to attend on account of an unforeseen engagement. The speakers of the evening were Arthur W. Brady, president American Electric Railway Association, who spoke on "The Association"; Hon. William B. McKinley, United States Congressman and president Illinois Traction System, on "The Public and Public Utilities"; Col. H. G. Prout, vice-president and general manager Union Switch & Signal Company, on "The Manufacturer," and

evidence to him that electric traction management and political service for the people were not incompatible.

Colonel Prout spoke on the relations between the electric railways and the manufacturers who supply their equipment. The feeling of the public toward the electric railways was of great importance to the manufacturers because their prosperity depended so much on that of the traction interests. The speaker emphasized his points by many interesting anecdotes which kept his auditors in the best of humor throughout his discourse. Colonel Prout also said, in part:

"The sport of jumping on corporations is nowadays safer than hunting lions in Africa. Exaggerated interest in it has been aroused by socialism, on the one hand, and by vote-seekers on the other. We are letting a spectre called 'government' oppress us. Some 14,000 laws were passed by Congress and the State Legislatures in 1909. Socialism doesn't frighten me much because as soon as a Socialist becomes competent enough to do anything practical for himself, let alone other people, he becomes an individualist and forgets his socialism. All these laws are the result chiefly of young men who write



Guests at the Banquet of the American Electric Railway Association

Patrick Calhoun, president United Railroads of San Francisco, on "Intelligent Popular Government and Public Utilities." The toastmaster of the evening was C. C. Castle, president American Electric Railway Manufacturers' Association.

Mr. Brady's speech is given elsewhere in this issue. Congress and McKinley spoke in a very happy vein of the pleasant relations which exist between the interurban electric railways of the Central West and the people whom they serve. He gave an entertaining history of the growth of the Illinois Traction System, illustrating it by mentioning the gradual increase in the length of the standard passenger cars and the inauguration of express, freight and sleeping car business. The speaker said that the Illinois Traction System could justly boast that it had attained the miracle of "tipless porters." Another feature of the sleeping-car service is the serving of free coffee and rolls for breakfast to the passengers. Congressman McKinley believed that the relations between the railways and the public would be greatly improved by the company impressing upon the trainmen the value of politeness. He said that the book of rules of the Illinois Traction System has on its cover the sentence, "Be civil and you will comply with the greatest rule of all." The speaker said that there need be no antagonism between the public and the operators of traction properties. His own election and re-elections to Congress seemed good

for 15-cent magazines. The associations of railroad officials of this country, however, are beginning to get in touch with the various public service commissions and with the saner newspaper editors, and I think a reaction is soon due."

Mr. Calhoun aroused the audience to a high pitch of enthusiasm by a speech which brought out the fact that great oratorical ability has not departed from the Calhoun family. He first discussed the ideas which were in the minds of the framers of the American Constitution with regard to checks upon hasty action by the body of people, as shown by the creation of two legislative chambers, of a Presidential electoral college and the courts. He strongly condemned the agitators who criticise judges for rendering decisions in accordance with the law as based on the Constitution rather than submitting tamely to the demagogic ideas which are so rampant among certain classes to-day. If the American people wanted good government it was necessary that they should have good administrators, so that the public service corporations could be left to conduct their business in a manner most useful to the people and without being subjected to blackmail or other political jobbery. The greatest political crime was to attempt to bribe an entire community by imbuig the people with the idea that they should take away the property of the public utilities corporations which were faithfully serving them.

MEETING OF INDIANA OPERATORS AND COMMISSION

Representatives of the Indiana interurban lines and members of the Indiana Railroad Commission met on Jan. 24, according to the agreement of Jan. 5. The recommendation made by the commission at the former meeting that all interurban railway motormen should have at least one year's experience in train service, either with interurban or steam roads, and that all conductors must show a clean record before being employed by interurban companies, was practically accepted.

The question of the adoption of block signals by all roads was not settled at this meeting, the committee on this subject wishing more time to investigate further the various available systems, including certain newly presented systems. At the last meeting with the commission, the railway people expressed themselves as being favorable to the block system. Several systems are now being used by different roads, and it is said that the one now used by the Indiana Union Traction Company cannot be used efficiently on lines that carry high-tension power. Action on this subject was deferred until Feb. 24.

At a former meeting of the commissioners the double order system was worked out in detail by the committee of operators and the system was accepted by the commission.

It was stated by the commission that a bill will be introduced in the General Assembly giving the commission full authority, both as to steam and interurban roads, over the installation of block signals.

RECOMMENDATIONS OF THE COMMISSION

A circular issued by the Railroad Commission of Indiana to interurban companies on Jan. 27 says in part:

"To the companies on whose lines accidents took place we made certain specific recommendations. Afterward all the interurban companies were called to a conference with the Railroad Commission by the Governor of the State, and the conference commencing then was carried on with committees appointed by those companies until this commission and those committees came to an agreement embodying substantially the recommendations made by the commission. These recommendations we now formally make to the interurban railroad companies as follows:

"1—(a) That each company shall secure and employ better railroad men for motormen and conductors, taking such steps as are necessary to secure capable and fit men and to keep them in its service.

"(b) That applicants for positions as motormen or conductors shall not be employed until their former records have been carefully investigated and all letters of reference and recommendations have been carefully considered.

"(c) That all motormen hereafter employed shall have at least one year's experience in train service on steam or interurban railroads. This rule not to be varied from unless in the judgment of the manager of the interurban company it would be best for the service to employ a man who has not had one year's experience in train service, and any such employment, with the reasons therefor, to be reported to the Railroad Commission within 60 days from the date of employment. If, upon receipt of such report, the Railroad Commission is of the opinion that such man should not have been employed, then upon direction of the commission so to do the interurban company shall dispense with the service of such man until he has had one year's experience as above mentioned.

"(d) That, generally, no other duties be assigned to motormen than the operation of their cars, and that they be relieved from all duties in connection with baggage and express matter except at stations, and that the conductor and agents shall give to the motorman at stations all assistance possible so as not to require from the motorman any attention to baggage and express while the car is at stations as above indicated.

"(e) That separate compartments shall be provided for motormen so that their exclusive attention may be given

to operating their cars and so that they may not be diverted by the conversation of passengers or other persons.

"(f) That when a trailer or additional car for carrying passengers is attached to the motor car a third man shall be put on to assist and work under the direction of the conductor.

"2—That interurban railroad companies shall proceed to install block signals on their lines, or parts of their lines, and will do so in such reasonable time as may be agreed upon by the commission and the committee composed of interurban officials and the expert of this commission. In explanation of this recommendation you are advised that a committee composed of the expert block signal inspector employed by this commission and of interurban owners and operators have now under consideration the matter of the best block signal system to be adopted and used on the interurban railroads of this State; that the expert of the commission has visited and inspected and examined such systems as are now in use in this country and in Canada, and a final report is to be made on this subject to the commission on Feb. 24, 1911, at which time it is expected that important improvements and additions may be known.

"3—That said companies shall enforce hereafter the double system of dispatching on their lines, and to this end shall put in force immediately the following rule:

"To obtain orders the motorman or conductor, whichever is more convenient, will call the dispatcher, who will then give such orders as are necessary. The one taking the order will write the same plainly without abbreviation, with carbon copy, on the blank provided for the purpose. When he has finished writing the order he will repeat it to the dispatcher. If correct the dispatcher will O. K. same. The one taking the order will then give his name to the dispatcher and at the same time sign the order. The one who has not taken the order will then repeat it without abbreviation to the dispatcher and give his name and at the same time sign the order. If correct, the dispatcher will then give the initials of the superintendent or other designated authority and the train order number, which must be repeated back to the dispatcher by the one then at the 'phone. If correct, the dispatcher will say, "Complete at —" (giving the time), which completes the order and puts it in full force and effect. If for any reason the dispatcher does not complete the order, it is of no effect and must be treated as if it has not been given. After the order is completed the motorman and conductor will each take a copy of same.

"Where it is not practicable for both members of the crews to leave the car at the same time, at important places designated by bulletin, in emergency at other places, after authority has been given by the train dispatcher on duty at the time, one member of the crew may receive and complete the order, the second member being required to read the order aloud to the one who has taken and repeated it, before the train is started, the dispatcher making a full record of the facts and reasons on his record book for every order completed by his instructions in this manner."

"4—That said companies shall proceed to eliminate obstructions to sight at curves where sight is badly obstructed, and that until this is done said companies on the order of the Railroad Commission may be required to post slow-speed signals at such curves and to reduce speed of cars to a speed limit not exceeding 15 miles per hour.

"5—That division superintendents and trainmasters (by this is meant those immediately in charge of trainmen) shall not be burdened with other duties than those pertaining to train operation, including supervision of agents.

"6—That train dispatchers shall not be required to handle interlocking plants or to perform other duties than those pertaining to the dispatching of trains.

"By virtue of the authority conferred on this commission and in accordance with the agreements made between this commission and the committees representing the interurban companies of the State, we make to each of you the recommendations above set out, and we direct that by March 1, 1911, you put the same in operation on your line."

COMMITTEE'S LETTER ON EMPLOYMENT OF MOTORMEN AND ON
BAGGAGE HANDLING

The recommendations of the Indiana Railroad Commission with regard to the employment of motormen were based in part on the following amended report of the committee of interurban representatives appointed by the commission on the subject of employment of motormen and handling of baggage, as finally agreed to by the commission on Jan. 24, 1911:

"Your committee appointed on Dec. 23, 1910, to consider and report to you regarding the following recommendations made by you, to wit:

"That all motormen hereafter employed shall have at least one year's experience in train service.

"That no other duties be assigned to motormen than the operation of their cars and that they should not be required to do the work or assist in doing the work of baggageman or expressman."

"We beg to report that we have had several meetings and have carefully discussed and considered the recommendations referred to us and report our conclusions as follows:

"First—Regarding the requirement of one year's train service in the employment of a motorman we are of the opinion that the proposition is one which has its advantages and should be adopted and followed wherever it can be done without injury to the service; but, after the most careful consideration, we believe that a hard and fast rule of this kind would interfere to such an extent with the operation of the roads as to render the service less efficient than it otherwise would be. We suggest that to the recommendation of the commission on this subject be added the following:

"This rule shall not be varied from unless in the judgment of the manager of the traction company it would be best for the service to employ a man who has not had one year's experience in train service, and any such employment, together with all the facts, must then be reported to the Railroad Commission within 60 days. If, upon receipt of such report, the Railroad Commission is of the opinion that such man should not have employment, then, upon direction of the commission so to do, the traction company shall discharge him."

"We also suggest, as part of our report, the wisdom and propriety of giving preference in employment of a man as motorman to such as may already have had shop, station or other similar experience and be familiar with the road and many of the rules incident to the operation of the cars over the same. We also ask the commission in this connection to construe the term 'one year's experience in train service' to mean one year's experience in train service on steam roads, interurban roads, suburban roads or city street car lines.

"Second—As to the other recommendation made by you and referred to us, that the motorman be not required to handle baggage or express matter, we beg to report that the recommendation as made is somewhat too far reaching to meet entirely with our approval. We believe that the motorman may well be relieved from all duties in connection with baggage and express matter except at stations and that the conductor should be required to give him, in connection with the accounting for baggage and express, all the assistance which he can in addition to his other duties, so as not to require from the motorman any attention to these matters except while the car is at station, as above indicated; and, also, at stations where there are agents or baggage handlers, that they be required to assist the motorman in the handling of baggage and express."

This report was submitted on Jan. 5, 1911, by Charles L. Henry, H. A. Nicholl, W. G. Irwin, C. E. Morgan and H. D. Murdock.

REPORT OF THE MASSACHUSETTS JOINT BOARD ON
ELECTRIFICATION

The report of the Massachusetts Joint Board on Metropolitan Improvements, consisting of the Board of Harbor and Land Commissioners, the Metropolitan Park Commission, the Board of Railroad Commissioners and the Boston Transit Commission, was presented to the Legislature Jan. 30. This board was appointed in 1910 to investigate a considerable number of proposed public improvements in the vicinity of Boston and to report conclusions to the Legislature of 1911, which is now in session. The results of these investigations appear in an exhaustive report of nearly 150 pages, which has just been made public, chief interest being attached to the question of steam railroad electrification at Boston, including a discussion of the desirability of constructing a tunnel between the North and South terminal stations.

Upon the main question nine of the 16 members are convinced that electrification is at present financially impracticable for the Boston conditions. These nine members consist of all three members of the Harbor and Land Commission, Messrs. Swain and Noyes of the Transit commission and four of the five members of the Park commission. Of the minority, five, consisting of Messrs. Hall and Bishop of the Railroad commission, Crocker and Allen of the Transit commission, and De Las Casas, of the Park commission, are of the opinion that electrification is feasible within a cost far from prohibitive and that it should be set in motion by positive legislation. The remaining two members, consisting of Mr. White, of the Railroad commission, and Mr. Quincy, of the Transit commission, state that the report of the majority is too conservative and its tendency is unduly to discourage even voluntary electrification. They believe that further studies should be made on the subject by some public board before legislation should be enacted requiring electrification.

After referring to the estimates on the cost of equipping the lines (published on page 1031 of the *ELECTRIC RAILWAY JOURNAL* for Nov. 19, 1910), the report of the majority of the committee states that the experience in New York has thus far shown that electric operation is not more economical than steam operation, but is more expensive, independent of the interest on the capital required for the installation. It believes that in many respects the conditions in Boston are even more unfavorable, as there are some 21 branch lines radiating from the city and for the expenditure of twice the sum required in New York a passenger would be carried only one-half as far. Another element is that the lease by which the New York, New Haven & Hartford Railroad Company operates the Boston & Providence Railroad provides that all permanent improvements shall be paid for by the lessee, but at the expiration of the lease shall become the property of the lessor. The cost of electrifying this division would be over \$6,000,000, or 50 per cent more than the entire capital stock of the Boston & Providence Railroad.

Continuing, the report of the majority of the board says: "Moreover, there are other elements which in the opinion of the board render unwise at this time the hastening of electrification. In the first place, the best system of electrification is still undetermined. The situation is somewhat similar to the situation regarding couplers 20 years ago, when no standard form had been adopted. The future relations of the railroad systems cannot be predicted, and it seems unwise to hasten electrification in advance of standardization."

It says that the disadvantage involved in the use of different systems by the two railroads is in some respects not as great in Boston as it is in New York. In Boston the trains of each railroad would run almost entirely upon its own tracks. But if the third-rail system should require overhead construction at certain points in the yard complications might arise which cannot now be formulated. However, it would be distinctly unfortunate if the two great railroad systems entering into and operating in the city should adopt different systems of electri-

Of the tramways owned by the Cordoba (Argentina) Electric Tramways Construction Company (Ltd.), 14½ miles of electric track have been constructed, of which 12 miles are now in operation. A concession also has been obtained for the conversion of 10 miles of horse tramways to electric traction. When this has been effected there will be 26 miles of electric track.

fication. It would seem unwise to unduly hasten electrification in advance of standardization.

The board also in its report discussed at some length the advantages and disadvantages of electrical operation, among the advantages being the possibility of utilizing the space over the tracks, the saving in fuel, the diminution of corrosion of overhead structures, the saving of switching in terminals if the multiple-unit system is used and the added convenience to passengers due to the absence of smoke and cinders.

Referring to the advantages of electric operation the report says: "The saving in fuel is considerable and undoubted. The corrosion of overhead structures, due to the smoke and steam from the locomotives, is diminished in proportion to the amount of steam service eliminated. If the multiple-unit suburban service is used there are certain savings in train movements, especially if the trains can be run continuously around loops at the terminals and do not have to reverse their direction. It is unquestioned that there are elements of economy in electrification which would be immediately felt. There are also some possible elements of economy which may be found to result, but are more or less hypothetical. For instance, with electrical operation high trainsheds become unnecessary. The trains can be run into a terminal station occupying simply one story and the space over the tracks is theoretically available for other uses. Whether it is practically so available will depend upon circumstances and is a real estate problem. If the operation of trains in a terminal station is by electricity instead of steam, without altering the location of the tracks, it is then a question whether it would pay to put up a building for commercial uses in which the first floor and basement would not be available. If the tracks are depressed and the electrically operated trains occupy the basement floor, it would then be a question whether the rental which could be obtained from a commercial building on that site, of which no space would be available below the ground floor, would be sufficient to justify the expense of lowering the tracks and constructing the building. In some cases there may be a considerable profit here; in other cases not. There would be more apt to be a profit if the site is in a large city, where the land is valuable; and in some cases the profit from the real estate investment might be such as to offset to a considerable degree not only the expense directly connected with the building operations, but the expense of electrification. The New York Central & Hudson River Railroad Company in its reconstruction of the terminal in New York intends to erect over the tracks a high building from which it expects to secure a considerable revenue. The Pennsylvania Railroad Company, on the other hand, whose station is farther downtown and occupies the space under two city blocks, has not planned any such real estate investment on the block occupied by the main portion of the station."

The greatest obstacle, the board believes, to speedy electrification is the large capital required and the fact that the railroad companies would be obliged to pay interest upon the double investment—that for steam and that for electricity. According to the regulations of the Interstate Commerce Commission a railroad company is obliged to replace in kind any of its structures or equipment out of earnings. If it abandons a roundhouse and replaces it by another one of the same materials and capacity it must pay for the new one entirely out of earnings. The same is true with reference to equipment; it must pay out of earnings the book value of the locomotives or cars, less the salvage from them. Independent, therefore, of interest on new capital and of a possible loss from electric operation, which experience thus far indicates to be an actual loss, the board considers that there is likely to be a further charge upon earnings due to property replaced. The problem of electrification is, therefore, not only an engineering one, but equally a financial one, involving provision of the necessary capital to make an improvement which will result, so far as experience has yet shown, in increased expenditure for operation, with an uncertain increase of traffic to offset it.

While admitting that electricity provides a cleaner, more

convenient and altogether more desirable method of operation than steam, the board thinks that it is a serious question whether it is wise by legislative enactment to endeavor to hasten a change rather than to await its natural development. In this connection it says: "Two points of view are especially to be kept in mind: In the first place, it must be remembered that the railroad companies in this country need to spend very large sums of money each year to provide increased facilities which are demanded in order that they may be able to carry the increased traffic which results from increasing population and business. Additional tracks, sidings, yards, structures, heavier bridges and equipment and many other things must be provided. These things are demanded by considerations of necessity. Safety appliances are also demanded for the protection of life, such as block signals, the elimination of grade crossings and many other expensive additions to railroad property.

"Electrification, however, stands in a different position. It is, it is true, very desirable, but its desirability arises not from considerations of safety or of necessity, but mainly, if not entirely, from those of convenience. It is a luxury. The railroads can operate by steam as safely as they can by electricity. How far, then, is it wise to hasten by legislative enactment an improvement which is undoubted and which is desired by every one, but from considerations of convenience alone?

"In the second place, our railroads are subject to legislative restrictions of many kinds. They have been required to spend large sums for safety appliances, and their rates are subject to regulation by the State. To raise the large sums of money which they must spend for improvements they must offer inducements to private capital. Capital, however, is deterred from making investments subject to public regulation which cannot be foreseen and which may be unwise. It is likely, therefore, to be seriously deterred and the business of the entire country to suffer correspondingly if it has reason to believe that the State will compel the expenditure of large sums of money which it is not necessary to spend, except from considerations of convenience. A wise and just regulation of the railroads by the State is undoubtedly proper. Railroad operation must be reasonably safe and rates must be reasonable. Capital, if it is assured that such regulation will be wise and just, will not be deterred. The board is of the opinion, however, that legislation compelling the railroads to adopt electricity as a motive power is unwise and not for the best interests of the public and that it will make it more difficult, if not impossible, for the railroads to secure the capital which they need for necessary improvements which the country demands.

"Since experience thus far indicates that electrification is not a source of economy, but rather the reverse, and since a return has to be earned on the additional capital necessary and a further charge to operating expenses made for property abandoned or replaced, there seems to be no escape from the conclusion that the railroads should be allowed to increase the revenues sufficiently to provide a return on the investment large enough to attract investors."

The board considers that it would not be fair, even if it were possible, to require the railroad companies to expend the money required for electrification in Boston unless they were also assured of an adequate return on that expenditure, but also thinks that an increase in the rates of fare on the lines equipped might not increase the net revenue. The benefit of electrification in the Metropolitan District it considers "would be mostly felt by the short-distance suburban passengers and the abutters who would be relieved from the annoyance of smoke and cinders. The long-distance traveler would not be especially affected, since the greater part of his trip would still be made with steam locomotives. In strict justice, therefore, if fares were to be increased the burden should be laid principally on the short-distance suburban traffic. This traffic, however, is likely to be just the kind which is least able and willing to stand such an increase. Moreover, the traffic is precisely the traffic which is least stable and most likely to desert the steam rail-

road entirely and patronize the street railway lines if the latter are conveniently located. In such cases the additional revenue required would necessarily have to be gained from the long-distance passenger traffic or even from the freight traffic, neither of which is benefited at all by electrification. It appears, therefore, that the class of traffic which would most benefit by electrification is the class which is most likely to change and patronize some other form of transportation; that it is the least profitable part of the passenger traffic and the part which is least able to afford the additional revenues which the cost of electrification would render necessary."

CONCLUSIONS

The following is a summary of the conclusions reached by the majority of the board:

(1) The electrification of steam roads is a development much to be desired. It would add to the comfort and convenience of the public and would have advantages for the railroads as well.

(2) The best method of electrification is still undetermined. The science is in a state of rapid change and standardization is much to be desired before extensive electrification is undertaken.

(3) So far as experience has yet shown the electrification of the terminals of steam railroads under present conditions does not result in economy, but, on the contrary, increased expense, aside from the interest on the first cost incurred.

(4) If a greatly increased traffic should result from electrification this expense would be reduced and might ultimately be changed to a profit.

(5) Electrification would probably result for some time in obliging the railroads to make charges to operating expenses due to property abandoned or replaced, in addition to interest on new capital and increased expense of operation.

(6) Electrification would, therefore, in all probability require an increase of passenger fares and perhaps of freight rates to produce the revenue required to pay for it.

(7) Electrification, while desirable, is not necessary nor is it required on grounds of public safety. It is desirable mainly, if not entirely, on account of added convenience and comfort.

(8) There are other expenditures which should be made by the railroads which are demanded by considerations of necessity to enable them to meet the demands of increasing traffic and which should have precedence of electrification. To compel electrification would postpone these more important improvements.

(9) The railroads are already subject to much regulation by the State and the nation. To require them to expend large sums of money for electrification would make it difficult if not impossible for them to raise the capital required to move the increasing traffic of the country and would thus hamper industrial development.

(10) As a result of the foregoing conclusions the board believes that it is not wise nor in the public interest to enact legislation compelling any electrification of railroads.

(11) To pass a bill making compulsory the electrification of the passenger traffic on all the steam railroad lines in the Metropolitan District of Boston within a stated time, as contemplated by the resolve, would be particularly unwise because of the difficulty presented by the lease of the Boston & Providence Railroad, already described; because no definite plan has yet been adopted for the construction of a tunnel between the North and South Stations, and because the limit of electrification should not be definitely fixed as coinciding with the limits of the Metropolitan District. The limit should be dependent upon traffic conditions.

(12) If a tunnel is constructed and used for passenger traffic in Boston this would necessitate electric operation through the tunnel and for a certain distance on either end, and this would naturally lead to an extension of the electrification to a reasonable distance beyond. If the tunnel is not to be constructed the demand for electrification is based on the convenience which would result to the public, and this demand, if logical, should require electrification for both kinds of traffic.

(13) The traffic to be handled in Boston is nearly three times that at the Grand Central Station in New York and, on account of the radiating traffic in Boston (as compared with the north and south traffic in New York) and the large number of lines in Boston (as compared with the single line with three branches in New York), the expense in Boston is very much greater. There is not sufficient justification for requiring the railroads to spend this sum of money here.

(14) If electrification of steam roads, either for passenger or freight traffic or both, is required by law, it should also be provided that the revenue may be increased so as to afford reasonable compensation to the roads for the expense involved and to make it possible to raise the necessary capital.

(15) If the expense of electrification is forced upon the railroads by legislative enactment a fair increase of rates and fares will be inevitable, and it should fairly be laid upon Boston business and might add to the disadvantages under which Boston now labors.

(16) The benefits of electrification in Boston will accrue mainly to the commuters and short-distance traffic and also in a very large degree to owners of property along the lines electrified. To raise suburban fares simply would place the burden where it mainly belongs, but where it is least capable of being borne; and such action would in itself tend in some measure to discourage the development of suburban territory and to divert travel from the steam lines.

(17) Electricity is probably the coming form of traction power; indeed, it is not improbable that at some time in the future all the trunk lines of the country over which there is heavy traffic will be electrified. The problem, however, is not like that of providing safety appliances, such as air brakes, signals, standard couplers or the abolition of the car stove and replacing it by steam heat from the locomotive. All of these matters were required from considerations of safety. The public demand for electrification, however, arises not from considerations of necessity or of safety, but from those of convenience. Considering that there are other improvements which are necessary in order to meet the demands of increasing traffic, the joint board believes that an improvement resting on considerations of convenience should be allowed to work itself out without legislative enactment.

(18) As stated in another part of the report of this joint board, permissive authority should be granted for the construction of a tunnel connecting the North and South Stations. If such authority is availed of, it will necessitate electrical operation and will lead gradually to the extension of such operation as similar causes have led to such extensions in the neighborhood of New York.

(19) It should be recognized that all improvements of this kind, whether they are the construction of tunnels or the electrification of lines, which afford greater facilities to the public and involve the expenditure of large sums on the part of the railroad companies, if not offset entirely by increased earnings or reduced expenses, should be accompanied by such increase of fares or rates as will enable the roads to maintain a fair rate of return upon their total investment. In all such improvements the public is a partner in the undertaking. The principal benefit accrues to it with no risk. Its attitude should be such as to encourage the legitimate and economical expenditure of capital and to compensate it fairly and even liberally for any risks involved. Under the laws of this State there is little danger of a misuse of capital expenditures.

Those agreeing with the majority report on electrification were: George E. Smith, Samuel M. Mansfield and Heman A. Harding, of the Board of Harbor and Land Commissioners; George F. Swain and James B. Noyes, of the Boston Transit Commission; Edwin U. Curtis, David N. Skillings, Ellerton P. Whitney and Everett C. Benton, of the Metropolitan Park Commission.

FIRST MINORITY REPORT

Walter Perley Hall, George W. Bishop, George G. Crocker, Horace G. Allen and William B. De Las Casas united in the following minority report:

"The undersigned dissent from so much of the report as relates to electrification and submit the following statement. Without undertaking to discuss in detail the statements and conclusions set forth in said report, it is enough to say that, taken together, they amount to a declaration that electrification is for the present impracticable. In our opinion, experience elsewhere has demonstrated both the feasibility and the financial ability of railroad corporations to equip a portion of their lines with electricity, and we find no conditions in Boston or its vicinity which lead us to a different conclusion. Indeed, the officers of the New York, New Haven & Hartford Railroad Company have stated to the Commission on Commerce and Industry, and on several occasions to the public, their purpose, if allowed to control the Boston & Maine system, which control is now effected, 'to equip both systems with electricity for a considerable distance near Boston.' The further proposals of this management to electrify the Boston, Revere Beach & Lynn Railroad, if authority to acquire the same is granted by the General Court, is additional evidence that electrification to some extent is both feasible and within the financial ability of the companies. The studies submitted to the joint board by the New York Central & Hudson River Railroad Company for the electrification of certain portions of the Boston & Albany Railroad also indicate feasibility within a cost far from prohibitive.

"We are convinced that the public welfare demands some legislation with respect to electrification. While we are not in favor of legislation compelling the electrification of all steam railroads of standard gage in the Metropolitan District before a date now to be fixed, we do not believe that leaving the matter in the hands of the several railroad companies exclusively will result in as speedy action as will follow some legislative requirement plainly indicating the policy of the State. Experience has shown that similar legislation as to automatic car couplers, fenders and vestibules for street cars, the prohibition of car stoves and the like has been found in the public interest and has accomplished good results.

"We are of opinion that any legislation should secure to the railroad companies the greatest latitude with respect to lines first to be electrified, but that the time for commencing the actual work of construction for electrical operation should be fixed at a reasonable date by the General Court or some public agency designated by it, with authority to such agency to extend the time for good cause shown."

SECOND MINORITY REPORT

Clinton White and Josiah Quincy joined in the following minority report:

"The undersigned dissent from so much of the report as relates to electrification, but are unable to join in the above statement of the views of the minority for the reason set forth below. We are unwilling to give our assent to all of the arguments, inferences and statements set forth in the majority report and we believe that its whole tendency is unduly to discourage and postpone electrification, even by the voluntary action of the railroad companies. In our opinion, continued study of the subject under legislative authority and reports to some public authority setting forth progress made will tend to advance electrification and to promote agreement upon and adoption of that system of electrical operation best adapted for general use and for facilitating interchange of traffic between different systems. We, therefore, believe that legislation should be enacted directing some public board to prosecute further investigations and make report to the Legislature and requiring the railroad companies, under the supervision of such board, to make further studies with plans and estimates not confined within the arbitrary limits of the Metropolitan District and including freight as well as passenger traffic. We think that it should be left to such board to recommend compulsory legislation if and when it is found to be called for.

"We are not, however, convinced of the advisability at the present time of any legislation requiring electrification. The fixing of the time within which the work of construction for electrical operation must be begun by all railroads within the

Metropolitan District, even though some public authority is given the power of extending such time for good cause shown, seems to us to be compulsory legislation, the wisdom and necessity of which are yet to be demonstrated. However strong the desire of the public may be that all railroads within the Metropolitan District should be electrified, we doubt whether the problem has yet reached the stage where any form of compulsory legislation is warranted by the facts shown or will really expedite an intelligent and comprehensive settlement of the question. We also believe that the effect of the great expense of electrification in justifying or requiring an increase in rates of fare within the Metropolitan District should be more fully considered before any form of compulsory legislation is recommended."

ALPHABETICAL LIST OF ITEMS OF EXPENSE

The Central Electric Accounting Conference has issued a pamphlet containing an alphabetical list of the items of expense in the operating of electric railways. The items are classified in accordance with the Interstate Commerce Commission and the American Electric Railway Accountants' Association standard classification of accounts. Extra copies of the pamphlet may be secured upon application to A. F. Elkins, secretary and treasurer of the conference and auditor of the Columbus, Delaware & Marion Railway, Columbus, Ohio. The pamphlets are sold at the rate of three copies for \$1. The introduction to the pamphlet states that it is not assumed that the list is complete, but that it is comprehensive enough for the general requirements of clerks and others engaged in distributing charges to the proper operating accounts when used as an auxiliary to the text of the accounts.

PROPOSAL BY MR. SPRAGUE FOR A RAPID TRANSIT SYSTEM

On Jan. 25 Frank J. Sprague, in behalf of himself, Oscar T. Crosby and associates, presented to the Public Service Commission, First District, New York, a proposal for the equipment and operation of an independent city-built rapid transit line. The route proposed is shown on the map on page 229 and follows very closely, in Manhattan, the route advocated by Mr. Sprague at a public meeting at the Engineering Societies Building about three months ago; that is, it consists of a West Side route on Seventh Avenue below Forty-second Street, an East Side uptown route on Lexington Avenue and a connection, as now arranged, on Thirty-fourth Street. Mr. Sprague stated in his proposal that he represented certain independent financial and engineering interests and was prepared to file a reasonable bond for the execution of the contract if it should be awarded to him. He described the route which he proposed to build as follows:

"A four-track, one-level subway from Times Square and Forty-fifth Street down Seventh Avenue, extended, and through Varick Street, both of which sections can be built for less cost than a double-deck line on Lexington Avenue below Forty-second Street; an extension thence through Church Street to Liberty Street, with two tracks to the Battery.

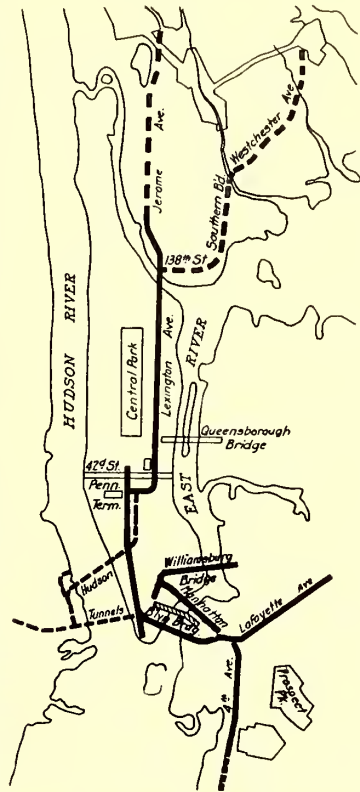
"A four-track cross-town connection through Thirty-fourth Street from Seventh Avenue to Lexington Avenue.

"A four-track extension from Thirty-fourth Street up Lexington Avenue to 138th Street, with a connection for providing a future extension through 138th Street and Southern Boulevard, as already planned; thence north from the 138th Street junction to 157th Street, to connect with a future three-track elevated up River and Jerome Avenues to Jerome Park Reservoir.

"A two-track extension from Liberty Street, through separate tunnels under the East River, to Flatbush Avenue and Fulton Street via the Manhattan Bridge Brooklyn extension,

and then out Lafayette Avenue to Broadway or out the Eastern Parkway, as may be agreed."

According to Mr. Sprague's proposal the city is to provide the easements and right-of-way, but the operator would provide the necessary yards and car houses at an estimated cost of \$2,000,000. Under the plans proposed Mr. Sprague estimated that the total construction cost to the city would not exceed \$75,000,000. The company would have an authorized stock and bond capital of \$40,000,000, which would provide for all of the equipment necessary, including the power station. Mr. Sprague proposes that after the deduction of operating expenses, including maintenance, depreciation and an obsolescent fund of three-quarters of 1 per cent on \$40,000,000, the net earnings shall be devoted, first, to the payment of 5 per cent on the \$40,000,000 capitalization of the company and then that the city should receive $4\frac{1}{4}$ per cent on its estimated invested capital in construction, or \$75,000,000. After that, each interest should receive pro rata to its investment a sinking fund up to 1 per cent of its investment and then the surplus earnings should be divided in like proportion between the two parties to the agreement; that is, in the ratio of 40 to private capital and 75 to the city.



Route Proposed by Mr. Sprague

The company will carry passengers for 5 cents and will offer to exchange passengers with the present subway system at meeting points without extra charge, but on the company debit and credit basis of $2\frac{1}{2}$ cents or such other equitable sum as may be determined.

Mr. Sprague declared that those represented with him in this enterprise are entirely independent of either of the existing companies which have made proposals, and offered to provide a surety bond of \$1,000,000 or a deposit of city bonds of like amount to carry out the contract if the city would engage in it and to deposit \$100,000 with the Public Service Commission or the Board of Estimate and Apportionment if they had authority to receive such sum as a guarantee that he would provide the surety bond as stipulated above. The proposal was stated to be open for consideration for a period of not less than three weeks, but the right was reserved of withdrawing it on one week's written notice after the lapse of two weeks if no contract along the lines set forth seemed likely to the bidders.

Mr. Sprague's proposal was accompanied by a number of tables and other data to prove the greater desirability of his proposal than of that recently made by Mr. McAdoo or the Interborough Rapid Transit Company. Among other points Mr. Sprague shows that the investment required by the city was about \$20,000,000 less than in the McAdoo proposal for a greater mileage and that it proposed a prior lien at a definite and reasonable rate on net earnings for \$10,000,000 less private capital and also a larger ratio of division of surplus earnings. Mr. Sprague also pointed out a number of engineering features in which his proposal was very desirable as compared with others offered to the city.

MESSAGES OF THE GOVERNORS

The following abstracts from the messages of the Governors supplement those published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 75, and Jan. 21, 1911, page 125.

GOVERNOR W. R. STUBBS OF KANSAS

At the last session of the Legislature I recommended the enactment of a public utilities law which would provide for a public utilities commission to take the place of the present Board of Railroad Commissioners and enlarge its powers to cover all State-wide public utilities, using the present railroad law as a basis and adding thereto the best features of the Wisconsin and New York public utilities laws.

I now renew this recommendation to this Legislature and recommend that you enact a law that will place all State-wide public utilities, railroads, telegraph, telephone, street railway, pipe-line, express and Pullman companies and common carriers of all kinds under the control of a State commission having full authority over the issue of stocks and bonds, giving them means and power to obtain the physical valuation of the property and plants of these corporations, to fix and adjust rates upon their own motion and to regulate rates and services in the interest of the people of Kansas and the investors and employees of these corporations.

I recommend that the City Council, or City Commission in cities having a commission form of government, be constituted a public utilities board, to have control of local public utilities such as gas, electric light, water supply, telephones and utilities of this character; giving the right to the corporation, the local public utilities commission or any taxpayer to appeal to the State-wide public utilities commission in cases of disagreement, similar to the Wisconsin law, which has proved beneficial and satisfactory to citizens and public utilities alike.

I also recommend the enactment of an employers' liability law, following the provisions of the federal law and the advanced views of the Supreme Court of Kansas on that subject.

GOVERNOR FRANCIS E. MCGOVERN OF WISCONSIN

No subject of more lasting importance than a workmen's compensation act will engage the attention of this Legislature. No matter from what standpoint it may be viewed, justice, humanity, economy and self-interest alike plead for prompt and thoroughgoing legislative reform along these lines. I feel I cannot too strongly urge it upon your attention.

GOVERNOR M. E. HAY OF WASHINGTON

I recommend that you abolish the offices of Railroad Commission, Tax Commission and Insurance Commissioner, the latter at the end of the term of the present commissioner, and in the place of these create the two following commissions:

First—A public service commission, to perform the duties now exercised by the Railroad Commission as relates to transportation, telegraph and telephone companies, with the added powers of supervision and regulative control over light, power, gas, water and irrigation companies or corporations doing business in the State.

Second—A public revenue commission, whose duties will include those now imposed on the Tax Commission, and which in addition thereto shall administer the insurance department, the collection of the motor vehicle tax, game licenses and such other indirect taxes as are not collected through established departments.

Last July the Tacoma Commercial Club called a conference of employers and employees to consider this subject. At that conference a resolution was passed requesting the Governor to appoint a commission of ten to study the question of employees' compensation and draft a bill embodying their conclusions for submission to this session of the Legislature. Acting upon this request, I appointed a commission composed of five well-known employers of labor and five representative employees. The members of this commission have devoted much time and careful study to the subject in hand, and the draft of the bill that they submit to your honorable body represents a most earnest and conscientious effort on their part to arrive at an

equitable solution of the problem. I commend it to your serious consideration and trust that it will meet with favorable action at this session.

I recommend that the section in regard to logging be amended, in that any railroad, tramway or electric railway built across State lands shall be a common carrier, so far as the timber is concerned, on the State land or from any State land that may be within a mile of the road anywhere throughout its length, and that the rates to be charged for hauling logs or other material from State lands be subject to regulation by the State Railroad Commission.

GOVERNOR JOHN K. TENER OF PENNSYLVANIA

The present Railroad Commission has done well, but circumscribed as to its limitations, it cannot fulfil the present requirements in the treatment of the relations between the people and the public service corporations. There should be a commission vested with all possible power to have the general supervision and control of the corporations and individuals having to do with public utilities, and the present Railroad Commission should be abolished.

Properly conducted this public service commission would create a better feeling between the people and the corporations; would keep these companies within their lawful bounds and compel them to render to the public the reasonable and satisfactory service for which their franchises were granted. It would prevent the building of unnecessary railroads and works and the issuance of obligations not fully represented by actual value given; it would protect these companies against unfair attacks; while at the same time the rights of the people would be fully conserved. I recommend the enactment of legislation creating such a commission. It is desired by the people and should be welcomed by all fairly disposed corporations.

I believe that the Commonwealth of Pennsylvania, the greatest of all industrial States, should be the first to put into operation advanced legislation in respect to compensation of workmen who are injured, and as a means to that end advise the appointment of a commission of representative workmen and employers, whose duty it shall be to investigate every phase of the question and recommend to the Legislature a bill in accordance with the result of their investigations.

I also believe it would be well to establish in the State a museum of safety devices and industrial hygiene. Such a department placed in the hands of competent instructors would be able to furnish employers of labor with drawings of safety devices, which devices, if placed on dangerous machinery, would reduce considerably the number of accidents which occur annually in the mining, manufacturing and transportation industries.

As a general rule, employees and employers should be left to themselves to settle their differences, but when a strike results which affects the public then there should be a method of having these differences and that strike properly adjusted and settled. If differences cannot be voluntarily, promptly and feasibly adjusted, then the law should provide a remedy. In such cases the people as a whole have rights paramount and they should not be compelled to suffer while the spleen of the combatants is being satisfied. I am in favor of a compulsory arbitration law, and if such cannot now be legally enacted I recommend a constitutional amendment to authorize it. With such a law there will be fewer disputes and no strikes.

GOVERNOR JAMES H. HAWLEY OF IDAHO

The last Legislature passed an employers' liability law which in my judgment, is absolutely ineffective. The only change as I view it that has been made in the system theretofore prevailing in this State is to limit the amount that could be collected by reason of an accident resulting in death. Action should be taken at this coming session to amend this law so as to make it conform to the laws enacted during the past decade by the Legislatures of most of the States of the Union and to give proper protection to the employees engaged in all branches of labor. Similar measures passed in the majority of the States have been conducive of great good and have worked no real disadvantage to the employers of labor.

GOVERNOR O. B. COLQUITT OF TEXAS

Our laws regulating and defining the rights of corporations are very strong and efficient, and I do not believe we need or that the people demand further restrictive legislation along this line at this time, but there is a very urgent demand that the people be given time to adjust themselves to the laws we already have and rest from the passage of new ones and the consequent agitation and uncertainty that precedes and follows their enactment.

GOVERNOR JOHN BURKE OF NORTH DAKOTA

In the report of the Railroad Commissioners you will find many valuable suggestions, much important information and recommendations, to some of which I call special attention. It is first suggested that the tenure of office of the railroad commissioners be changed in such a way that there will always be a majority of holdovers on the board, thus enabling the board to keep a working membership who are familiar with the details of the work. * * * That the commission be given supervision over telephone, telegraph, gas, water and electric companies and other public utility corporations. * * * To all of which I call your attention and ask your careful consideration.

LONG SCALE SWITCHBOARD METERS

The Westinghouse Electric & Manufacturing Company is placing on the market a complete line of type F a. c. switchboard meters. These are round-pattern meters of the usual size, about 9½ in. in diameter, with scales subtending an arc of 300 deg. and about 14½ in. long. The length of scale usually found only in the large illuminated dial meters is thus obtained in a meter of normal size. There is no metal front on the meter, but instead a round glass cover is used. This makes it possible thoroughly to illuminate the dial from the front and thus avoid the use of special lamps.

The meters operate on the induction principle. The torque depends on the action of a rotating magnetic field on a light, pivoted drum. This principle makes connections to the moving element unnecessary, and, by avoiding the use of a copper coil or iron core for the moving part, reduces the weight on



Long Scale Switchboard Meter

the pivot bearings and consequently the friction. The moving element also has inherent damping qualities and the torque developed is very high.

The type F meters are furnished as ammeters, voltmeters, single-phase and polyphase wattmeters, power-factor meters and direct-reading frequency meters. All of these meters utilize different forms of the induction principle. Type F single-phase and polyphase static ground detectors are also furnished, harmonizing in size and general appearance with the rest of the line. The type B synchroscopes and the type FL direct-current meters made by the Westinghouse company are also of the same size and appearance, so that a complete harmonious switchboard can be arranged.

EXTRUDED TROLLEY EARS

An extruded trolley ear is about to be placed on the market by the Ohio Brass Company, of Mansfield, Ohio. The accompanying illustration shows that the extruded ear consists of two pieces, a runner piece and a boss. The boss is made of malleable galvanized iron and is pressed upon the runner piece and then securely riveted in place.

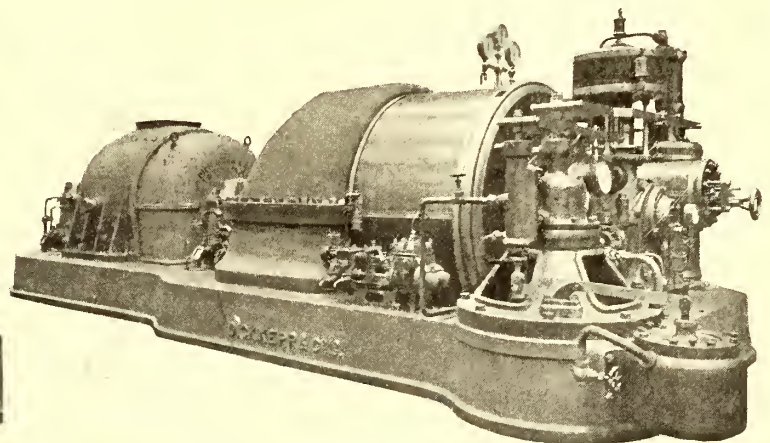
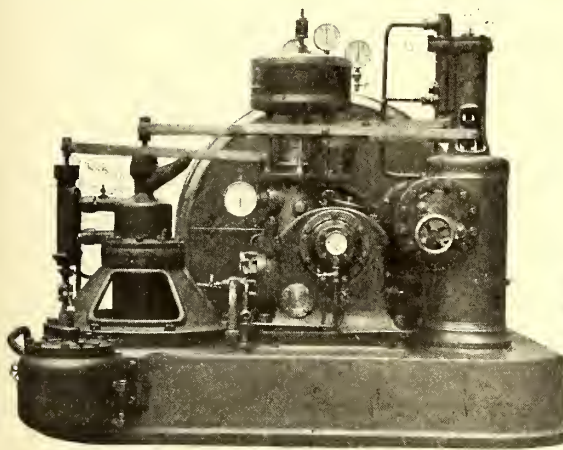
The runner piece or portion which grips the trolley wire is made of extruded metal, which is the special feature of the



Extruded Ear Applied

ear. A brief description of the extruded metal of which the runner piece is made, and how it is produced, will aid in perceiving the good qualities asserted for this trolley wire support.

A billet of pure cast bronze is placed in a furnace and heated to a bright red heat, after which it is taken out and immediately inserted in a very thick walled, laminated steel drum having a tungsten steel die clamped against the opposite end of this cylindrical drum. This die has an opening in it exactly the shape of the section of the extruded metal device



End and Side Views of Mixed Pressure Turbo-Alternator

which it is desired to produce. Both the steel drum and tungsten steel die are especially designed to withstand enormous pressures at high temperatures. A hydraulic ram is brought to bear upon the red-hot billet of cast bronze, forcing it out through the die under several tons pressure. The metal, as it emerges from the die, is cooled rapidly by a very strong blast of cold air.

Due to this process of extrusion and not to the composition of the metal, the sections which are being put into these ears have a tensile strength of 70,000 lb. per square inch, an elastic limit of about 50,000 lb. and an elongation of 33 per cent. These physical properties as given, coupled with the additional assurance that the sections must come absolutely true in dimensions, and have a perfectly smooth surface for gripping the trolley wires, make the metal peculiarly adapted for use as a trolley wire support.

The great strength of the extruded section permits the lips which grip the trolley wire to be very thin, so that they offer the least amount of obstruction to the passage of the trolley wheel. Furthermore, this metal is capable of being easily hammered down to a perfectly smooth fit around the trolley wire without leaving crimps or bumps to cause continual chattering of the wheel in passing under them, as is often the case in cast ears. The manufacturer believes that the new ears will effect a considerable saving in line maintenance over the ordinary types of ears.

MIXED-PRESSURE TURBO-ALTERNATOR SETS

In the accompanying illustrations are shown two views of a 500-kw mixed-pressure steam turbo-alternator supplied by Dick, Kerr & Company, London, England, to a colliery in Scotland.

The turbine, which is of the impulse type, is designed to give 500 kw with exhaust steam having a pressure of 16 lb. per square inch absolute, or with dry saturated live steam of 90 lb. per square inch, or with a combination of both pressures, and to give the full output when working condensing with a vacuum of 27.5 in., the barometric pressure being 30 in. The turbine is mounted on a combination base, and is complete with two bearings and directly connected to its alternator through a flexible coupling.

The turbine is provided with high-pressure and low-pressure main stop valves, high-pressure steam separator, governor, steam and oil-gage pipes, emergency device for stopping when normal speed is exceeded by 10 per cent, oil receptacles with filter, directly connected oil pump, separate steam oil pumps for flooding the bearings before starting up, speed-adjusting device, etc.

The governor, which is said to be extremely sensitive, is based on a principle which allows steam to enter into the turbine in a continuous and steady flow, whether running on mixed pressure or on live steam, or when changing from one to the other.

The following are the principal features of the turbo-alternator in this combination:

It is designed to give 625 kva (500 kw at 80 per cent power-factor) at 3000 volts and 50 cycles when running at 3000 r.p.m. The temperature rise is said not to exceed 70 deg. Fahr. above an air temperature of 77 deg. Fahr. after an eight hours' run at full-load.

RECENT CONTRACTS FOR PAY-WITHIN CARS

Announcement is made by the Electric Service Supplies Company, Philadelphia and Chicago, that it has closed contracts for pay-within cars during the last 60 days with the following companies:

The American Railways Company, Philadelphia, has contracted for license and equipment for 35 cars for the People's Railway Company, of Dayton, Ohio, and for 10 new cars for the Scranton Railways Company, of Scranton, Pa. Of the Dayton cars, 25 single-truck and 10 double-truck cars will be converted to the standard pay-within four-leaf folding-door type. Six of these cars are new prepayment cars of another type, which are to be converted to the pay-within type before being placed in service. The Scranton cars are being built by the Cincinnati Car Company, Cincinnati, Ohio; they are 43 ft. long over all, having single arched roof, 6-ft. platforms without

bulkheads, equipped with four-leaf folding doors and steps at all four corners. They will be used on the Scranton company's new high-speed mountain lines to Moosic Lake, where the vestibuling of the platforms is of particular importance. They also will be used in regular city service during the winter.

The Boston Elevated Railway Company, Boston, Mass., has purchased license and equipment for 50 cars which are being built by the Laconia Car Company, Laconia, N. H. The Capital Traction Company, Washington, D. C., has purchased equipment and license for 80 new cars, which are being built by the Jewett Car Company, Newark, Ohio. When these cars are completed this company will have a total of 115 in service.

The Central Pennsylvania Traction Company, of Harrisburg, Pa., has purchased license and equipment for six new cars, which are being built by The J. G. Brill Company.

The Cleveland Railways Company has obtained the license to convert 50 equipments, which, when installed, will make a total of 400 cars of this type in Cleveland. The Illinois Traction System has ordered 13 equipments for the conversion of cars on the Urbana & Champaign Railway and 17 equipments for the conversion of cars of the Danville Street Railway & Light Company. The Oakwood Street Railway Company, of Dayton, Ohio, has ordered equipment and license for 13 single-truck cars, which are now in process of conversion. The Philadelphia Rapid Transit Company has ordered 11 equipments with manual control. When these are installed this company will have in operation 742 pay-within cars.

SHUNTED GRAPHIC RECORDING METERS

The Sangamo Electric Company, of Springfield, Ill., has developed shunted graphic recording wattmeters and ammeters which are a radical departure from the forms heretofore employed. The record is made on a paper chart ruled with rectangular co-ordinates and driven by clockwork. The movement of the recording pen across the chart is proportioned to the quantity measured and the speed of the record chart is controlled by a driving clock.

The switchboard form is shown in Fig. 1 and the portable type in Fig. 2. The measuring elements consist of two mercury-floated motor elements so located as to actuate a common indicator to which is attached a recording pen for tracing a line or curve on the moving chart. Each meter has two measuring elements connected in series and in turn connected across an external shunt. The moving element consists of a simple metal disk or sector rigidly attached to a shaft carrying the recording pen mounting and control springs. The moving disk is floated in a mercury chamber which not only serves as a conducting medium for the current to be measured, but also by the damping action of the disk passing through the mercury renders the meter indications highly aperiodic or dead beat. This is a very important and desirable feature when meters are measuring fluctuating loads, as it insures a true record free from false indications or "overshooting."

Surrounding the moving disk is a magnetic field generated by electromagnets in the wattmeter and permanent magnets in the ammeters. The magnetic field of the fixed elements is in such relative position to the moving system or armature that it cuts or passes through the armature field and tends to rotate the moving system. This rotative movement causes the recording pen to move across the chart against the re-

straining force of the control springs, which tend to return the pen to zero position. The turning force of the mercury-floated moving element is thus balanced against the restraining or coercive force of the control springs and their point of balance or equilibrium is a measure of the current flowing in the measuring coils.

As the meters are of the direct deflection type the use of relays, control magnets, contacts, etc., with their attendant trouble, is entirely avoided. The construction adopted is also said to be unique in that it secures a torque or turning moment much higher than has been heretofore attained. This high torque in conjunction with the minimum friction value of the mercury floated moving element gives a ratio of "torque to weight and friction" of such value that errors due to pen friction on the chart are eliminated.

An important feature is that the moving element of the measuring system is inherently damped or rendered highly aperiodic dead beat by the dash-pot action of the copper vane traveling through the mercury chamber. This very desirable and essential quality is thus secured without employing the usual auxiliary means for damping.

An eight-day inclosed hand-wound clock has been adopted as a standard to avoid the inherent weaknesses of the open type electrically wound clocks, in which trouble invariably develops, due to entrance of dust or oxidizing of the contacts which control the winding circuit.

The mercury-floated type of graphic recording meter is considered particularly well adapted for measuring the output of electric railway generating stations, as it is of the shunted type

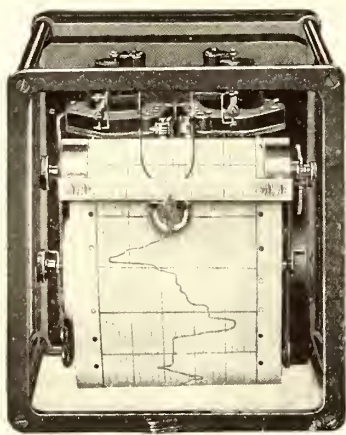


Fig. 1—Shunted Type D.C. Switchboard Wattmeter

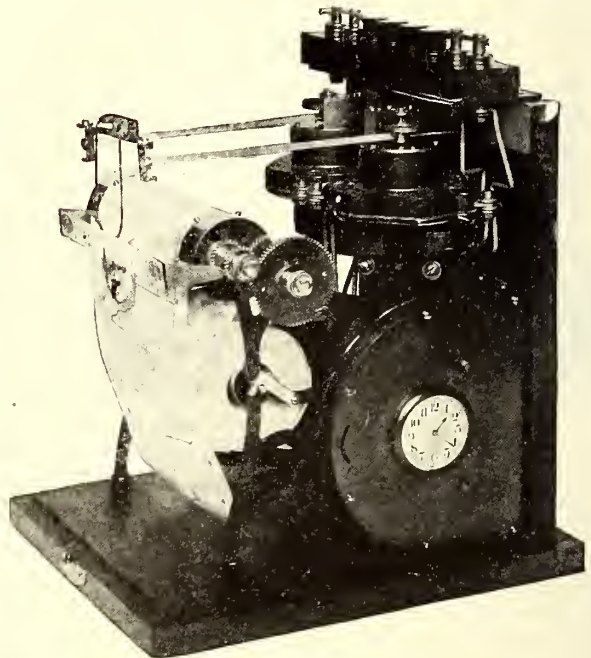


Fig. 2.—Shunted Type Multiple Capacity Portable Ammeter

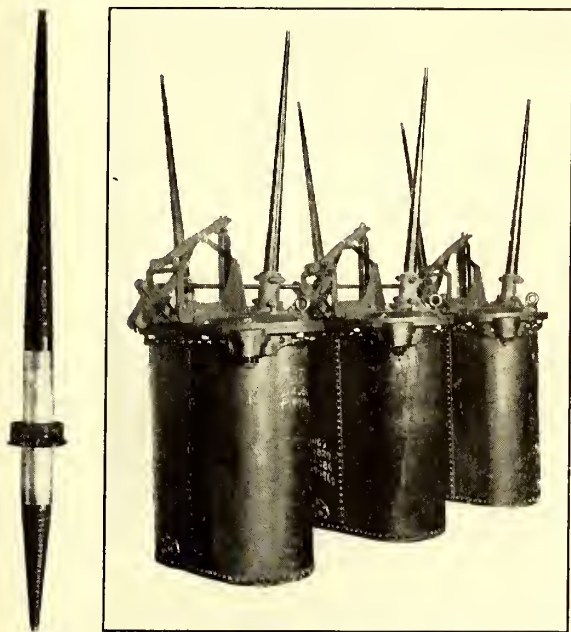
and does not require the use of heavy conductors leading to the meter, as in the older type or series meters. This shunted feature is very desirable where heavy currents are to be measured, as in large installations the cost of the conductors and labor incident to their installation may exceed the initial cost of the series meter. The shunted meter requires that only two small wires be carried to the meter, as the shunt is external and is located at any accessible point in the circuit, such as the switch terminals, generator leads, etc.

The manager, therefore, is enabled to mount the meter in his own office and have a constant indication or record of current or kilowatt load being carried. No auxiliary leads are required to accomplish this result, as the use of relays or control circuits has been entirely eliminated. Another advantage incident to this type of meter is that, as it indicates in addition to recording, the cost of switchboards may be reduced by omitting the ordinary indicating meters.

HIGH-TENSION CONDENSER-TYPE TERMINALS

A new type of terminal for high-tension apparatus has recently been developed by the Westinghouse Electric & Manufacturing Company, utilizing a principle not employed for this purpose before.

The terminal is constructed of alternate concentric insulating and conducting layers, forming a series of condensers



High-Tension Condenser Type Terminals

which serve to make the distribution of potential stresses in the insulating material uniform and thus increase the dielectric strength of the terminal. As a result a much smaller terminal can be used for a given voltage with a corresponding saving in the cost of the entire piece of apparatus and a gain in dependability under conditions of abnormal stresses due to surges, lightning and similar causes.

It can be readily seen that any terminal passing through a metal tank forms in effect a curved condenser, the plates of which are the surface of the terminal and the surface of the hole or bushing in the tank. The insulation between the two is the dielectric of a condenser and is subject to all the conditions affecting such a dielectric. It can be shown both mathematically and experimentally that the static stresses in the dielectric of a curved condenser are not uniform throughout the thickness, but are greatest near the inner surface. Therefore the thickness of the insulation must be made such that the inner layers will not be subjected to dangerous stresses, which result in the outer layers being thicker than necessary. Looking at the matter in another way, if the insulation is designed for a certain voltage per inch of thickness there will be danger of breakdown due to the higher stresses near the inner surface. For low voltages the unnecessary thickness of insulation is not important, but for voltages of 70,000 and over the ordinary insulator becomes so large as to necessitate an increase in the size of the entire apparatus.

By interposing the metal layers the difference in diameters of the plates of each condenser is reduced and the distribution of potential made more uniform, which results in a saving of unnecessary thickness of insulation. An idea of the saving affected can be had by a comparison of two terminals designed and tested for 200,000 volts. An ordinary bulk type terminal for this voltage is about 9 ft. in length and 16 in. in diameter, including insulation. A condenser-type of terminal for the same voltage is 7 ft. in length and 4 in. in diameter, the volume of the former being eight times the latter.

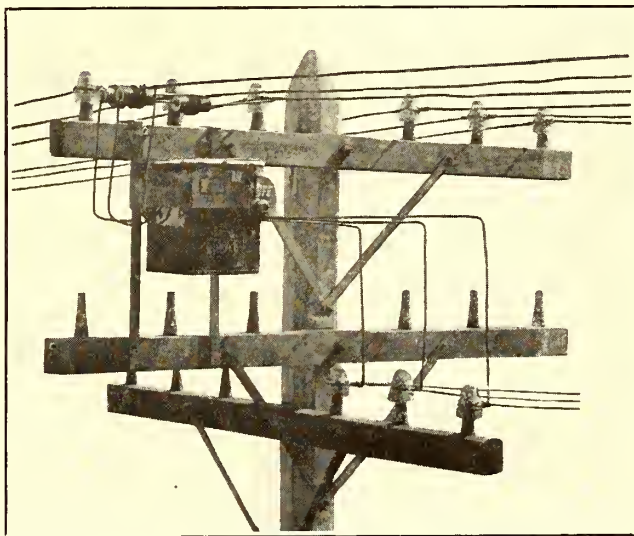
The general appearance of a condenser-type terminal is shown in the smaller illustration. The terminal is constructed by winding successive layers on a central outlet tube. The insu-

lating layers consist largely of a special grade of paper wound under pressure and cemented and pressed together into a solid mass without weak spots. On each thickness of insulation is wound a layer of metal foil. The layers are so finished that each is shorter than the one beneath it, thus tapering the terminal and providing a creeping surface between successive conducting layers. The creeping surfaces on the end projecting into the air are, naturally, larger than those at the end submerged in oil. A heavy metallic flange is fastened to the outside of the terminal to serve as a support for mounting it in the tank. The larger illustration shows a 60,000-volt oil circuit-breaker equipped with condenser-type terminals.

OIL-BREAK POLE-LINE SWITCH

The General Electric Company recently has designed an oil-break pole-line switch which is simple in design and easily installed. It can be mounted on a flat surface, or by use of strap-iron hooks, on transmission pole cross-arms like pole-type transformers.

This switch is known as type F, form P. It is thoroughly weatherproof, as it is entirely enclosed in a cast-iron frame which is fitted with a removable cover, grooved on the under side to fit closely to the edge of the frame and supplied with a suitable gasket. A detachable oil vessel, with insulating line and barriers between the switch poles, fits around a flange at the bottom of the frame. The stationary contacts are flared fingers of drop-forged copper, supported from the contact blocks of the copper current-carrying studs by a heavy flat steel frame. The studs are supported by and insulated from the frame by porcelain insulators. The movable contacts are wedge-shaped copper blades hinged at one end. They are actuated by specially treated wooden rods connected to the shaft, which in turn is operated by the crank and handle outside of the frame. The construction of the stationary and movable contacts is such that any burning, due to rupturing the arc, is confined to the tips of the stationary contact fingers and the upper extremity of the movable contacts, preserving the actual



Oil-Break Pole-Line Switch Installed

current-carrying surfaces. This feature of construction insures clean contact surface and uniform contact pressure without retarding the opening of the switch.

This switch is built in sizes up to 200 amp at 15,000 volts. The method of bringing the leads to the switch varies somewhat according to the voltage, but in every case the leads enter through porcelain bushings which are protected from the weather by the overhang of the frame. The switches up to 4500 volts are designed for use with insulated wire, while for potentials between 4500 volts and 15,000 volts bushings are furnished to allow the use of bare wire.

LONDON LETTER

(From Our Regular Correspondent)

Reference has frequently been made in the *ELECTRIC RAILWAY JOURNAL* to the improvements which the Metropolitan District Railway has made since electricity was installed as motive power to displace steam, about six years ago. The Metropolitan Railway, the only other railway similar to the Metropolitan District Railway, has been slower to commence improvements in the details of its stations, etc., but now extensive work is being carried out at Liverpool Street, Moorgate Street and King's Cross Stations, and a new station is being erected at Baker Street Junction to replace the present one. At Liverpool Street Station an arcade about 300 ft. long by 18 ft. wide is to be made with provision for shops on each side of the arcade. At Moorgate Street a new subway will be constructed to connect the station with the City & South London and the Great Northern tubes, so as to encourage traffic between these lines. The plans for King's Cross embody the erection of the largest reinforced concrete span road bridge in London. This bridge will form a new thoroughfare from Pentonville Road to King's Cross Road, and will enable the London County Council Tramways from Highgate to run from Caledonian Road into Gray's Inn Road without the deflection which they make at present to avoid the King's Cross Station. The structure is a skew bridge 130 ft. long, with two principal spans 53 ft. and 30 ft. respectively. The bridge will be 60 ft. wide, with a 36-ft. roadway to accommodate two lines of electric tramway. The steady growth of the through traffic between the stations on the Circle line and those on the St. John's Wood and Harrow line have made the Baker Street improvements necessary. At present the through connection is made by a single track, but two tracks will be installed with additional tracks for the trains which start north from the Baker Street Station.

During the next session 16 bills for permission to install trackless trolleys will be introduced in Parliament by municipalities and companies chiefly for lines in outlying districts. It is expected that by March 1, 1911, the Manchester Corporation will be ready to experiment with the trackless trolley, and that trackless trolleys will be running in Bradford by April 1, 1911.

Mr. Baker, general manager of the Birmingham tramways, believes that the trackless trolley can be of service only in districts incapable of developing traffic to support a tramway. For large towns whose areas will expand he prefers to procure cheap land on which track can be built and maintained cheaper than in a public road. A road of this description is being constructed to a district five miles from Birmingham.

Mr. McElroy, general manager of the Manchester Corporation Tramways, has issued a report in regard to the demand of the drivers and guards of the corporation for an eight-hour day. The conditions of service of the men in Manchester are compared with those of men in other large towns, and the effect of the increase on the rates is indicated. On the strength of the report the tramway committee has recommended the City Council not to accede to the men's demands, and the Council has supported the committee.

The London County Council has deposited only one measure for the consideration of Parliament which relates to tramways. The principal tramway scheme is the four-mile line from Marble Arch to Cricklewood, which is strongly opposed by the Paddington Borough Council because it fears that the Cricklewood scheme may be followed by an extension along the Bayswater Road. The Marylebone Borough Council is inclined to favor the measure. On the other hand, Willesden and Hampstead feel that the plans do not indicate a sufficient width of road. At Cricklewood the proposed line would join with the lines of the Middlesex County Council, which operates tramways through parts of Middlesex and Hertfordshire. The bill includes tramways in other parts of London, and the estimated cost of construction of the proposed lines is £830,340.

When Mr. Rider resigned as chief electrical engineer of the London County Council recently the Council authorized the appointment of a traffic assistant at a salary of

£600 a year. Applications were invited by public advertisement, and Lewis Slattery, general manager of the Oldham Corporation Tramways, has been appointed to the position.

As outlined last month, Glasgow has recently been considering the problem of reduction in fares. At present a ride of more than 2½ miles is given for one penny in Glasgow. In addition, rides of half-mile stages are given for a halfpenny. An effort was made to have the committee adopt two halfpenny stages for one halfpenny, but it was decided that a ride of a mile for a halfpenny would result in serious financial loss. Subsequently it was decided to give two halfpenny stages for 3 farthings. It was also intended originally to issue books containing 12 tickets for 9d, each ticket to be available for two halfpenny stages. As a certain amount of hardship to poor people would be involved if they were required to buy tickets in quantity it has been decided to permit passengers to travel two consecutive halfpenny stations and a similar distance on another car for 1½d for a period of four months, thus making it unnecessary to use farthings. This will be called the "two-stage fare," and is an experiment. The modus operandi follow: The passenger will ask the conductor for a two-stage ticket, and on paying 1½d the conductor will give him a yellow ticket which will be punched to indicate the station from which the journey begins and will be available for the two half-mile stages. The passenger will retain this ticket on leaving the car, as it can be presented on any other part of the system on which he may wish to travel two other stages. The passenger will then present this ticket to the second conductor, who in exchange will give him another ticket punched to indicate the station to which he is entitled to travel. This latter ticket is, of course, valueless when these two stages have been traveled, and may be discarded. The first two-stage ticket will be marked "1½d—two-stage," and the instructions printed on the ticket are: "Ticket is available to station opposite punch hole, and also for two consecutive halfpenny stages on any other car on production complete to conductor." The experiment will be watched carefully by tramway officials generally, because it appears to approach the minimum in municipal tramway fares.

So successful has the electrification of the South London portion of the Brighton Railway been that work is under way on an extension which will take in the Crystal Palace, and it has been decided that even that line will be extended to Croydon. Arrangements for this line will have to be made between the railway and the Croydon Borough Council.

It is proposed to extend the Central London Railway from the present terminus at Wood Lane, Shepherd's Bush, to Ealing Broadway, a distance of about 4½ miles. The chief object in seeking power to make this extension is to bring the line into direct communication with the Great Western Company's main line, and thus to facilitate communication with all parts of the metropolis. The Great Western Company is contributing substantially toward the cost, and if the extension is carried out Great Western trains will call at Ealing Broadway, so that not only will this become an important exchange, but the western suburbs will have another important alternative route to the city. The bill in Parliament provides for working agreements between the two companies. As the extension of the Central London Railway from the Bank to Liverpool Street is expected to be completed next year it will be possible for passengers traveling by the Great Western system to proceed direct to the Great Eastern Company's line.

An ambitious scheme for which the authority of Parliament is being sought has for its object the incorporation of the Greater London Railway to construct various railways in Middlesex and Essex. The lines, starting at Feltham, will pass through or connect the following places: Isleworth, Heston-Isleworth, Norwood, Southall-Norwood, Hayes, Northolt, Greenford, Wembley, Kingsbury, Hendon, Finchley, Friern Barnet, Hornsey, Wood Green, Southgate, Tottenham and Edmonton, in Middlesex; Walthamstow, Wanstead, Ilford, East Ham, West Ham, Romford, Dagenham, Hornchurch, Rainham, Upminster, South Ockendon, North Ockendon, Stifford, Orsett, Grays Thurrock, and Little Thurrock, in Essex. In addition to connecting these important centers of population this proposed line will afford direct facilities to all the main lines. A. C. S.

News of Electric Railways

Cleveland Traction Situation

At the annual meeting of the stockholders of the Cleveland Railway on Jan. 24, 1911, the directors were re-elected. The board organized by electing these officers: President, J. J. Stanley; vice-presidents, C. F. Emery and R. A. Harman; secretary and treasurer, Henry J. Davies; executive committee, J. J. Stanley, Horace E. Andrews, L. C. Hanna, Thomas P. Schmidt, Samuel Mather, C. F. Emery and H. P. McIntosh. R. A. Harman, as vice-president, succeeds J. J. Stanley, who was elected president some time ago, and Thomas P. Schmidt fills the place formerly occupied by Mr. Harman on the executive committee.

John H. Clarke, general counsel for the Nickel Plate Railroad, opposed the proposed authorization of an issue of \$35,000,000 of bonds as illegal and said that it would weaken the stock on the market. He held that no authorization of bonds could be greater in amount than the capital stock and refused to change his view upon the suggestion that the authorization should be for the full amount asked with the amount to be issued limited to \$15,000,000 or a sum equal to the amount of stock outstanding at any time.

Horace E. Andrews and Attorney Andrew Squire explained that the proposed issue was intended to benefit the stock and the company and that it was not intended that the issue of bonds should ever exceed the amount of stock. Mr. Andrews said that the step was decided upon after a consultation with N. W. Harris & Company, who are expected to take the bonds. Mr. Squire said that the purpose was to have the issue sufficient to cover the needs of the company through the life of the franchise. At least \$25,000,000 would have to be expended upon the property in that time. Both he and Mr. Andrews said that additional bonds could be issued under the original mortgage and that there would be no need for an issue under a second mortgage. The resolution authorizing a mortgage for \$35,000,000 was carried. It provides that not more than 6 per cent interest shall be paid.

President Stanley pointed out that at a rate of fare of 3 cents, with 1 cent for transfers, the average rate per passenger for the 10 months of operation was 3.39 cents, and including income from other sources 3.57 cents. In the interest fund at the close of the fiscal year there was \$750,921.31 in cash, or \$250,921.31 more than the original \$500,000 borrowed to start the fund. A portion of this represents reserves for the payment of interest not payable until March 1 of this year. The total receipts were \$5,196,471.60 and expenses \$5,314,897.40, leaving a deficit of \$118,425.80. For the two months under the receiver's control there was a surplus of \$46,947.56, leaving a net deficit for the year of \$71,478.24.

Sales of stock during the year have aggregated \$386,200, but the company was compelled to borrow an amount which increased the floating debt to \$1,222,500. The capital stock is placed at practically \$15,000,000, while the bonded and floating debt amount to \$9,400,000.

Transit Affairs in New York

The Board of Estimate of New York on Jan. 31, 1911, authorized the committee appointed to confer with the Public Service Commission concerning modifications of the Interborough subway offer to confer also with the officials of the Interborough Rapid Transit Company. The resolution, which Borough President McAneny himself proposed, as finally adopted, bore an amendment offered by Controller Prendergast. The amendment recognized the section of the original resolution of the board appointing the committee, which instructed it to consider any alternative plans, including independent routes, which the Public Service Commission might suggest or receive. The resolution as finally adopted follows:

"Resolved, That the special committee appointed in pursuance of the resolution adopted by the board at its meeting of Jan. 19 to confer with the Public Service Commission with relation to the pending proposition of the Interborough Rapid Transit Company, or to such alternative plans, including independent routes, as may be presented,

be authorized to confer also with the officers of the Interborough Rapid Transit Company, with a view toward ascertaining whether that company will enter into a contract for the construction, equipment and operation of subway extensions upon terms acceptable to the city, and be it further

"Resolved, That the committee be requested to report to the board as early as may be practicable the results of such conferences, in order that the board, if the general terms proposed prove acceptable to it, may authorize the Public Service Commission to proceed with the negotiation of a contract."

Chairman Willcox, of the Public Service Commission, has made the following statement in regard to the report that the Public Service Commission, which some time ago produced tentative forms of contract giving the Interborough Rapid Transit Company, among other things, 80-year franchises on its elevated third tracking, had agreed with that company to put such provisions into the final contracts for the elevated third tracking and extensions.

"No agreement as to franchises for third tracks on the elevated lines or extensions of the same has been reached between the Interborough Rapid Transit Company and the Public Service Commission, nor has the commission adopted the certificates for either the third tracking or elevated extensions.

"Since the public hearing was held upon the form of certificates many alterations have been made in the certificates and conferences have been had between representatives of the commission and of the Interborough company, but no agreement has been reached, nor have the certificates been adopted by the commission.

"It is well known that the commission is now having conferences with a committee of the Board of Estimate on the subway situation, and, as the Interborough company has stated that its subway proposition is contingent upon its elevated proposal, it is probable that the commission will take no formal action on the elevated certificates until the conferences with the committee of the Board of Estimate have been concluded."

The Riverbank Subway in Boston

The Railroad Commissioners of Massachusetts have handed down the following decision in regard to the application of the Boston Elevated Railway for a revision of the determination of the Boston Transit Commission relative to stations in the Riverbank subway in Boston:

"The Riverbank subway is authorized by Chapter 573, Acts of 1907. Under the provisions of this act the Boston Transit Commission on Nov. 3, 1910, passed the following vote:

"Voted: That the stations in the Riverbank subway be located on Massachusetts Avenue, Dartmouth Street and Charles Street."

"The Boston Elevated Railway, under the provisions of said act, has applied to the board for a revision of such determination and requests the board to consider and finally determine the question as to whether or not there shall be any stations in said Riverbank subway, and if so the number and location thereof."

"In making its determination the board adopts as a controlling factor the principle laid down in its decision of March 29, 1905, upon a former appeal of the same company from the determination of the Boston Transit Commission relative to the location of an entrance to the Washington Street tunnel. The following language was then used:

"The governing thought must, of course, be the largest convenience of the public consistent with a reasonable economy in construction."

"Applying the foregoing rule to the application before us, we are of opinion that three stations, as located by the Boston Transit Commission, would afford the largest convenience to the public, and that their installation can be consistently secured with a reasonable economy in construction.

"In arriving at the foregoing conclusion we must take

the situation as we find it, and confine ourselves to the narrow issue presented by the application. The only legislative authority for the construction of a subway in this section of the city is for the proposed Riverbank subway, designed to contain two railway tracks and running under the terms of the act from a connection with the Park Street station in and under the Charles River embankment, so called, to a point west of the Harvard bridge in Boston. What our conclusions might be on the application before us if another subway in this section of the city were in progress of construction or had been authorized by the General Court it is not necessary to discuss.

"The board, therefore, has considered and now finally determines that there shall be three stations in the Riverbank subway as located by the Boston Transit Commission on Nov. 3, 1910."

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., Feb. 8.

Central Electric Traffic Association—Indianapolis, Ind., Feb. 13, 14 and 15.

Illinois Electric Railway Association—Chicago, Ill., Feb. 17.

New England Street Railway Club—Boston, Mass., Feb. 23.

Central Electric Railway Association—Columbus, Ohio, March 23.

Central Electric Accounting Conference—Springfield, Ohio. Date to be fixed.

Iowa Street & Interurban Railway Association—Davenport, Ia., April.

Missouri Electric, Gas, Street Railway & Water Works Association—St. Louis, April.

Mayor Whitlock Continues to Improve.—Brand Whitlock, Mayor of Toledo, Ohio, was able to receive some of the city officials at his room in the hospital on Jan. 25, 1911, and continues to convalesce rapidly. He will not, however, be able to take up work in connection with the franchise matter for some time.

New Tunnel for Surface Cars Opened in Chicago.—Madison Street cars of the Chicago (Ill.) Railways are being operated through the new Washington Street tunnel of the company. The tunnel will relieve downtown traffic congestion. The bore is 1520 ft. long between Franklin Street in the business district and Clinton Street on the West Side.

Report on Philadelphia.—Ford, Bacon & Davis, New York, N. Y., who have been retained by the Pennsylvania State Railroad Commission to report on transit affairs in Philadelphia, have advised the commission that the first part of their report will be ready within a few days, but that the complete report will not be ready before March 1, 1911.

Meeting of Southwestern Electrical & Gas Association.—At a called meeting of the advisory and executive committees of the Southwestern Electrical & Gas Association it was decided to hold the seventh annual convention of the association in Houston, Tex., on April 27, 28 and 29, 1911. D. G. Fisher, 1316 Commerce Street, Dallas, Tex., is third vice-president and secretary of the association.

City-Owned Subway Proposed in Philadelphia.—Mayor Reyburn, of Philadelphia, Pa., advocates a four-track subway the entire length of Broad Street, which is 11 miles long, to be owned by the city; the extension of the Market Street subway system of the Philadelphia Rapid Transit Company to Camden through tunnels under the Delaware River, and the erection of an immense convention hall on the edge of Fairmount Park. All the projected improvements, it is suggested, should be made under a \$60,000,000 city loan, of which \$28,000,000 will be spent on the Broad Street subway.

Right of Minneapolis to Order Railway Extensions.—In an opinion filed with the city clerk, Judge Daniel Fish, city attorney of Minneapolis, Minn., holds that the City Council has power to order and enforce construction of new street car lines and extensions and to regulate service by the Minneapolis Street Railway. Judge Fish's opinion was prepared at the request of the Council. Judge Fish declares the Minneapolis Street Railway has an exclusive franchise to give service to the people of Minneapolis. The company,

he holds, is bound by the franchise of 1875, which requires it to accommodate passengers comfortably. Further, he holds the company, by an ordinance of 1890, is bound by all subsequent ordinances regarding service. After declaring the Council has the right to force the construction of new lines and extensions, Judge Fish discusses the section of the ordinance which provides that whenever the company refuses to build new lines it forfeits its exclusive franchise on those streets and the Council has authority to issue franchises to new companies. He says: "It has been supposed that the forfeiture of the exclusive franchise on these streets is the only remedy, but I believe that to be an entirely mistaken view. On the face of this provision it would be futile for the Council to try to enforce the construction of extensions. It is plain, I believe, that whenever your honorable body shall see fit to order reasonable extensions and new lines the company is bound to abide by the order. I believe also the Council's authority applies to the proposed snow and ice ordinance."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

California.—A bill to create a public service commission was introduced in both houses of the Legislature on Jan. 20. The bill provides for the appointment by the Governor of three commissioners to hold office at the pleasure of the Governor and to receive a salary of \$8,000 a year each. One member of the board must be an attorney and another must have had experience with a public service corporation. The commission is to have charge of all matters relating to the service of light, water, heat, power, telephone and telegraph and telephone except that it is to exercise none of the functions of the State Railroad Commission. A measure has been introduced to limit governing bodies to the issuance of indeterminate franchises or franchises to run not more than 20 years. Senator Finn has introduced a bill to give San Francisco the right to construct and maintain a municipal street railway over lands of the State from the eastern boundary line of the Presidio to the San Mateo County line. R. J. Callaghan has introduced in the Assembly a bill which provides that every transfer issued by a street railway shall be honored by the conductor of the line for which the transfer is issued at any time during the day that it is issued.

Indiana.—Senator Carelton proposes to introduce a bill to create a public utilities commission to succeed the railroad commission. Senate bill No. 105 has been passed. It is pointed out that the bill, which provides that foreign corporations operating in Indiana shall be restricted to the powers, rights and privileges that are enjoyed by domestic corporations, would compel railroads to sell tickets to points beyond the State line not to exceed 2 cents a mile, the Indiana rate. Senate bill No. 256, recently introduced, provides for the examination of employees and officials of interurban and steam railroads and for regulating the system of "tracking" interurban employees by "spotters." The bill provides that an officer shall be allowed only one day in which to file charges against an employee, and that such employee shall be informed of such charges within one day after they are filed. A 12-hour limitation is placed on the working day of employees and immediate discharge is required of any train dispatcher issuing "lap orders" to train crews. Senate bill No. 263 provides for the installation of block signal systems on all steam and interurban roads at the option of the Railroad Commission. House bill No. 258 would regulate the construction of interurban passenger cars relative to partitions between baggage, smoking and passenger compartments, sanitation, ventilation, etc. Senate bill No. 251 would compel interurban railways to maintain suitable waiting rooms and sanitary conveniences in cities of 5000 or more population.

Massachusetts.—The joint board upon metropolitan improvements at Boston, which consists of the Massachusetts Railroad, Boston Transit, Metropolitan Park and Harbor and Land Commissions, has submitted a report to the Legislature upon the electrification of railroads within the Boston district. The majority of the joint board has concluded that the cost of the work is too great to require the railroads to undertake it at the present time. The minority report in favor of electrification is signed by a majority of the Massachusetts Railroad and Boston Transit Commissions. The close division of the board throws the question

upon the Legislature for further consideration, and active discussion of the electrification problem will unquestionably be a feature of the session. A bill has been introduced into the Senate which provides that all future extensions of railroads and street railways shall be double-tracked. A bill has been introduced into the House which provides for the repeal of the Riverbank subway act, designed to provide rapid transit for the outlying suburban districts to the west of the city. Sentiment has recently developed in favor of a subway under Boylston Street instead of under the southerly embankment of the Charles River. House Chairman Cushing, of the committee on metropolitan affairs, is of the opinion that the committee will be slow to recommend any positive subway legislation without an expert report by the Railroad Commission.

Missouri.—A measure to create a State Public Service Commission was introduced in the House on Jan. 17 by Representative Roach. The bill would abolish the Railroad & Warehouse Commission. It provides for a commission of five, to be appointed by the Governor for a term of four years, at an annual salary of \$3,500 for each member. The Governor is not permitted to appoint more than three men from any one party.

New York.—A bill has been introduced by Assemblyman Graubard to insert a new section in the railroad law to require the Public Service Commission to give 30 days' notice to every corporation in New York City operating a street surface railroad by "animal or horsepower" to change such motive power to electricity. Such notices are to be given not later than Jan. 1, 1912. Violation is punishable by a fine of \$100 a day for each car. Two bills relating to transfers on surface railways in New York City were introduced on Jan. 31 by Assemblyman Goldberg. One requires an interchange of transfers on all railroads crossing any bridges connecting the Boroughs of Manhattan and the Bronx. Certificates permitting the operation of railroads over the bridges are to be withheld until the companies agree to such interchange of transfers. The other measure requires the railroad companies of Manhattan and the Bronx whose lines run north and south to operate a system of transfers with intersecting lines running east and west. Senator J. Mayhew Wainwright has prepared a bill which gives the Public Service Commission of the First District of New York practically the same powers that the Interstate Commerce Commission has to suspend railroad rate schedules. Governor Dix has tendered W. A. Huppuch a place on the Public Service Commission of the Second District of New York to succeed J. N. Carlisle.

Pennsylvania.—It is stated that Governor Tener will appoint Judge Shull, of Perry County, as railroad commissioner, to succeed John Y. Boyd, resigned. Attorney-General Bell and his assistants are preparing an administration measure to create a public utilities commission to succeed the present State Railroad Commission. There is a disposition to enlarge the new commission from three to five members, at least one of whom is to be learned in the law. The terms of the first commissioners appointed are to expire on the first Mondays of January, 1913, 1914, 1915, 1916 and 1917, respectively. After that commissioners are to be appointed for five years. There is a provision which forbids the appointment as commissioners of persons interested in corporations. The main offices of the commission are to be at Harrisburg, but it is directed to maintain offices in Pittsburgh and Philadelphia. The commission is to meet once a week in Harrisburg. A majority of the commission is to constitute a quorum.

Utah.—The creation of a public utilities commission, with jurisdiction over all public service corporations in the State, is authorized by a bill introduced by Senator Badger, of Salt Lake. The bill gives the commission executive powers over the corporations specified with reference to fixing standards of rates to be charged, adjusting differences and regulating the business of the corporations. The commission is to consist of three members, appointed by the Governor. Not more than two of the members shall be affiliated with the same political party. One commissioner is to be appointed for two years, another for four years and the third for six years. At the expiration of each term the successor of the original appointee is to be named for six years. One commissioner is to devote all of his time to the work and the other two part of their time.

Financial and Corporate

New York Stock and Money Market

Jan. 31, 1911.

The Wall Street market for the past week has been strong with moderate activity. While prices have advanced fractionally the general condition of the market is little improved because no outside interest has developed. The announcement, made to-day, that the Harriman lines in the West intended to issue \$75,000,000 of new securities braced the market. The bond market continues to be very satisfactory and the money market is easy. Quoted rates to-day were: Call, $2\frac{3}{8}$ @ $2\frac{1}{2}$ per cent; 90 days, $3\frac{1}{4}$ @ $3\frac{1}{2}$ per cent.

Other Markets

In Philadelphia there was a good deal of activity in Rapid Transit and Union Traction, but neither buyers nor sellers were insistent. There was an active buying demand for Lehigh Valley Transit during the week and the price was advanced several points.

In the Chicago market there was a steady business last week in the certificates of the Railways company. The demand, however, was not sufficient to advance prices to any considerable extent. Other tractions were neglected.

Boston Elevated was fairly active last week, but there were no price changes of importance. Massachusetts Electric shares also continued to sell in small quantities at old prices.

In the Baltimore market during the week there has been some activity in United Railway shares and the price has been advanced as high as 18 $\frac{1}{2}$. The bond market has been good at former prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 24.	Feb. 1.
American Light & Traction Company (common).....	a288	a288
American Light & Traction Company (preferred).....	a105	a105
American Railways Company.....	a44 $\frac{1}{2}$	a45
Aurora, Elgin & Chicago Railroad (common).....	a42	a42 $\frac{3}{4}$
Aurora, Elgin & Chicago Railroad (preferred).....	83	a87
Boston Elevated Railway.....	129 $\frac{1}{2}$	a129 $\frac{3}{4}$
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	a71	a71
Boston & Worcester Electric Companies (common).....	a10 $\frac{1}{2}$	a10
Boston & Worcester Electric Companies (preferred).....	a30 $\frac{1}{2}$	a30
Brooklyn Rapid Transit.....	77 $\frac{1}{4}$	77 $\frac{1}{2}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83 $\frac{3}{4}$	83 $\frac{3}{4}$
Capital Traction Company, Washington.....	a130	128 $\frac{3}{4}$
Chicago City Railway.....	a200	a195
Chicago & Oak Park Elevated Railroad (common).....	*3 $\frac{1}{4}$	*3 $\frac{1}{4}$
Chicago & Oak Park Elevated Railroad (preferred).....	*7 $\frac{1}{4}$	*7 $\frac{1}{4}$
Chicago Railways, ptcptg., ctf. 1.....	a93	a93
Chicago Railways, ptcptg., ctf. 2.....	a25	a25 $\frac{1}{2}$
Chicago Railways, ptcptg., ctf. 3.....	a9	a9 $\frac{1}{2}$
Chicago Railways, ptcptg., ctf. 4.....	a6 $\frac{1}{2}$	a6 $\frac{1}{4}$
Cleveland Railway.....	*91 $\frac{1}{2}$	*91 $\frac{1}{2}$
Consolidated Traction of New Jersey.....	a73 $\frac{1}{2}$	a74
Consolidated Traction of N. J., 5 per cent bonds.....	a104 $\frac{1}{2}$	a105
Detroit United Railway.....	a71 $\frac{1}{2}$	a72
General Electric Company.....	a152	a154
Georgia Railway & Electric Company (common).....	a118	a120
Georgia Railway & Electric Company (preferred).....	88	a88
Interborough-Metropolitan Company (common).....	19 $\frac{1}{4}$	19 $\frac{3}{4}$
Interborough-Metropolitan Company (preferred).....	52 $\frac{1}{2}$	54
Interborough-Metropolitan Company (4 $\frac{1}{2}$ s).....	79	79
Kansas City Railway & Light Company (common).....	a21	a22
Kansas City Railway & Light Company (preferred).....	a71	a71
Manhattan Railway.....	140	137 $\frac{3}{4}$
Massachusetts Electric Company (common).....	a18	a18
Massachusetts Electric Companies (preferred).....	a85	a85 $\frac{1}{2}$
Metropolitan, West Side, Chicago (common).....	21	23
Metropolitan West Side, Chicago (preferred).....	*69 $\frac{1}{2}$	*68
Metropolitan Street Railway, New York.....	*19 $\frac{1}{2}$	*19 $\frac{1}{2}$
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	70 $\frac{3}{4}$	72 $\frac{3}{4}$
Northwestern Elevated Railroad (common).....	a22 $\frac{1}{2}$	a23
Northwestern Elevated Railroad (preferred).....	a63	a63
Philadelphia Company, Pittsburgh (common).....	53	53
Philadelphia Company, Pittsburgh (preferred).....	44 $\frac{1}{2}$	44 $\frac{1}{2}$
Philadelphia Rapid Transit Company.....	20 $\frac{1}{2}$	20 $\frac{1}{2}$
Philadelphia Traction Company.....	86 $\frac{1}{2}$	*86 $\frac{1}{2}$
Public Service Corporation, 5 per cent col. notes.....	a96 $\frac{1}{2}$	a96 $\frac{1}{2}$
Public Service Corporation, ctf.....	a115 $\frac{3}{4}$	a101 $\frac{1}{2}$
Seattle Electric Company (common).....	a110	a110
Seattle Electric Company (preferred).....	a102	a101 $\frac{1}{2}$
South Side Elevated Railroad (Chicago).....	a70	a70
Third Avenue Railroad, New York.....	a10 $\frac{1}{2}$	a11
Toledo Railways & Light Company.....	a8	a9
Twin City Rapid Transit, Minneapolis (common).....	a110	a110
Union Traction Company, Philadelphia.....	a48	a47 $\frac{3}{4}$
United Rys. & Electric Company, Baltimore.....	a17	a18 $\frac{1}{2}$
United Rys. Inv. Co. (common).....	43	44 $\frac{1}{2}$
United Rys. Inv. Co. (preferred).....	68	69 $\frac{3}{4}$
Washington Ry. & Electric Company (common).....	38 $\frac{1}{2}$	a38
Washington Ry. & Electric Company (preferred).....	a89 $\frac{1}{2}$	a89 $\frac{1}{2}$
West End Street Railway, Boston (common).....	a91 $\frac{1}{2}$	a91
West End Street Railway, Boston (preferred).....	a105	a105
Westinghouse Elec. & Mfg. Co.....	68	68
Westinghouse Elec. & Mfg. Company (1st pref.).....	*124	119

aAsked. *Last sale.

Revival of Railway Consolidation Rumors in Chicago

It is reported that negotiations are under way between the Chicago & Milwaukee Electric Railroad and the Northwestern Elevated Railroad, Chicago, Ill., by which the former will obtain terminal facilities in Chicago connecting with the Northwestern Elevated Railroad's tracks at Evanston. That there is to be an actual consolidation between the two companies is denied in some quarters, where it is stated that the arrangement is simply a traffic agreement. The Chicago & Milwaukee Electric Railroad is in the hands of receivers, but A. C. Frost, who was formerly president of the company, is reported to have said that the road will pass under new management. It is also reported that Mason B. Starring, president of the Northwestern Elevated Railroad, will be president of the new company in process of formation to combine the franchises of the two existing companies.

The report that all the surface and elevated railways of Chicago are to be combined has been revived. It is said that J. P. Morgan & Company, New York, N. Y., are interested in the project, which has been discussed at intervals for several years. It would seem that this possible consolidation would have an effect on the reported amalgamation of the Chicago & Milwaukee Electric Railroad and the Northwestern Elevated Railroad.

Chicago Railways Bonds

The Chicago (Ill.) Railways has sold to the National City Bank, New York, and Harris, Forbes & Company, New York, \$15,000,000 of first mortgage 5 per cent gold bonds dated Feb. 1, 1907, and due Feb. 1, 1927, and these bonds are now being offered for subscription at 98 and interest. A statement showing the earnings and expenses for the fiscal year ending Jan. 31, 1911, partly estimated, follows:

Gross earnings.....	\$13,935,000
Operating expenses, including taxes and maintenance.....	9,754,500
Net earnings.....	\$4,180,500
* Annual interest charge on \$40,955,000 first 5s, including the present issue.....	2,047,750
Balance	\$2,132,750

*The entire \$40,955,000 first mortgage bonds were not outstanding during this period. The actual interest charges on outstanding first mortgage bonds amounted to only \$1,270,000, leaving a balance of \$2,910,500. The earnings include approximately one month's operations of the recently acquired city lines of the Chicago Consolidated Traction property.

In a statement issued by the bankers they say:

"The Chicago Railways, pursuant to an ordinance passed Oct. 10, 1910, recently purchased 128 miles single track located entirely within the city limits and formerly owned by the Chicago Consolidated Traction Company. Through the acquisition of this property the company has increased its trackage by more than 40 per cent, now having a total of more than 445 miles measured as single track. With the operation of the entire mileage of the company, it is estimated that the earnings will show a large increase. The gross receipts of the Chicago Consolidated Traction System have shown annual increases for the past 10 years, averaging more than 9 per cent.

"There will be indorsed on each bond a certificate of the Comptroller of the City of Chicago, identifying the bond as being entitled to a first lien upon the entire property of the Chicago Railways, including the additional property just acquired.

"The City of Chicago placed a valuation upon the properties as of Feb. 1, 1907, of \$30,779,874.94, which, under the ordinance granting the company its franchise, is to remain as a minimum equity behind the first mortgage bonds. When the proceeds of the bonds now offered have been expended the valuation as fixed by the city will amount to at least \$71,734,874.94.

"The franchise provides for a straight 5-cent fare with universal transfers, and the city is entitled to 55 per cent of the surplus earnings after first providing for all operating expenses, including taxes and full charges for maintenance and depreciation and 5 per cent upon the value of the properties as imposed from time to time. Under the division of profits the city is partner of the company, at least equally interested in increasing its earnings, and these first mortgage bonds are therefore in a certain way quasi-municipal securities.

"The major part of the property has been reconstructed during the past few years, and the money that will be spent on recently acquired mileage will place it in the same excellent condition of operating efficiency, while the franchise provides for large maintenance and depreciation funds to be charged to operating expenses."

Earnings of Interborough Rapid Transit Company for Six Months

The Interborough Rapid Transit Company, New York, N. Y., has made public the following statement, which shows the earnings of the company for the six months ended Dec. 31, 1910, compared with the six months ended Dec. 31, 1909:

Six Months Ended Dec. 31,	1910.	1909.
Gross operating revenue.....	\$14,286,689	\$13,924,809
Operating expenses.....	5,926,563	5,379,808
Net operating revenue.....	\$8,360,126	\$8,545,001
Taxes	923,476	873,779
Income from operation.....	\$7,436,650	\$7,711,222
Non-operating income.....	174,447	227,999
Gross income.....	\$7,611,097	\$7,939,221
Interest, rentals, etc., including Manhattan Guarantee	5,333,866	5,272,932
Net income.....	\$2,277,231	\$2,666,289
Dividends on \$35,000,000, Interborough Rapid Transit Company capital stock for 6 months ended Dec. 31, 1910, at the rate of 9 per cent. per annum.....	1,575,000	1,575,000
Surplus	\$702,231	\$1,091,288
Operating, per cent.....	41.48	38.63
Passengers carried.....	277,186,032	270,337,624

It is explained that the increase in operating expenses is largely due to extraordinary expenditures, the result of changes in subway equipment made necessary in connection with the operation of 10-car express and 6-car local trains.

Boston & Northern Street Railway, Boston, Mass.—William A. Read & Company, New York, N. Y., offer for subscription at 92¾ and interest, netting 4.37 per cent, the unsold portion of \$2,050,000 of first-mortgage refunding 4 per cent gold bonds, dated 1904 and due July 1, 1954. The authorized issue of these bonds is \$15,000,000, and of this amount \$4,618,000 is outstanding.

Brooklyn (N. Y.) Rapid Transit Company.—At the annual meeting of the stockholders of the Brooklyn Rapid Transit Company on Jan. 27, 1911, the following directors were elected to serve for three years: T. S. Williams, Colgate Hoyt, Nicholas F. Brady and C. D. Meneely. George W. Davidson was chosen to serve for two years. Mr. Hoyt, Mr. Brady and Mr. Davidson succeed David Valentine, deceased, and Edwin W. Winter and Norman B. Ream, retired. As mentioned elsewhere in this issue, Mr. Winter has announced that at the meeting of the directors he will retire as president of the company.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—The Columbus, Mount Vernon & Mansfield Traction Company, which is to take over the Columbus, New Albany & Johnstown Traction Company, is selling its 5 per cent bonds at 85 and giving a bonus of 40 per cent of the stock of the company.

Detroit (Mich.) United Railway.—The Detroit United Railway has sold to William A. Read & Company, New York, N. Y., \$1,500,000 of 5 per cent collateral trust notes dated Feb. 15, 1911, and due Jan. 1, 1912. The notes, which are secured by \$1,880,000 of the company's first consolidated 4½ per cent bonds and other collateral, have been resold by the bankers. Recently Montreal bankers contracted to purchase from the company \$1,500,000 of first consolidated 4½ per cent bonds.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Public Service Commission of the Second District of New York has authorized the Elmira Water, Light & Railroad Company to issue its 5 per cent first consolidated mortgage bonds to the amount of \$243,995, to be sold at not less than 87. The proceeds are to be used to discharge indebtedness incurred for capital purposes and various extensions and improvements in Elmira and vicinity.

Farmington Street Railway, Hartford, Conn.—The New York, New Haven & Hartford Railroad, which took over the Farmington Street Railway in December, 1909, called for payment on Jan. 1, 1911, the \$30,000 of 5 per cent

debenture bonds of the Farmington Street Railway, which were due to mature on July 1, 1924.

Georgia Railway & Electric Company, Atlanta, Ga.—Twenty-five first consolidated mortgage 5 per cent bonds of the Atlanta Consolidated Street Railway have been drawn for redemption on Feb. 1, 1911, at 105 and interest at the office of the Mercantile Trust & Deposit Company, Baltimore, Md., trustee.

Illinois Traction System, Champaign, Ill.—The Milwaukee Trust Company, Milwaukee, Wis., is offering for subscription at 95 and interest, yielding 5.35 per cent, first and refunding mortgage 5 per cent gold bonds of the Bloomington, Decatur & Champaign Railroad, due Nov. 1, 1940. According to the bankers the bonds are "an absolute first mortgage at the rate of \$16,000 per mile of main track, of which more than 81 miles is on private right-of-way, averaging 66 ft. in width." The replacement value of the physical property, without including franchises and good will, is said to be \$1,248,000 in excess of the outstanding bonded debt. The net earnings are more than $1\frac{3}{4}$ times the interest charge on the outstanding bonds. The property is an integral part of the Illinois Traction System.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—The report of Harry J. Milligan, receiver for the Indianapolis, Crawfordsville & Western Traction Company for December, 1910, shows that the total earnings were \$15,382.49 and the net earnings \$2,211.80. The balance on hand Jan. 1, 1911, was \$11,759.02.

International Transit Company, Sault Ste. Marie, Mich.—A. E. Ames & Company, Ltd., Toronto, Ont., have recently offered at a price to yield $5\frac{3}{4}$ per cent \$280,000 of 5 per cent first mortgage serial 15-year gold bonds of the International Transit Company, dated July 1, 1910, due \$20,000 annually on July 1 each year to and including 1925. The principal of these bonds is guaranteed by the Lake Superior Power Company.

Metropolitan West Side Elevated Railway, Chicago, Ill.—F. A. Delano, chairman of the board of directors of the Metropolitan West Side Elevated Railway, has denied that negotiations are pending between the Metropolitan West Side Elevated Railway and the Aurora, Elgin & Chicago Railroad which have for their purpose a closer affiliation of the companies than is implied in the present traffic agreement between them.

Northern Ohio Traction & Light Company, Akron, Ohio.—The annual meeting of the stockholders of the Northern Ohio Traction & Light Company was held in the offices of the company on Jan. 21, 1911. H. A. Everett, E. W. Moore, C. W. Wason, Barney Mahler, J. R. Nutt, F. S. Borton, Will Christy, Charles Currie, W. E. Hutton, L. E. Beilstein and C. J. McCuaig were elected to the board of directors. The board organized by the election of the following officers: Henry A. Everett, president; Will Christy, first vice-president; Charles Currie, second vice-president and general manager; C. F. Moore, secretary; J. R. Nutt, treasurer, and C. H. Lahn, auditor.

Quakertown (Pa.) Traction Company.—The time limit for the deposit of the 5 per cent bonds of the Quakertown Traction Company in acceptance of the Lehigh Valley Transit Company's exchange offer has been extended to Feb. 9, 1911. Thus far \$240,000 of the bonds out of the total issue of \$300,000 have been deposited.

Second Avenue Railroad, New York, N. Y.—Wilbur Larmore, as referee, filed a report with the Supreme Court on Jan. 24, 1911, recommending that the application of George W. Linch, receiver of the Second Avenue Railroad, to issue \$500,000 receiver's certificates, should be granted. The money is to be applied to renovating the tracks, equipment, and rolling stock, \$200,000 to be spent in replacing tracks within the next six months.

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass.—The \$50,000 of first mortgage 6 per cent bonds of the Shelburne Falls & Colerain Street Railway, dated 1896, have been called for payment at the Shelburne Falls National Bank, Shelburne Falls, Mass., on March 1, 1911. The company has made the Federal Trust Company, Boston, Mass., trustee of the \$100,000 of 20-year sinking fund 5 per cent bonds issued to refund old bonds, fund floating debt, etc.

Twin City Rapid Transit Company, Minneapolis, Minn.—The directors of the Minneapolis & St. Paul Suburban Railway, a subsidiary of the Twin City Rapid Transit Company, have voted to increase the capital stock of the Minneapolis & St. Paul Suburban Railway from \$1,000,000 to \$3,000,000.

Washington Railway & Electric Company, Washington, D. C.—Clarence P. King has been elected a director of the Washington Railway & Electric Company, to succeed Ward Thornton, resigned.

Washington Water Power Company, Spokane, Wash.—The Washington Water Power Company has declared a quarterly dividend of 2 per cent on its \$9,245,800 of stock, payable on April 1, 1911, to stock of record of March 15, 1911. This dividend compares with $1\frac{3}{4}$ per cent paid quarterly since 1905.

Dividends Declared

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, $1\frac{1}{4}$ per cent, preferred.

Fairmont & Clarksburg Traction Co., Fairmont, W. Va., $2\frac{1}{2}$ per cent, preferred.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., $1\frac{1}{2}$ per cent, common.

Lincoln (Neb.) Traction Company, quarterly, $1\frac{1}{2}$ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, $1\frac{1}{4}$ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., $2\frac{1}{2}$ per cent, preferred.

Public Service Investment Company, Boston, Mass., quarterly, $1\frac{1}{2}$ per cent, preferred; $1\frac{1}{2}$ per cent, common.

Susquehanna Railway, Light & Power Company, Lancaster, Pa., $2\frac{1}{2}$ per cent, preferred.

Tampa (Fla.) Electric Company, quarterly, 2 per cent.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, $1\frac{1}{4}$ per cent, preferred.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, $1\frac{3}{4}$ per cent, preferred; quarterly, $1\frac{1}{2}$ per cent, common.

West Penn Railways Pittsburgh, Pa. quarterly, $1\frac{1}{4}$ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

CAPE BRETON ELECTRIC COMPANY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Nov.	'10	\$29,960	\$14,279	\$15,681	\$6,066	\$9,614
1 "	'09	26,535	13,776	12,759	6,175	6,584
12 "	'10	324,400	170,825	153,575	73,825	79,751
12 "	'09	282,689	167,995	114,693	73,992	40,702
CLEVELAND, PAINESVILLE & EASTERN RAILROAD.						
1m., Dec.	'10	\$27,234	\$14,647	\$12,587	\$7,947	\$4,639
1 "	'09	23,600	12,887	10,713	7,969	2,744
12 "	'10	355,469	185,202	170,267	96,585	73,682
12 "	'09	321,173	174,267	146,906	90,924	55,981
JACKSONVILLE ELECTRIC COMPANY.						
1m., Nov.	'10	\$48,904	\$26,961	\$21,943	\$9,498	\$12,445
1 "	'09	45,611	23,053	22,558	9,482	13,077
12 "	'10	569,696	305,936	263,760	112,312	151,449
12 "	'09	476,731	268,637	208,094	112,649	95,445
LAKE SHORE ELECTRIC RAILWAY SYSTEM.						
1m., Dec.	'10	\$95,571	\$52,640	\$42,930	\$34,703	\$8,228
1 "	'09	89,062	47,755	41,308	35,011	6,296
12 "	'10	1,206,112	632,533	573,579	417,050	156,529
12 "	'09	1,109,084	586,184	522,900	414,950	107,949
NORTHERN OHIO TRACTION & LIGHT COMPANY.						
1m., Dec.	'10	\$201,973	\$115,016	\$86,957	\$44,175	\$42,782
1 "	'09	182,912	101,555	81,357	43,210	38,148
12 "	'10	2,437,426	1,348,963	1,088,463	521,060	567,394
12 "	'09	2,177,642	1,190,057	987,585	524,066	463,519
PUGET SOUND ELECTRIC RAILWAY.						
1m., Nov.	'10	\$150,274	\$106,037	\$44,237	\$49,609	\$5,462
1 "	'09	139,018	97,507	41,511	48,930	17,419
12 "	'10	1,906,301	1,257,119	649,183	607,093	42,090
12 "	'09	1,856,678	1,234,895	621,783	504,323	57,400
SAVANNAH ELECTRIC COMPANY.						
1m., Nov.	'10	\$56,863	\$39,316	\$17,517	\$17,435	\$82
1 "	'09	51,088	33,516	17,572	17,555	17
12 "	'10	629,130	412,900	216,230	215,131	1,099
12 "	'09	607,527	393,404	214,123	209,171	4,952
SEATTLE ELECTRIC COMPANY.						
1m., Nov.	'10	\$469,334	\$256,618	\$212,716	\$106,026	\$106,690
1 "	'09	451,533	265,088	186,445	104,179	82,261
12 "	'10	5,576,239	3,241,023	2,335,216	1,303,586	1,031,630
12 "	'09	5,787,362	3,359,304	2,428,058	1,234,268	1,193,790

Traffic and Transportation

Merit System in Sheboygan

To stimulate and encourage employees in the prompt, faithful and intelligent performance of their duties the Sheboygan Railway & Electric Company, Sheboygan, Wis., adopted a merit and demerit system on Jan. 1, 1911, on which date the employees were divided into four classes, A, B, C and D, as follows: Class A—Those who have satisfactorily served the company for one year. Class B—Those who have satisfactorily served the company for two years. Class C—Those who have satisfactorily served the company for five years. Class D—Those who have satisfactorily served the company for ten years.

For each additional year of good and efficient service members of each class will receive stated sums of money as a gratuitous reward, which is in no way connected with wages. The cash bonus to each eligible member of each class will be as follows: Class A—The sum of \$30. Class B—The sum of \$45. Class C—The sum of \$60. Class D—The sum of \$75.

The names of trainmen will be classified on Jan. 1 of each year only and awards will be made on the same day for the year just ended, excepting that there will be no awards for 1910.

Each trainman's account will be opened with a credit of 100 merit marks. Demerits will be deducted and merits will be added and on the first day of each month the standing of each man will be shown. When a trainman's net score reaches the net amount of 50 his case will be considered by a board consisting of the general manager, the superintendent and the three other department managers, who will act as the case seems to warrant, the penalty ranging from reduction in the list to discharge. If the trainman persists in reducing his net score until it reaches zero his case will again be considered and the board will act as seems best. To be eligible for the bonus the trainman must have a net score of 100 on Jan. 1. In other words, merits and demerits must balance so that a man shall end the year with the same score he had at the beginning of the year. No trainman who resigns or is discharged during the year will participate in any bonus or premiums on Jan. 1.

The merits and demerits as prescribed under the system adopted by the company follow:

MERITS

1. Securing names and addresses of witnesses who saw accident, other than those on accident report, 2 to 10.
2. Assistance rendered in case of accident such as to bring commendation from passengers, 2 to 10.
3. Politeness and attention to passengers calling special commendation from them (2 to 10).
4. Complete and perfect accident reports, 2.
5. Careful handling of car, 5.
6. Clear record for one month, 10.
7. Turning in transportation or badges ordered up by the company, 5.
8. Special meritorious act calling for recognition by the company, 10 to 50.
9. Neatness in personal appearance, 5 to 20.
10. Informing the company of matters which are for the best interests of the service, 5 to 20.

DEMERITS

11. Disloyalty to the company, immediate discharge.
12. False statements, immediate discharge.
13. Intoxication or drinking while on duty or about to go on duty, immediate discharge.
14. Gross, ungentlemanly conduct, immediate discharge.
15. Disobeying positive orders or running by signals set at danger, immediate discharge.
16. General incompetency, immediate discharge.
17. Running by train meets, immediate discharge.
18. Failure to report accidents, 10 to discharge.
19. Incomplete and poor accident reports, 1 to 5.
20. Talking to others than proper officers of the company about accidents, 20.
21. Running railroad crossings without proper flagging, where required, 20.
22. Fast running over crossings, switches, around curves and along streets requiring slow speed, 5 to 20.
23. Not ringing gong when passing car, 5.

24. Passing standing car on streets without coming under complete control, 5 to 20.
25. Starting car without proper signal, except to avoid accident, 5 to 10.
26. Not obeying conductor's signal, 5.
27. Failure of conductor to give proper signals, 2 to 10.
28. Following car in front too close, 2 to 10.
29. Leaving car without taking reverse lever or notifying conductor, 5 to 10.
30. Feeding current too fast, 5 to 10.
31. Careless and indifferent operating of car, 5 to 20.
32. Running ahead of schedule time, 5 to 10.
33. Allowing unauthorized persons to ride in front vestibule except as provided in bulletins, 5 to discharge.
34. Running away from passengers, 5 to 20.
35. Failure to report trouble with car or appliances, 5 to 10.
36. Giving bells too quickly before passengers are safely on or off, 5 to 30.
37. Inattention to passengers, 5 to 20.
38. Unnecessary conversation with passengers, 5.
39. Unnecessary conversation with motorman, 5 to 20.
40. Riding in front vestibule with motorman unless absolutely necessary in special cases, 5 to 20.
41. Dirty cars, 5.
42. Untidy condition of dress, 5.
43. Reading while on duty, except such as pertains directly to your duties, 10.
44. Sitting down while on duty, except as provided for in bulletins, 2 to 20.
45. Not looking to the rear when starting when conductor is ahead, 2 to 10.
46. Jerking car when starting or stopping, 2 to 10.
47. Laying over at the end of the line after leaving time, 2 to 20.
48. Missing fares—each fare, 5.
49. Failure to register fares—each fare, 10.
50. Bunching fares, 5.
51. Making change before registering fare, 5.
52. Carrying persons free, 20.
53. Starting car from front when aisle is clear, 10.
54. Backing any double-end car in the city without first turning trolley and reversing position of trainmen—except to avoid collision or accident, 2 to 10.
55. Failure to properly reset registers at proper time and place, 5.
56. Errors or omissions on report trip sheets or envelopes, 1 to 5.
57. Not having markers and other necessary signals lighted at sunset, 5.
58. Impolite remarks to passengers (on all reports received from passengers complaining of the actions or conduct of trainmen there will be a charge against the trainman under this head even though the charge is not sustained by investigation), 5 to discharge.
59. Failure to warn passengers to wait for car to stop when alighting, 5.
60. Failure to regulate the heating and ventilation of cars in accordance with the bulletins, 2 to 10.
61. Carrying passengers by their destination when previously notified of same, 1 to 10.
62. Failure to cancel all tickets at the time of receiving same, 1 to 10.
63. All acts or omissions detrimental to good service in the opinion of the superintendent, 5 to discharge.

Interborough Bulletin

The Interborough Rapid Transit Company, New York, N. Y., has begun the publication of the *Interborough Bulletin* to foster cordial relations between the company's employees and the public. The publication is 9 in. x 12 in. and the first issue contains 12 pages. The purpose of the *Interborough Bulletin* is set forth by Theodore P. Shonts, president of the company, in a statement in which he says in part:

"The *Interborough Bulletin* is published for circulation among the employees of the company. From time to time the necessity arises of calling their attention to matters affecting the interests of the corporation and their relation thereto, which cannot well be put in the form of specific

orders, but are nevertheless of great importance. In order to put the various departments in touch with each other and with the employees generally the *Bulletin* is printed for free circulation, so that all may avail themselves of the information it contains and may in turn make use of it to express their own ideas and opinions so far as they relate to the management and maintenance of the corporate business. It is desirable that the loyalty and efficiency of the army of men concerned in the work of the company be fostered, developed and recognized by making it evident that there is a true community of interest and that what is for the good of the company is for the good of each and every man in the service. The promotion of cordial relations with the public is a matter of great importance to the company and to all connected with it; such relations can be cultivated by efficient service and by courteous and considerate treatment of passengers. Suggestions from employees with respect to betterment of service and to convenience and comfort of passengers necessarily will be valuable in many instances and are invited."

Near Stops in Indianapolis.—The Indianapolis Traction & Terminal Company, Indianapolis, Ind., has informed the Indianapolis Board of Works that the recent ruling which requires city cars to stop at the near crossings in downtown districts passed before the holidays by the board prevents accidents and saves time by reducing the number of stops.

Destination Signs on the New York Elevated Lines.—The Interborough Rapid Transit Company, New York, N. Y., has adopted a system of denoting the destination of the elevated trains similar to that now in use in the subway. Cars of the Second, Third, Sixth and Ninth Avenue lines will be soon equipped with reversible steel boards marked with the destination.

Service in Memphis.—T. H. Tutwiler, president of the Memphis (Tenn.) Street Railway, conferred recently with a committee of citizens and Thomas Dies, Commissioner of Public Utilities, Grounds and Buildings, of Memphis. Mr. Tutwiler said that it was the policy of the company to strive to remedy all weak spots. The company had spent \$5,000,000 in the last five years in improvements. Objection has developed to the safety gates on cars which are not opened until the cars have come to a stop.

Petition for Reduction in Fare on Harrisburg Suburban Line.—The State Railroad Commission of Pennsylvania has been petitioned by persons living along the Rockville line of the Central Pennsylvania Traction Company, Harrisburg, Pa., to take up with the company the matter of granting a 5-cent fare between Moclays Street, Harrisburg, and Rockville. The present fare is 10 cents. The petitioners allege that the rate is excessive compared with the rate charged by the company on other suburban lines.

Protest Against Increase in Fee for Checking Parcels.—The Public Service Commission of the Second District of New York has received a complaint against the Buffalo, Lockport & Rochester Railway in regard to the increase from 5 cents to 10 cents in the fee for checking parcels. The complaint alleges the change to be unwarranted and unreasonable and out of proportion to the trouble and expense to which the company is put and asks that the former rate of 5 cents be restored. The company has been asked to answer the complaint within 20 days.

Mail Rate Too Low to Be Attractive.—Citizens of Jeffersonton, Ky., which is located on the Louisville & Interurban Railroad, petitioned the railway mail service to have mail carried on the company's line instead of by the steam railroad, over which trains are operated at infrequent intervals. H. M. Swetnam, chief clerk of the service in Louisville, offered to pay the Louisville & Interurban Railroad 3 cents a mile, the rate paid the railroads, but the offer was declined, though the company intimated that it would be glad to handle the business at a higher rate.

Car-Ahead Question in Albany, N. Y.—The United Traction Company, Albany, N. Y., has replied to the complaint filed with the Public Service Commission of the Second District of New York by H. H. Horner, of the State Education Department, in which he cited an instance where passengers on one of the company's cars who refused to transfer to a car ahead were carried to the railroad station and back.

In replying to the complaint, E. S. Fassett, general manager of the company, said that the practice of turning cars in times of delays obtains on almost all street railways. The commission has taken the case under advisement.

To Reduce Railway Fare.—The Public Service Commission, Second District of New York, has received a complaint from E. J. Jennings, president of the West Hempstead Gardens & Lake View Association, against the Jamaica division of the New York & Long Island Traction Company, as to the rate of fare from the junction of Fulton Street and Jericho Turnpike, in Queens County, to the intersection of Front Street and Main Street, in Hempstead. The franchise granted to the company provided for a 10-cent fare between the two points, and the company is now charging 15 cents. The commission is asked to require the company to charge not more than 10 cents between these points.

President Taft's Proposed Trip by Electric Railway.—On Feb. 11, 1911, President Taft will board private car 233, of the Illinois Traction System, at Decatur, and be conveyed to Springfield, where he will be the guest of honor at the Lincoln banquet. He will arrive at Decatur over the Wabash Railroad from Chicago, and make the trip from Decatur to Springfield as the guest of Congressman William B. McKinley, who is president of the Illinois Traction System. The presidential special will consist of office car 233, which will pull Mr. McKinley's private car Champaign. The train will be under the personal supervision of General Superintendent C. F. Handshy. It will be preceded by a pilot car, as is the custom on railroads. The presidential party will be followed by a special car carrying members of the press who will attend the visitor. Besides Mr. McKinley, Vice-President Executive H. E. Chubbuck and Vice-President-Treasurer G. M. Mattis, of the Illinois Traction System, State officials and prominent visitors will make up the party.

Handling Newspapers in Rochester.—The New York State Railways, Rochester lines, has filed with the Public Service Commission of the Second District of New York changes in the regulations governing the transportation of newspapers on passenger cars. Newspapers in bundles may be carried on the date of issue, or in the case of afternoon papers during the forenoon of the following day, in the front vestibule of all scheduled passenger cars at 25 cents per 100 lbs., subject to the following conditions: Publishers or agents must deliver papers to cars at any one of the following points: Corner Main and Water Streets, corner Main and State Streets, corner Main and St. Paul Streets, corner Main and Clinton Streets, and tender to motorman a shipping order of form to be approved by the general passenger agent; shipping order to show the number of bundles loaded on any one car, together with total weights. The company reserves the right at any time to restrict the number of bundles to be carried on any one car. Newspapers will not be received for transportation between the hours of 6:30 a. m. and 8 a. m. and between 5 and 6:30 p. m.

Good Work Done by the Little Rock Railway & Electric Company.—Recently, in speaking of the work done during the past year by his department, Superintendent of Public Works E. A. Kingsley, of Little Rock, Ark., stated: "In the West Eighth District, instead of paving between the tracks with brick, D. A. Hegarty, general manager of the Little Rock Railway & Electric Company, has adopted the concrete pavement. This is not only a magnificent piece of work but I believe will last better and give more satisfaction between the track than will any other character of pavement excepting creosoted blocks. I shall commend to the City Council Mr. Hegarty, general manager of the Little Rock Railway & Electric Company, not only for the aid and assistance that he has given this department and the city at large in prosecuting the improvements where his lines are affected, but also for the exceptionally good character of work which he is doing. There will be found nowhere in this country, even in cities much larger than ours, better street car construction than in Little Rock. It has been a source of congratulation that the Department of Public Works has secured heartier co-operation with the street car management of the city, both in construction and repair work, than any other city of my acquaintance."

Personal Mention.

Mr. Z. V. Taylor has been elected president and general manager of the Charlotte Electric Railway, Light & Power Company, Charlotte, N. C.

Mr. F. M. Johnston, auditor of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., has been appointed purchasing agent of the company.

Mr. W. W. S. Butler has resigned as general manager and purchasing agent of the Newport News & Old Point Railway & Electric Company, Newport News, Va.

Mr. H. A. Fiske has been appointed electrical engineer of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., in charge of all the electrical affairs of the company.

Mr. Louis J. Fohr has been appointed superintendent of the Vincennes (Ind.) Traction Company, to succeed Mr. George E. Henry, who has resigned, effective on Feb. 1, 1911.

Mr. F. H. Cooke, of the Central Savannah Lines, has been appointed general agent of the Illinois Traction System, with headquarters at St. Louis, Mo., reporting direct to the traffic manager.

Mr. R. G. Hutchins has been elected to the newly created office of vice-president of the Chicago (Ill.) Railways. Mr. Hutchins is connected with the Harris Trust & Savings Bank, Chicago, Ill.

Mr. Charles B. Metcalfe has been elected secretary and treasurer of the San Angelo (Tex.) Street Railway to succeed Mr. Charles W. Hobbs as secretary and Mr. C. A. Broome as treasurer.

Mr. E. E. Kester, formerly general agent of the Illinois Traction System at Peoria, Ill., and recently acting general agent of the company at St. Louis, Mo., has returned to Peoria as general agent of the company.

Mr. C. M. Bridge, formerly acting general agent of the Illinois Traction System, Peoria, Ill., has been appointed commercial agent of the Illinois Traction System, with headquarters at St. Louis, Mo., reporting to Mr. F. H. Cooke, general agent.

Mr. R. A. Harman has been elected vice-president of the Cleveland (Ohio) Railway to succeed Mr. J. J. Stanley, formerly vice-president and general manager of the company, who was elected president and general manager of the company some time ago.

Mr. W. H. De Witt has been appointed superintendent of transportation of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., to succeed Mr. Frank Arnold, whose resignation from the company was announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911.

Mr. Eugene E. Soules, formerly with the Peoria *Star*, has been appointed publicity agent of the Michigan United Railways, with headquarters at Jackson, Mich. Mr. Soules' experience includes daily newspaper work and the promotion of several public amusement resorts.

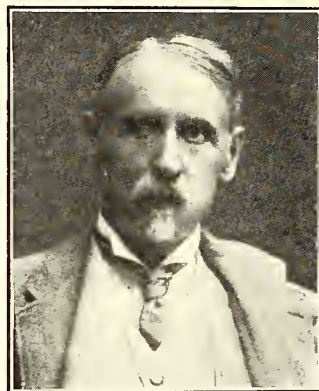
Mr. E. E. Strong has been appointed chief inspector of the Syracuse (N. Y.) Rapid Transit Railway. Mr. Strong was graduated from Syracuse University with the degree of electrical engineer in June, 1908, and entered the employ of the Syracuse Rapid Transit Railway Company in its mechanical department, where he was employed in different capacities until his appointment as chief instructor in October, 1909.

Mr. Thomas Roycraft has been appointed general manager of the Grand Forks (N. D.) Street Railway. Mr. Roycraft has been identified with the gas and electric industries for 28 years. He was formerly located at Fargo, but more recently has been secretary and superintendent of the Grand Forks Gas & Electric Company, from which he retired recently, following the purchase of the property by H. M. Byllesby & Company, Chicago, Ill.

Mr. George F. Henry has resigned as superintendent of the Vincennes (Ind.) Traction Company, effective Feb. 1, 1911, and has formed a partnership with Henry M. Williams in a machine shop in Vincennes which makes a specialty of overhauling automobiles and manufacturing a trolley wheel patented by Mr. Henry. Mr. Henry has been connected with the Vincennes Traction Company and its predecessors for seven years as vice-president and general manager. After the property changed hands in 1909 he was retained

as superintendent. He was formerly with the Hudnut Company, Terre Haute, Ind., and the American Hominy Company, Indianapolis, Ind., as superintendent and builder of mills for 18 years. He resigned from the American Hominy Company in 1904 to become connected with the Vincennes Citizens' Street Railway, afterward the Vincennes Traction Company.

Mr. Edwin W. Winter, president of the Brooklyn (N. Y.) Rapid Transit Company, resigned as a director of that company at the annual meeting of the stockholders on Jan. 27, 1911, and announced that he would resign as president



E. W. Winter

of the company at the next meeting of the directors. Mr. Winter has been president of the company since January, 1903. He was born in Vermont on Nov. 18, 1845, and entered railway service in 1867 with the construction department of the Union Pacific Railway. From 1870 to 1873 he was a contractor's agent on the construction of various railroads, and from 1873 to 1876 was general claim agent of the Chicago & Northwestern Railway. He served as general superintendent of the West Wisconsin Railway from 1876

to 1879, and subsequently served for a year as general superintendent of the Chicago, St. Paul & Minneapolis Railway. During 1880 and 1881 he was general superintendent of the St. Paul, Minnesota & Omaha Railway and from 1881 to Nov. 16, 1885, he was assistant to the president of this company. From Nov. 16, 1885, to July, 1896, he was general manager of the St. Paul, Minnesota & Omaha Railway. From July, 1896, to Aug. 31, 1897, he was president of the Northern Pacific Railway, and from September, 1899, to February, 1902, he was president of the Chicago Transfer & Clearing Company at Chicago, Ill. Following Mr. Winter's election as president of the Brooklyn Rapid Transit Company the scheme of organization of the company was changed and its personnel strengthened materially, and with the exception of a few defections it is the same staff that began work under Mr. Winter which has carried to a successful consummation the very large and important rehabilitation work, to the description of which so much space has been given from time to time in the *STREET RAILWAY JOURNAL* and the *ELECTRIC RAILWAY JOURNAL*. Mr. Winter made public a statement in regard to his retirement in which he said: "The outlook of the company at the close of 1902 was not over-encouraging. I made only one promise—to do my best—when I came in and I see no occasion for apology as I go out." Mr. Winter will hereafter devote himself entirely to his private interests. In commenting editorially on Mr. Winter's retirement the *Brooklyn Daily Eagle* said: "No man commanded more respect from Brooklyn, and no man showed more for Brooklyn than Mr. Winter has done. Nor eventually did any officer in Mr. Winter's place create more regard and few deserved so much as he. Only as an executive and administrator of a great transit enterprise has he been known or sought to be known, and his record in that field has been distinguished by integrity, wisdom, energy and unequalled success."

OBITUARY

J. W. Brock, president of the Chicago, Kankakee & Urbana Railroad, Paxton, Ill., which is building an electric railway between Kankakee, Urbana and Champaign, died on Jan. 17, 1911, at his home in Urbana.

Ernest Benson Prior, roadmaster of surface lines of the Brooklyn (N. Y.) Rapid Transit Company, died on Jan. 29, 1911, following an operation for appendicitis. Mr. Prior was born at Hillsdale, N. Y., 47 years ago, and had lived in Brooklyn for 15 years. He was the inventor of a number of railway devices, one of them a protected heel switch, described in the *STREET RAILWAY JOURNAL* of July 28, 1906, and made by the Lorain Steel Company under the Prior patents.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***City Railroad, Birmingham, Ala.**—Application for a charter has been filed in Alabama to build an electric railway in Birmingham. Capital stock, \$3,000. Officers: Paul Mitchell, president; DeWitt B. Lightber, vice-president and treasurer, and A. F. Kummer, secretary.

***Fresno, Coalinga & Tidewater Company, Fresno, Cal.**—Incorporated in California to build an electric railway to connect Fresno, Coalinga, Tidewater and Monterey. Capital stock, \$300,000. Directors: Charles J. Shaw, Hollister; A. G. Metz, Monterey; W. J. Kilby and Frank Cheney, Coalinga; J. W. Briscoe, Bakersfield; G. W. Cartwright, G. P. Cummings, Roy Hall, T. C. White and W. T. Burks, Montgomery; H. H. Alexander and C. S. Pierce, Fresno.

***Kentucky Securities Corporation, Lexington, Ky.**—Incorporated in Virginia with a capital stock of \$5,000,000. Incorporators: Percy M. Chandler, Philadelphia; J. K. Trimble, Philadelphia, secretary; J. N. Trimble, Philadelphia, treasurer, and John A. McArthur, Philadelphia; Thomas B. Gay, Richmond; Caldwell Hardy, Norfolk; G. W. Cook, Lansdown, Pa., and Howard Loeb, Elkins Park, Pa., directors.

***Chehalis & Cowlitz Railroad, Chehalis, Ore.**—Incorporated in Oregon to build an electric or steam railway from Chehalis to a point on the Cowlitz River on Cowlitz Prairie, 20 miles southeast of Chehalis. Much of the right-of-way has been secured. Capital stock, \$300,000. Incorporators: H. C. Coffman and George A. Robinson, Chehalis.

***Orangeburg Railway, Springfield, S. C.**—Chartered in South Carolina to build a 30-mile steam or electric railway from Orangeburg to Springfield. Capital stock, \$50,000. Officers: W. C. Wolfe, Orangeburg, president; J. A. Berry, Orangeburg, secretary, and Lawrence Manning, Sumter, director.

FRANCHISES

Los Angeles, Cal.—The Los Angeles-Pacific Railway, Los Angeles, has been awarded a franchise by the Board of Supervisors for an electric railway in the San Fernando Valley near Burbank.

San Francisco, Cal.—The United Railways has asked the supervisors for a franchise to extend its Ninth Avenue line to meet the Corbett Road in San Francisco.

Stockton, Cal.—The San Joaquin Valley Electric Railway, Stockton, has asked the Board of Supervisors for a franchise to build its railway over McKinley Avenue, in Stockton.

Delta, Colo.—Chas. C. Montz and Watson Zeigler, representing the Fairview Interurban Railway, will ask the City Council for a franchise to build an electric railway in Delta. This proposed 25-mile electric railway will connect Delta and Fairview Coal Mine with a branch to Cedaredge, California Mesa and Montrose. [E. R. J., Nov. 12, '10.]

New Haven, Conn.—The Connecticut Company will ask the General Assembly for the right to build a new electric railway from New Hartford to New Boston, through the Farmington Valley, probably following the line of the old Lee & New Haven Railroad. The line will make a short route for through travel from New Haven to Pittsfield and Albany, cutting off the long, roundabout turn by way of Canaan.

Chicago, Ill.—The Chicago, Aurora & Elgin Railway has received a franchise from the Village Boards to build its tracks in Maywood and Melrose Park.

Galesburg, Ill.—The Galesburg Railway & Light Company has received a franchise from the City Council to build several extensions of its railway into various parts of the city.

Joplin, Mo.—The Southwest Missouri Electric Railway, Webb City, has asked for a franchise to extend its railway from the junction of Main Street and Twentieth Street south to the city limits.

***St. Louis, Mo.**—E. A. Hildenbrandt, T. G. Portis and C. F. Vogel, representing the St. Louis, Arcadia & Jefferson City Railroad, St. Louis, will ask the House of Delegates for a franchise to build an electric railway from Grand Avenue and Wyoming Avenue, to the western city limits at Bancroft Avenue, in St. Louis.

Brooklyn, N. Y.—The Brooklyn Rapid Transit Company has filed a certificate with the State Department asking for authority to extend its railway along Sixteenth Avenue, between Forty-ninth Street and Sixty-fourth Street.

Youngstown, Ohio.—The Lake Erie & Youngstown Railway has received an extension of its franchise from the City Council to build its railway in Youngstown. The franchise permits the company to operate cars over part of the right-of-way of the Mahoning Valley line in Youngstown. This projected railway will connect Conneaut and Youngstown. John H. Ruhlman, Youngstown, promoter. [E. R. J., Aug. 28, '10.]

***Tulsa, Okla.**—Charles Page, Tulsa, has asked the City Council for a franchise to build an electric railway from Tulsa to his proposed amusement park.

Toronto, Ont.—The Toronto Interurban Railway will ask the Ontario Legislature for a franchise to build an electric railway from Toronto to Barrie.

Portland, Ore.—The Portland Subway Company, Salem, will ask the City Council for a franchise giving it the right to enter into a general street railway business and to construct a tube under the Willamette River and through a loop aggregating a mile in length under West Side streets. This is part of a plan to build 150 miles of track on the east and west sides of Portland. A. K. Bentley. [E. R. J., Dec. 31, '10.]

Knoxville, Tenn.—The Knoxville Railway & Light Company, Knoxville, has received a franchise for double-tracking its Oakline line in Oakland to the city limits.

Wheeling, W. Va.—The Wheeling Traction Company will ask the City Council for a franchise to lay a third rail to its tracks from Jonathan's ravine to the northern limits of the city. The company plans to run its cars all the way to Glenova.

TRACK AND ROADWAY

Montgomery (Ala.) Traction Company.—During 1911 this company expects to build 3 miles of new track in Montgomery.

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company is said to be considering plans for building a 4-mile extension of its line from Van Buren to Fort Smith.

Los Angeles Pacific Railway, Los Angeles, Cal.—This company will build 2 miles of track in Los Angeles and a 25-mile extension of its line from Hollywood to Van Nuys via Lankershim during 1911.

Craggs & Canon Railway, Denver, Col.—This company will build 11 miles of track between Craggs, Eldorado Springs and Boulder during 1911.

Denver, Greeley & Northwestern Railway, Greeley, Col.—This company has secured rights-of-way, financial backing and important terminals for its railway between Denver and Greeley. It will circle northern Colorado with stations at Boulder, Fort Collins, Pierce, Nunn, Ault, Eaton, Greeley and Denver. J. D. Houseman, general manager.

Sanford (Fla.) Traction Company.—It is reported that this company is considering plans for building a 15-mile extension of its railway. A. P. Connelly, general manager.

Sandpoint & Interurban Railway, Sandpoint, Idaho.—Subject to certain conditions about 3 miles of railway will be built by this company between Sandpoint and Dover during 1911.

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company will place contracts during the next two months for building a 10-mile extension of its railway. J. J. Burns, Isabella Building, Chicago, purchasing agent.

Taylorville Railway, Light, Heat & Power Company, Taylorville, Ill.—About 3 miles of new track will be built in Taylorville by this company in the spring.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company has completed and placed in

operation the stretch of track between Chesterton and Laporte.

Kentucky & Tennessee Traction Company, Hopkinsville, Ky.—This company has secured rights of way and a bond issue will be authorized shortly for the purpose of securing funds with which to construct this proposed 25-mile electric railway to connect Hopkinsville, Salubria, Sulphur, Mineral Springs, Pembroke, Trenton and Guthrie. It is the intention to extend this line to Nashville, Tenn. Charles Van den Burgh, Hopkinsville, general manager. [E. R. J., Oct. 15, '10.]

Somerset Water, Light & Traction Company, Somerset, Ky.—It is announced that this company will spend about \$50,000 for improvements which include an extension to the railroad shops. J. H. Gibson, Somerset, president.

Rockland, Southern Thomaston & St. George Railway, Portland, Maine.—This company will construct about 2 miles of new track between Matin's and Southern Thomaston during 1911.

Union Street Railway, New Bedford, Mass.—At a recent meeting of the directors of this company an expenditure to the amount of \$400,000 for improvements, was authorized. Among the improvements will be the building of several extensions. Henry H. Crapo, president.

***Mankato, Minn.**—Henry E. Hance, Mankato, is reported to be projecting an electric railway from Mankato to St. Peter.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—About 70 miles of railway will be constructed by this company during the year between Sarcabault, Owatonna, Dodge Center, Cassen and Rochester. M. W. Savage, Minneapolis, president.

Whitefish & Polson Electric Railway, Kalispell, Mont.—This company has secured 55 miles of right-of-way from Whitefish to Kalispell, and has surveyed 30 miles of the route. The company has a capital stock of \$200,000, of which over half is said to have been subscribed. It is said that as soon as the remainder of the stock is subscribed contracts for construction and for materials will be placed. Officers: J. A. Edge, president; O. P. J. Mosby, vice-president; J. H. Stevens, secretary; A. W. Swaney, treasurer, and G. H. Adams and J. E. White, directors. [E. R. J., March 12, '10.]

St. John (N. B.) Railway.—This company will construct about 2 miles of railway in St. John during 1911.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company will build about a mile of new track with 60-lb. T-rails during the next few weeks.

New York City Interurban Railway, New York, N. Y.—About 10 miles of new track will be built by this company during 1911 in New York.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has formed plans which will shorten the time from Canton to Cleveland about 2 hours. The company has secured right-of-way for the purpose of double-tracking its line between Cuyahoga Falls and Newburg. It is said that the work will begin in the spring and about \$600,000 will be spent in improvements.

Oklahoma Union Traction Company, Tulsa, Okla.—This company expects to complete its 15-mile railway from Tulsa to Sapulpa via Redbank and Tamaha during 1911. Contracts have been let and construction has begun.

Guelph (Ont.) Radial Railway.—This company will place contracts during the next two months for building one mile of single track with 60-lb. T-rails in Guelph. J. J. Hackney, purchasing agent.

Sarnia (Ont.) Street Railway.—The Board of Trade at Sarnia, Ont., has requested this company to extend its line a mile further along the shore of Lake Huron, in connection with the proposed extension of the summer resort at that point. The company has practically agreed to build the line on condition that the Board of Trade procure the necessary right-of-way from the property owners along the route.

Easton (Pa.) Transit Company.—This company will soon purchase 55 tons of 90-lb. A. S. C. E. T-rails to rebuild and double-track the East Northampton Street line in Easton. H. R. Fehr, Easton, purchasing agent.

Southern Cambria Railway, Johnstown, Pa.—This company states that it is now making plans for building an extension of its line from South Fork to connect with the lines of the Northern Cambria Street Railway at Carrolltown. Negotiations for the financing of the extension to Ebensburg will soon be closed. It is expected that this railway will soon be double-tracked and operated by the third-rail system.

Johnson City Traction Company, Johnson City, Tenn.—This company is securing right-of-way for building an extension of its railway to the State Normal School site in Johnson City.

Memphis (Tenn.) Street Railway.—About 4 miles of new track will be built by this company in Memphis during 1911.

Texas Traction Company, Dallas, Tex.—During 1911 this company will build about a mile of new track in Sherman and about 3 miles of track in McKinney. R. B. Sticher, general manager.

Northern Texas Traction Company, Fort Worth, Tex.—A loop line extension to the baseball park will be built by this company in Fort Worth.

***Greenville (Tex.) Development Company.**—It is reported that this company will soon build a 3-mile electric railway from Greenville to Mineral Heights.

***Mexia, Tex.**—J. Sanford Smith and associates are considering plans for building an electric railway between Mexia and Waco.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company expects to place a contract during the next two months for building about one mile of new track in Lynchburg. D. C. Frost, superintendent.

Olympia Light & Power Company, Olympia, Wash.—It is stated that this company will build about 2 miles of new track in Olympia during 1911.

***Martinsburg, W. Va.**—F. S. Felker, Martinsburg, Richard Hammersley and associates are considering plans for building an electric railway from Martinsburg to Glengary via North Mountain.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—This company will begin work April 1 on the construction of its railway to Portage. Surveys from Madison to Stevens Point will begin soon. This projected interurban railway will connect Janesville and Merrill via Friendship, Easton, Portage, Lodi, Middleton, Wausau, Stevens Point and Madison. Allen T. Russell, Chicago, general manager. [E. R. J., Oct. 29, '10.]

Sparta-Melrose Electric Railway & Power Company, Sparta, Wis.—This company will complete its 30-mile railway from Sparta to Melrose during this year. The work is being done by the Western Transportation Company. A. B. Karns, 401 American National Bank Building, St. Paul, secretary. [E. R. J., April 2, '10.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company is preparing plans for building extensive freight terminals on the north shore of False Creek. A permit will shortly be requested for the first of the buildings, being a freight house 80 ft. x 120 ft.

Los Angeles (Cal.) Railway.—This company is said to be considering plans for erecting an office building and transfer station in Los Angeles on the block bounded by Eleventh Street, Hill Street, Main Street and Twelfth Street.

Stockton (Cal.) Electric Railroad.—This company has purchased 12 acres of land north of the car houses and adjacent to Oak Park, in Stockton. It is stated that the land will be used for extending the car houses, material yards and shops of the company.

Connecticut Company, New Haven, Conn.—This company is considering plans for building another story to its new car houses on State Street and James Street, in New Haven. The plans call for a 1-story structure with the walls of sufficient thickness to allow for the adding of a second story in the future if desired.

Boston (Mass.) Elevated Railroad.—The site for the new terminal of this company in East Cambridge will be in Lechmere Square, between Bridge Street and Cambridge Street. It is expected to begin work in the near future. Edward Mahler, purchasing agent.

Union Street Railway, New Bedford, Mass.—This company is considering plans for building a west wing to its car house on Pope's Island, New Bedford. This wing will be a duplicate of the present east wing of the car house, and will accommodate about 50 cars. E. S. Wilde, New Bedford, purchasing agent.

Ogdensburg (N. Y.) Street Railway.—The car house and seven open summer cars and the entire repair equipment of this company at Ogdensburg were destroyed by fire on Jan. 24. It is said that the loss is about \$17,000. It is reported that the loss is covered by insurance, and that the company will rebuild at once, probably in a more central location.

Cincinnati Union Depot Terminal Company, Cincinnati, Ohio.—This company has completed new plans for building a combined steam and interurban union station at Cincinnati. The buildings and grounds will both be larger than contemplated in the original plans, and several other changes have been made. J. E. Bleekman, vice-president. [E. R. J., May 28, '10.]

Columbus Interurban Terminal Company, Columbus, Ohio.—This company is taking new bids for building a new terminal station at Columbus. The structure will have two stories and basement, and will be 60 x 150 ft., of brick construction. D. H. Burnham & Company, 9 Jackson Boulevard, Chicago, are receiving the bids.

Nashville (Tenn.) Interurban Railway.—This company has completed and opened to the public its new station at Seventh Avenue and Broadway, in Nashville. The offices of the company will be moved into this building.

Cleburne (Tex.) Street Railway.—This company has nearly completed its new brick car house in Cleburne. [E. R. J., Sept. 10, '10.]

Janesville Traction Company, Madison, Wis.—This company has nearly completed its new car house in Janesville. The structure will accommodate about 15 cars. The cost is estimated to be about \$10,000.

POWER HOUSES AND SUBSTATIONS

Sacramento & Sierra Railroad, Sacramento, Cal.—This company is considering plans for building a new power plant at Chili Bar on the south fork of the American River. B. F. Hulings, Sacramento, local representative. [E. R. J., April 23, '10.]

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company will place contracts during the next two months for equipment for one power station. J. J. Burns, Isabella Building, Chicago, Ill., purchasing agent.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—The substation of this company at Boone was recently destroyed by fire. Frank Arnold, Boone, superintendent.

Waterville & Fairfield Railway & Light Company, Waterville, Maine.—During the next 10 weeks this company will purchase a two-phase, 60-cycle, 2300-volt, 400-kw or 500-kw turbo-generator. Ralph J. Patterson, Waterville, purchasing agent.

Tide Water Power Company, Wilmington, N. C.—This company will soon purchase one boiler, one 500-kw rotary and two 200-kw transformers. A. B. Skelding, Wilmington, purchasing agent.

Rutland Railway, Light & Power Company, Rutland, Vt.—Preparations are being made by this company to begin the construction of a new substation near the Eureka quarry at North Poultney. The structure will be 20 ft. x 20 ft., of concrete and fireproof construction. It will contain 75-kw transformers stepping the current from 13,200 volts to 2300 volts. G. Tracy Rogers, president.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company has purchased and will install in March one 1000-kw Curtis turbine generator at its power plant in Lynchburg.

Manufactures & Supplies

ROLLING STOCK

Columbus (Ga.) Railroad expects to purchase six single-truck cars.

Kankakee (Ill.) Electric Railway will purchase two passenger cars.

Goldsboro (N. C.) Traction Company will purchase two passenger cars.

Wilkes-Barre (Pa.) Railway will purchase 20 additional passenger cars.

Hull (Que.) Electric Company proposes to remodel 20 of its passenger cars.

Peterborough (Ont.) Radial Railway will order two or three single-truck cars.

Enid (Okla.) Interurban Traction Company will purchase three storage battery cars.

Tri-City Railway & Light Company, Davenport, Ia., will order ten interurban cars.

Peoria (Ill.) Railway has purchased two McGuire-Cummings standard snow sweepers.

Guelph (Ont.) Radial Railway expects to purchase a number of pay-as-you-enter cars and trucks.

Wichita Railroad & Light Company, Wichita, Kan., expects to purchase a number of motor cars.

Salt Lake & Ogden Railway, Salt Lake, Utah, will purchase ten trail cars and ten hot-water heaters.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., will purchase four closed passenger cars.

Morgantown & Southern Railway, Morgantown, W. Va., will order two passenger cars, one open and one closed.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., will order two new open cars and equipment.

Dayton & Troy Electric Railway, Dayton, Ohio, will purchase two 60-ft. three-compartment passenger car bodies.

Homestead & Mifflin Street Railway, Homestead, Pa., will purchase one car, complete, with all necessary equipment.

Scranton (Pa.) Railway has ordered ten 43-ft. cars, of the pay-within type, from the Cincinnati Car Company, Cincinnati, Ohio.

Rockland, South Thomaston & St. George Railway, Rockland, Me., will order one work car, with trucks and motors, one snow plow and two trucks.

Texas Traction Company, Dallas, Tex., expects to purchase four single-truck cars, with 18-ft. car bodies and two 30-hp motor equipment for each car.

Wilmington & Philadelphia Traction Company, Wilmington, Del., has ordered through J. G. White & Company, Inc., New York, N. Y., 22 cars, 38 ft. long, from The J. G. Brill Company.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., it is reported, will purchase six fully equipped interurban cars and one 50-ton locomotive.

Long Island Railroad, New York, N. Y., will purchase 30 steel passenger cars, 10 steel parlor cars, 5 steel combination cars and 5 steel combination mail and passenger cars.

Winona Interurban Railway, Winona Lake, Ind., reports that it has for sale three 13-bench open cars, mounted on Taylor trucks and built by the Jewett Car Company. The cars have never been used.

TRADE NOTES

McKeen Motor Car Company, Omaha, Neb., has received an order from the Ann Arbor Railroad for five 70-ft. gasoline motor cars.

Pressed Steel Car Company, Pittsburgh, Pa., has elected O. C. Gayley a director of the company to succeed F. G. Ely, deceased.

Hicks Locomotive & Car Works, Chicago Heights, Ill., valued at \$750,000, will be sold by William McInnes, receiver, at Chicago, Ill., on Feb. 21, 1911.

Ackley Brake Company, New York, N. Y., has shipped large orders of Ackley adjustable brakes to Johannesburg and Durban, Natal, and Cape Town, South Africa.

General Railway Signal Company, Rochester, N. Y., will move its New York offices on Feb. 4, 1911, from the Night & Day Bank Building to suite 2806 Liberty Tower, 55 Liberty Street.

American Ship Windlass Company, Providence, R. I., has furnished the Cleveland Railway three Taylor furnaces with overfeed extension grates which have been installed under three 512-hp B. & W. boilers at the Cedar Avenue power plant. This equipment was placed in operation Dec. 12, 1910.

Harold Kirschberg has been appointed engineer for the Heany Lamp Company, the Novelty Incandescent Lamp Company and the Tipless Lamp Company, with headquarters at 1733 Broadway, New York. Mr. Kirschberg, up to this time, has been illuminating engineer of the Pennsylvania Railroad.

Burton W. Mudge & Company, Chicago, Ill., have elected Thomas H. Garland vice-president. In this capacity Mr. Garland will devote his time to the manufacture of various devices which he has designed and patented. Mr. Garland recently resigned as general agent of the refrigerator service of the Chicago, Burlington & Quincy Railroad.

Chicago Pneumatic Tool Company, Chicago, Ill., has appointed W. P. Pressinger manager of the compressor department, with headquarters in New York. Mr. Pressinger resigned as vice-president of the Keller Manufacturing Company, Philadelphia, a short time ago, and at that time sold his interest in the company.

Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., has appointed S. R. Fuller, Jr., district manager in charge of the Chicago office. Mr. Fuller was formerly sales agent in the New York office. George L. L. Davis, assistant to the vice-president, has been elected third vice-president of the company. Mr. Davis will remain in charge of the St. Louis sales office.

Lord Manufacturing Company, New York, N. Y., reports that during the year 1910 it sold enough Earl catchers to equip all city cars purchased in the United States and Canada, and more than enough Earl retrievers to equip all interurban or suburban cars purchased. It still has a large number of unfilled contracts and future orders on hand. Aside from the large output in the United States the company has also made shipments of these same devices to nearly every foreign country.

National Carbon Company, Cleveland, Ohio, has just completed its fifth annual salesmen's convention, which was held at the general offices. During the convention a great deal of time was given to the demonstration of various products used in connection with different types of apparatus. A good part of the time was spent in the brush-testing laboratory, where the Laclede railway motor brush was demonstrated in practically every type of service that it is possible to reproduce. The brush-testing laboratory is thoroughly equipped with apparatus to reproduce every known phase of brush service. About 150 people attended the convention. The annual banquet was held at the Colonial Hotel, with Dr. Steinmetz, of the General Electric Company of Schenectady, as speaker of the evening.

Allis-Chalmers Company, Milwaukee, Wis., has announced the appointment of E. T. Pardee, formerly manager of its Boston office, as manager of its power and electrical department. Mr. Pardee began his business experience with the Western Union Telegraph Company at Syracuse, N. Y., with which company he was connected from 1885 to 1891. Subsequently he represented the Fort Wayne Electric Corporation at Omaha and San Francisco from 1891 to 1898, being advanced in the latter year to manager of the Boston office, which position he held until 1901. In that year he entered the Boston office of the Bullock Electric Manufacturing Company as a salesman, and remained with Allis-Chalmers Company in a similar capacity after it acquired the Bullock Company. Mr. Pardee was made manager of the Boston office of Allis-Chalmers Company in 1905. He will be succeeded as manager of the Boston office of Allis-Chalmers Company by T. J. Lynch, who for the past seven years has been manager of the Toronto office of Allis-Chalmers-Bullock Company, Limited.

ADVERTISING LITERATURE

United States Electric Company, New York, N. Y., has issued bulletin No. 101 on Gill selectors for telegraph service.

National Tube Company, Pittsburgh, Pa., has issued a small booklet, describing Shelby seamless cold-drawn steel trolley poles.

Allis-Chalmers Company, Milwaukee, Wis., has issued bulletin No. 1510, on direct-connected Reynolds-Corliss engines and generators.

Western Electric Company, New York, N. Y., has issued bulletin No. 1117, illustrating and describing central-battery telephone sets and accessories.

Parmenter Fender & Wheel Guard Company, Boston, Mass., has issued a catalog illustrating and describing the Parmenter fenders and wheel guards.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued a stuffer circular, No. 257, describing the new six-station inter-connu-phone.

Universal Safety Tread Company, Boston, Mass., has publishing a catalog on the Universal safety tread for use on stairways, thresholds, subway platforms, sidewalks, bridges and car steps.

Robert W. Hunt & Company, Chicago, Ill., has republished in pamphlet form the report of the joint committee of the American Society for Testing Materials on "Concrete and Reinforced Concrete."

Steel City Electric Company, Pittsburgh, Pa., has issued bulletin C, on "Universal Insulation Supports." In this connection the company has also printed blotters illustrating and describing the supports.

Heath & Milligan Manufacturing Company, Chicago, Ill., has published "Co-operation and Expansion" for January, 1911, in which is stated that the contest which was carried on during 1910 will be repeated in 1911, owing to its great success.

Fairbanks, Morse & Company, Chicago, Ill., have published a very interesting booklet entitled "Catechism on Direct-Current Apparatus," giving definitions of electrical terms and describing the construction and uses of different electrical machines.

Jordan Brothers, New York, N. Y., have issued a circular letter calling attention to the electrical equipment manufactured by them. Accompanying this is a large map of greater New York, containing general information about the city and a number of views, which show some of the methods of attaching the "Jordan" commutator truing device.

General Incandescent Lamp Company, Cleveland, Ohio, has just issued a folder describing railway "Tantalum" lamps. The folder is illustrated with two engravings, one showing a car lighted with 25 16-cp carbon lamps, consuming 1600 watts, the other showing the same car, lighted with 25 16-cp "Tantalum" lamps, consuming 925 watts.

United States Electric Company, New York, N. Y., has issued bulletin No. 501, on "Gill Selectors" for telephone train dispatching. The bulletin contains a number of illustrations and describes the development of the selective calling system particularly in its application to railway telephony and explains the functions and service of the selector and the answer back. The company also states that, although the first installation of the system was put in service less than four years ago, there are now more than 35,000 miles of line being used by the railways of the United States.

J. G. Brill Company, Philadelphia, Pa., has issued the "Brill Magazine" for January, which contains a biographical sketch of Arthur W. Brady, president of the Indiana Union Traction Company and the American Electric Railway Association. The sketch is accompanied with an excellent portrait of Mr. Brady, as a supplement. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Buenos Aires, Argentina," "Interesting Interurban Cars for the Chicago & Joliet Railway," "Open and Closed Cars for Athens, Georgia," "Baggage Car for the Washington Railway & Electric Company," "Semi-Convertible Cars for the Clinton Street Railway," "Pay-As-You-Enter Cars for Columbus, Ohio," and "A History of The J. G. Brill Company."

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CONTENTS.

"Deceleration" or "Retardation".....	247
Larger Depreciation Fund in St. Louis.....	247
Improving Old Shops.....	248
The Neck of the Bottle.....	248
The Weight of Steel Cars.....	248
Elevated Railways and Subways.....	249
Improvements on the Lehigh Valley Transit System.....	250
Snow Fighting Equipment for the Brooklyn Rapid Transit System.....	255
The Arnold Pittsburgh Report.....	257
Central Electric Railway Association Committees.....	262
Central Electric Railway Traffic Association Committees.....	263
Prize Article by Portland (Ore.) Trainman on "How to Avoid Accidents".....	264
Comments on the Safety of Operation of Electric Roads.....	265
Testimony Before the Railroad Securities Commission.....	265
Report to Stockholders of Cleveland Railway.....	266
Brown Book of the Central Electric Railway Association.....	267
Traffic Association Proposed for Illinois.....	267
Automatic Block Signals for Electric Railways.....	268
Report on Subways for Chicago.....	272
Governors' Messages.....	273
New Express-Passenger Motor Car for Illinois Traction System.....	275
News of Electric Railways.....	276
Financial and Corporate.....	279
Traffic and Transportation.....	282
Personal Mention.....	284
Construction News.....	286
Manufactures and Supplies.....	288

"Deceleration" or "Retardation"

We are glad to second the protest made by C. O. Mailloux, in the current issue of the *Transactions* of the A. I. E. E., against the use of the words "deceleration" and "decelerate," because the same ideas can be expressed by the words "retardation" and "retard," which are etymologically correct. In an industry which grew so quickly and is still expanding so rapidly as the electrical industry it is not surprising that some barbarisms should have crept into the nomenclature employed. Certain of these have been used so long to designate a particular kind of apparatus, or some special process or effect, that they seem to have become engrafted on our language. This is not true, however, with regard to "deceleration" and "decelerate," which are based on a misconception of the fundamental meaning of the word "accelerate" and are philological counterfeits. It may not be possible to purify the English language from all of the questionable terms which have come into it as a result of the electrical industry, because in many cases there is no proper and well-recognized equivalent. But this is not the case with "deceleration" and "decelerate," and the effort to abolish these words from exact writing should have the support of all.

Larger Depreciation Fund in St. Louis

A still further increase in the percentage of gross earnings set aside for depreciation has been made by the United Railways Company of St. Louis. According to the annual report of President Robert McCulloch, which has just been published by the company, the charge of 10 per cent of gross for this purpose is due to the fact that experience had shown that this proportion was "required to provide for the present annual depreciation of the property." The allowance for depreciation was computed upon the total gross revenue and amounted to \$1,153,777—that is to say, it was computed upon the revenue from transportation plus the revenue from operation other than transportation. The operating expenses were 52.8 per cent on \$6,096,794 of the gross earnings, so that the total of the expenses and the depreciation charge was equal to 62.8 per cent of gross. The taxes were not included in these expenses and amounted to an additional expenditure of 5.7 per cent of gross. It is unfortunate that the report does not give the details of operating expenses as charged. They would show the proportion of earnings applied to maintenance before the expenditures on this account were supplemented by the appropriations for depreciation. The policy under which the United Railways started the establishment of a depreciation reserve fund was inaugurated in 1905, when 5 per cent of gross was set aside. This rate was maintained annually until the middle of 1909. The rate was increased then to 6 per cent, and the total reservation for 1909 was equal to about 5.5 per cent.

Improving Old Shops

Time and money expended in the improvement of old repair shops on systems where the conditions do not justify the erection of new plant for maintenance purposes seldom fail to return high rates of interest. It pays to go over such properties thoroughly every year or two in the effort to improve the conditions of production, for, irregular as may be the work of rolling-stock maintenance even on a large system, it has many points in common with routine production in the factory. A recent survey of machine shop practice disclosed the need of the following improvements, many of which are capable of immediate application in electric railway service: The increasing practice of making patterns locally necessitated the enlargement of a pattern storage annex to contain all patterns used on the system in orderly classification; the erection of a small, temporary storage room for the reception of machine and supply parts stripped from equipment undergoing overhauling was desirable, as it obviated trouble from the accumulation of scattered material around the yard and the frequent loss of good stock carelessly thrown into the scrap bin; the provision of an electric drying stove to be installed for use in connection with a blue-printing outfit. Other needs were the replacement of a decayed and broken wooden floor with one of concrete, surfaced with new boarding, and with the electric wiring for machine tools transferred to pipe conduit beneath the floor instead of being allowed to run loosely through the shop, and the installation of overhead crane facilities, with a stronger roof construction.

The Neck of the Bottle

On Jan. 23 the Interborough Rapid Transit Company began operating the first of the 10-car express trains in the New York subway. As soon as all the station platforms have been lengthened to accommodate longer trains all the express trains will have 10 cars and the local trains will be increased in length from six cars to eight. The maximum possible number of trains is now being operated during the rush hours and no further relief from congestion of traffic can be expected after the longer trains are put on. When the subway was first opened the Brooklyn Bridge terminal was the point of greatest congestion and delay to trains. Later the junction of the Broadway and Lenox Avenue divisions at Ninety-sixth Street became the critical point as the number of trains was increased. The separation of grades at this point was avoided by the introduction of speed-control signals which permitted the passage of trains through the junction at closer intervals than were allowed by the length of station stops below Ninety-sixth Street. The time of station stops was next reduced by fitting the cars with center-side doors and automatic starting signals operated by the closing of all the doors in a train. Now the neck of the bottle is the stretch of track between Ninety-sixth Street and 110th Street on the Lenox Avenue division. There are no stations between these points, but several curves require slow-speed running, and the capacity of this section is taxed to the utmost. As the Broadway trains are alternated with Lenox Avenue trains no more trains of the former division can be operated as long as the capacity of the latter division is limited beyond the Ninety-sixth Street junction. Speed-control signals are now being installed on the congested section in the expectation of crowding through perhaps one or two more trains an hour. Little did the builders of the subway think that a long stretch of track on one division beyond the four-track section would ever limit the capacity of the entire system.

THE WEIGHT OF STEEL CARS

The possibility that the use of steel can still further reduce the weights of street car bodies by the employment of pressed and structural steel in car construction is attracting the attention of many designers who for a long time held to the theory that, pound for pound, wood was stronger and stiffer than steel when properly framed into a complex structure, such as a car body. The first attempts at building all-steel passenger cars did not go far toward disproving this theory, but recent developments in the art of pressing and bending steel plates and rolled sections into almost every conceivable shape have made possible the use of many novel forms of construction having great strength and extremely light weight. Wood is an uncertain material as regards strength, and hence when it is used a large factor of safety must be employed. Designers have been guided in selecting sizes and shapes of timber for the principal members of the car-body framing more by the results of experience with the cut-and-try method than by exact mathematical calculations of strength and deflection under load. The formulas which enable the bridge engineer to design the details of a steel structure from a stress diagram have no place in the design of a wooden car. As the study of car design has developed, however, the stresses to which the different members are subjected under given conditions of loading have been more accurately ascertained and the application of these data to the design of steel cars should result in an appreciable decrease in the weight without sacrifice of the necessary strength or stiffness of any part.

A comparison of the weights of some recent steel cars shows how far the reduction of the weight has been carried in the latest cars as compared with those built a few years ago. The all-steel pay-as-you-enter cars of the Chicago Railways which were built in 1909 were very carefully designed with respect to the reduction of weight, and as a result they have a weight substantially the same as that of the wooden cars of the same general design and dimensions, of which the Chicago Railways have more than 600 in service. The body weight is 19,800 lb., and the cars have the following unit weights: Weight of body per seat, 494 lb.; weight of body per foot of length, 403 lb.; weight of body per square foot of floor area, 46 lb. These weights may be compared with the corresponding unit weights of the bodies of the Third Avenue Railroad's semi-convertible cars, which are of extremely light-weight wooden construction. The respective unit weights of the Third Avenue cars are 337 lb., 376 lb., and 43.5 lb. It will be seen that the wooden cars of the Third Avenue Railroad are much lighter than the steel cars of the Chicago Railways when compared on any one of the three bases of unit weight.

The type of semi-steel cars built last year for the Pittsburgh Railways is much lighter than the Chicago steel cars. The entire body below the windows is built of steel, while the roof and interior trim are wood. Owing to the elimination of the front platform and the utilization of this part of the car-body floor for seating passengers, the Pittsburgh cars have an exceptionally large seating capacity for their length and weight. The weight of the body per seat is only 315 lb., or 22 lb. less than the Third Avenue cars. The weight per foot of length is 385 lb., which is slightly more than the Third Avenue cars. The weight per square foot of floor area, however, is even higher than that of the Chicago steel cars, being 46 lb. This is due to the fact that a large part of the total floor area which is

represented is occupied by seats instead of by platforms.

The lightest steel car bodies of which we have data of weights and dimensions are the new pay-as-you-enter cars of the Jacksonville Electric Company. Only a small amount of wood is used in these cars, and it is employed for such structurally unimportant purposes as the flooring, seat-arm caps, door and window frames, etc. The bodies are 39 ft. 6½ in. long over platforms and weigh only 12,179 lb. The weight of the body per seat is 276 lb.; weight per foot of length, 308 lb.; weight per square foot of floor area, 35.4 lb. These weights are 20 per cent less than the corresponding weights of the Third Avenue Railroad wooden cars. They were obtained largely by the use of very light T-sections for one-piece posts and curved car-lines, the substitution of sheets of composition board covered with canvas on the outside and painted on the inside in place of steel roof sheets, and several other radical departures from previous practice. Time alone will show whether the reduction in weight has been made at the expense of cost of maintenance.

Perhaps the best example of the reduction of weight in steel cars of successive designs is shown in the subway cars of the Interborough Rapid Transit Company. The bodies of the first steel cars, built in 1904, weighed 34,000 lb. This was reduced to 32,000 lb. in the 1907 type cars and was still further reduced to 28,540 lb. in the 1909 type cars. The body weight of the 1909 type cars compares favorably with the weight of wooden interurban car bodies of equal or greater length. The weight per foot of length is only 557 lb. and the weight per square foot of floor area is 65.7 lb. A typical high-speed interurban car body built almost entirely of wood weighs 710 lb. per foot of length and 78 lb. per square foot of floor area.

The above comparisons show that steel car bodies do not necessarily weigh more than wooden car bodies of the same size and type. The question of weight, however, is not the only factor to be considered. The first cost of steel cars at the present time is in most instances higher than that of wooden cars owing to the expensive dies and templates required for pressing and punching the various members of the framing. The maintenance cost of steel passenger car bodies has not yet been definitely established, and in a shop not properly equipped to handle repairs of steel cars the cost might be excessive.

Another problem which is a serious one in the operation of steel cars is the difficulty of insulating them against the transfer of heat from the inside to the outside during cold weather. Owing to the narrow over-all width permissible in cars operated on city streets, no width can be sacrificed on the inside of the car for dead-air spaces, or even for a moderate thickness of insulating material. In some recent steel suburban cars it was found necessary to install 68 electric heaters in each car in order to maintain a comfortable temperature. In spite of these objections the steel car seems to be destined to come more and more into general use. The Pullman Company, the Pennsylvania Railroad and several other large steam railroad systems have definitely abandoned the wooden car in favor of the all-steel car, principally because of the greater safety of the latter in collisions. Safety is not such an important consideration in the construction of cars for city service, because of their comparatively low speed, but it nevertheless is of sufficient importance to turn the balance in favor of the steel car if the first cost can be kept down, and experience shows that the maintenance cost, including painting, is at least no higher than that of wooden cars.

ELEVATED RAILWAYS AND SUBWAYS

The elevated railway reached the height of its popularity in this country about ten years ago. At that time there were about 340 miles of elevated track in the United States, all operated by electricity. Over half of this was in New York and Brooklyn. The remainder was divided among Chicago, Baltimore, Boston, Kansas City and Jersey City. The most important elevated structures built during the last decade have been those in Philadelphia and the elevated extensions of the Interborough Rapid Transit Company in New York and of the Long Island Railroad in Brooklyn. In all three of these cases the elevated lines were built simply as extensions to subway systems. It seems worth while at this time, when subways are being seriously projected, not only by the largest cities but also in such places as Cleveland, Toronto and Los Angeles, to consider the relative advantages from an operating standpoint of both elevated and subway systems.

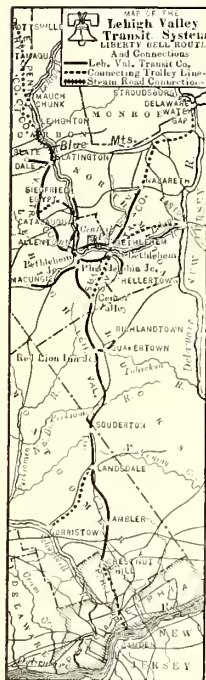
Since the opening of the Boston and New York subways little has been heard of elevated structures. Undoubtedly this is largely because the most conspicuous work of a rapid transit character in the largest cities recently has been underground. But in situations which would often warrant the construction of an elevated structure a subway at four to five times the expense would be out of the question. Again, at the same ratio of cost, from four to five times as many miles of elevated track can be built as would be the case if the tracks were underground. At the same time an elevated structure will afford practically every advantage from a traffic standpoint possessed by a subway and will in addition provide much more agreeable and practically as rapid transit for passengers.

The two principal objections to an elevated system, as compared with a subway, are its appearance on the street and the fact that owners of abutting property can collect damages for noise and the deprivation of light and air. Both of these objections are based largely upon existing elevated structures, and we believe that the objections to the appearance and the noise of elevated railways would disappear in large measure with a modern design of structure. The actual damage suffered by the abutting property from loss of light depends very largely upon the width of the street on which the elevated road is built. If the road is the property of a private company and the courts construe the common law strictly, the expense from property damages of various sorts may be, and in some cases has been, almost as much as the cost of the construction of the road itself. Even then, however, an elevated road is much cheaper than a subway, which also is liable to some damages because of encroachment upon underground vaults. But we believe that it will be possible by proper design largely to reduce these consequential damages.

In other words, we believe that the day of elevated railway construction is by no means past. For all except the very largest cities it affords a means for relieving street congestion not otherwise possible, and it should be particularly useful as providing a means by which high-speed suburban cars can enter a city without undue delay from street traffic. In fact, the elevated road should prove desirable in practically every case where a subway is considered except in those instances where the extent of traffic is such as to require a four-track line. In such cases a subway would probably be preferable to an elevated road.

IMPROVEMENTS ON THE LEHIGH VALLEY TRANSIT SYSTEM

During the past year (1910) the Lehigh Valley Transit Company, Allentown, Pa., under R. P. Stevens, president, has instituted a number of physical and operating improvements and important changes in the organization. The following paragraphs will describe in detail the work which has been done or which is now under way in each department.



Map of System

TRACK LINE, DISPATCHING AND SIGNALS

The 50-lb. and 55-lb. T-rails, which were the former standard on suburban lines, have been replaced by rails weighing 80 lb. per yard, which weight will be the future standard for suburban construction. Continuous joints have been adopted for these rails, and the entire system has been rebonded with the electric-weld rail bond of the Electric Railway Improvement Company, Cleveland. The company is permitted, and, in fact, in some cases is ordered, to use T-rails in the streets of certain cities. It therefore uses T-rail paving in those cities where paving is required and where the street traffic is not exceptionally heavy or severe. Such rails weigh 90 lb. per yard; the groove is formed by special beveled blocks. Allentown is the only city on the system where girder rails are installed. Another general track improvement has been the installation of solid manganese special work to replace manganese center construction.

These changes have had an excellent effect on the traffic of the company. On the 21-mile line from Allentown to Slatington, for instance, the receipts have risen 33 1/3 per cent, due primarily to eliminating a number of curves and grades and otherwise improving the track structure. The increased business is carried on two cars instead of three because the running time was reduced from one and a

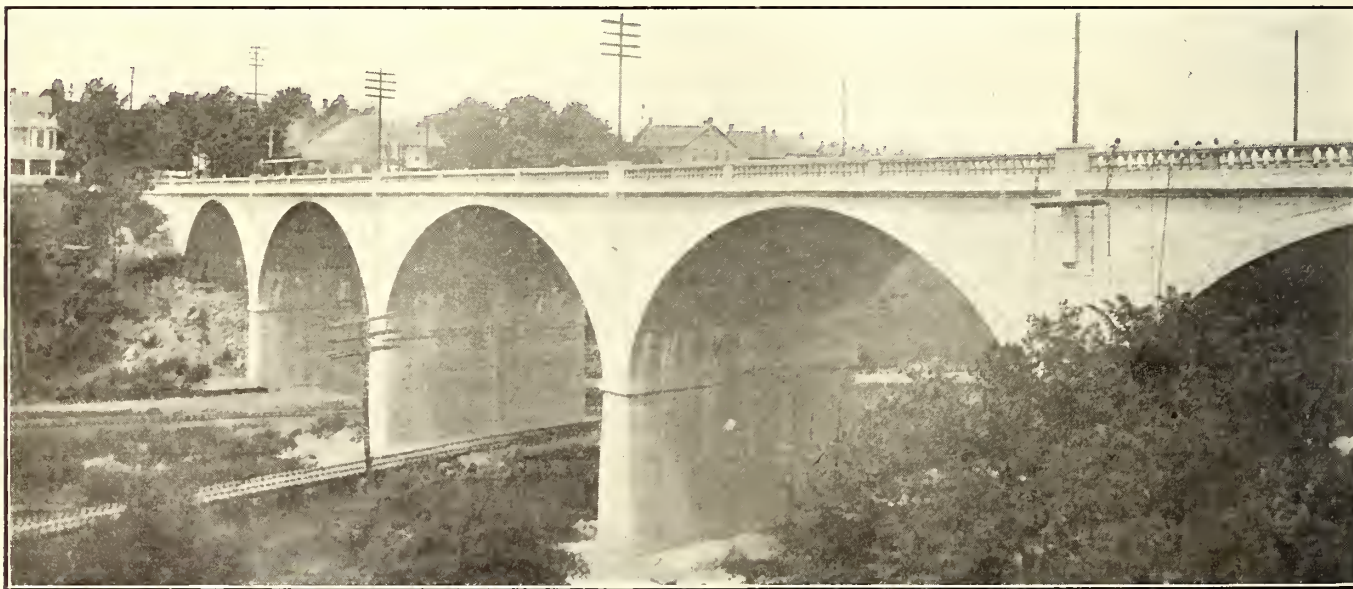
sonable expense. The company is also investigating the standard steam road block signals manufactured by the Union Switch & Signal Company and the General Railway Signal Company. Propositions from these companies are now being considered and it is quite probable that an experimental outfit of either one of these signals will be tried out.

Isolated curves will be equipped with individual signals, but only one signal will be needed for the protection of several curves in proximity.

A feature which is contributing greatly to the safety and dispatching facilities of this railway is the installation of Western Electric telephone outfits on the cars of the Philadelphia and Slatington lines. Wires from the car boxes are plugged into jack boxes which are placed on the line poles at convenient intervals. The railway's contract with the Bell Telephone Companies in this vicinity permits connection to be made not only to the local system but also to the long-distance service. Consequently a person on one of these cars has the same telephoning facilities as if he were at a regular Bell telephone. This arrangement has proved a great convenience to the officers of the company when they wished to communicate with employees or others on parts of the system which could not be reached by the limited private telephone. Another favorable feature of this contract is that the telephone company maintains all instruments and the wires inside of the city limits, while the railway maintains only the lines outside of the city and has nothing whatever to do with the maintenance of the instruments.

POWER CONDITIONS

The industries of the territory served by the Lehigh Valley Transit Company have been growing so rapidly that the company has already found it necessary to increase its power station equipment, despite the fact that it completed but recently the power station described in the *ELECTRIC RAILWAY JOURNAL* of July 30, 1910. This growth in power business is not due so much to the normal increase in the railway load as to the demand from the numerous silk mills and tobacco factories in this vicinity. The additional equipment which has been ordered includes a Westinghouse turbine, rated at 4500 kw, but capable of a continuous maximum output of 6800 kw. At the lower rating this turbine will take 16.2 lb. of steam per



Lehigh Valley Transit—Concrete Bridge at Bethlehem

half hours to one hour. The increase in the business of this line will warrant half-hour service in a very short time.

The management has been giving a great deal of thought to securing the best possible signal equipment. It has now installed two trial equipments of the Nachod trolley contact block signal. Should this device prove satisfactory, it will be installed to protect all curves which cannot be eliminated at rea-

kw-hour. With this turbine there will be installed a Le Blanc condenser, B. & W. boilers, Roney stokers; also a set of Venturi meters for accurately measuring the amount of water evaporated per pound of coal.

The load on the station has increased so that the feed-water pumps are working at their capacity. Instead of installing additional feed-water pumps of the plunger type, it was decided

to use centrifugal pumps, manufactured by the Jeanesville Pump Works and driven by Terry steam turbines, on account of the increased economy obtained by this form of pump over the ordinary plunger pump; the other auxiliary apparatus provides plenty of steam for feed-water purposes.

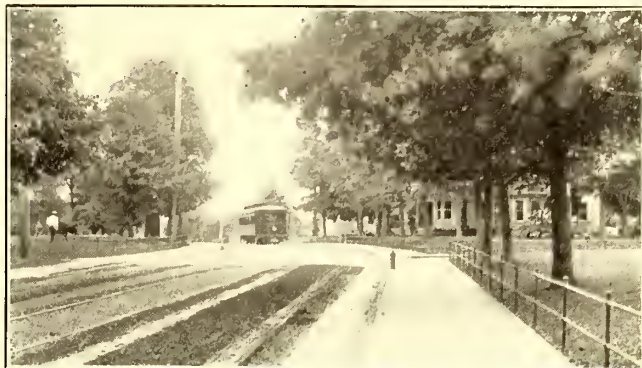
As noted in the general description of the power station previously mentioned, the company is obliged to maintain 25-cycle and 60-cycle distributing systems. This, of course, makes it impossible to obtain the maximum output from the machinery, so that separate reserve equipments must be available. The railway substations receive three-phase current at 25 cycles, 13,200 volts, but a 60-cycle circuit is employed for the lighting and industrial circuits. The rates charged by the company for power are very reasonable. The standard rates quote power as low as 2.4 cents per kw-hour, but the company has special power rates considerably below this for special customers, depending on the amount of power required and the load conditions. In other instances the contract calls for a fixed sum per kilowatt connected plus so much per kw-hour, as shown by the watt-meter.

ROLLING STOCK

Last summer the company purchased from The J. G. Brill Company 10 convertible cars of the type shown in the accompanying illustrations. These cars will be the company's standard, except for high-speed service. They are similar in construction to the convertible prepayment cars of the Third Avenue Railroad, New York, except that the panels are not secured with clips, but have malleable iron strips such as are used on the No. 4000 type convertible cars of the Brooklyn Rapid Transit System. In all there are nine removable panels on each side of the car, reaching from the top of the sill plate to the letter board. There are also two fixed panels of steel at the corners of the car. All panel sash are of French plate glass, which not only looks better than the usual window glass, but is really cheaper in the long run because of its lower breakage factor.

In planning these cars the management desired to obtain a design which would be as attractive as a summer car without having the drawback of a running board. In part, this end was attained by the substitution for the panels of sectional screens which are placed between the posts and which extend from the top of the sill plate to a height of 44 in. from the floor. However, the feature which actually has led the public to prefer this type to the ordinary open-bench car is the door arrangement. The two doors in the end bulkhead slide alongside each other toward the center of the car, so that with the doors open

extends across them and latches to the corner post. When the doors are opened the pipe is held vertically behind the door. The sliding exit door enters a pocket, which has a hinged window on the inside for easy access to the door mechanism and for cleaning the outside windows. Primarily, this prepayment design was adopted for the value of its operating and alighting features.



Lehigh Valley Transit—A View in Coopersburg

The passengers are being educated in the use of the front platform for exit, but the management has no early intention to use the prepayment fare system, on account of the fact that practically all of its lines are at least two-fare lines, or, in other words, have more than one collection. The city service in the different cities is made up almost entirely of suburban and interurban cars running through city streets, and because of the fact that the company would not get as much benefit from the prepayment features on this account as it would if the cars were all operated with one collection, the management has decided to wait until these pay-as-you-enter features are more developed before any decision is reached as to which method will be adopted.

The general dimensions and other statistical data of these cars are as follows:

Length of car body over the corner posts.....	20 ft. 1 in.
Length of each platform.....	5 ft. 10 in.
Length of the car over the vestibules.....	41 ft. 9 in.
Length over the bumpers.....	43 ft. 1 in.
Width over the sills, including plates.....	8 ft. 8 in.
Width over the posts.....	8 ft. 8 in.
Weight of the car and trucks, including Westinghouse air brakes, four 101-B motors.....	49,420 lb.

There are nine reversible rattan seats on each side of the car and longitudinal seats at the front corner, giving a total seating capacity of 44 persons. As a part of the removal panel construction the side sills, which are 4½ in. x 7 in. long-leaf yellow pine, are covered with 14-in. x 9/16-in. steel plate, extending above the level of the floor. The trucks are of the Brill No. 27 M. C. B. type, with 6-ft. wheelbase, 34-in. rolled-steel wheels, with 3-in. thread and ¾-in. flange. The axles are 5 in. in diameter and the journal 4¾ in. x 8 in.

The interior finish of the cars is cherry with composition ceiling. A Consolidated push-button passenger signal system is installed to facilitate operation. Another interesting feature of these cars is the lighting by tantalum lamps. These lamps are being used experimentally only, as the company's low power cost makes the use of the more expensive high-efficiency lamp of doubtful economy.

These cars are equipped with the Cooper Heater Company's improved pressed-steel, automatic-feed, hot-water heaters. These heaters are very much lighter than the previous styles of heaters manufactured by this company. It has been demonstrated that in addition to the saving in weight the advantages of the automatic feed of the coal, the little space which the heater takes up and a few minor improvements over the former Cooper heater result in a fuel consumption which is but a little over one-half of that required by the other type of heaters to give the same amount of heat.

The company has made adequate preparation for snow fighting by equipping its work and freight cars with Russell plows



Lehigh Valley Transit—Waiting Room at the Philadelphia Terminal

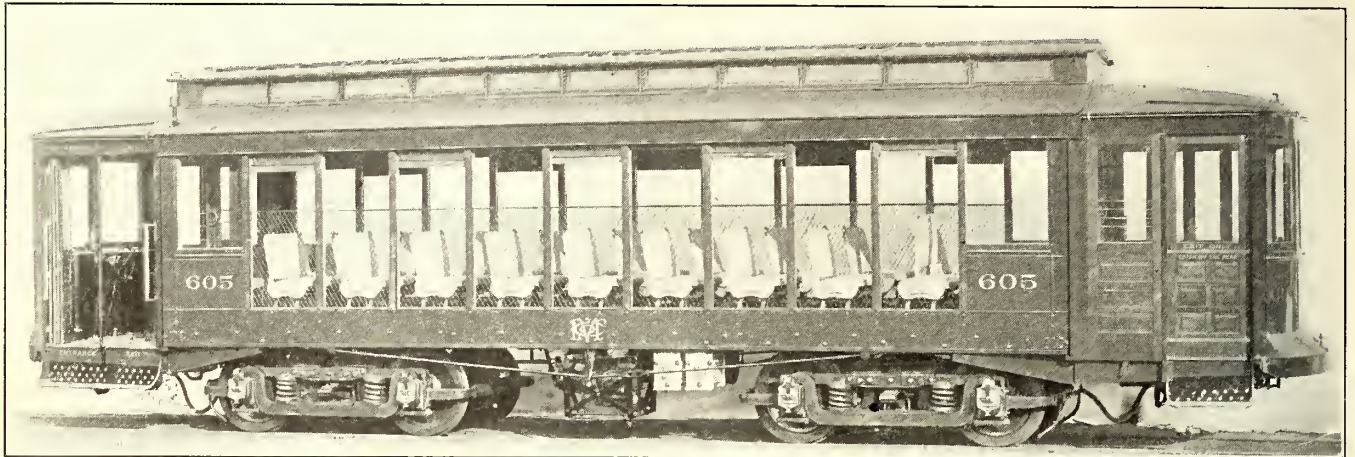
and the vestibule sash down a draft of air passes directly over each line of transverse seats.

The cars are double-ended and have full vestibules with the standard pay-as-you-enter arrangements. Four-section folding doors are provided on the controller side of the car, and a single sliding door on the brake shaft or exit side. When the folding doors are closed a pipe which is pivoted on the doors

and Root scrapers and purchasing five Kuhlman long-broom sweepers, which have just been completed by The J. G. Brill Company. Each sweeper is 27 ft. 8 in. long and 8 ft. wide over all. The cab is 24 ft. 13/4 in. long and 7 ft. 8 1/4 in. wide. The cab is vestibuled at each end and has two sliding doors and five windows on each side. The center doors are carried on baggage-door hangers. The height from the rail to the top of the platform is 4 ft. 4 3/8 in. and to the top of the trolley board 11 ft. 1 1/4 in. The framing of the sweeper is of yellow pine with side sills plated with 5/8-in. x 8-in. steel. The truck has a wheel-

woodworking tools, such as a car mortiser, planer, saws, shaper, lathe and a "Universal" Fay & Egan machine, all of which will be belt-driven from below the floor. The machine shop equipment has recently been enlarged by the addition of a McCabe two-in-one lathe, which handles all steel wheel turning besides a variety of general work. The overhauling facilities are also to be improved by the installation of Q M S pneumatic car-raising apparatus and a car-hoisting outfit from the Columbia Machine Works & Malleable Iron Company.

As noted in the description of the new cars the standard truck

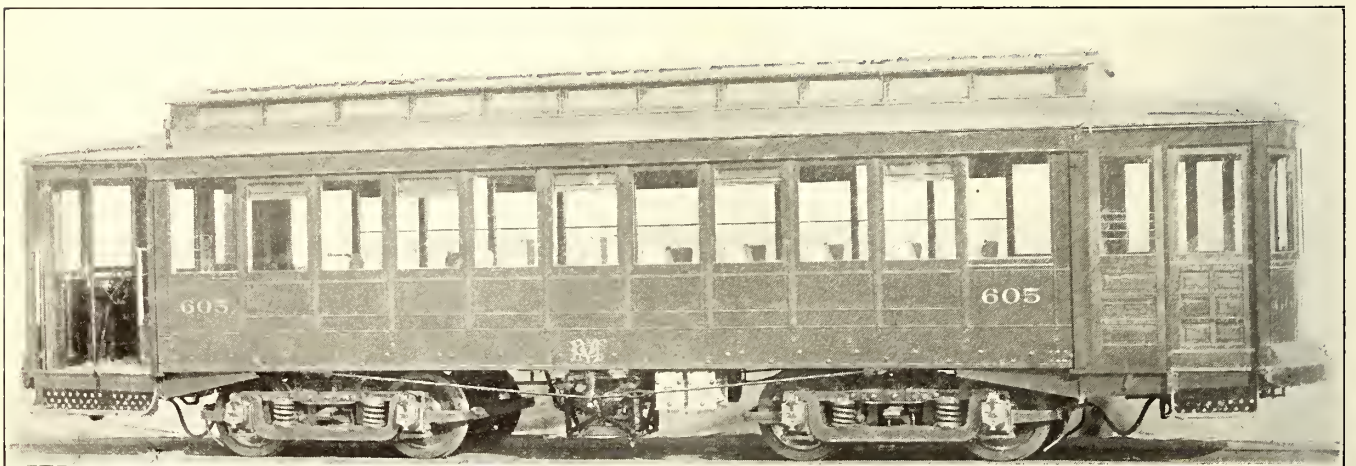


Lehigh Valley Transit—Standard Convertible Car as Used in Warm Weather

base of 6 ft. 7 in. The brooms are 35 1/2 in. in diameter, extending 14 in. outside of the track. The two side plows, which are thoroughly braced, are 6 ft. long and are made of 1/4-in. steel. These plows are 24 in. high and clear the snow for 4 ft. outside of the rail. Two Westinghouse No. 56 motors are used for traction and one motor of the same type for operating the broom.

The company has also adopted a combination express car and snow plow for its standard type of heavy equipment. The large double-truck express cars in addition to the work cars are all equipped with the standard Russell nose and in this way it is possible to get 12 months of the year service out of

for suburban service is the Brill No. 27 M.C.B.-1. The standard high-speed passenger trucks are of Baldwin design. Symington journal boxes are used throughout on all class of trucks. Schoen and Standard solid steel wheels 34 in. in diameter are replacing the 33-in. cast-iron wheels formerly used on all closed cars. The standard brake shoe head of the American Brake Shoe & Foundry Company has been adopted as standard, and all brake shoes, a half-dozen different types of which have been tried out during the past year, have been made to fit this head. These shoes are either of the steel-back type as used successfully on the solid steel wheels of the Philadelphia-Allentown cars or of plain gray iron. The brake shoe cost



Lehigh Valley Transit—Standard Convertible Car as Used in Cold Weather

these cars. The company now has six of these heavy cars, each equipped with No. 121-A 90-hp motors, in addition to 10 of the older type of Brill and Taunton single-truck plows.

MAINTENANCE FEATURES

At present the company is handicapped in maintaining its cars owing to outgrown shop facilities, but eventually a larger structure will be built on another site. To afford immediate relief, however, the paint shop has been removed to a new brick and concrete building, thus giving room for a larger carpentry shop. The latter is being equipped with modern

for September, 1910, was 1.2 cents per 1000 car miles. Three-fourths of the shoes used during that month were gray iron and the rest were steel-backed.

ORGANIZATION OF THE TRAFFIC DEPARTMENT

An important departure in the organization of the Lehigh Valley Transit Company has been the recent founding of a traffic department. Under the direction of President Stevens this department has been taken over by E. C. Spring, who was formerly general superintendent of the Dayton (Ohio), Covington & Piqua Traction Company. As assistant to the presi-

dent and as traffic manager Mr. Spring's work includes the handling of passenger and excursion business, park operation, freight and express service, the industrial department and publicity covering the relations with press and public.

The creation of an industrial department is rather unusual for Eastern electric railways, although such an organization is quite common on steam railroads and on some of the Western interurban railways. The efforts of this department will be devoted to inducing manufacturers to locate their industries along the lines of the company. The traffic manager will keep a list of all manufacturing sites which are available for building or for rental, and will strive to bring together the sellers and buyers of such facilities, co-operating in particular with the local boards of trade. The company has already persuaded several manufacturers to locate buildings along its lines.

The Allentown district is unfamiliar with the advantages of electric freight hauling, but it is believed that the possibilities for business therein are even better than on many Western roads because the proximity of the towns to one another should give a greater revenue per car-mile. Express service in competition with the steam railroads and the old line express companies is given for shipments, which are handled at the rates given in regular freight classifications. While no carload lots are taken, nor is a wagon service maintained, the company is willing to make special arrangements for collection and delivery through local truckmen. The rates from Allentown to Philadelphia, a distance of 52 miles, range from 16 cents to 25 cents per 100 lb.

An agreement has been closed with the Philadelphia Rapid Transit Company to carry goods to the latter's freight terminal at Front and Market Streets in the heart of Philadelphia via express car connections at Chestnut Hill. The Lehigh Valley Transit Company has made a list of all Philadelphia concerns which ship to towns along its lines and is mapping out a campaign in which every single shipper will be made acquainted with the advantages of routing his goods by the electric line in preference to the steam railroad.

In line with the policy of attracting new business the company has greatly improved its schedule; the mileage of the express cars has been doubled and there are now three daily trips to Philadelphia, each car making a total run of 147 miles. The principle is to maintain a schedule so much better than that offered by competitors that it will create business.

Freight stations for the convenience of shippers are being placed in the more important cities and freight houses will be put up at isolated points where shippers can store their goods under cover. These isolated buildings will be slate-roofed wooden structures approximately 12 ft. x 12 ft. in size. Some of the town stations will be on the premises of local storekeepers. In two places the brick buildings will include rooming quarters for the agent. A freight station for transfers has been erected at Chestnut Hill, Philadelphia, because of the difference in the gage between tracks of the Lehigh Valley Transit Company and the Philadelphia Rapid Transit Company.

In its campaign for traffic the company will depend more upon advertising its service through personal work and private literature than upon newspaper advertising. The agents who will be placed in all the large towns along the line will also look out for the passenger excursion business in their respective localities. The company believes that it is a most vital thing to have local representatives everywhere to look after the details of its business. This practice saves much mileage and time for the officials while keeping them in close touch with the local freight and passenger business. It is the plan also to have the head of the traffic department give talks to the trainmen on what they can do to encourage the public to take advantage of the company's facilities, thereby making each man a publicity agent for the railway.

The traffic department will make a strong effort to get the local public interested in long distance riding. The company is rather fortunate in having on its route such exceptionally attractive trips as the one to the Delaware Water Gap and

through the historic territory between Allentown and Philadelphia, which is rich in Revolutionary lore. Hitherto the public has had the impression that the Gap was accessible only by steam railroad, but by active advertising the company is inducing it to prefer the more convenient and pleasing combination of electric car and auto-bus. During next summer two or three limited trains a day will be run to the Gap. The patronage for this business will be worked up through an excursion agent in Philadelphia and by local representatives.

The long trip to Philadelphia has been aptly termed the Liberty Bell Route. The many places of historic interest along this line should prove especially attractive for school riding. The management, therefore, has placed itself in close touch with the different schools in its territory for the purpose of persuading teachers to organize excursions to different places from time to time. The company gives away a booklet which describes the points of interest along the line, but whenever desired large parties are personally conducted by its representatives. It is worth mentioning that special rates are never offered for this or other excursion business. It is considered a mistake to offer reduced rates when the service is so evidently worth the regular rates and is so far superior to that offered by competing lines.

A large number of minor improvements have also been made on the Philadelphia division, such as the establishment of smoking compartments, Ohmer registers and hot-water heaters in all these cars, a ticket system and terminal stations. A large number of line improvements have also been made by constructing the track on private right-of-way in a great many instances where it was formerly either on or alongside the highway.

The company is planning also to give more attention to the park business. It is the owner of Central Park, which is situated at Rittersville, midway between Allentown and Bethlehem. This is a resort of great natural beauty, which can be reached by a 5-cent fare from the two large cities mentioned. The principal attractions have been free band concerts, vaudeville, musical comedy and comic opera, in addition to the standard amusements, such as the midway, roller coasters, temple of fun, bowling alleys, dancing pavilions, water rides and other standard attractions. It is worthy of note that this park is not only paying operating expenses, but shows a sufficient surplus to pay for the interest on the entire investment. The real estate is increasing in value sufficiently so that the investment always represents the actual value which can be turned into cash in case the park should be eliminated.

Another new traffic-creating feature will be the encouragement of local celebrations, such as "Old Home Week." To this end the company will co-operate with the commercial and social bodies in the several towns.

SUGGESTIONS FROM EMPLOYEES

The management firmly believes in encouraging the employees to submit suggestions for the improvement of the service. Last year \$100 was offered in prizes for suggestions and some exceptionally good ideas were found among the 100 replies. The conductors especially gave the management some excellent suggestions on improving the transfer system and cutting down unprofitable mileage. The transfer changes alone have more than saved the amount of the prizes. Some conductors reported that they had heard many complaints about the ventilation of the cars, particularly on long runs where the doors were closed for considerable intervals. As a result of this matter having been called to the attention of the management 20 equipments of Ford ventilators were purchased from the Automatic Ventilator Company for the equipment of the interurban cars and eventually all cars will be supplied with these devices.

Some three years ago this property was a strong union property, but the unions have all been disbanded and now the feeling against unions is very intense. The company has systematically raised wages each year. It has provided a pension system and an employees' benefit association, besides an employees' outing and picnic each year.

These methods have established a spirit of good feeling between the officials and the employees which could hardly be improved upon.

The pension and sick benefit systems were inaugurated on Jan. 1, 1911. All employees who have been in the company's service continuously for 25 years or over will receive a pension of \$5 per week as long as they live. The following paragraphs will give some particulars of the benefit association.

Membership in the association is limited to employees over 18 years and under 50 years of age who have been in the service for at least three months. Membership ceases when the member leaves the employ of the company, but sick benefit payments continue under certain conditions if the resigning member is suffering from sickness incurred while in the company's employ. Employees who are dishonorably discharged immediately forfeit all association benefits. An applicant for membership must be approved by an authorized medical examiner of the association and indorsed by the superintendent or head of his department. The ordinary initiation fee is \$1 plus 50 cents for the dues of the first month and a fee to the examining physician.

Paid 191	
Date Filed 191	Check No.
LEHIGH VALLEY TRANSIT BENEFIT ASSOCIATION	
NOTICE OF DISABLEMENT AND APPLICATION FOR SICK BENEFIT	
..... 191	
TO THE SECRETARY:	
I, residing	
at and employed as	
in Department, and holding Certificate	
No. hereby certify that I was compelled to quit my	
work at o'clock 191	
on account of	
.....	
which rendered me totally unable to continue my usual duties	
..... Sick Member	
DR. Attending Physician	
Address	
REFERRED TO SECRETARY	This blank is to be filled out by any member of the Association who is unable to perform his usual duties, on account of sickness, and no claim for benefits will be considered unless this Notice, properly filled out, and approved by head of department has been received promptly by the Secretary. Full address and correct time, and nature of disability must be given.
REMARKS:	
..... Head of Department	

Lehigh Valley Transit—Form for Reporting Illness

The regular dues are 50 cents a month. Special assessments must not exceed 50 cents in any one month or \$3 in any one year. Members are not required to pay dues while receiving benefit payments. In case the net balance at the time of the annual meeting is over \$500 any excess will be divided pro rata among the members in good standing. Sick or injured members are entitled to receive \$1 for each day after the first seven days and for each period not exceeding 90 days in any one year. No payment is made on account of disability lasting less than seven consecutive days. On the death of a member the heirs receive \$150.

The accompanying blank shows the procedure followed in applying for a sick benefit. The applicant's statement must be indorsed by the head of his department. If not indorsed, the latter must write his reasons on the form and transmit the report to the secretary of the association. The secretary then details the physician to examine the member in question. Payment is made only if the doctor's report is favorable. The physician also keeps the secretary advised of the progress made by sick members. Sick benefits are paid weekly and death benefits are paid within 30 days after proof of death is filed

with the secretary. Advances may be made by direction of the president of the association for funeral or other urgent expenses incidental to the death of a member up to and including \$60. These advances must not exceed the sum mentioned if they are made without the written consent of the person to whom the death benefit is payable.

The president (or general manager) of the Lehigh Valley Transit Company is the president of the association. The first vice-president is elected at the annual meeting by a majority vote of the members present. The treasurer of the Lehigh Valley Transit Company is always the treasurer of the association. The secretary is appointed by the board of trustees. The management of the association is vested in a board of trustees, which consists of a chairman and six members. The president is also the chairman of the board of trustees. The president of the Lehigh Valley Transit Company appoints three members of the board, one of whom is the company's treasurer, one the company's vice-president and one a representative of either the railway or the lighting department. The other two trustees are elected by a majority vote of the members present at the annual meeting. The term of office of the trustees is one year and they meet at least once a month.

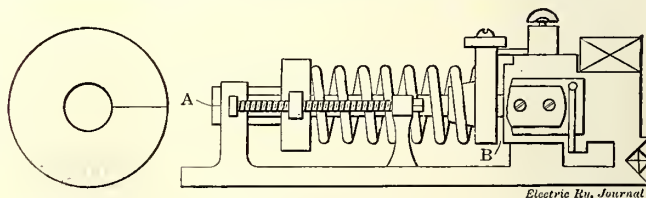
FINANCIAL

The preliminary report on the company's earnings for the year ended Nov. 30, 1910, shows a surplus of about \$211,000 above all charges. The report shows considerable additions to income from the railway business and also from the sale of power, electric lighting and express business. The surplus compares with a surplus for 1909 of \$101,688. The company has now doubled its surplus for each of three successive years and has followed a conservative policy of investing it in improvements.

ADJUSTING WESTINGHOUSE ELECTRIC PUMP GOVERNOR

BY GEO. H. COLEMAN

When the adjusting attachment is not used with the Westinghouse electric pump governor, type G-I-A, it is regulated with difficulty. Those using this type have found that when the governor is set to cut out at 90 lb. it will not cut in again until the air pressure has been reduced to about 68 lb., making a variation of 22 lb. When the air is thus reduced the brakes give poor service. On the magnetic type the piston is held by the magnetic coil and spring. Consequently, when the pressure against the piston is sufficient to overcome the magnet and spring the armature begins to move away from the magnet. As the power of the magnet decreases faster than the tension of the spring increases, the rate of movement of the piston and armature increases more and more rapidly until the current is



Adjusting Attachment for Electric Pump Governor

broken at the contacts. Then the electromagnet loses all its power, and the entire load is thrown upon the spring. As a result the armature and circuit closer are forced away from the magnet and contacts with a quick movement.

To correct this fault use a piece of cardboard about 3 in. in diameter, with a hole cut in the center large enough to admit the shaft. Cut the cardboard as shown in illustration, so that when the armature and circuit closer are released from the magnet it can easily be placed at "B" without taking the governor apart. Put a little shellac on the cardboard and it will hold firmly to the armature. This will make a magnetic gap the same width as the thickness of the cardboard, so that the variation will be between 10-lb. and 15-lb. air pressure.

SNOW-FIGHTING EQUIPMENT FOR THE BROOKLYN RAPID TRANSIT SYSTEM

The mechanical department of the Brooklyn Rapid Transit System has recently completed the equipment of seven long-broom snow sweepers, six of which are of the Smith & Wallace type and one of McGuire-Cummings manufacture. These sweepers are approximately 28 ft. over all and about 7 ft. wide. The trucks are of ordinary freight design and are fitted with 4¼-in. x 8-in. M. C. B. journals arranged to take the B. R. T. standard freight car axles, which are 5-in. diameter at the motor bearings. The trucks are equipped with solid steel wheels.

These sweepers are fitted with sand spouts at each end, hand brakes with inside brake rigging, Nuttall No. 11 trolley stands and Dayton No. 8 headlights. A rather unusual feature for service cars is that all the wires are run in separate loricated conduits which have junction boxes at the place where the resistance and motor leads are taken out.

The underframing of the six sweepers is of standard structural steel shapes throughout. The side sills are of 6-in. 12¼-lb. I-beams, the cross framing of 6-in. 12¼-lb. I-beams and channels, and the diagonal bracing of 6-in. 7-lb. channels and 3-in. x 3 in. x ½-in. angle iron. The underframe is reinforced with 15-in. 33-lb. channels riveted to the same and extended beyond the pedestals. The floor of the sweeper is of 1¾-in. yellow pine. The cab, which is also framed in pine, has sliding doors at each side, one drop sash on each side and four drop sash at each end.

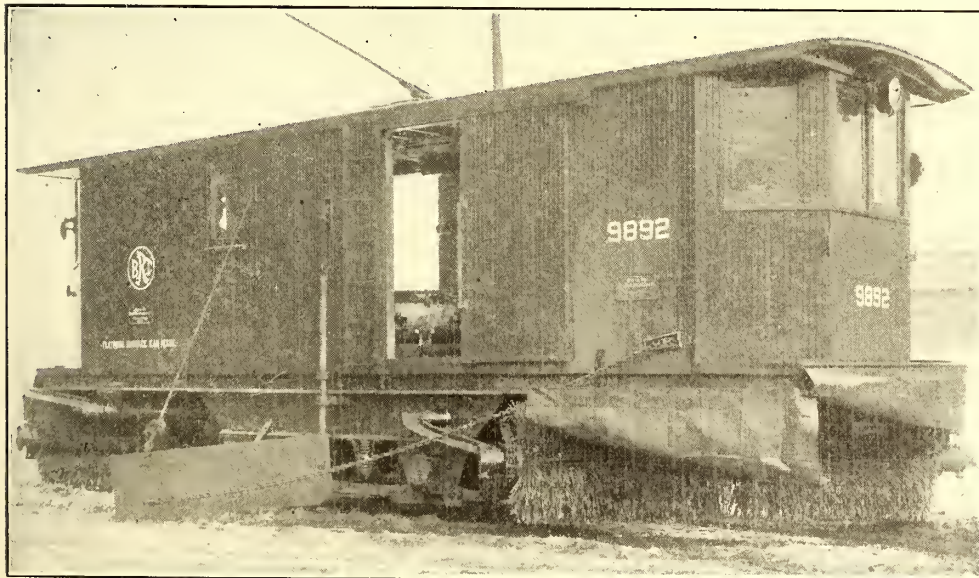


Fig. 1.—Brooklyn Snow-Fighting Equipment—One of Six Long-Broom Sweepers Ready for Service

The equipment for propelling these sweepers consists of two Westinghouse 81 60-hp motors. One motor of similar type is used for the broom drive. These brooms have the long sweep of 14 in. outside the rails. They are made up in eight segments of 5/16-in. rattan and are 36 in. in diameter when assembled. The brooms are raised and lowered at approximately 45 deg. to the track by a hand wheel located inside the cab. They can be lifted to a maximum of 3 in. above the head of the rail. The brooms are driven by means of a forged

steel link roller chain operating on cast-steel sprockets. The broom motor drive leads from the motor shaft to a sprocket idler and from the sprocket idler to the broom by a separate chain. The idler sprocket is mounted on the shaft which carries the broom arms so that the raising and lowering of the brooms will not cause any difference in the slack of the driving chain. The side wings are of ¾-in. x 22-in. x 6-ft. reinforced sheet steel. They are attached to the truck framing on each side and are set at an angle of approximately 45 deg. The wings are controlled from the cab.

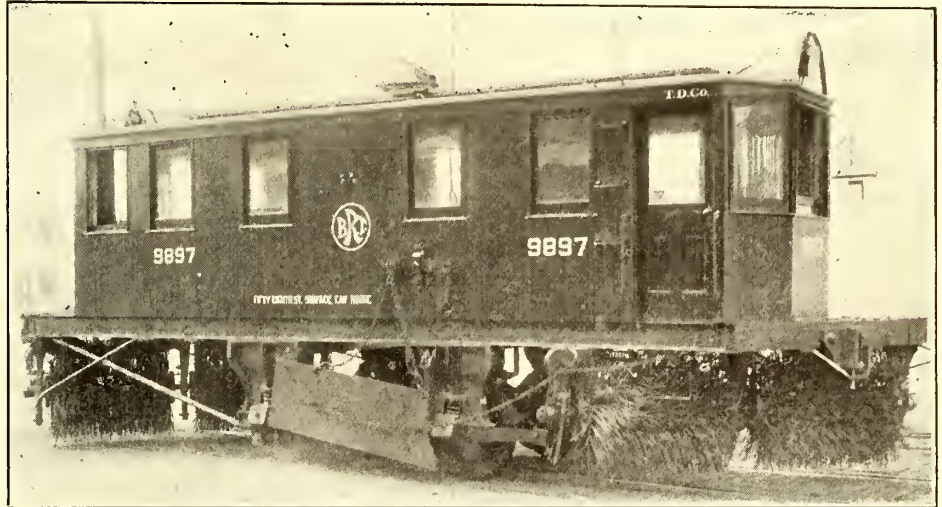


Fig. 2.—Brooklyn Snow-Fighting Equipment—Another Type of Sweeper

The McGuire-Cummings sweeper, shown in Fig. 2, has substantially the same equipment and dimensions as the others. Its framing is made up of 8-in. 18-lb. I-beams for the side sills; 8-in., 11¼-lb. channels for the end sills and smaller channels for the cross members, as indicated on the drawing. The extreme width of the car and brooms is 8 ft. 11 in. The truck wheelbase is 6 ft. 6 in. The overhang of the mechanism

and sills is braced to the truck pedestals with piping. The broom is 32 in. in diameter and is operated by means of wrought-steel links over cast-steel sprockets which are fastened to the motor shaft and to the broom shaft. A feature of this sweeper is the flexible hanging of the brooms which is so necessary in going over uneven pavement. The brooms are journaled in slots at the center and each end so that they can be removed merely by loosening three bolts. The brooms are driven at 300 r.p.m. to 350 r.p.m. by a 60-hp motor, which is set on a journaled shaft in the center of the cab. This shaft has a clutch on each end to throw the brooms in and out of gear. The side wings are raised and lowered by an operating wheel on the cab. The diagonal end sills of this

car prevent the snow from packing under the body. The general construction is such that a draft gear can be located on the end sill without interference from snow thrown off by the brooms. The underframe of this sweeper is shown in Fig. 3.

TEMPORARY SNOW PLOWS

The Brooklyn Rapid Transit System owns quite a number of freight cars, some of which are idle in the winter owing to the decreased freight business during that season. It has, therefore, been found feasible to increase the snow-fighting

equipment at little expense by taking two box cars and equipping them for service as temporary snow plows. The shears and lifting mechanism are operated with air like the company's large pneumatic plows, but hand operation for emergencies is also provided. These box car plows were built up from two steel gondola cars. The snow-fighting equipment is removed in the spring to permit these cars to be employed for freight service.

The original gondolas had very light platforms and were without a vestibule. In order to fit them for snow-plow service the platforms were removed entirely and a 10-in. 15-lb. channel iron was attached to each side of the sill for a dis-

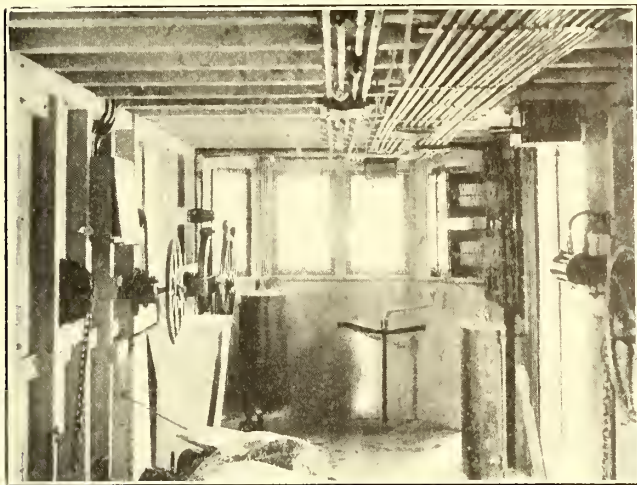


Fig. 6.—Brooklyn Snow-Fighting Equipment—Interior of Sweeper, Showing Arrangement of Apparatus and Conduit Wiring

tance of 26 in. back of the bolsters and extending outward far enough for a platform and vestibule to carry the plow nosings as well as the lifting apparatus placed inside the cab. A roller was placed on each truck with a radial casting on each nosing, and between the two trucks a girder was installed with a 9-in. channel bent to the radius of the truck swing. This construction will carry the thrust from one truck to the other without going through the center plates or the king pins. The plow nosings are arranged to rise about 10 in.

PROPOSED SHUTTLE SYSTEM OF CHICAGO SUBWAYS

In a paper read before the Western Society of Engineers on Feb. 8, 1911, A. S. Robinson outlined a proposed subway system to relieve the congestion of surface cars on the streets within the Loop district. The essential feature of Mr. Robinson's plan was the through routing of cars from north to south and looping of cars to and from the west side. Four separate north and south routes were proposed and four separate loop routes from the west side. The subways would be built close to the surface of the streets and at intersections the west side loop routes would be carried under the north and south subways. The plan also contemplated a crosstown transfer subway at a lower level, intersecting all routes so as to avoid the necessity of providing means for transferring at each separate intersection of the through routes. A total of 18 miles of subways would be required for the complete system. When the width of the street would permit, three or even four tracks would be built and the cross-section of the tunnels would be large enough to accommodate elevated cars as well as surface cars. One feature of Mr. Robinson's plan on which he laid great stress was that it would permit the construction of the subways as independent sections or units which could be used immediately after they were completed with corresponding relief to the streets now occupied by the lines which would be diverted into them. Mr. Robinson estimated that cost per mile for double-track subways, not including rolling stock, would be \$2,513,000, or a total of nearly \$45,000,000 for the complete system.

THE ARNOLD PITTSBURGH REPORT

The complete report of Bion J. Arnold on the Pittsburgh transportation problem was submitted to Mayor Magee, of Pittsburgh, this week. It is contained in a volume of over 200 pages with a large number of diagrams and other illustrations. Portions of this report which were made public before the completion of the entire report were published in the *ELECTRIC RAILWAY JOURNAL* for July 23, July 30, Aug. 13 and Aug. 20, 1910.

INTRODUCTORY

The report begins with a copy of a letter of authorization from Mayor Magee to Mr. Arnold to take up the subject of the transit situation in Pittsburgh. Mr. Magee stated that the city was about to enter upon a new era of physical improvement and was planning to widen, extend and alter the grade of streets at congested points in the business district, to eliminate steam railway grade crossings, to regulate vehicle traffic on streets, etc., and desired to know "what new rapid transit facilities we need and to what extent capital would be justified in making this investment and what technical and financial limitations may exist in the promotion of subways, elevated roads and electrified steam roads, etc."

In the introduction to his report Mr. Arnold stated that he had confined himself almost entirely to the surface railway system in Pittsburgh because, in his opinion, the city's immediate transit needs can and should be supplied mainly by the present street railway system, although Mr. Arnold adds a preliminary report on rapid transit in connection with the discussion of future developments. He said he did not attempt to show in detail either the corporate history of the interrelationships between the various underlined companies forming the system or the distribution of the fixed charges, nor would he attempt to determine whether the fixed charges were excessive either in whole or in part. He believes that this would require an appraisal of the existing physical property, but this Mr. Arnold did not advise at the present time. He shows, however, comparative records of the Pittsburgh system with traction systems in nearly all of the large American cities. In his introduction he also emphasizes the benefits of having one operating system for the entire district and acknowledges the co-operation of Mr. Callery and other officers of the Pittsburgh Railways Company in supplying information.

IMMEDIATE NEEDS

After a discussion of the immediate needs of transportation in the Pittsburgh district, which had been discussed in previous reports by the State Railroad Commission and others, the difficulties to be overcome, the general direction in which improvements must be made in the opinion of Mr. Arnold and a general discussion of the transportation problem, as abstracted in the *ELECTRIC RAILWAY JOURNAL* for Aug. 13, 1910, Mr. Arnold gives a history of surface traction in Pittsburgh.

As a basis for a permanent settlement, he states certain considerations which he considers are fundamental in reaching a satisfactory conclusion. The first of these is that the company "should be assured on the basis of an agreed rate of return on the actual present value of the property (cost to reproduce minus depreciation); this value to be determined by an appraisal of the present physical property, to which should be added an agreed allowance for development expenses. A fair return should also be allowed upon all money spent upon the property to rehabilitate it and put it in first-class operating condition so as to give adequate service, as well as on all moneys spent on extensions and improvements."

The second consideration is that the "properties to be rehabilitated and maintained up to an average operating condition equal to at least 70 per cent of its cost to reproduce new, all future maintenance to be paid for out of operating expenses and renewals to be made out of the earnings of the property."

The system should also have the benefit of the latest improvement in the arts, so as to be kept up to date, and the service to be supplied should preferably be measured in a percentage of

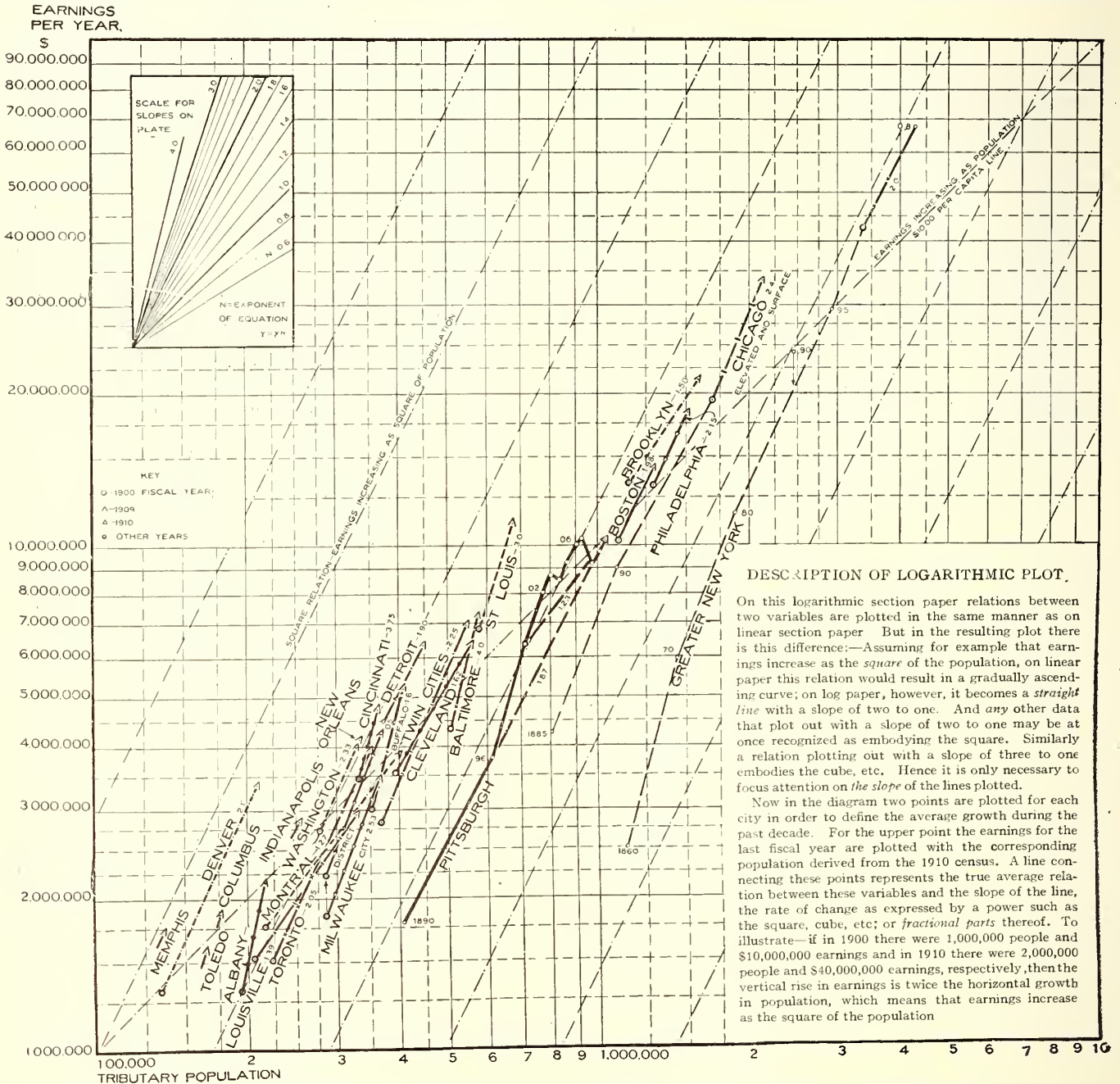
the income so that the greater the yearly income the better will be the service.

Mr. Arnold also believes in re-routing, not only to eliminate useless car miles, but to reduce transferring. Transfers, he thinks, should be provided so that a continuous single ride can be secured in one general direction with at least one free transfer.

All of the technical details, expenditures of money on property, methods of operation, standardization of accounts and general auditing of books "should be under the supervision of

ple increases from year to year as the community grows, as its business, family and social life become more and more complex and as its facilities of intercommunication improve. Broadly speaking, the traffic increases as the square of the population. In this connection the report shows records of the growth of traction earnings and of the population of several different American cities on the logarithmic chart reproduced herewith. In this diagram the "earnings per year" are used as ordinates and the "tributary population" used as abscissas.

A peculiarity of logarithmic section paper is that equations in



Pittsburgh Report—Relation Between the Increase of Population and of Traction Earnings as Plotted on Logarithmic Section Paper

some board (upon which both the city and the company might be represented) empowered with authority to initiate reasonable improvements, control operation and cause its acts to be enforced. The records of this body should be open to the public."

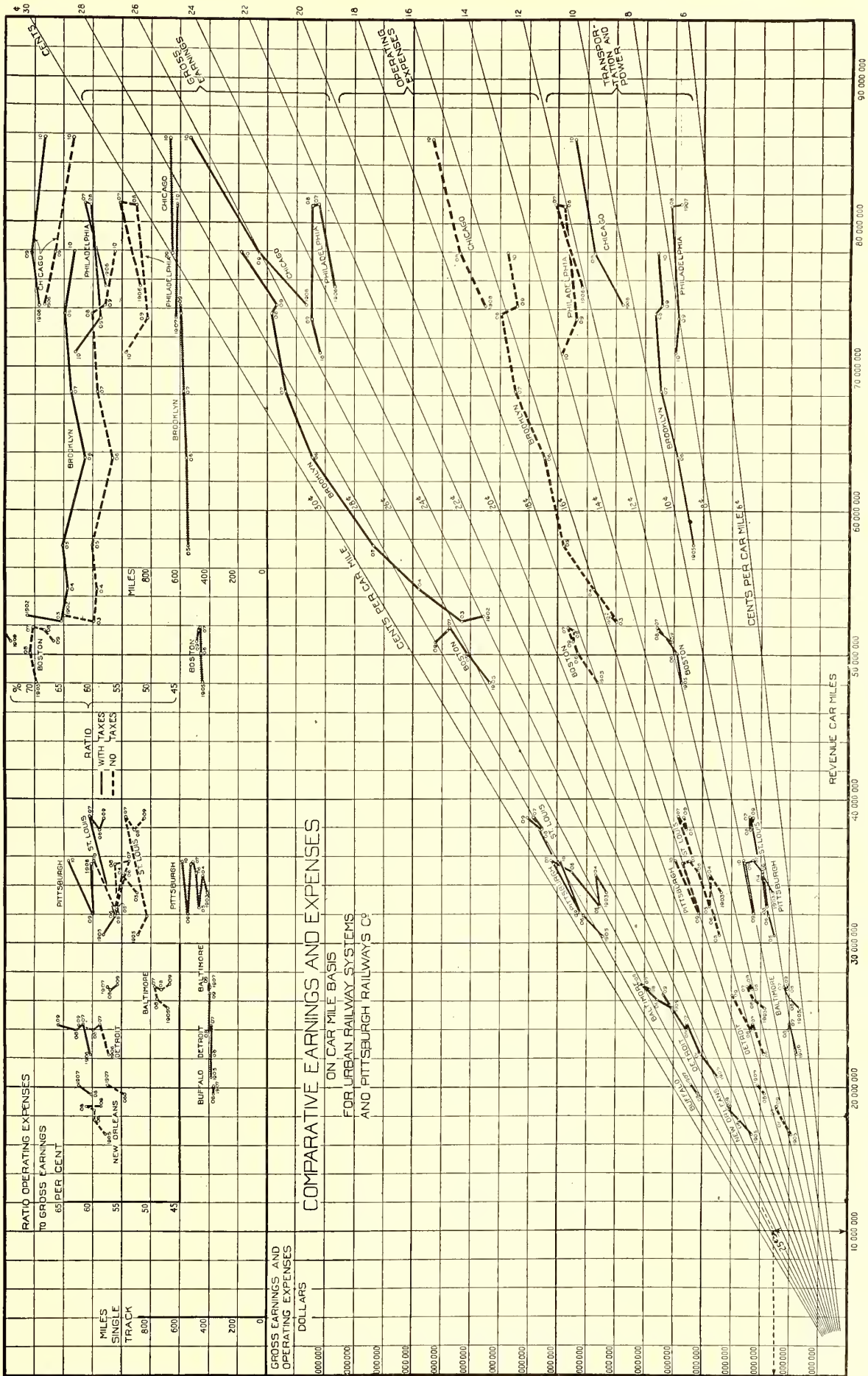
Finally he thinks that "the new agreement should be in the form of an indeterminate permit or franchise which can be terminated by the city at any time upon the payment of a fair compensation for the value of the property, exclusive of franchise values."

FUTURE TRANSIT DEVELOPMENT

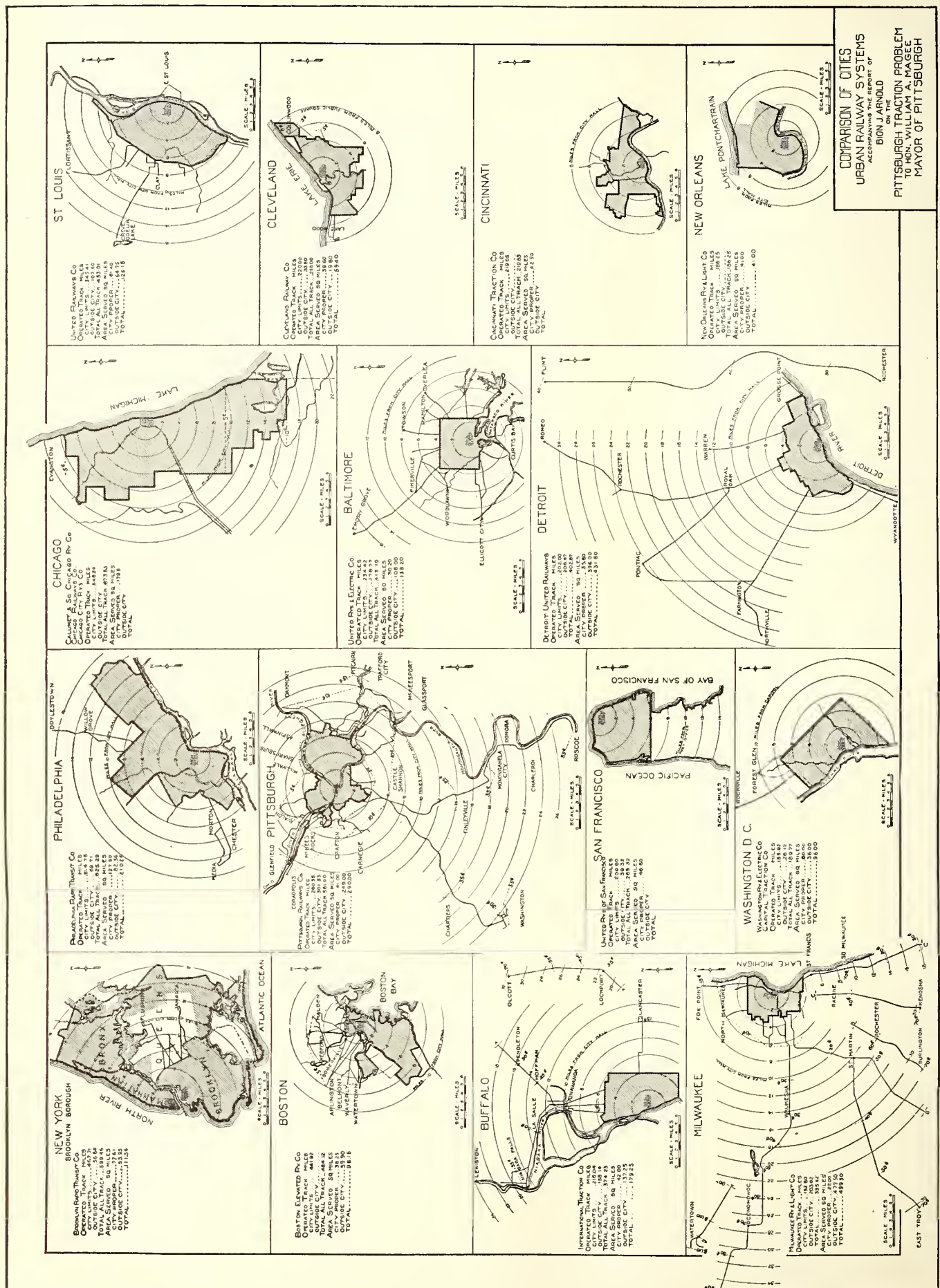
On this subject Mr. Arnold states that the riding habit of peo-

ple increases from year to year as the community grows, as its business, family and social life become more and more complex and as its facilities of intercommunication improve. Broadly speaking, the traffic increases as the square of the population. In this connection the report shows records of the growth of traction earnings and of the population of several different American cities on the logarithmic chart reproduced herewith. In this diagram the "earnings per year" are used as ordinates and the "tributary population" used as abscissas.

As will be seen, some of the lines show in parts of their curves a relation greater than $y = x^2$, where y is the earnings



Pittsburgh Report—Comparison of Earnings, Expenses and Track Mileage of Large Urban Railway Properties on a Car-Mileage Basis



Pittsburgh Report—Comparison of Urban Railway Systems—Suburban Railways Are Shown Where They Are Operated Directly by the City Traction System as in Pittsburgh, Milwaukee and Detroit

and x is the population. Others have a lower ratio, but practically none show as slow a growth as a direct ratio between the earnings and the population.

In discussing this diagram Mr. Arnold gives several reasons for the variations of the line showing the Pittsburgh ratio, the principal one being that some years ago the system was extended rapidly into outlying territory and that business depressions have been particularly felt in the Pittsburgh district.

INVESTMENT IN INCREASING FACILITIES

On this point Mr. Arnold says:

"All of the developments of the science of transportation have a decided tendency toward reducing the actual operating cost of

APPROXIMATE EXPENDITURES FOR TRANSIT FACILITIES			
Share Apportioned to	Increased Annual Earnings.	Average Rate.	Additional Investment.
Surface systems.....	\$15,000,000	\$3.50	\$52,500,000
Subways and other "rapid transit" facilities.....	10,000,000	7.00	70,000,000
Electrified railroads.....	5,000,000	5.00	25,000,000
Total	\$30,000,000		\$147,500,000

moving passengers. On the surface lines the use of larger cars reduces the cost per seat per mile; the electrified railroad lines are operating at a less cost per car mile with electric motors than they formerly did with steam locomotives, and subway cars of twice the capacity of surface cars can be run at double the speed and at almost half the operating cost per car mile of the trolley car. In other words, a larger investment per dollar earned can be made with the more modern equipment, and this fact expressed within reasonable limits in actual figures may be stated as follows:

"For surface systems each additional dollar earned will justify an investment of \$3 to \$4.

"For electrified railroads each additional dollar earned will justify an investment of \$4 to \$6.

"For subway systems each additional dollar earned will justify an investment of \$6 to \$8.

"Following is an approximate estimate of the summation of future expenditures for transit facilities in the Pittsburgh district to be made by the time the district has a population of 2,000,000. This is believed to be conservative and possible of execution.

"This means that a comprehensive transportation program should involve the plans for the expenditure of between \$140,000,000 and \$150,000,000 in the Pittsburgh district. These figures give a fair idea of the magnitude of the Pittsburgh transportation problem."

ANALYSIS OF OPERATING RESULTS ON CAR-MILEAGE BASIS

The diagram on page 259 is from the report and shows the results in a large number of American cities on the car-mileage basis, with the corresponding earnings and the operating expenses.

Revenue car miles are plotted along the horizontal axis and gross earnings along the vertical axis, thus showing the variation between two quantities instead of the yearly variation in one. In explanation of this diagram the report says, in part:

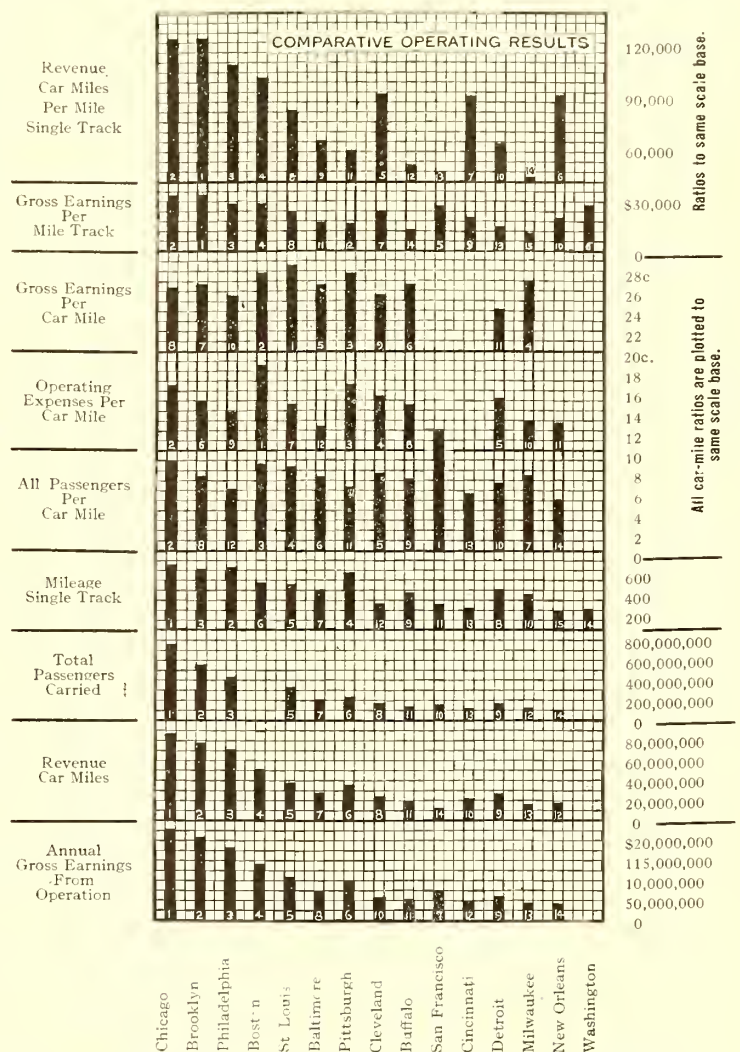
"On account of the slight difference in fares, the difference in the average length of rides in the various cities, the variation in the size of the cars and the character of the riding in different localities, earnings per car mile is not an exact measure, but taken in connection with the other elements of the analysis it is the most consistent one for comparing each system with itself from time to time and for making a relative study of the different systems.

"It will be noted, for instance, that in Brooklyn the earnings per car mile increased from 24 cents in 1902 to 29 cents in 1906 and then decreased to 25.85 cents in 1910. In Philadelphia the earnings per car mile first decreased from 23.4 cents in 1906 to 22.48 cents in 1907 and then increased to 25.6 cents in 1910. In Boston the tendency has been to increase the earnings per car mile slightly each year until 1909, when for some reason the number of car miles operated was reduced, although the earn-

ings increased, the result being that the earnings per car mile showed a decided increase during this last year. St. Louis has consistently shown earnings near the 28-cent line until 1909, when the record shows 28.57 cents. Pittsburgh's record has been more erratic than the other cities. During the panics of 1904 and 1908 there was a much greater reduction in car miles in Pittsburgh than in any other city. On the other hand, Pittsburgh shows a larger increase in car miles in proportion to the increase in earnings during the last year than any other city."

The report also calls attention to the fact that the results reported from Boston, Brooklyn and Philadelphia include the earnings from operation of the elevated roads, which in those cities form a part of the complete system with transfer privileges, and also that corresponding curves, showing the operating expenses and the cost of transportation and power, are given. In general, these groups of curves show the same characteristics as the curves already mentioned. For ready reference, the operating ratio both with and without taxes is plotted along the upper margin of the diagram. The dotted line indicates that taxes are not included.

For further comparison the relation between the track mile-



Pittsburgh Report—Comparative Operating Results of Large Urban Traction Systems

age and car mileage has also been plotted on this plate. In the report itself tables are published showing these relations and others.

The diagram on this page shows graphically the comparative results given in most of these tables, and states that Pittsburgh ranks sixth among the cities in earnings, car miles and passenger traffic, and relatively higher (fourth) in track mileage, but that it ranks eleventh or twelfth in car miles and earnings per mile of track. The car-mile records are rendered somewhat

uncertain by varying practice in counting transfers and computing car-mileage. Thus Pittsburgh ranks third in earnings and expenses per car mile, but eleventh in passengers per car mile. This is explained largely by the fact that Pittsburgh gives few transfers. In other cities revenue passengers are recounted more times than in Pittsburgh—in Chicago as high as 58 per cent more. All the car-mile ratios from Pittsburgh are influenced by the fact that trailers are counted as full car mileage.

Mr. Arnold believes these records show that the Pittsburgh system is relatively over-expanded as compared to larger and more densely settled cities. This indicates there is opportunity for cultivation of traffic along the lines already constructed and he suggests the development of the "riding habit," the possibilities of a saving in maintenance and power cost and probably the introduction of a more liberal transfer policy and a greater attention to a short-haul business.

CITY PLANNING AND TRANSPORTATION

The report then discusses the relation of city planning and transportation. It points out that a community appears to crystallize about natural centers and that when the traffic between these centers develops along the natural lines these lines should be encouraged and perpetuated. In this connection the plan of different American cities and their transportation systems, published on page 260, is presented.

In discussing the equipment which should be provided for a good service with growing demands, Mr. Arnold says that the expenditures for this purpose in Pittsburgh should amount to \$10,000,000. He then says:

"Future renewals of equipment should be provided for out of earnings at the rate of at least \$1,000,000 per year, which means an annual depreciation fund for future obsolescence equal to about 10 per cent of the gross earnings.

"Equipment to provide for future extensions, betterments and improvements should be purchased at the rate of at least \$3 of new investment for each additional dollar of annual earnings. As earnings are increasing about \$800,000 per year, the new capital available annually should amount to \$2,500,000."

He believes additional track connections are necessary and that a universal transfer system might be tried with the understanding that if it did not produce sufficient revenue a charge should be made for certain transfers. Pittsburgh is not yet ready for a subway system, but if its transportation earnings should increase as the square of the population and the downtown terminal facilities of a subway system could be properly combined with the rapid transit surface of the electrified suburban lines, the city may be ready for a subway system in about 1920. In conclusion he recommends a system of city control to cover the entire Pittsburgh district, with sufficient power to lay out a general plan for the entire community, to determine the rate of return on the investment, the rates of fare to be charged, the amount of funds to be set aside for insurance, depreciation, etc., to adjust taxation, paving and other requirements, to bring about a combination of surface and subway facilities with electric, steam and suburban lines, etc.

In the appendices the report discusses the question of re-routing, and gives the method employed for counting passengers on individual roads; a comparative analysis of traction ordinances in Chicago, Cleveland and Philadelphia; a digest of public service laws and an account of traction ordinances in Chicago, Cleveland, Philadelphia and Los Angeles.

At the annual convention of the Wisconsin Electrical Association, held in Milwaukee on Jan. 18, W. J. Kelsh, superintendent of rolling stock, Wisconsin Electric Railway Company and Eastern Wisconsin Railway & Light Company, read a paper on "Electric Railway Repair Shop Practice." An abstract of this paper was published on page 122 of the *ELECTRIC RAILWAY JOURNAL* of Jan. 21. Mr. Kelsh said that when oil was used 50 per cent less babbitt was required than when grease was used as a lubricant. This statement was incorrectly reported on page 166 of the issue of Jan. 28. Mr. Kelsh advises that with oil lubrication he gets 50 per cent more mileage or longer wear for his bearings than with grease lubrication.

CENTRAL ELECTRIC RAILWAY ASSOCIATION COMMITTEES

E. B. Peck, president of the Central Electric Railway Association, has announced the following committee appointments for the year 1911:

STANDING AUDITING COMMITTEE

Walter Shroyer, chairman, auditor Indiana Union Traction Company.

L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company.

E. L. Kasemeier, auditor Ohio Electric Railway.

COMMITTEE ON RULES AND REGULATIONS GOVERNING ANNUAL TRANSPORTATION

W. S. Whitney, chairman, general freight and passenger agent Ohio Electric Railway.

H. A. Nicholl, general manager Indiana Union Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

J. O. Wilson, general passenger agent Cleveland, Southwestern & Columbus Railway.

M. J. Insull, general manager Louisville & Northern Railway & Lighting Company.

CONSTITUTION AND BY-LAWS COMMITTEE

F. D. Carpenter, chairman, general manager Western Ohio Railroad.

A. A. Anderson, general manager Springfield Consolidated Railway.

A. W. Brady, president Indiana Union Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

W. S. Whitney, general freight and passenger agent Ohio Electric Railway.

CLAIMS COMMITTEE

E. C. Carpenter, chairman, claim agent Indiana Union Traction Company.

J. H. Shan, claim agent Cleveland, Painesville & Eastern Railroad.

Wm. Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company.

F. E. Rankin, claim agent Detroit, Monroe & Toledo Short Line Railway.

H. Rimelspach, claim agent Lake Shore Electric Railway.

M. J. Insull, general manager Louisville & Northern Railway & Lighting Company.

A. L. Neereamer, secretary Central Electric Railway Association, Indianapolis, Ind.

FINANCE COMMITTEE

F. D. Carpenter, chairman, general manager Western Ohio Railroad.

A. W. Brady, president Indiana Union Traction Company.

W. G. Irwin, president Indianapolis, Columbus & Southern Traction Company.

H. E. Vordermark, auditor Fort Wayne & Wabash Valley Traction Company.

C. N. Hawley, auditor Toledo, Port Clinton & Lakeside Railway.

C. N. Wilcoxon, general manager Chicago, Lake Shore & South Bend Railway.

HOTEL COMMITTEE

W. H. Bloss, chairman, Ohio Brass Company.

L. J. Drake, Jr., Galena Signal Oil Company.

T. A. Hankle, Electric Service Supplies Company.

S. D. Hutchins, Westinghouse Traction Brake Company.

J. A. Gohen, Cleanola Company.

F. A. Willard, Burroughs Adding Machine Company.

INSURANCE COMMITTEE

H. N. Staats, chairman, American Railway Insurance Company.

F. W. Coen, general manager Lake Shore Electric Railway.

H. B. Clegg, president Dayton & Troy Electric Railway.

LIGHTNING ARRESTER COMMITTEE

Edw. Heydon, chairman, superintendent overhead construc-

tion Terre Haute, Indianapolis & Eastern Traction Company.

F. T. Bundy, master mechanic Ohio Electric Railway.

Fred Heckler, master mechanic Lake Shore Electric Railway.

C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company.

H. D. Murdock, superintendent Indianapolis & Louisville Traction Company.

COMMITTEE ON COMPENSATION FOR HANDLING UNITED STATES MAIL

A. W. Brady, chairman, president Indiana Union Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

Geo. Whysall, receiver Columbus, Marion & Bucyrus Railway.

W. A. Carson, general manager Evansville Railways.

PUBLICITY COMMITTEE

Geo. S. Davis, chairman, editor *Electric Traction Weekly*.

L. E. Gould, Western editor ELECTRIC RAILWAY JOURNAL.

E. B. Grimes, vice-president Ohmer Fare Register Company.

STANDARDIZATION COMMITTEE

H. H. Buckman, chairman, master mechanic Louisville & Northern Lighting & Railway Company.

W. P. Graydon, master mechanic Western Ohio Railroad.

W. H. Evans, superintendent motive power Indiana Union Traction Company.

F. J. Foote, master mechanic Ohio Electric Railway.

W. E. Ralston, superintendent power and shops Cleveland, Southwestern & Columbus Railway.

L. W. Jacques, master mechanic Fort Wayne & Wabash Valley Traction Company.

L. M. Clark, master mechanic Terre Haute, Indianapolis & Eastern Traction Company.

R. N. Hemming, secretary, general manager Ohio & Southern Traction Company.

SUBJECT COMMITTEE

Geo. Whysall, chairman, receiver Columbus, Marion & Bucyrus Railway.

H. A. Nicholl, general manager Indiana Union Traction Company.

C. D. Emmons, general manager Fort Wayne & Wabash Valley Traction Company.

J. Jordan, general manager Cleveland, Painesville & Eastern Railroad.

G. W. Parker, general freight agent Detroit, Monroe & Toledo Short Line Railway.

C. C. Collins, trainmaster Western Ohio Railroad.

Will H. Bloss, Ohio Brass Company.

SUPPLY MEN'S COMMITTEE

S. D. Hutchins, chairman, Westinghouse Traction Brake Company.

John F. Ohmer, president Ohmer Fare Register Company.

W. H. Bloss, Ohio Brass Company.

L. J. Drake, Jr., secretary Galena Signal Oil Company.

H. C. Marsh, General Electric Company.

TRANSPORTATION COMMITTEE

G. K. Jeffries, chairman, general superintendent Terre Haute, Indianapolis & Eastern Traction Company.

H. C. Warren, general manager Toledo & Indiana Traction Company.

Geo. Whysall, receiver Columbus, Marion & Bucyrus Railway.

A. Shane, general manager Indianapolis, Columbus & Southern Traction Company.

J. F. Keys, general passenger agent Detroit, Monroe & Toledo Short Line Railway.

E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway.

B. J. Jones, general manager Ohio Electric Railway.

C. F. Franklin, general superintendent Winona Interurban Railway.

VIGILANCE AND MEMBERSHIP COMMITTEE

C. D. Emmons, chairman, general manager Fort Wayne & Wabash Valley Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

Geo. Whysall, receiver Columbus, Marion & Bucyrus Railway.

R. A. Crume, general manager Dayton & Troy Electric Railway.

T. F. Grover, general manager Terre Haute, Indianapolis & Eastern Traction Company.

F. H. Cuttshall, auditor Chicago, South Bend & Northern Indiana Railway.

Will H. Bloss, Ohio Brass Company.

L. E. Gould, Western editor ELECTRIC RAILWAY JOURNAL.

CENTRAL ELECTRIC RAILWAY TRAFFIC ASSOCIATION COMMITTEES

The committees of the Central Electric Traffic Association for the year 1911 are given in the following paragraphs. The chairman of the association is A. L. Neereamer, whose office is in 308 Traction Terminal Building, Indianapolis, Ind.

STANDING AUDITING COMMITTEE

Walter Shroyer, chairman, auditor Indiana Union Traction Company.

L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company.

E. L. Kasemeier, auditor Ohio Electric Railway.

INTERCHANGEABLE MILEAGE TICKET COMMITTEE

F. D. Norviel, chairman, general freight and passenger agent Indiana Union Traction Company.

W. S. Whitney, general freight and passenger agent Ohio Ohio Electric Railway.

C. C. Collins, trainmaster Western Ohio Railway.

INTERLINE BAGGAGE COMMITTEE

C. O. Sullivan, chairman, general freight and passenger agent Winona Interurban Railway.

R. W. Waite, treasurer Louisville & Northern Railway & Lighting Company.

O. H. Murlin, general passenger agent Dayton & Troy Electric Railway.

JOINT PASSENGER TARIFFS COMMITTEE

W. S. Whitney, chairman, general freight and passenger agent Ohio Electric Railway.

F. D. Norviel, general freight and passenger agent Indiana Union Traction Company.

C. J. Laney, trainmaster Toledo, Bowling Green & Southern Traction Company.

JOINT FREIGHT TARIFFS COMMITTEE

C. C. Collins, chairman, trainmaster Western Ohio Railroad.

F. I. Hardy, superintendent of transportation Fort Wayne & Wabash Valley Traction Company.

L. D. Johnson, general freight agent Dayton & Troy Electric Railway.

S. Ridlen, general freight and passenger agent Indianapolis, Crawfordsville & Western Traction Company.

Chas. A. Floyd, general freight and passenger agent Grand Rapids, Holland & Chicago Railway.

OFFICIAL INTERURBAN MAP COMMITTEE

G. M. Patterson, chairman, trainmaster Toledo & Chicago Interurban Railway.

J. H. Crall, general freight and passenger agent Terre Haute, Indianapolis & Eastern Traction Company.

O. H. Murlin, general passenger agent Dayton & Troy Electric Railway.

G. S. Henry, trainmaster Indianapolis & Cincinnati Traction Company.

C. C. Trees, auditor Kokomo, Marion & Western Traction Company.

OFFICIAL INTERURBAN GUIDE COMMITTEE

C. C. Collins, chairman, trainmaster Western Ohio Railroad.

W. S. Whitney, general freight and passenger agent Ohio Electric Railway.

J. H. Crall, general freight and passenger agent Terre Haute, Indianapolis & Eastern Traction Company.

F. D. Norviel, general freight and passenger agent Indiana Union Traction Company.

R. J. Thompson, train dispatcher Indianapolis & Louisville Traction Company.

BOOSTER COMMITTEE

F. D. Norviel, chairman, general freight and passenger agent Indiana Union Traction Company.

C. C. Collins, trainmaster Western Ohio Railroad.

J. H. Crall, general freight and passenger agent Terre Haute, Indianapolis & Eastern Traction Company.

O. H. Murlin, general passenger agent Dayton & Troy Electric Railway.

C. O. Sullivan, general freight and passenger agent Winona Interurban Railway.

PRIZE ARTICLE BY PORTLAND (ORE.) TRAINMAN ON "HOW TO AVOID ACCIDENTS"

Prizes were offered recently by the Portland Railway, Light & Power Company, of Portland, Ore., for articles by trainmen on the subject: "How to Avoid Accidents." Sixty articles were received. The first prize was won by Paul Bartholomew. An abstract of Mr. Bartholomew's article follows:

"Trainmen about to enter upon the duties of their day's work should be in good physical condition.

"The conductor and the motorman assigned to the same car ought to be on good terms with one another and work in harmony constantly.

"A motorman should know before taking his run that his car is in good working order and that he has sand in the sandbox. The hand brakes of cars that are equipped with air brakes ought to be tested frequently. The motorman should know, in case of hand brake and air brake failing, what to do to stop his car.

"A motorman should never attempt to pass a car on the opposite track while his car is running over a switch the point of which is pointing toward him, no matter if the style of switch is a lock switch, for it is known that sometimes cars will split those switches. A motorman should never pass another car on a paved street or other improved street at a high rate of speed, but rather throw off power and be ready for any emergency that might arise. Should the passing point be at a cross street he should sound his gong and hold his car in check. Where another car is standing to let off or take on passengers or for some other cause the motorman should have his car controlled so that he can stop instantly.

"Where streets are partly obstructed by building material or by standing vehicles, etc., and the view of the street is not complete, the motorman should sound his gong and at the same time have perfect control of his car. In passing vehicles that are moving in the same direction the motorman should ascertain if the driver is conscious of the approach of his car.

"In passing horses, cows, etc., tied at the back end of wagons motormen should exercise great care. Care should also be taken in passing refractory horses; always wait till such animals are subdued before attempting to pass them.

"Motormen should exercise the greatest care in passing school houses during the recess and closing hours.

"Motormen should exercise the greatest precaution during holidays, circus days and festivals, etc., when the streets are one mass of humanity and cars are loaded to suffocation; then, above all things, they must be on their guard.

"In loading up his car, especially after dark, where people board with a rush at both ends and possibly his car has not had time to stop, the motorman should place himself in such a position as to protect his controller and brake. When the conductor gives him the signal to go ahead he should start his car just as slowly as possible, for as long as the car is standing people will catch hold of handles or put a foot on the step,

even if they know that it is quite impossible for them to get on.

"When he begins to unload he should be just as careful in starting his car, for on loaded cars it is always necessary for some one to step on the ground to make room for others to get off and perhaps the conductor is inside collecting fares.

"Greater care should be exercised after dusk, when objects are not so easily discernible. The motorman should have his headlight burning and the conductor should have the car lighted up. In dark streets the motorman should never let his vigilance lapse. During stormy weather, if unable to keep the front window clear, he should lower window in order to obtain an unobstructed view of his path.

"Trainmen should at all times exercise the greatest care in the handling of passengers. In starting or stopping his car the motorman should do it as easily as possible. Before starting his car he should be sure that no one is in the act of getting on or off the front entrance of car.

"In following a car a motorman should use good judgment. If the car ahead is moving slowly and he is close to it he should carefully keep his distance. If moving rapidly he should allow a space of at least a block between his car and leader. If the track is slippery or the car is running down grade he should increase the intervening space, always bearing in mind that the other motorman might have to make a sudden stop. During the hours when traffic is congested and cars move a little distance at a time he should be very watchful, always allowing his leader to take a little headway so that when his car starts he may be able to move some distance without having to throw power off and on.

"Another place where a motorman has to be vigilant is on the bridges, especially after the draw has been opened and long lines of cars and vehicles of all sorts have accumulated so that the approach is congested. During foggy weather a motorman should endeavor to run his car as carefully as possible. Motormen should always take good precaution in running down grades. The car should never be allowed to get beyond your control where the grade is very steep.

"At steam road crossings, where the conductor has to get off the car to flag, after making the stop the motorman should, before starting his car across, be sure no one is getting on or off; if it is dark the front door should be left open so that he can see. The car should be started as slowly as possible and before reaching the danger line he should satisfy himself that he is safe to go ahead.

"Motormen upon hearing unusual sounds pertaining to the working of their cars should investigate the cause thereof.

"Don't leave your car standing on a grade; if compelled to do so have the conductor station himself at the forward end with instructions what to do.

"Don't talk to passengers when operating the car. Your whole attention should be with your work.

"Don't allow children to play around or on your car when at the end of the line. Don't allow small children around the controller when operating the car."

RECENT EXTENSIONS IN CONNECTICUT

During the past six months the Connecticut Company has extended its lines an aggregate of 12.752 miles. These extensions are divided among the different districts as follows:

Bridgeport	5.873	miles
East Haven .....	.416	"
Hartford	2.893	"
Manchester .....	.006	"
Meriden .....	.122	"
New Britain .....	.977	"
New Haven .....	.577	"
New London .....	.162	"
Norwalk .....	.015	"
Waterbury	1.711	"
Total	12.752	"

On June 30, 1910, the track mileage of the system, as reported to the Railroad Commission, was 768.628. From the extensions made during the past six months 0.409 mile should be deducted for shortening of extensions, renewal of cross-overs, etc., so that the aggregate mileage on Jan. 1, 1911, of the Connecticut Company was 780.971.

COMMENTS ON THE SAFETY OF OPERATION OF ELECTRIC ROADS

BY A. GORDON DYE, ROCHESTER, N. Y.

I have read the reports of the Jan. 19 conference at Syracuse, N. Y., with interest, but it seems to me from my personal experience as conductor, motorman and train dispatcher that there is one point on which greater stress might be laid. I believe that greater effort should be made to reduce the chance of forgetfulness to a minimum. Some men are naturally nervous, erratic or irresponsible, and if these characteristics are detected in an employee he should be discharged before he has a chance to get into trouble. But the great majority of accidents happen to men who are experienced and methodical and cannot justly be accused of carelessness or stupidity. In fact during my past five years' connection with a high-speed, single-track electric road I have not known of a single case where a crew has made a mistake because they have misunderstood the rules or an order, but I have known of several cases where mistakes have been made as the result of forgetfulness and fortuitous circumstances alone prevented serious wrecks.

In view of this experience, which I believe may be duplicated on almost any road, it is worth while to ask ourselves why we remember and why we forget. A little introspection will show that a large number of things contribute causes to the flow of thought. A glance at the clock may bring some duty to mind, a chance sound or word may start another sequence of thought, a statement heard or read may arouse strong feeling, and one thought will crowd another out of the mind.

Introspection will also show that all or nearly all of the thoughts which pass through one's field of consciousness are there because they have been suggested by some other thought or by some impression received through the sensory organs. Therefore if we wish to reduce to a minimum the chances of forgetting a given thing we must surround ourselves with things which will suggest that which we wish to remember. Various devices may be used to remind us of a given fact, duty or obligation, and ordinarily the mere routine of our work is sufficient to accomplish this. It is in this respect that experience is valuable in railroading. If a man is accustomed to meet a train at a given point the physical surroundings of that point will tend to remind him of the meet, even though he may be thinking of something else as he approaches the meeting point. His habits of thought and action will also tend to make him remember where a man who has not acquired these railroad habits might forget.

But routine alone is not sufficient at all times to prevent important things from being supplanted in the consciousness at inopportune times, as is evident from the slips of memory that have occurred. Hence we must supplement routine with devices to suggest and help the memory. Most roads hold the conductor and motorman equally responsible for train movements, yet no means are used to compel the conductor to check the motorman on meets, with the result that conductors become very negligent in this respect. This leaves only the motorman to safeguard the train. To overcome this it might be well to arrange a small rack in the cab in which the numbers of trains to be met could be arranged in order before a train leaves its terminal and require the conductor to go to the cab and remove the train numbers in order as the trains are met. This would forcibly call the attention of both conductor and motorman to the meet and should prevent both from forgetting. Where meets are made on double track or long sidings the motorman should be required to call the attention of the conductor to an approaching train by a bell and the conductor should give the motorman a bell when approaching a meeting point. All special orders affecting the movement of a train should be hung where they may be easily seen and read from time to time. If by such means we can reduce the chances of forgetfulness we ought to be able to operate safely under the standard American Railway Association rules.

TESTIMONY BEFORE THE RAILROAD SECURITIES COMMISSION

The Railroad Securities Commission, which is investigating the subject of the issue of securities, held sessions in Chicago during the week beginning Jan. 23. Testimony was received from bankers, railroad and other corporation officials and members of commissions.

Prof. Henry C. Adams, statistician of the Interstate Commerce Commission, said that if possible the actual cost of railroad properties should be ascertained and a reasonable return allowed on the investment thus determined.

Marvin Hughitt, chairman of the board of directors of the Chicago & Northwestern Railway, said that he was impressed with the necessity of proceeding in the matter of regulation with as much freedom from prejudice and haste as was consistent, because it was clear to him that the States had rights and that they would cling to them tenaciously. He doubted the advantage to the public of having the federal government go much further than it had gone in the control of railroads.

E. K. Boisot, vice-president of the First Trust & Savings Bank of Chicago, expressed the opinion that the unrestricted sale of railroad stocks and bonds was necessary in order to carry out fully the development of territory in the West.

John J. Mitchell, president of the Illinois Trust & Savings Bank of Chicago, said that if the railroads were restricted to the issue of stock at par construction would be confined solely to the extension and improvement of existing lines.

F. A. Delano, president of the Wabash Railroad, said that if roads were to be valued on the basis of original cost or the cost of reproduction the ill-conceived roads would be overvalued and the well-conceived roads would be undervalued.

Rufus C. Dawes, president of the Union Gas & Electric Company, said that since the government exercised the power of regulation and could not guarantee earnings it must not interfere more than was necessary with the manner by which capital was attracted to enterprises.

Burton Hanson, general counsel of the Chicago, Milwaukee & St. Paul Railway, said that he was not sure but that federal regulation of securities was entirely practicable. If the issue of securities by interstate carriers came within the right to regulate commerce he thought that Congress could exercise that power to the exclusion of the States. It was impracticable to have two kinds of regulation at the same time, and the federal government ought to be supreme.

George M. Reynolds, president of the Continental and Commercial National Bank of Chicago, although favoring federal supervision as preferable to that of the States, was opposed to a too rigid control. He pointed out the danger that the public might assume that the government was overseeing the management of the railroads and might hold it to account in the case of failure or depreciation of securities.

John H. Roemer, member of the Railroad Commission of Wisconsin, said that in cases of overcapitalization the question should be taken into consideration whether such capitalization had been honest or had been the result of misrepresentation. It was in the interest of the public that such business mistakes should be prevented in future by strict supervision. Wisconsin was preparing new laws for the issue of railroad securities without a designated money value.

W. H. Williams, member of the Texas Railroad Commission, opposed the extension of federal control as an interference with State control.

The report of J. Lambert Payne, Comptroller of Railway Statistics, shows that the mileage of electric railways in Canada increased from 989 miles in 1909 to 1049 in 1910. Capital liability increased from \$91,604,989 to \$102,044,979. Gross earnings for 1910 were \$17,100,789, an increase of \$2,275,853. Net earnings reached \$5,389,276; 360,964,786 passengers and 853,294 tons of freight were carried, while the employees numbered 11,390 and the wages paid amounted to \$6,316,777.

REPORT TO STOCKHOLDERS OF CLEVELAND RAILWAY

At the annual meeting of stockholders of the Cleveland Railway on Jan. 25 a report was presented by John J. Stanley, the president, which gave the earnings and reviewed the conditions with which the company is now confronted.

Mr. Stanley recalls the fact that under the ordinance which went into effect on March 1, 1910, the company was required to put into operation a cash fare of 3 cents and 1 cent charge for a transfer, this rate to continue in force for eight months or longer if the company should not within five months have installed 450 pay-enter cars. Mr. Stanley adds: "Although more than 450 pay-enter cars have been placed upon the road, the initial rate of fare is still in force.

"The company's suburban franchises, of course, were not repealed by the new Cleveland grant, except as to such parts of the city as were within the city limits at the time of its passage, and the rates of fare now collected in Lakewood and several other suburbs, and in that part of Cleveland that was formerly Collinwood, are the same as were in effect before the Cleveland grant was accepted, viz., 5 cents cash fare or 11 tickets for 50 cents. The average rate of fare, therefore, on the system has been considerably in excess of 3 cents. To be exact, the company's passenger receipts in the 10 months of operation under the Tayler grant, including receipts from the sale of transfers, have been 3.39 cents per passenger. The gross earnings from all sources have been 3.57 cents per passenger.

"The ordinance provides for the establishment of what is called an 'interest fund,' which is to be maintained from earnings at all times at a sum equal to \$500,000. The purpose of this fund is to assure the payment of taxes and interest, including payments to stockholders quarterly of 1½ per cent upon the face value of their stock. There was in the interest fund at the close of the fiscal year \$750,921 in cash. Part of this was for interest accrued on bonds to Dec. 1, but not payable until March 1, and part of it for accrued taxes.

"The ordinance limits the amount that may be expended for operating expenses to 11½ cents per car-mile, and the amount that may be expended for keeping up the company's property to substantially 5 cents per car-mile, unless the allowance is increased by the Council or by arbitration. The cost of operation has exceeded these allowances, and your directors have asked that the operating expense allowance be raised to 12½ cents per car-mile. To provide for the renewals that ought to be made in 1911 and 1912 it will probably be necessary to increase also the maintenance allowance.

"The earnings and the cost of maintenance and operation, including taxes and interest on bonds, notes and capital stock, in the 10 months of operation at the initial rate of fare fixed in the ordinance, have been as follows:

		Cents Per Car Mile.
Disbursements for maintenance.....	\$1,283,058	5.76
Disbursements for operation.....	2,593,218	11.64
Total	\$3,876,276	17.40
Taxes	310,598	1.39
Interest	1,128,023	5.07
Total	\$5,314,897	23.86
Gross earnings from operation.....	\$5,166,370	
Miscellaneous income.....	30,101	
Total	5,196,471	23.33
Deficit	\$118,426	.53

"The ordinance allowance of 11½ cents per car mile for operating expenses was \$32,011 less than the actual expenses.

"The ordinance allowance for maintenance of the property fell short of the amount needed and expended for the purpose by \$140,138.

"The reports for December and for the 10 months have just been completed, and the city street railroad commissioner has had very little time in which to audit them. They are submitted to you subject to his correction.

"To complete the report for the entire 12 months of 1910 there should be added to the 10 months' statement the earnings and expenses of the first two months of the year, under the management of Mr. Bicknell. The earnings of the property

and the cost of operating it in those months were as follows, as shown by Mr. Bicknell's report:

Gross earnings from operation.....	\$957,271.56
Operating expenses.....	639,466.67
Net earnings from operation.....	\$317,804.89
Miscellaneous income.....	6,635.51
Gross income, less operating expenses.....	\$324,440.40
Taxes	52,064.24
Income, less operating expenses and taxes.....	\$272,376.16
Interest	225,428.60
Surplus	\$46,947.56

"These figures added to the figures for the 10 months give the following totals for the year:

Disbursements for maintenance and operation.....	\$4,515,743	
Taxes	362,662	
Interest	1,353,451	
Total		\$6,231,857
Gross earnings from operation.....	\$6,123,641	
Miscellaneous income.....	36,737	
Total		6,160,378
Deficit		\$71,479

"The expenses of the last four months of the year were proportionately greater than in the six months from March 1 to Sept. 1. The increase was due largely to an increase in wages. In May the motormen and conductors of the company, acting under an agreement made with them in December, 1906, demanded an increase in their wages from an average rate of about 25 cents to a flat rate of 32 cents per hour. Your officers refused to grant the increase, and demand was then made for arbitration, in accordance with the agreement. A board of arbitrators, consisting of Elroy M. Avery, Robert D. Beatty and Judge Willis Vickery, was selected. After the hearing of testimony and arguments, the arbitrators ordered an increase to 27 cents per hour during the first year of service and 30 cents per hour during the second and subsequent years. In the hearing your officers exerted their best efforts to show that the increase asked was not warranted, but their arguments were only partially successful.

"Realizing that the increase in wages thus authorized would make it impossible for the company to operate its road for 11½ cents per car mile, your officers made application to the City Council in June for an increase of the allowance. Their request was refused. The cost of operation since the change in rates of wages confirms the statement we made in June that an increase in the operating expense allowance would be needed, and we are hopeful that the Council will now grant the request. If it does not, the question will have to be submitted to arbitration, as provided in the ordinance.

"Soon after the property was restored to the company the directors offered for sale, first to you and then to the public, about \$1,500,000 of stock, at the minimum price fixed in the ordinance, namely, par and interest. Under this offer the company had received, to the end of the year, \$386,200.

"Being unable by the sale of stock to raise the money needed for improvements, the company borrowed from the banks of the city sums that raised the floating indebtedness to \$1,222,500.

"We have conferred with bankers and financiers, in Cleveland and elsewhere, with a view to interesting them in the stock of the company. We have tried to ascertain from them also upon what terms and to what amount an issue of bonds could be floated. These conferences led to a careful examination of the company's franchise by them and their attorneys. It is not surprising that in a document so long and so full of detail some imperfections and inaccuracies of expression should develop. N. W. Harris & Company, New York, bond dealers and leading authorities on street-railway finances, stated to us that, in their opinion, the company should be in a position to finance by the sale of stock as well as by the sale of bonds, and, this being so, that the investment in stock, as well as that in bonds, should be amply protected by the company's franchises; that investors in new stock of the company could not be sure of the full return of their principal, because, first, the ordinance failed to provide a sinking fund for the retirement of Judge Tayler's valuation of the old franchises, which

valuation was included by him in the company's capitalization, and, secondly, because the ordinance seemed to permit the company to maintain newly acquired property at a value only equal to 70 per cent of its cost, and to provide no sinking fund to take care of the 30 per cent depreciation that it was assumed the property would suffer.

"These suggestions have made it still more difficult to sell stock. Your directors, while believing that the property can for the present, under the ordinance, earn interest upon the bonds, floating debt and capital stock, are unable, in view of these criticisms of the ordinance, to assure investors that their stock will at all times, and especially at the end of the grant, be intrinsically worth par.

"In the hearing before Judge Tayler it was publicly stated, both by Mayor Johnson, representing the city, and by Mr. Andrews, representing the company, that it would be more desirable to raise money for extensions, additions and permanent improvements by the sale of stock than by the sale of bonds, both believing and stating that it would be better for the city to have the ownership of the property remain in Cleveland than to have it go to New York or New England, as it probably would do if bonds were sold for future improvements.

"It is for these, among many, reasons that we have attempted persistently to sell stock, rather than to mortgage the property of the company to secure the payment of additional bonds.

"If the ordinance does not protect the additional capital that the company needs, then an increase of the bonded indebtedness would decrease the equity and value of each share of stock, in case of a sale of the property at an appraised price at the end of the grant.

"Under these circumstances, we addressed a communication to the City Council, the Mayor and the City Street Railroad Commissioner, suggesting a conference with them or their representatives to see whether amendments to the ordinance could not be agreed to that, while safeguarding the city's interest in every way, would so express Judge Tayler's intention of protecting the investment in the property as to make it possible for us to finance by the sale of stock, or, if not, then by the sale of bonds at a lower rate of interest than would probably be asked if the ordinance were not amended. The city administration has so far declined to confer with us on this subject, saying that our needs for two or three years can and should be met by the sale of bonds.

"Because of the necessity of refunding next year the present bonds, the desirability of taking care of the floating indebtedness in a more permanent way than by promissory notes, and for the purpose of meeting the urgent needs of the company for additional power and equipment to take care of the large increase in travel that is surely coming with the certain growth of Cleveland, the directors submit for your consideration the resolution that was embodied in the notice of this meeting. If you adopt the resolution, it will not mean that the bonded debt of the company will be increased immediately, or in the near future, to \$35,000,000. Bonds to the amount of \$3,151,000 will be due Jan. 1 next and outstanding bonds to the amount of \$5,000,000 mature on March 1, 1913. These bonds must be provided for at their maturity, and this can undoubtedly best be done by an issue of refunding bonds. In addition to these outstanding bonds, the floating debt of the company should be provided for and funds for necessary betterments raised.

"The present outstanding capital stock of the company is about \$15,000,000; the bonded and floating debt amounts to about \$9,400,000. We may lawfully issue about \$5,600,000 of additional bonds, therefore, before the capital stock is increased. But when the amount of the bonded debt equals the amount of the stock outstanding it is our understanding that additional stock must be sold before more bonds can be disposed of, and, as, the ordinance fixes the minimum price of the stock at par, it will be necessary then, if not before, that the franchise be so amended that stock may be sold."

Mr. Stanley then gives the correspondence with the city on

this subject. Most of this correspondence was published in the issues of the *ELECTRIC RAILWAY JOURNAL* for Jan. 7, 14 and 21, 1911.

The directors of the company were re-elected. The board consists now, as it did last year, of Horace E. Andrews, C. F. Emery, L. C. Hanna, R. A. Harman, Samuel Mather, H. P. McIntosh, W. C. Rhodes, Thomas P. Schmidt, John J. Stanley and J. H. Wade. At a meeting of the directors following the stockholders' meeting, John J. Stanley was elected president and general manager, C. F. Emery and R. A. Harman vice-presidents and H. J. Davies secretary and treasurer.

This resolution was adopted by a vote of 104,593 shares:

"Resolved, by the stockholders of the Cleveland Railway Company, that consent is hereby given to the issue by the Cleveland Railway Company of an amount of bonds not exceeding \$35,000,000, and that the board of directors of the Cleveland Railway Company be, and said board is hereby, authorized to do all acts and things in its judgment necessary or proper to authorize an issue of bonds, said bonds to bear interest at a rate not exceeding 6 per cent per annum, payable semi-annually, to be dated and to mature at such times, and to be secured, issued and disposed of on such terms and conditions and at such prices as the board of directors may determine, and as the necessities of the company may require, as the same shall be determined from time to time by the board of directors."

BROWN BOOK OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The 1911 "Brown Book" of the Central Electric Railway Association and the Central Electric Traffic Association has been issued from the office of the secretary-treasurer, A. L. Neereamer, Indianapolis. This publication contains an official list of the officers, railroad members, committees, annual reports, etc. The dates of the meetings during the coming year are given as follows: March 23, May 25, Sept. 21 and Nov. 23. The next annual meeting and election will be held on Jan. 23, 1912. The report shows a membership of 46 interurban railways aggregating 3480 miles of track and one city railway with 34 miles of track. Practically all of the information now gathered in the "Brown Book" in convenient form has been published in previous issues of the *ELECTRIC RAILWAY JOURNAL* during the past year, with the exception of committee appointments for the Central Electric Railway and the Central Electric Traffic Associations for the year 1911, which are published elsewhere in this issue.

TRAFFIC ASSOCIATION PROPOSED FOR ILLINOIS ELECTRIC RAILWAYS

Steps were taken at the meeting held in Chicago, Ill., on Jan. 28, 1911, to form a traffic association as an auxiliary to the Illinois Electric Railways Association, which will meet in Chicago on Feb. 17, 1911, to organize permanently. It is proposed at this meeting of the Illinois Electric Railways Association to organize a traffic association among the employees of the electric railways which become members of the Illinois Electric Railways Association, and Robert A. Barnett, special agent of the Chicago & Southern Traction Company, has been appointed temporary secretary of the Illinois Electric Traffic Association to issue a letter to the electric railways in Illinois, requesting the presence of their traffic managers at the next meeting of the Illinois Electric Railways Association. At the meeting in Chicago at which the plan to organize a traffic association was discussed Richard Breckinridge, general freight and passenger agent of the Aurora, Elgin & Chicago Railway; W. C. Woodward, traffic manager of the Chicago, Lake Shore & South Bend Railway; W. A. Russell, superintendent of the Elgin & Belvidere Electric Company; C. C. Shockley, general express and passenger agent of the Rockford & Interurban Railway, and Robert A. Barnett were present.

AUTOMATIC BLOCK SIGNALS FOR ELECTRIC RAILWAYS *

BY W. K. HOWE, CHIEF ENGINEER, GENERAL RAILWAY SIGNAL COMPANY

In view of the fact that the operating problems of interurban electric railways are comparable in many respects with those of steam roads, it seems fitting that the principles which are employed on steam roads in the operation of trains, and which have been found by long experience to be safe and reliable, should have careful consideration by the managements of interurban roads. The controlled space interval is rapidly superseding the indefinite and uncontrollable time interval method. The space interval method, as its name suggests, consists in maintaining a definite space or distance between trains and is commonly known as the block system. The block systems in use may be divided into three classes, the manual block, the controlled manual block and the automatic block.

The manual block system is one in which trains are controlled by signals operated manually upon information by telegraph, telephone or electric bells. It consists of a series of sections of track or blocks with a block station at the entrance to each section at which there are placed signals to be used by the attendant operator or blockman to control trains entering and occupying the block. Information concerning the condition of a given block is obtained by communication between the operators at both ends of the block. All of the block station operators in a given district are under the general supervision of a train dispatcher, from whom orders are received governing the irregular movement of trains, etc. The safety of operation under the manual block system depends upon the accuracy with which orders are received and transmitted, there being no check, either electrical or mechanical, to prevent the display of a wrong signal. Errors in receiving or transmitting orders or information relating to block operation have resulted in some very serious accidents. While many thousands of miles of single-track steam railroad are to-day being operated under the manual system with fairly satisfactory results, this system is out of the question on electric roads on account of the comparatively great number of passing points and the consequent expense were operators to be maintained at such points. Furthermore, there remains the entire dependence upon the human element which is greatly reduced in other systems.

The controlled manual block system is the same as the manual block except that the signals at the ends of each block are electrically interconnected in such a manner that co-operation of the signalmen at both ends of the block is required to display a clear signal. The co-operation referred to is the physical moving of certain levers in a predetermined manner and is in addition to, and affords a valuable check on, co-operation by communication only as in the manual system. It is a great improvement over the manual system, but still does not prevent two operators from making simultaneous errors. This latter fault is overcome by the use of a continuous track circuit so arranged that a train having entered a block will automatically set the proper signals to stop and hold them in that position until it is entirely out of the section, regardless of any attempt on the part of the operators to clear them. The controlled manual system has been largely used on steam roads and is regarded as a safe and flexible method of handling trains, especially on single-track lines with a mixed traffic. Its use on many electric lines is prohibited on account of the large expense involved in maintaining operators at so many points.

Another form of controlled manual block system is the so-called staff, tablet or token system, which has been applied only to single-track lines. In its operation no train is allowed to occupy a block section without the possession of a tangible object or token such as a staff, ball or tablet. The tokens are obtained from instruments located at the opposite ends of each block, which are so interconnected electrically that but one token

can be removed at a time and until this one has been deposited in one of the two instruments no other token can be withdrawn from either instrument. As but one token can be removed from the pair of interconnected instruments at one time and as the possession of a token is the only authority to enter a block, it is evident that there can be but one train in a section at a time, except where permissive blocking is permitted, in which case the tokens are made in pieces, each of several following trains taking part of a token and the last train taking all that remains. When this divided token is put together and deposited in the instrument at the outgoing end of the block another token can be withdrawn from either instrument. The strong feature claimed for this form of controlled manual blocking is that it requires the train crew to take part in the operation and gives the engineman tangible evidence of his right to occupy the block. Its drawbacks are that thus far it has required the train to stop to deposit and withdraw the tokens or else requires operators at each passing point to receive and deliver them to the crews of passing cars.

The use of this system has made very slow progress, as shown by the fact that up to Jan. 1, 1910, only 270 miles of railroad were being operated by it in the United States. It cannot be considered the equivalent of any system using a continuous track circuit for the reason that a train can enter a block without a token and not indicate its presence to an opposing train, whereas with a track circuit system a train cannot enter a block without doing so. Furthermore broken or removed rails or a car in or fouling the block cannot be indicated by the staff without the track circuit. It is believed, therefore, that this system as it stands to-day is not well adapted to high-speed electric traction. It may be applicable where station stops can be made coincident with passing points, although even under such conditions if the car must slow down or stop to obtain its authority to enter a block it would be possible to use miniature block signals, which could be made very inexpensive.

Still another method of controlling trains, although not a block system, is the dispatcher's signal system in which signals located at the passing points are under the direct control of the train dispatcher and are used to stop trains for the purpose of issuing orders over the telephone. With modern selective systems signals of this kind can be operated with a high degree of accuracy and be made to give a return indication that the desired signal has been set. They have not been successful, however, in all cases and the dispatcher has no check on the trains. He cannot be absolutely sure that a train has not passed by the signal he proposes to set unless the trains are required to stop at every signal, which would be out of the question on most lines on account of the delay occasioned thereby. The liability of changing a signal from clear to stop in the face of a high-speed train is undesirable. Even though these defects could all be overcome there still remains the objection to any purely manual system that safety depends on human agency alone. Any error in transmitting or receiving orders may result in an accident. It would not seem advisable to depend entirely on such a system except as supplementary to an automatic block system for the purpose of stopping trains to give them orders.

In the automatic block system signals govern the entrance to each block. The signals are automatically controlled by the trains as they proceed in such manner that complete head-on and rear-end protection is afforded. Different forms of the automatic block system have been and are being used. The essential differences between them lie in the manner in which the control of the signals by the train is effected. The wheel contact method, using the so-called track instrument, was at one time used by some of the steam roads, but later abandoned in favor of track circuit control. Trolley contacts are being used by a number of electric lines at the present time with more or less success. Short track circuits at the entrance to each block have also been used. The continuous track circuit is the only method embodying the fundamental principle of a car or train controlling at all times the signals governing the specific section of track occupied. There are in the United

*Abstract of a paper presented at a conference called by the Public Service Commission, Second District, New York, Syracuse, Jan. 10, 1911.

States over 17,000 miles of railroad protected by continuous track circuit signals, and during the year 1910 an increase of over 3000 miles was made in automatic block signaling as against about 450 miles of all other forms. In some instances roads have abandoned older forms of signaling for the automatic block. This is adequate testimony as to the safety and reliability of the continuous track circuit method of signal control.

Some of the advantages of the automatic block signal system using track circuit control as applied to interurban lines are as follows:

No operators are required at passing points; hence it is comparatively inexpensive to operate.

Trains are not required to stop or even slow up to find out whether they can enter the next block.

It does not place dependence for safety on human agency alone.

The certainty with which signals are given is independent of the train speed.

The proper signals will indicate stop under any of the following conditions: A train or a car of any description anywhere

tion and the coil of a relay *R* to the rails at the other end. The secondary electric circuit is shown complete, leading from a set of signal batteries through the track relay armature and the signal motor mechanism *M*. The pair of wheels *W* represents a train. Owing to the presence of the wheels the relay for signal 1 is short-circuited and the armature contacts held open, with the result that no current can flow from the signal batteries into the motor mechanism for that signal; therefore, the semaphore will drop by gravity to its horizontal or danger position, indicating to a following train that the train *W* is in the block ahead. There being no train in the block ahead of *W* the relay for that section will receive current through the rails from battery *D*, which will cause its armature to close the motor circuit. This in turn will cause the motor to rotate, moving the semaphore arm to the "clear" or "proceed" position as shown, thereby indicating to train *W* that the block ahead is clear. By means of the continuous track circuit and signals controlled thereby the trains automatically protect themselves, putting signal after signal at stop and allowing each signal to move to the clear position only after the train has proceeded into another block under the protection of another signal.

Signals are frequently controlled not only by their own immediate track circuit, but by others in advance by means of line wires running from one signal to the next and broken through separate contacts on the track relays of the various sections involved. A signal may also be controlled by another signal in advance over line wires in such way that its semaphore cannot move to the vertical position indicating proceed until the signal in advance has moved to the inclined or 45-deg. position indicating caution. Thus one signal can give advance information to an approaching train of the condition of the next signal beyond. An endless variety of combinations of this kind can be made to suit varying needs. Signals can be spaced any distance apart up to several miles and still have continuous track circuit control. If they are too far apart for one track circuit two or more may be employed, one controlling the other in such way that the signal will be held at stop till the train has left the last track circuit in the series. When two or more track circuits are employed in this way they are spoken of as "cut sections."

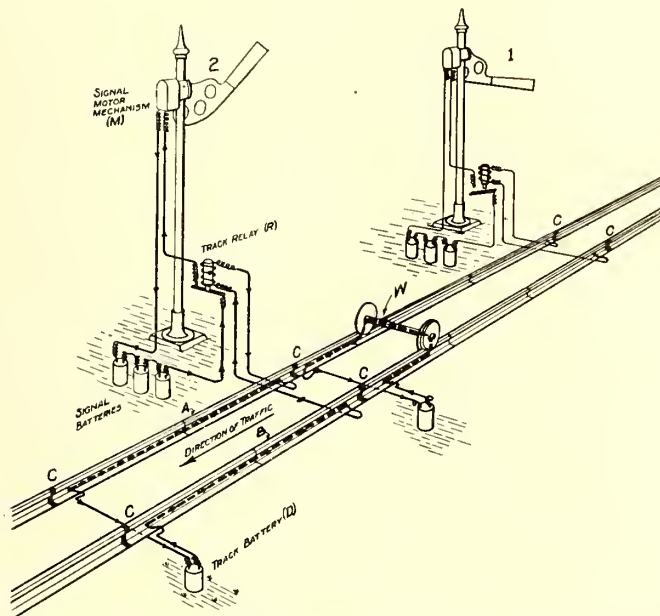


Fig. 1—Automatic Block Signals—Diagram of Track and Signal Circuits Using Batteries

in the block or fouling it, an open switch or drawspan, a broken or removed rail or any failure of the power or the breaking or crossing of the connecting wires.

The main objection to automatic signaling for many electric lines has been the high initial cost. However, certain of the signal companies have for some time been at work on the problem with a view of devising methods and apparatus which, while maintaining the same degree of safety and reliability that is found on the steam roads, are much less expensive. Automatic block systems employing the track circuit are now available at a cost which should appeal strongly to the managements of many of the electric roads. The continuous track circuit automatic block system is confidently recommended to electric railways as the best known means of providing for the safe and expeditious operation of trains.

The track circuit, as its name indicates, is nothing more than an electric circuit of which the track rails are made to form a part. Fig. 1 shows in perspective a section of railroad track with two signals numbered 1 and 2 and with the necessary batteries, relays, etc., required for their control. Each rail is electrically separated by insulating rail joints *CC*, placed opposite each signal and also opposite track battery *D*. These are for the purpose of dividing the track into electrically independent sections. A track battery at *D* is connected by wires to the rails at one end of each sec-

Fig. 1 shows the rails divided into sections by insulating joints in such manner that they cannot serve as a return for the propulsion current. To provide for this and at the same time keep the various block sections electrically independent for signaling purposes reactance bonds *TT* are used, connected across the rails and to each other as shown in Fig. 2. These reactance bonds consists of a few turns of a very heavy copper wire wound around a mass of laminated iron, something like the construction of a transformer. When connected as shown in Fig. 2 the return propulsion current flowing through both rails in the same direction passes through the bonds in such manner as to have no magnetic effect on the iron core, whereas the alternating current, which is used in place of the track battery current, encounters a comparatively high resistance. This causes some of the current to flow through the track relay, which is connected across the rails exactly as in Fig. 1. A track winding on a transformer is connected across the rails at the other end of the track section to supply the alternating signal current in place of the track battery shown in Fig. 1. Track circuits of this type, due to various improvements which have been made, can now be operated up to lengths of 2 miles without cut sections and with reasonable energy consumption where the ballast is good. Under like conditions, by feeding energy in at the center of the section and using a relay at each end, track circuits approximately 5 miles long can be operated. Track circuits of this kind are known as center-fed circuits. The effect of the condition of the track ballast on the permissible length of end-fed track circuits is very marked. With poor ballast such as occurs when the rails are buried in wet earth or when wet cinders are brought up around the base of the rail the permissible length of track circuit is roughly 6000 ft. With medium ballast such as wet gravel, etc., the length is about 8000 ft. and with good rock ballast kept away from the base

of the rail, even when wet, the track circuits can be upward of 10,500 ft. in length.

In calculating the length of track circuits the worst conditions must always be considered, viz., when the ballast is soaked after a continued rain. The figures given above, of course, are only approximate, as conditions will vary widely, depending on the size of rail, amount and nature of propulsion current, frequency of the alternating signal current, etc. The figures given are based on 80-lb. rail using a signaling current of 25 cycles.

On account of the greater amount of power available and the absence of all batteries, track circuits operated by alternating current are even more reliable and require less attention than the battery-operated track circuits on steam roads. Any condition of the bonding that would be tolerated from a traction standpoint is good enough for the operation of signals. What to a traction return would be equivalent to an open circuit would not be noticeable in a track circuit. Reports received from a number of electric traction signal systems covering a number of years show very little trouble due to this cause. In view of the fact that alternating current must be used for the track circuits and hence a transmission line must be used to distribute the current to the track transformers, the various signals, relays, signal lights, switch lights, etc., can also be operated from the same source, thus avoiding all batteries and reducing the operating charges to a minimum.

On electric lines using alternating current for propulsion a signaling current having a different characteristic from that of the propulsion current is used and relays are provided which are responsive only to such signaling current and not to the traction current. The cost of such a system would be somewhat higher than with direct current propulsion on account of the greater number of cut sections that would have to be employed. It is possible to operate track circuits where a. c. propulsion is used by employing ordinary direct-current batteries. In such event one of the rails would have to be abandoned for the return propulsion current and used for signaling only, the other rail being continuous for the propulsion current return. It is believed to be inadvisable, however, to attempt the use of battery-operated track circuits on alternating current lines because of the danger of false indications due to the flow of stray direct current through the track rails.

The proper indications of signals form an important part of the problem of signaling. Block signals may be divided into two general classes, viz, absolute and permissive. Absolute signals ("stop and stay") are those which normally permit but one train in a block at a time except by special permission such as an order from the dispatcher. Permissive signals ("stop and proceed") are those which normally permit trains to follow each other into the same block under certain prescribed rules. Absolute signals are used to govern the entrance to a piece of single track, which of course could not be used by trains in the opposite direction at the same time. Permissive signals are used to govern the movement of trains following each other.

Figs. 3 to 9, inclusive, show a series of day and night indications in which an arm in the horizontal position or a red light always means stop; the arm inclined upward at an angle of 45 deg. or a yellow light displayed above a white light always means proceed at normal speed prepared to stop at the next signal, and a blade in the vertical position or a green light always means proceed at normal speed prepared to pass the next signal at normal speed. Furthermore, a yellow light displayed below a white light, Fig. 9, gives authority to proceed into an occupied block and is named a "call on signal." The white light next below the semaphore is used as a marker to show whether a signal is absolute or permissive. Lights in a vertical line indicate an absolute signal, as shown in Fig. 3, and when staggered, as shown in Fig. 4, indicate a permissive signal.

In planning this series of indications it was the aim to have as few and as simple indications as possible, always having each arrangement of arms or lights indicate only one and the

same thing, so that the motormen could easily learn and remember what they mean and could comprehend their meaning in an instant when the signals were seen. The system of signal indications shown is the result of a prolonged and careful study of the subject made by prominent members of the Railway Signal Association. It is a safe, uniform and consistent scheme and will meet practically all of the conditions to be encountered in automatic block signaling on electric lines. It is worthy of careful consideration by those having such matters in charge.

Light signals corresponding as regards their day and night indications to the light indications of Figs. 3 to 9 can also be used. By the use of large and powerful lenses and reflectors and by providing suitable hoods over each light they can be seen clearly at a distance of several hundred feet in the bright sunlight and of course very much further at night. They are recommended where the speeds are moderate or where the trains slow up at all sidings. They are very simple and inexpensive as compared with semaphore signals, the only objection to them being that they cannot be seen so far in the daytime. Their use for electric railway signaling is more justifiable than in steam road signaling. Light signals have the advantage as compared with semaphores in that there are no exposed moving parts to be interfered with by sleet, ice or broken wires.

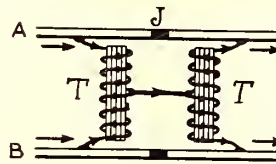


Fig. 2—Automatic Block Signals—Connections for Reactance Bonds

In the location and control of signals for single-track operation several points must be considered; first, with respect to intermediate sections of track and, second, with respect to passing points. Each section of single track should be protected by absolute starting signals, one placed at each entrance thereto and so controlled that two trains approaching from opposite directions can never both get clear signals and proceed into the same block at once. This is accomplished by "overlapping" one signal by the other, that is to say, by having the control of one signal extend beyond that of the other. Before a proceed signal can be given into a piece of single track the opposing signal should be required to be at stop. This can be guaranteed by electrically interlocking opposing signals and by so designing the circuits and apparatus that no breaks or crosses between the line wires controlling such signals can by any possibility cause the opposing signals, which should be at stop, either to remain in or be moved to the proceed position. This can be accomplished in a very simple manner.

With regard to the arrangement of signals at passing points, it must be recognized that as conditions are at present there is a great difference between steam road and interurban electric railway practice as regards the weight, speed and make-up of the trains moved and hence as regards the braking distances which can be depended upon. For equal safety electric lines operating practically uniform equipments can dispense with some of the provisions necessary on steam roads. On single-track lines various arrangements at passing points are used, namely, the distant signal, staggered signals, siding signs or a combination of such schemes.

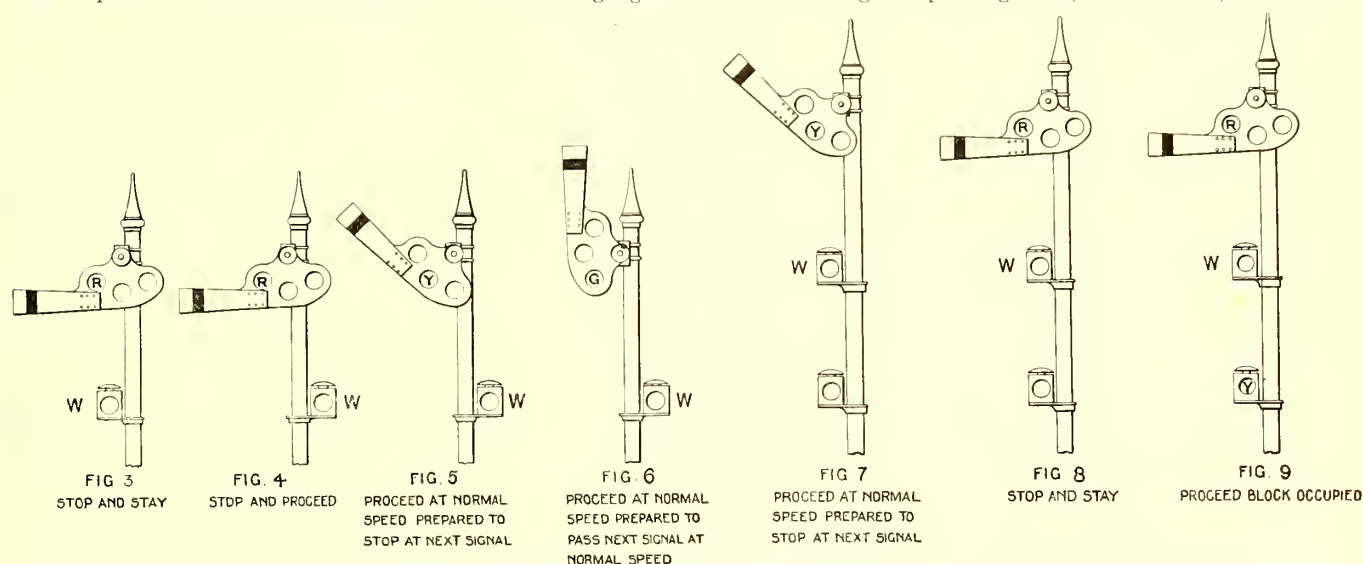
To take care of certain situations, signals on single-track roads frequently are staggered, that is to say, opposing signals are placed at a certain distance from each other. In this arrangement approaching trains stopping at their signals will have a predetermined space between them. The need for this separation becomes less as speeds become less and the equipment becomes more uniform and lighter and therefore the braking distance shorter and more uniform. It also becomes less as the distance at which a signal can be clearly distinguished is greater than the braking distance or when distant signals or fixed siding signs are used to indicate the approach to and the condition of the signal at the point of danger. The siding sign indicates to a motorman that he is approaching a danger point and must be on the lookout to see that the switches

are properly set and no other trains are in the way. Siding signs are frequently set 2000 ft. in advance of the point of danger, on a level with the headlight and close to the track, and are very large and conspicuous. There is therefore very little chance that siding signs will be missed. A distant signal is both a siding sign and a means of giving advance information as to the conditions at the point of danger. It is a time saver, especially in bad or foggy weather, and is very useful where the view of the home signal is obscured by a non-removable obstruction. Distant signals, if used, should be fully automatic, that is, they should go to stop behind a train and remain so until the train is under the protection of the next signal in advance. To make a distant signal fully automatic a track circuit must be used. The larger and more conspicuous the home signal is made the less the need for a distant signal, especially where siding signs are used.

It is evident that any degree of protection desired can be given and that the protection required depends largely on the braking distance. As the requirements become more severe the expense will go up. For moderate speeds or when traffic conditions permit slowing up on the approach to each passing point the simple scheme of using light signals opposite each other with siding signs will be found satisfactory and is the least expensive. It should be remembered that a starting signal

passing sidings two signals, with or without distant signals, will generally be found sufficient, but where long passing sidings are employed four signals, with or without distant signals, should be used. The practice employed by some roads of requiring cars to head in and back out is to be heartily commended from the standpoint of safety, insuring as it does the setting of the switch in the main line position. Wherever spurs or sidings exist other than at regular passing points they should be protected by switch indicators so arranged that they will show whenever it is safe for a car to leave such a siding; and when the switch is thrown the proper signals should be set at stop, indicating to any other train which may be approaching that the block is occupied. Furthermore, the proper signals at passing points should be controlled by the switches in such a manner that they will give the proper danger indications when the switches are opened.

An important consideration in determining the number and arrangement of signals is the cost of stopping or slowing down high-speed trains in order to ascertain whether or not the next block is clear. Systems initially less expensive than the track circuit system may be employed where trains are required to slow down or stop at all passing points, but it is a question if their use can be justified, especially on high-speed lines, in view of the higher operating costs, loss of time, etc. Based



Figs. 3 to 9—Automatic Block Signals—Recommended Semaphore and Light Signal Indications

permitting entrance into a given piece of single track, when clear, tells the motorman that the block is clear and that it is safe for him to proceed to the next signal only. He must approach the next signal prepared to stop short of it. If upon approaching this signal at high speed he is unable to distinguish the indication he must apply the brakes and continue under control until the indication of the signal which he is approaching is visible. With a full-size semaphore in moderately clear weather either day or night and when the view is unobstructed the motorman of a high-speed electric car will be able to sight the signal in plenty of time to stop if the signal is at danger. It is necessary to slow down, when the signal is clear, only in foggy weather. With light signals high-speed cars would have to slow down in all kinds of weather; hence such signals are only recommended where the speeds are moderate, say about 30 m.p.h.

In view of the foregoing it is believed that on many electric lines it is neither necessary to stagger the home signals or use distant signals where the view of the home signal is unobstructed, where siding signs are used and where a full-sized semaphore is employed. If the locality is such that much bad weather occurs, or if the view of the home signal is obstructed by a curve, or if for any reason the view of the home signal is often obstructed, it would be economical to use distant signals. The arrangement of signals at passing points also is largely influenced by the nature of the siding. For stub end or short

upon information furnished by an officer of one of the large interurban lines of the country, it was found that the cost to stop and start an ordinary 40-ton car, running at 40 m.p.h., including power, wear and tear on the brake shoes, brake rigging and trucks, is approximately 3 cents per stop, based on a cost of power of $1\frac{1}{4}$ cents per kw-hour. Assuming a movement of 20 trains a day in each direction the cost per day at one passing point would be \$1.20 and per year \$438, which would pay the interest on an investment of \$8,750. For higher speeds and greater car weights this would be more, and for slower speeds less; also, if the train did not come to a full stop it would be less. If these figures are anywhere near correct it shows conclusively that any system in which trains have to stop frequently for the sake of getting indications is a poor investment. Not only is stopping expensive, but it involves a loss of time. In the case cited above about one minute was lost per stop. Where a road gives limited service and where there are many sidings and only a few stops for the limited train it would be a serious handicap to stop or even slow up at the various passing points.

[The writer then gave a series of cuts, which are not reproduced here, illustrating various arrangements of signals to meet different classes of traffic, with a full description of each arrangement, especial attention being directed to a system which will allow close following movements under a distinctive signal with absolute head-on protection using the track circuit

as the medium of control and without the use of intermediate signals.]

The statement is sometimes made that trainmen will not obey signals and therefore their use is not justified. While it is true that trainmen have in many instances disregarded signals, it by no means proves that their use is not justified. The disregard of signals has been due largely to their improper location or operation. For example, signals have frequently been allowed to be at stop when they ought to have been at clear, which has led to their disregard, and which in turn has resulted in some very serious accidents. Another important point in securing obedience to signals is to locate them properly. For example, if a distant signal is set too far away the motorman will soon find out that he need not shut off and apply brakes when he passes it, for if he does he will lose time and he soon learns that he can just as well apply them later and stop in time. He may under such conditions do it too late. Cases have also come to the writer's attention where, due to misplaced signals, trains were regularly delayed when they need not have been; hence the tendency on the part of the engineer or motorman to disregard the signals. In short, whatever disobedience there may have been to signals is largely due, in the opinion of the writer, to faulty apparatus, misplaced signals or faulty practices in their operation. With up-to-date systems and mechanisms, together with a better understanding of traffic requirements, the operation goes on with surprising accuracy with the result that the causes leading to the disobedience to signals have been very greatly reduced.

Some of the reasons which may justify an electric line in spending the money necessary to install proper signals are:

Increased capacity of the line, reduced liability to accident, avoidance of delays and increased confidence of the traveling public. With strong line construction a properly designed signal system will give much less trouble than a telephone system with its delicate apparatus, thus making it possible to operate with comparative freedom with the telephone line in trouble. The telephone should not be abandoned, however, as it is a very valuable adjunct in the handling of trains on single track. A suitable signal system will permit schedules to be maintained safely in all kinds of weather, which is an important consideration in sections of the country where there is much foggy weather and the like.

AUTOMATIC STOPS

There is a wide difference of opinion on the subject of automatic stops, some claiming that automatic stops will have a tendency to make motormen relax in vigilance and others that they will have the opposite effect. If automatic stops are used in interurban service they should record every time they operate and the motorman should account for each record. Under these conditions no relaxation in vigilance would result. Stops, if used, should be so connected with the air system that an emergency application will not result when the trips are caused to operate. This will frequently require the use of auxiliary air-controlling apparatus on the car. To make automatic stops of their highest value it frequently becomes necessary to rearrange the signals on single track to secure the necessary braking distance and when so rearranged the signal installation may become much more expensive. On double-track roads a full block overlap is usually provided. With this arrangement about 33 per cent more signals are needed than without stops to maintain the same headway.

In conclusion the writer wishes to emphasize the following points in this paper:

(1) Where the traffic conditions on electric railways are such as to require block signals the automatic system employing continuous track circuits is recommended. Its use is urged from the standpoint of safety, reliability and economy. It is now successfully employed on over 17,000 miles of steam road in this country and its use is rapidly increasing, to the exclusion of other block systems.

(2) Automatic block systems employing track circuits for electric lines are now available which, while maintaining a full

degree of safety, reliability and economy, are much less expensive than ever before.

(3) Of the various systems of single-track signaling available the one in which opposing moves are controlled absolutely and following moves permissively under a distinctive signal is recommended for those roads where following moves closer than the distance between passing points are required.

(4) The adoption by the various electric railroads of the country of a uniform system of signal aspects and indications is urged. The system proposed by the Railway Signal Association, as far as it will apply and as described in this paper, is recommended.

REPORT ON SUBWAYS FOR CHICAGO

On Monday of this week Bion J. Arnold, chief subway engineer for the City of Chicago, submitted to Mayor Busse and the local transportation committee of the City Council a report on a proposed system of subways to be used as the basis for formulating a well-defined policy on the part of the city with regard to future extensions of rapid transit facilities in the congested loop district.

Mr. Arnold submitted two plans for future subway construction. The first plan contemplates the construction of a comprehensive system of high-speed subways designed ultimately to cover the entire city and make it possible to remove the present elevated structures in the downtown district. Such a system of subways would provide not only for the operation of high-speed express and local trains, but also for the operation on separate tracks of surface cars which could be deflected into the subways at outlying points and therefore greatly relieve the congestion on the surface of the streets. This plan contemplates using the subways to be built first for some of the present surface car lines; later the trains of the elevated roads and, finally, for high-speed subway trains, reaching far out into the residential districts. These subways could be built by the city or by private capital, or by calling upon the surface street railway systems for financial support. If the city decided to enforce the clause of the traction ordinances of 1907 under which the surface lines are operating, these lines could be required to furnish money toward the construction of the subways, provided that they had the full use of the subways so constructed up to the capacity which they required.

The second plan proposed by Mr. Arnold is for a system designed to be used exclusively by surface cars for the immediate relief of the present congestion on the streets in the business district. This plan would utilize the existing tunnels under the Chicago River and the routes and levels would be so located that there would be no interference with the subsequent construction of the high-speed subway system, as proposed in the first plan. Under this second plan the city could allow the surface lines to construct a subway system suitable only for surface cars with their own money, or call upon the surface lines for the money required to construct such a system and built it jointly with them or not, as might seem best.

Mr. Arnold strongly recommends the first plan. The general principles upon which the system he favors is based are as follows: (1) Through operation from north to south with as straight tracks as possible. (2) The construction of loop routes for the West Side lines which would encircle and cross the business district. These east and west subways would have the grades separated where they cross the north and south subways. (3) Subways under diagonal avenues leading to the northwest and southwest sections of the city. With such a system passengers from the West Side could be carried directly to the lake front without transferring, or by transferring once could take any of the north and south routes. Similarly, passengers from the North and South Sides could be carried from one end of the city to the other without transferring, or by transferring once they could reach any point on the West Side of the city.

The construction of subways in Chicago is somewhat

hampered by the fact that 33 ft. below the surface of the streets the Illinois Tunnel Company has constructed a system of nearly 60 miles of freight tunnels which cannot be disturbed. This would necessitate very shallow construction for the new subways, especially at street intersections where the north and south lines cross the east and west lines on two levels. Mr. Arnold proposes the use of combination I-beams and reinforced concrete construction for the new subways so as to permit cross-sections of sufficient size to admit the present standard elevated cars in the tunnels within the narrow limits of depth. Sufficient space would be left at the sides of the tunnels to permit building pipe galleries which would accommodate all of the subterranean structures of the various public utility companies. Special attention is given in the report to the subject of the disposition of the sewers. The sewers will either be constructed in the streets not wholly occupied by the high-level subways or in special galleries which will form a part of the high-level structures. It is proposed to provide for ventilation of the tunnels by having the bore of each track inclosed, except at stations, so as to produce a piston action by the movement of trains.

The report outlines the progressive steps in the construction of the complete system. The first step would be to relieve the congestion on Clark Street, which at the present time is most in need of such relief. The plan would be to construct a two-track subway from the present southerly portal of the La Salle Street tunnel under the Chicago River; south to Madison Street, east to Clark Street and thence south under Clark Street to a portal at Archer Avenue. The estimated cost of this section, which would include 4.28 miles of single track and four stations, is \$3,000,000, exclusive of damages to property. The next step would be the construction of a terminal loop from the east entrance of the Washington Street tunnel under the Chicago River, via Franklin and Madison Streets, Michigan Avenue, Jackson Boulevard and Franklin Street back to the east entrance of the Washington Street tunnel and a similar loop under the same streets from the east entrance of the Van Buren Street tunnel. This route comprises 3.663 miles of single track and six stations, and the estimated cost, exclusive of damages to property, is \$5,000,000. Subsequent extensions of the system would consist of routes substantially parallel to these. The total cost of the complete system comprised in the first plan as outlined in the report, comprising a total of 49.185 miles of single track and 44 stations, is estimated at \$48,900,000. The cost of the complete system proposed in the second plan is estimated at \$13,200,000 for 9.8 miles of single track and 11 stations.

The report is accompanied by a number of maps showing the successive stages of construction in each of the proposed plans and cross-sections at several different points, showing the shallow construction proposed and complete studies of station plans and other details.

STANDARD CLASSIFICATION OF STREET RAILWAY ACCOUNTS IN NEW JERSEY

The Board of Public Utility Commissioners of the State of New Jersey has adopted as a standard classification of accounts for the electric railways in its jurisdiction the standards of the American Electric Railway Accountants' Association, with two slight changes. One of these is in operating expenses account No. 26, "Depreciation of Way and Structures." The other is in operating expense account No. 42, "Depreciation of Equipment." As modified these read as follows:

"26. Depreciation of Way and Structures. Charge to this account, month by month, the amount estimated to be necessary to cover such wear and tear, obsolescence and inadequacy as have accrued during the month on all way and structures of the accounting corporation, less an amount equal to the sum of the amounts charged for that month to the various repair accounts in 'Maintenance of Way and Structures.'

"Note.—Until otherwise prescribed the 'amount estimated to be necessary to cover such wear and tear and obsolescence and inadequacy as have accrued during any month shall be based on a rule to be determined by the accounting corporation. Such

rule may be derived from consideration of the said corporation's history and experience. A general statement of the rule in use by each company, together with the general information upon which it is based, is to be filed with the Board of Public Utility Commissioners."

"42. Depreciation of Equipment. Charge to this account, month by month, the amount estimated to be necessary to cover such wear and tear, obsolescence and inadequacy as have accrued during the month on all equipment, less an amount equal to the sum of the amounts charged for that month to the various repair accounts in 'Maintenance of Equipment.' See note under Account 26."

GOVERNORS' MESSAGES

The following abstracts from the messages of governors supplement those published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 75; Jan. 21, 1911, page 125, and Feb. 4, 1911, page 229.

GOVERNOR EDWIN L. NORRIS OF MONTANA

The issuance of capital stock, an increase in stock or the creation of an indebtedness by corporations should not be allowed until some State authority has made an examination and become satisfied that the fair market value in money or property has been paid for stocks or bonds, except that a reasonable amount of promotion stock or premiums might be allowed for organization, promotion or sale purposes.

This duty might appropriately be performed by a public service commission, for the organization of which recommendations will be made. All realize that none but laws that deal justly with capital should be passed, but, upon the other hand, laws that will compel capital to deal justly with the public are insisted upon. I cannot believe that the enactment of any laws justly and fairly regulating corporations will prevent investments and development in Montana.

Public service commissions with full power to regulate will cut the taproot of corporate evils and bring about conditions that are fair alike to the corporations and the public. Many favor elective commissions, while others advocate appointive bodies. I am not so much concerned with the method of selection as I am impressed with the necessity for a public service commission.

GOVERNOR SPRY OF UTAH

In my message to the Legislature two years since I called attention to and made certain recommendations regarding the creation of a public service commission in the State of Utah, which I again present for your consideration, in part, as follows:

"The affairs of quasi-corporations and associations should have publicity. Intelligent investigation of combinations and public service corporations will greatly aid the people of Utah and tend to establish just and fair dealing.

"Whatever action is taken should be in the spirit of conservatism and fairness to both individuals and corporate interests, such as has characterized the past history of the State, and which will make for the public good.

"For the attainment of this end I recommend the creation of a public service commission, to be composed of citizens of ability to deal with matters of such weighty importance; the commission to be clothed with ample powers to make regulations necessary to conserve the public welfare in this regard. Such a commission should be entirely accessible to all of the people upon all of the subjects within its jurisdiction and the law be sufficiently broad to include every public utility operating within the State. The prompt adjustment upon an equitable and inexpensive basis of the many difficulties and complaints arising in this class of business should be provided for in creating a commission of this character, which thus would be beneficial to every interest involved. In fairness to all the people of this State the creation of a public service commission should not be longer delayed."

GOVERNOR J. M. CAREY OF WYOMING

I recommend to the Legislature that in all corporate organi-

zations under the laws of the State the right of cumulative voting in the selection of boards of directors of said companies be provided for. In other words, that the minority stockholders shall have representation upon these boards by pooling their stock if they so desire and electing at least one of the board.

GOVERNOR GEORGE W. DONAGHEY OF ARKANSAS

The fact that public service corporations are organized under our State laws and have home men on their boards of directors does not alter the real situation, for these home men are sometimes selected merely for their supposed local influence, while the real control is, of course, in the people who own the shares of stock in the corporation. That foreign capital is invested in them is no ground for complaint, but abuses in the management of these properties are permitted to grow up that would hardly exist if those in control were on the ground and able to know what was being done.

Under existing laws corporations operating street railroads have an undue advantage in their litigation. If a citizen from any part of the State is injured by a street car in Little Rock, Fort Smith, Pine Bluff, Hot Springs, Texarkana or Eureka Springs he is not permitted under the law to bring suit in his home county, but must sue in the county where the car line is operated. It is not fair to make the defendant go to the plaintiff's county, nor is it fair to make the plaintiff go to the defendant's county for trial. Neither party to a suit should have any advantage over the other in the matter of the court where the case is to be tried. A law ought to be passed giving the plaintiff an absolute right to a change of venue merely upon his filing a petition, verified by himself, asking therefor in every case where it is necessary under the law to bring suit in the county where a corporation has its principal office in order to get legal service of summons in the action. It does not meet the case to say that the law already gives any party the right to a change of venue when he can show the court that the other has an undue influence in the county where the case is pending, for when the plaintiff, who is often a stranger in the county, undertakes to make this showing he is very apt to be met by the friends of the corporation willing, ready and eager to testify that he can get a fair trial. Not only should there be legislation to remedy the abuses here referred to, but it will be eminently proper to place all public service corporations under the jurisdiction and supervision of a commission with ample authority and power to make and enforce all reasonable rules and regulations governing their operations. If the financial condition of the State will not admit of the creation of such a commission at this time, the jurisdiction of the Railroad Commission should be so extended as to cover such matters.

Within the last decade the General Assembly of this State has enacted many beneficial laws for workmen engaged in hazardous occupations to recover compensation for injuries sustained for which at common law there could be no recovery. The abolition of the fellow-servant rule has been a step in the right direction. But I am of the opinion that the time has arrived to take another forward step and provide by legislation for compulsory compensation for industrial accidents, regardless of the rules of the common law known as assumption of risks and contributory negligence. For the latter I would recommend to your honorable body the enactment of a law based on what is known as comparative negligence, and in addition to these I would recommend to your favorable consideration a compulsory compensation law providing in all cases of injury to an employee, unless it is caused by his own wilful act, compensation based on his earnings. If the injury results in death, a sum equal to the earnings of a certain number of years should be paid to the family of the deceased dependent upon him for support, and a similar proviso should be made for him in case of permanent or temporary disabilities. At present the burden is placed entirely on the shoulders of the workmen, those least able to bear it.

GOVERNOR EMMET O'NEAL OF ALABAMA

My views on this important question are so fully and clearly

expressed by the Democratic platform adopted on May 17, 1910, that I quote it in full:

"The public has a right to require from public service corporations just and impartial service, without rebates, discriminations or exactions, and an efficient and courteous performance of their duties. Such corporations, on the other hand, are entitled to just and fair treatment and to equal protection of the law, and capital invested in such enterprises should not be denied the opportunity of earning just and reasonable compensation. We favor legislation which will safeguard the rights of the public as against such corporations, but condemn any legislative attempts to cripple such corporations by enactments which are harsh or inspired by a spirit of hostility."

I would suggest that the powers of the present Railroad Commission be so enlarged as to embrace telephone and telegraph companies with full power, after hearing, to adjust and regulate intrastate rates.

GOVERNOR HIRAM W. JOHNSON OF CALIFORNIA

The people are, indeed, fortunate now in having a Railroad Commission of ability, integrity, energy and courage. I suggest to you, and I recommend, that you give to the commission the amplest power that can be conferred upon it. The president of the Railroad Commission, John M. Eshleman, in conjunction with Attorney-General Webb, Senator Stetson and others, in all of whom we have the highest confidence, has been at work preparing a bill which shall meet the requirements of the case, and I commend to your particular attention this instrument.

I would suggest that an appropriation of at least \$75,000 be made for the use of the commission that it may, by careful hearing and the taking of evidence, determine the physical value of the transportation companies in the State of California, and that the commission may have the power and the means to determine this physical value justly and fairly, and thereafter ascertain the value of improvements, betterments and the like, and upon the values thus determined may fix the railroad rates within the State of California.

GOVERNOR OSWALD WEST OF OREGON

The four years' work of the Railroad Commission speaks for itself. Since the creation of the commission the public has seen a marked improvement in the roadbed, equipment, station facilities and train service of our railroads and is receiving the benefit of an annual saving of several hundred thousand dollars through rate reductions. The great task of ascertaining the original cost and cost of reproduction of all of the railroads in the State is about finished and the information thus obtained will be of inestimable value both for taxation and rate-making purposes. This undertaking has cost the State but a small fraction of what similar undertakings have cost other States. The commission is now working under a very effective law and but few amendments are necessary. These, however, will be submitted to you for your approval through measures which are being prepared by the commission. Its further needs are fully set out in its annual report and will no doubt be called to your attention by the members of the commission.

There is a demand from many quarters for the better regulation of all public service corporations and a movement is now on foot to place those not now subject to control under the jurisdiction of some commission. Experience has shown that just rates and treatment come only through such effective regulation and there is no excuse for further delaying action in this State.

The constant consolidation and reorganization of our public service corporations and the lack of proper regulation in the matter of issuing stock should attract the attention of the members of this Legislature and convince them that there is great need of legislation which will protect the public from all unwarranted issues of watered stock. It may be that this is a matter for federal regulation, but in the absence of any action on the part of Congress it is surely within the province of the State to take action in the matter.

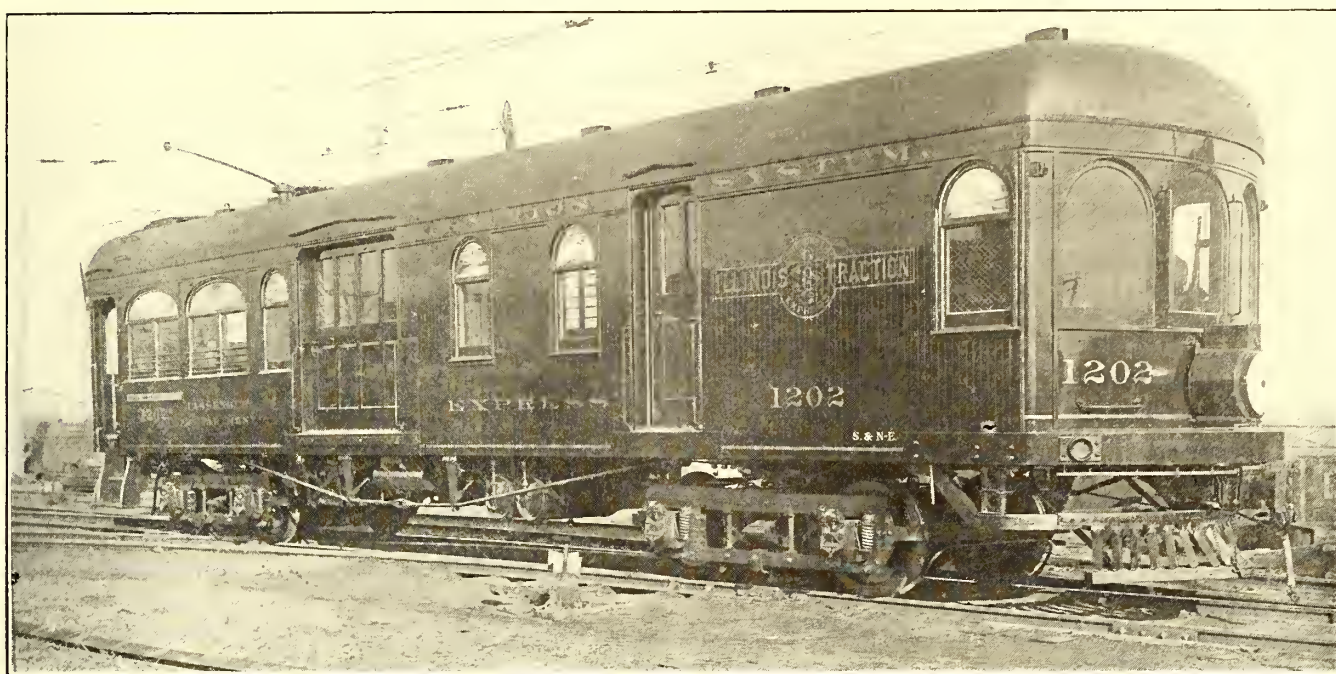
NEW EXPRESS-PASSENGER MOTOR CARS FOR ILLINOIS TRACTION SYSTEM

The growth of long-distance traffic on the Illinois Traction System has brought about the construction of motor cars of a novel type, four of which recently have been put into service. These cars are designed for handling mail or baggage and express and a small number of passengers. They are supplied with complete motor equipment and arranged for use as locomotives in hauling trains of passenger, sleeping or express cars. An illustration of one of four of these cars, just delivered by the McGuire-Cummings Manufacturing Company, is presented. Two of the new equipments have been put into service hauling the through sleeping cars between Peoria and St. Louis. These trains make a run of 175 miles between the two terminal cities daily, leaving one terminus at midnight and arriving at the

the passenger compartment conforms to the standard practice.

The new cars are mounted on Curtis trucks and equipped with four GE-205 motors with type M multiple-unit control. They are heated with Peter Smith hot-water heaters and are provided with toilet rooms at the forward end of the passenger compartment. In addition to the hot-water heating system eight cross-seat heaters and one cab heater of Consolidated Car Heating Company manufacture have been installed. The cross-seat heaters are arranged to supply 1 deg. of heat only. The cab heater is connected on an independent circuit and all heaters are controlled from the motorman's compartment.

Some of the special equipment on these cars includes the following: Dayton toilet fixtures, 5-in. Globe ventilators, Empire safety treads, Edwards trap doors, Forsyth No. 88 ring curtain fixtures, Pantasote curtain material, U. S. No. 13 trolley base, No. 2 Knutson trolley retrievers, Wagenhals headlights,



Illinois Traction System New Motor Car, the Greater Portion of Which Is Reserved for Baggage

other at about 7 a. m. The two other combination cars are used in pulling local milk trains in and out of St. Louis. These trains have early morning runs making all stops, and it is desired to be able to haul a milk car and yet have the motor car arranged so that the few passengers using the early morning run can be carried conveniently. The new cars are admirably adapted to this service.

The most noteworthy feature in connection with the design of the new type of motor car is the use of the turtle-back roof which was adopted a little over a year ago by the Illinois Traction System when its latest sleeping cars were built. The bodies of the new motor cars are of heavy construction, 52 ft. 6 in. long and designed for single-end operation. The front compartment of the car is 24 ft. long. Its windows and doors have been so placed that this compartment may conveniently be equipped for railway mail service. A motorman's cab of the type standard on the Illinois Traction System has been set off at the left-hand forward corner of the car. The doors and windows in the forward compartment have been made small to provide maximum wall space.

The middle compartment is 12 ft. long and is provided with wide side doors. This compartment will be used for handling baggage. The rear compartment of the new type of car is similar to a section of a standard passenger coach, having six Hale & Kilburn reversible and two leather-upholstered seats. Twelve campstools also are carried in this car. The passenger compartment is trimmed with mahogany and is fully up to the standard of other passenger cars. The window arrangement in

Westinghouse schedule AMS type air-braking equipments.

The general dimensions of the combination motor cars are as follows:

	Feet.	Inches.
Length over all.....	52	6
Width over sheathing.....	9	3
Width over all at eaves.....	9	5 3/8
Width inside between sheathing.....	8	5
Height, bottom of sill to top of roof boards.....	9	4 13/16
Height, top of rail to bottom of sill.....	3	5
Height, rail to top of drawbar.....	2	10

REPORT ON EUROPEAN RUSH-HOUR CONDITIONS

The consular report for Tuesday, Jan. 10, issued by the Bureau of Manufactures, Department of Commerce and Labor, gives particulars of the methods adopted in Liverpool, Birmingham, Manchester, Leeds, Belfast, Marseilles, Brussels, Berlin and Moscow for reducing or preventing the overcrowding of cars during the rush hours. Most of the cities mentioned limit the number of passengers who are allowed to stand in the cars or on the platforms. In Leeds, Belfast and Moscow this limit is eight persons. In Berlin the usual number is seven, but under certain conditions a larger number is permitted, such as during sudden showers, snowstorms, on Sundays and holidays after 3 p. m., etc. The number of passengers allowed to stand in the other cities mentioned in the report is not given. Where the number is limited in this way passengers form in a line, called in England a "queue," and await their turn to be admitted on the cars.

News of Electric Railways

Plans for Electrifying the Revere Beach & Lynn Road

At the hearing held before the joint committee on railroads of the Legislature of Massachusetts on the application of the New York, New Haven & Hartford Railroad for permission to take over the Revere Beach & Lynn Railroad T. E. Byrnes, vice-president of the New York, New Haven & Hartford Railroad, said: "The New York, New Haven & Hartford Railroad proposes to build and equip a double-track tunnel under Boston harbor, connecting the eastern branch of the Boston & Maine and the Revere Beach road with the South Station, using a lower level of the South Station for station, to connect with the main line tracks of the New Haven at a point between the tracks of the South Terminal Company and the Back Bay station. It is proposed to equip and operate by electricity at least two tracks of the New York, New Haven & Hartford Railroad from Readville to the tunnel; also the tracks through the tunnel, and two additional tracks from the tunnel to Lynn and the tracks of the Revere Beach & Lynn Railroad from the tunnel to Lynn. It is also proposed to four-track the main line of the Boston & Maine Railroad beyond Lynn to Beverly, building a four-track tunnel through the city of Salem, and as soon as the grade crossings on the line are eliminated and the Salem tunnel completed to operate by electricity at least as far as Beverly. The tunnel will cost about \$12,000,000, while the other work outlined will amount to nearly as much."

Letter on Proposed Cleveland Railway Bond Issue

H. J. Davies, secretary of the Cleveland Railway, returned to Cleveland from New York on Jan. 31, 1911, with a proposition from Harris, Forbes & Company to purchase a certain amount of bonds of the company. J. J. Stanley, president of the company, and Mr. Davies decided to submit the offer to the City Council before giving out detailed information regarding it, although Mr. Stanley stated that it relates to a 5 per cent bond at a discount. If the City Council refuses to make such changes in the grant as will allow the sale of these bonds the company may demand arbitration. The following letter, bearing upon the bond issue, was submitted to the City Council by the Cleveland Railway on the evening of Feb. 5, 1911:

"We have at present outstanding \$3,151,000 mortgage bonds due Jan. 1, 1912, but optional on 60 days' notice, and an existing floating indebtedness of about \$1,250,000. The latter ought to be funded at once, and it is desirable to refund the former at this time instead of waiting until their maturity. Pursuant to the franchise under which we are now operating, we have authority to refund our bonded or floating indebtedness at any time without asking the consent of the city of Cleveland, but if the bonds necessary to be sold to refund such indebtedness bring less than par it becomes necessary for us to ask the consent of the city.

"While the existing ordinance authorizes the city to approve a sale of bonds at a discount, there appears to be some doubt as to whether or not the discount may be amortized. In other words, if the ordinance does not permit the amortizing of the discount, a sale of bonds below par, even with the consent of the city, may involve a direct loss to us of the amount of the discount. The existing ordinance authorizes the company to sell at par without the consent of the city any bonds bearing interest not in excess of 6 per cent. Of course, it is entirely practicable for us to sell a 6 per cent bond at par, but we do not desire to have the securities of the company bear a higher rate of interest than is absolutely necessary or than good business judgment dictates. To the stockholders of the company it makes no direct financial difference whether the bonds bear 6 per cent or 5 per cent interest.

"We have an offer from Harris, Forbes & Company to purchase \$5,000,000 of 20-year 5 per cent bonds at 97, but it may be that, under the ordinance as it stands, to do this would involve a loss to us ultimately of \$150,000 on this \$5,000,000 issue. At 97 a 5 per cent bond, including amortiz-

ing the discount, is equivalent to about $5\frac{3}{4}$ per cent. We do not think it possible for us to sell at par any bonds bearing a lower rate of interest than $5\frac{1}{2}$ per cent, and, therefore, the price of 97 for a 5 per cent bond, including amortizing the discount, is a direct saving of fixed charges to the extent of approximately $\frac{1}{4}$ of 1 per cent. We are willing to make this saving, but hesitate to do it at the expense of the stockholders. Neither do we think it sound financing at the present time to issue bonds bearing a rate of interest in excess of 5 per cent. We are also satisfied that the offer of 97 is a fair price, and that we cannot hope to receive more than that amount for a 5 per cent bond at the present time.

"In this situation we desire to obtain from the city its construction of the ordinance on the question of our right to amortize the discount in the event that the city approves the proposed sale, and if the city should maintain that the existing ordinance does not confer upon us that right we wish to suggest our willingness to accept an amendment to the ordinance which would accomplish this purpose and result in a net saving of fixed interest charges."

Transit Affairs in New York

Controller Prendergast and President Mitchel of the Aldermen sent to the Public Service Commission on Feb. 4, 1911, a letter urging that body, in its consideration of the subway offer of the Interborough Rapid Transit Company, to consider the possibilities of an independent subway route, particularly as regards the cost of construction. A copy of the letter was sent to Borough President McAneny, who is chairman of the subway conference committee of the Board of Estimate. Mr. Mitchel and Mr. Prendergast point out that, according to figures they have received direct from President Shonts of the Interborough Rapid Transit Company, the cost of constructing an extension from Thirty-fifth Street to 135th Street is figured by the Interborough Rapid Transit Company at \$34,200,000, whereas the lowest bids received by the Public Service Commission for the corresponding section of the Lexington Avenue line of the triborough subway from Fortieth Street to 138th Street aggregated only \$26,673,362. Adding in an estimate of \$760,000 for station finish, track and ballast, which were not included in the triborough bids but were included in Mr. Shonts' estimate, a difference of \$6,766,634 appears in favor of the triborough bids on this section. The triborough bids, moreover, were based on a tube sufficient to accommodate cars of the standard size, whereas the Interborough Rapid Transit Company's estimate was for a subway built on the lines of the present tube. On the basis of these comparisons Mr. Mitchel and Mr. Prendergast suggest that the whole scheme as laid out by the Interborough Rapid Transit Company may be entirely misleading, and that, with the city's investment fixed at \$53,000,000, the acceptance of such a proposition might place upon the city an undue proportion of the total cost.

An order granting an application of the Hudson & Manhattan Railroad for an extension of the time within which to build the extension of the Sixth Avenue subway through Ninth Street to Fourth Avenue, from June 15, 1911, to June 15, 1913, has been adopted by the Public Service Commission.

Work has been commenced by the Third Avenue Railroad at the corner of Third Avenue and Sixtieth Street, Manhattan, to extend a line from Third Avenue to First Avenue and there connect with the tracks on the north side of the Queensborough Bridge. Direct connection with the Third Avenue tracks is to be made at Third Avenue and Sixtieth Street. At Third Avenue and Fifty-ninth Street a connection is to be made with the Third Avenue tracks and the lines now on Fifty-ninth Street. The Third Avenue Railroad, under a franchise which has been granted by the Board of Estimate and the Public Service Commission, proposes to run cars over Fifty-ninth Street, connecting with the tracks now on the south side of the bridge, then continuing to Long Island City, to the Queensborough

Bridge plaza and out as far as Jackson Avenue, there looping to the south side of the plaza and thence returning to Manhattan over the tracks on the south side of the bridge.

The Public Service Railroad Commission has denied the application of the Brooklyn Heights Railroad, the Nassau Electric Railroad and the Coney Island & Brooklyn Railroad for a rehearing on the grant of a certificate last July to the Manhattan Bridge Three-Cent Fare Line, which proposes to construct a surface road across the bridge and Manhattan to the North River via Canal Street. The commission told the company that unless it obtained operating rights across Manhattan it would refuse to approve the exercise of a franchise later on. The Brooklyn companies in their application declared the Three-Cent Fare Line would never be able to get the operating rights.

Railway Affairs in Detroit

The Michigan Supreme Court, sitting at Lansing, Mich., on Feb. 1 decided that Detroit does not possess the right under its charter to submit the Moore municipal ownership plan for acquiring the street railways and other utilities to a vote of the people. The court holds that a general revision of the charter must precede amendments such as the one providing for this vote, and that amendments adopted otherwise are null and void. The decision nullifies the civil service and a number of other amendments made to the charter at the fall election, as well as the one applying to municipal ownership.

The city has a right to issue two kinds of bonds, one permissible by the charter limits and the other chargeable to the utility for the purpose of acquiring public utilities, according to the decision. Both Justice Blair and Justice Hooker wrote opinions, but in the main they coincide. Justice Hooker discussed at length the suggestion that if the relators have a remedy at this stage of the proceedings it must be by injunction bill and not by mandamus. Both opinions agree in that the charter of the city will not permit an amendment such as was adopted in this case, and that the plan for issuing bonds is legal.

Two courses are now open to the city to obtain the right to submit the question of municipal ownership to the voters. A complete revision of the charter can be ordered or the Legislature may be induced so to amend the home rule law that a revision of the charter will not be required.

Corporation Counsel Hally estimates that the cost of revising the charter would be about \$80,000 and would necessitate the holding of four elections. If the proposal for revision carried, a primary would follow for the nomination of members of a commission to make the revision. Finally the charter in its revised form would be submitted to a vote of the electors.

On Feb. 1, 1911, the Detroit United Railway filed an answer and cross bill in the suit begun by the city to collect rent on the Fort Street line, on which the franchise is alleged to have expired. The company claims that the franchises for this line do not expire until Dec. 14, 1921, and has asked for an injunction to restrain the city from collecting rent and from interfering with the operation of cars on the line by starting suits at law or otherwise. The company alleges that the city has never demanded that the streets mentioned in the bill of complaint should be vacated and alleges that the city has no legislative authority over rates and terms under which the companies operate, as such rights were never given it by the Legislature. The company admits knowledge of the resolutions passed by the Common Council which ordered it to pay \$200 rental, but denies that the city or any one else knows that the right of the company to maintain and operate railways on the streets named has expired. The company denies that its claims constitute an irreparable injury to the city; that they cloud the city's title to control of the streets, and that they embarrass the city in its dealings with other corporations which desire to operate on the streets at terms more favorable to the public than are afforded by the Detroit United Railway. On the other hand, it avers that the city has made no effort to deal with either the Detroit United Railway or other street railway companies nor taken any steps whatever to supply transportation to the public other than that given by the defendant. The answer alleges that the Common Council has never requested the company to

vacate the streets named or authorized any action at law to dispossess the Detroit United Railway Company from the streets.

An agreement has been reached between the Detroit United Railway and the village of St. Clair Heights as a result of which cars will be run through the village for the accommodation of the people. Heretofore many of the cars have been turned before they reach the village boundary. The loop at this point will be removed and a double track will be built on Mack Avenue.

Estimate to Be Made of Cost of Electrifying London & Port Stanley Railway.—The directors of the London & Port Stanley Railway, London, Ont., of which S. Baker is secretary and clerk, have instructed the civil engineering department of the company to prepare estimates of the probable cost of electrifying the road between London and Port Stanley.

Mayor Whitlock's Illness Delays Matters at Toledo.—Although Brand Whitlock, Mayor of Toledo, Ohio, has so far recovered from his recent operation as to be able to sit up in bed and read, nothing is being done toward a settlement of the street railway question. It is possible that the city authorities will await the result of a vote on the proposed Geleerd bill, which will be before the Legislature at this session and which aims to make it possible for cities to purchase and operate street railways.

Convention of Manufacturers of Corrugated Steel Culverts.—The first annual convention of the manufacturers of steel culverts in the Northwestern States was held at Minneapolis, Minn. The purpose of the association is to standardize the gage and weight of the material used in culverts, to obtain adequate transportation facilities and proper freight rates, to educate the public to the value and efficiency of metal culverts and for general publicity purposes. Officers of the association are: T. M. Thompson, president; B. W. Harris, vice-president; N. V. Lux, secretary-treasurer.

Work of A. E. R. A. Reviewed in Daily Press.—The New York Tribune of Feb. 5, 1911, contained a long article on the American Electric Railway Association and its work with abstracts from the speeches by Arthur W. Brady, president of the association, on "The Association," and by Col. H. G. Prout, vice-president and general manager of the Union Switch & Signal Company, on "The Manufacturer," made at the annual banquet given by the American Electric Railway Manufacturers' Association to the American Electric Railway Association in connection with the mid-year meeting on Jan. 27, 1911, at the Hotel Astor, New York. The article was accompanied by portraits of the following officers of the association: Arthur W. Brady, president; Gen. G. H. Harries, second vice-president; C. N. Black, third vice-president; H. C. Donecker, secretary, and W. Caryl Ely, past-president.

Resolutions Regarding Mr. Winter's Retirement.—The following preamble and resolutions were adopted by the directors of the Brooklyn Rapid Transit Company at their meeting on Feb. 7, 1911: "Whereas E. W. Winter has declined to be re-elected a director and the president of this company; now, therefore, be it resolved, that this board has accepted Mr. Winter's decision with great regret. During the eight years in which he has been president of the company he has built up a strong and efficient working organization, has directed the expenditure of upward of \$45,000,000 in the enlargement and improvement of the transportation facilities of the company's system, has increased its gross earnings from \$12,695,000 in 1902 to \$21,130,000 in 1910 and its surplus earnings from \$531,000 to \$2,793,000, has, by his broad and intelligent appreciation of transportation needs and opportunities, removed many causes of public criticism, and by his ability, energy, sense of fairness, high ideals and independence of judgment has justly earned an enviable reputation as an executive corporate officer. In terminating official relations with Mr. Winter we assure him of our earnest appreciation of his services to the company and extend to him our best wishes for his continued success and good health; and be it further resolved, that the secretary be instructed to transmit to Mr. Winter an engrossed copy of this resolution under the seal of the corporation."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—Feb. 2, the last day fixed for the introduction of new measures, was anticipated by a flood of bills and resolutions. There are many resolutions for extensions of electric railways now in operation and a number of resolutions extending the time for the construction of new lines. There are several workmen's compensation acts, an act to provide a telephone, water and light commission and a bill which would make it a misdemeanor for electric railways to charge more than 3 cents for passengers who are not provided with seats. Perhaps the most important happening thus far was the hearing held on Feb. 2 by the judiciary committee at which the subject of public utility legislation was taken up. The bills considered were the ones introduced by Senator Fenn, by Representatives Banks and Corey and by Representative Hotchkiss to establish a court of commerce. The last measure is fathered presumably by the New York, New Haven & Hartford Railroad. Some weeks ago President Mellen of that company suggested such a court as a substitute for the proposed new utility commission. Mr. Mellen proposed that an additional Superior Court judgeship should be created and that one of the Superior Court judges should be appointed by the chief justice to be a court of commerce for a year with power to employ such experts and assistants as he might deem necessary to carry out the law. Appeal from the proposed court of commerce to the Supreme Court could be taken only on questions of law, not of fact. The principal speakers were Representative Chandler and Prof. W. A. Henry, ex-dean of the department of agriculture of the University of Wisconsin. Mr. Chandler said that the last three Governors had favored a public utility commission and that there was a general sentiment throughout the State on the part of business men in favor of such a commission. He regretted that the proposed commerce court idea had not been advanced sooner so that it might have received the same careful consideration which was given the other public utility measures. Prof. Henry, who is now a resident of Connecticut, reviewed the work of the Railroad Commission of Wisconsin. He said that the commission in that State had met with the general approval of the corporations, the public and the press. The hearing was adjourned until Feb. 8.

Delaware.—A bill has been introduced in the House to create a public utility commission with five members to be elected by the people and to have control over all public service corporations in the State.

Indiana.—Among the measures reported for passage is Senator Netterville's bill to regulate the clearances of wires crossing railroad and interurban tracks. Representative Seidenslicker's bill to give the Railroad Commission power to compel steam and electric railroads to install block signal systems has been reported favorably. The House committee failed to bring in a unanimous report on the Wider bill to provide that no person shall be employed as an interurban motorman unless he has had one year's experience on an electric or steam railroad. The majority report, however, favored the bill. The Senate bill which provides for the examination of interurban employees and officials by the Railroad Commission was killed by the committee. Several hearings on the bill to conserve water-power sites have been held by the committee on naval resources. Representatives of the Indiana & Michigan Electric Company say that this bill would restrict further development of water-power plants to the detriment of the power industry in the northern part of the State. A number of new bills have been introduced. A Senate bill provides that at least two members of a section gang employed on a steam or electric railway shall understand English and be able to pass an examination on the flagging rules. A House bill provides that electric railways may contract with hydroelectric companies for electric power. A House bill would regulate the time and manner in which passengers shall be transported by railroads and the tolls and compensation to be paid therefor. A Senate bill would permit railroads which operate lines less than 15 miles long to charge 4 cents a mile for passenger service. A House bill would provide that when a public-service franchise expires a year's notice shall be given and the renewal franchise be awarded to the highest bidder.

Kansas.—The committee on railroads of the Senate, to

which has been referred all public utility legislation presented in the Senate, has appointed a sub-committee to draft a committee public utility measure.

Maine.—The first month of the Legislature has seen the introduction of many bills affecting public service corporations for which committee hearings and legislative action will probably come during February. The most important general measure introduced provides for a public utilities commission to replace the railroad commission, and to exercise authority over telegraph, telephone, express and other companies. The commission would have the power to regulate capitalization, service and rates. It would number five men, with a chairman drawing \$4,000 a year and the others \$3,500. Appeal from a decision of the commission could be taken to the Supreme Court. This bill is more drastic than the one introduced in the Legislature of 1909 and referred to this Legislature. The most unusual special measure is for the Canadian Pacific Railway to turn over to the Aroostook Valley (Electric) Railroad its 33 miles of branch from Aroostook Junction, N. B., to Presque Isle, Me., the latter road to operate it by electricity. Two other bills would charter a line of the Aroostook Valley Railroad from Washburn to Presque Isle and from Washburn to the west line of the State. The road would afford a short line from Quebec to the Canadian harbor of St. John, N. B. A charter has been asked for a steam or electric railroad from Friendship via Waldoboro, Union, Hope, Lincolnville, Searsmont and Belmont to Belfast, by Cyrus F. Stackpole, William F. Curran, Harry J. Chapman, Bangor, Me., and others, the road to be known as the Knox County Central. Charter extensions have been asked for two years for the Lincoln County Electric Railway, which is proposed from Damariscotta to Boothbay Harbor, for the Waldo Electric Railway between Belfast and Camden, and the Winter Harbor & Eastern to run from Winter Harbor to Cherryfield or vicinity. A charter is asked for the R. & T. Cement Railroad to take over the Rockland, South Thomaston & Owl's Head Electric Railway, and extend it to Tennant's Harbor and Port Clyde. Two railroad taxation bills have been introduced. One is the bill introduced in five previous Legislatures for a valuation of railroads and taxation according to valuation. The other was introduced by Representative Pattangall, and provides for an increase of the limit for railroad taxation to 6 per cent of the gross receipts. The present tax is a percentage of gross receipts graded according to the receipts per mile, with the limit at 5 per cent. Two other bills concern the Wiscasset, Waterville & Farmington narrow-gage steam railroad and also may affect the Lewiston, Augusta & Waterville Electric Railway. One of them would extend the charter of Waterville & Winslow Bridge Company and revive the plan by which the narrow-gage road from Wiscasset was once expected to enter Waterville.

New York.—A bill has been introduced in the Assembly to limit to 5 cents the rate of fare which may be charged by a steam or an electric railway for transportation between two stations in the Boroughs of Manhattan and the Bronx. A bill has also been introduced in the Assembly to require street railways in cities to carry school children at half fare. Governor Dix has transmitted to the Senate the appointment of W. A. Huppuch as a member of the Public Service Commission of the Second District of New York to succeed John N. Carlisle, Watertown. On Feb. 1, 1911, the Governor was reported to have stated that he had not yet considered the appointment of a successor to Edward M. Bassett as a member of the Public Service Commission of the First District. Mr. Bassett's term of office expired on Feb. 1.

Ohio.—Representative Meyer Geleerd, of Toledo, has completed his municipal ownership bill. It would permit municipalities to own and operate street railways, lighting plants and water plants, with the privilege of furnishing commercial service. In the construction of new municipal lines the consent of owners of abutting property will not be necessary. Bonds for the purchase of public-service properties are not to be included within the present limit for cities, but only after a vote of the people at a regular election or a special election called for that purpose. The committee on labor of the House has recommended the Calvey bill, which would provide for closed vestibules to protect conductors in the winter.

Financial and Corporate

New York Stock and Money Market

Feb. 7, 1911.

The stock market has been fairly active during the past week and prices have remained firm at the advances recorded since the middle of January. There is undeniably a very much better tone in the market and traders are beginning to believe that there will be moderate business during the spring, even if prices do not advance materially. The excellent bond market is the brightest feature of the situation. There is a healthy demand for all good issues.

The money market continues to be very easy. Rates to-day were: Call, $1\frac{3}{4}$ @ $2\frac{1}{2}$ per cent; 90 days, $3\frac{1}{4}$ @ $3\frac{1}{2}$ per cent.

Other Markets

There was only moderate trading in traction shares last week in the Philadelphia market. For the most part prices held firm. Both Rapid Transit and Union Traction closed to-day at about the figures quoted a week ago.

In the Chicago market there has been less activity in tractions. A few small lots of Chicago Railways certificates, mostly Series 2 and 3, have been sold at former prices, but Series 1 has been out of the market.

Massachusetts Electric shares are still sold in odd lots in the Boston market, but prices are unchanged. Boston Elevated has been under some selling pressure and within the week prices have sagged about two points.

In the Baltimore market some United Railways stock has sold in the neighborhood of $17\frac{1}{2}$ and the bonds have continued to be active at unchanged prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 1.	Feb. 7.
American Light & Traction Company (common).....	a288	a288
American Light & Traction Company (preferred).....	a105	a105
American Railways Company.....	a45	a45
Aurora, Elgin & Chicago Railroad (common).....	a42 $\frac{3}{4}$	a41 $\frac{1}{2}$
Aurora, Elgin & Chicago Railroad (preferred).....	a87	a85
Boston Elevated Railway.....	a129 $\frac{3}{4}$	a128
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	a71	a71 $\frac{1}{2}$
Boston & Worcester Electric Companies (common).....	a10	a9
Boston & Worcester Electric Companies (preferred).....	a40	a40
Brooklyn Rapid Transit.....	77 $\frac{1}{2}$	78 $\frac{3}{4}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83 $\frac{3}{8}$	84 $\frac{1}{8}$
Capital Traction Company, Washington.....	128 $\frac{3}{4}$	129 $\frac{7}{8}$
Chicago City Railway.....	a195	a200
Chicago & Oak Park Elevated Railroad (common).....	*3	*3 $\frac{1}{4}$
Chicago & Oak Park Elevated Railroad (preferred).....	*7 $\frac{1}{4}$	*7 $\frac{1}{4}$
Chicago Railways, pteptg., ctf. 1.....	a93	a93
Chicago Railways, pteptg., ctf. 2.....	a25 $\frac{1}{2}$	a25 $\frac{1}{4}$
Chicago Railways, pteptg., ctf. 3.....	a9 $\frac{1}{2}$	a9 $\frac{1}{2}$
Chicago Railways, pteptg., ctf. 4.....	a6 $\frac{1}{4}$	a6 $\frac{1}{4}$
Cleveland Railway.....	*91 $\frac{1}{2}$	*91 $\frac{1}{2}$
Consolidated Traction of New Jersey.....	a74	a75 $\frac{1}{2}$
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Detroit United Railway.....	a72	72
General Electric Company.....	a154	a154
Georgia Railway & Electric Company (common).....	a120	a123
Georgia Railway & Electric Company (preferred).....	a88	a88
Interborough-Metropolitan Company (common).....	19 $\frac{3}{4}$	19 $\frac{1}{2}$
Interborough-Metropolitan Company (preferred).....	54	a53 $\frac{3}{4}$
Interborough-Metropolitan Company (4 $\frac{1}{2}$ s).....	79	78 $\frac{7}{8}$
Kansas City Railway & Light Company (common).....	a22	22
Kansas City Railway & Light Company (preferred).....	a71	71
Manhattan Railway.....	137 $\frac{3}{4}$	*137 $\frac{3}{4}$
Massachusetts Electric Company (common).....	a18	a18 $\frac{1}{2}$
Massachusetts Electric Companies (preferred).....	a85 $\frac{1}{2}$	a88
Metropolitan West Side, Chicago (common).....	23	21
Metropolitan West Side, Chicago (preferred).....	68	67
Metropolitan Street Railway, New York.....	*19 $\frac{1}{2}$	*19 $\frac{1}{2}$
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	72 $\frac{5}{8}$	71 $\frac{1}{2}$
Northwestern Elevated Railroad (common).....	a23	a22 $\frac{1}{2}$
Northwestern Elevated Railroad (preferred).....	a63	*63
Philadelphia Company, Pittsburgh (common).....	53	53
Philadelphia Company, Pittsburgh (preferred).....	44 $\frac{1}{2}$	44 $\frac{1}{2}$
Philadelphia Rapid Transit Company.....	20 $\frac{1}{2}$	20 $\frac{1}{2}$
Philadelphia Traction Company.....	*86 $\frac{1}{2}$	*86 $\frac{1}{2}$
Public Service Corporation, 5 per cent col. notes.....	a96 $\frac{1}{2}$	a96 $\frac{1}{2}$
Public Service Corporation, ctf. s.....	a101 $\frac{1}{2}$	*103 $\frac{1}{2}$
Seattle Electric Company (common).....	a110	a110 $\frac{1}{2}$
Seattle Electric Company (preferred).....	a101 $\frac{1}{2}$	a101 $\frac{1}{2}$
South Side Elevated Railroad (Chicago).....	a70	a70
Third Avenue Railroad, New York.....	a11	11
Toledo Railways & Light Company.....	a9	8
Twin City Rapid Transit, Minneapolis (common).....	a110	a110 $\frac{3}{4}$
Union Traction Company, Philadelphia.....	a47 $\frac{3}{4}$	a47 $\frac{3}{4}$
United Rys. & Electric Company, Baltimore.....	a18	a18
United Rys. Inv. Co. (common).....	44 $\frac{7}{8}$	47 $\frac{3}{4}$
United Rys. Inv. Co. (preferred).....	69 $\frac{3}{4}$	74 $\frac{3}{4}$
Washington Ry. & Electric Company (common).....	a38	a36
Washington Ry. & Electric Company (preferred).....	a89 $\frac{1}{2}$	a89
West End Street Railway, Boston (common).....	a91	a92 $\frac{1}{2}$
West End Street Railway, Boston (preferred).....	a105	*105
Westinghouse Elec. & Mfg. Co.....	68	69
Westinghouse Elec. & Mfg. Company (1st pref.).....	119	*119

a Asked. *Last sale.

Report on the Proposed Consolidation and Other Matters in Boston

Under date of Jan. 14, 1911, the Senate of Massachusetts received a report from the Board of Railroad Commissioners and the Boston Transit Commission sitting jointly on various matters relating to the three following subjects:

First, the acquisition by the Boston Elevated Railway of stocks and bonds of other street railway companies, or for the acquisition of the property and rights of other street railways in any other way. Second, extensions of the existing contracts for the use of subways and tunnels. Third, methods for continuing the advantages of a single control of the systems of the Boston Elevated Railway and the West End Street Railway.

With regard to authorizing the Boston Elevated Railway to acquire and hold the stock and securities of other railways, the joint board refers to a report made by it to the General Court of 1910, under date of Jan. 8, 1910, in which it arrived at the general conclusion that "a holding bill should be enacted permitting the Boston Elevated Railway to acquire and hold the stock of other street railway companies." The joint board, after a review of its previous conclusions, states that by virtue of existing contracts and leases between the company and the Commonwealth and the City of Boston advantage cannot be taken of the general law relative to the consolidation of street railways. The question thus placed before the joint board was whether consolidation by special act presented the necessary elements of feasibility and practicability. While it has always been conceded that a special consolidation bill could be drafted no action can be required under such a bill without the consent of the Boston Elevated Railway; an act providing for consolidation which would have to be permissive would remain inoperative unless accepted. The joint board, however, deems it advisable to include a special provision relative to consolidation in its draft bill. This section, taken as a whole, is in aid of the consolidation. It will tend to bring about consolidation of all those companies in which the Boston Elevated Railway may become a stockholder, for in case such consolidation is not effected the company must by Jan. 1, 1924, cease to be a stockholder, and dispose of any stock or bonds of other street railways which it may then hold.

Section 1 of the draft bill permits the Boston Elevated Railway, subject to the approval of the Board of Railroad Commissioners, to acquire the stocks and bonds of any other street railway, except the West End Street Railway, incorporated under the laws of the Commonwealth which has a physical connection with any railway now owned, leased or operated by the company. The company, subject to the approval of the board, may issue its own stocks or bonds, to provide means for payment, but their par value shall not exceed the par value of the securities so purchased, and in no case shall the amount of the bonds so issued exceed the amount of bonds so purchased. The company is not authorized to acquire the stocks or bonds of any street railway organized after Jan. 1, 1911, whose lines may hereafter be constructed where the Boston Elevated Railway now owns, leases or operates a street railway. Section 2 provides that whenever the Boston Elevated Railway acquires 35 per cent of the stock of another company it shall notify all stockholders of the company in question that it will purchase all remaining stock tendered to it within six months thereafter at a price per share equivalent to the average price paid by it for such 35 per cent.

Section 3 states that the stocks or bonds of other street railways acquired by the Boston Elevated Railway shall not thereafter be sold or otherwise disposed of except with the consent of the board, but this provision shall not be so construed as to impair the rights of the creditors of the other company. Section 4 states that no contracts relating to joint traffic or to the sale of power between the company and any other street railway in which it owns any shares shall be valid until approved by the board. Section 5 states the provisions of section 10 of chapter 500 of the acts of the year 1897 relating to tolls or fares shall be extended to include within a distance of $5\frac{1}{2}$ miles from the State House the road of any street railway in which the Boston Elevated Railway has acquired 35 per cent of the stock under the provisions of this act, but this shall not be con-

sidered as affecting the said section so far as it relates to roads owned, leased or operated by the company at the time of the passage of this act. Section 6 relates to taxation. Section 7 states that for the purpose of effecting any consolidation the vote of a majority in interest of the stockholders of each of the contracting corporations shall be sufficient but such consolidation shall not be valid and binding until its terms have been approved by the board. The authority granted to the Boston Elevated Railway to acquire stocks and bonds of other street railways shall terminate on June 10, 1922, and not later than Jan. 1, 1924, the said company shall dispose of any stock or bonds of any other street railway acquired by it under the provisions of this act, and shall have no authority to hold the same thereafter. Section 8 relates to the provisions for enforcing this act or preventing violation thereof. Section 9 states that the act shall take effect upon its acceptance by the company by vote of its board of directors and return thereof to the secretary of the Commonwealth within six months of its passage.

The report on extensions considers whether it is advisable to provide in advance of the expiration thereof for extensions of existing contracts for the use of the Tremont Street subway, the Washington Street tunnel and the East Boston tunnel, and if so on what terms. The report says that there should be a uniform date upon which the leases, not only of the existing subways and tunnels, but also of subways and tunnels to be constructed should expire. The finances of the subway and tunnel construction, including both those completed and those proposed, should provide for the payment at maturity or renewal of all bonds heretofore or hereafter issued by the city for subway and tunnel purposes. The joint board holds that the question of extending the existing leases should be dealt with as part of a comprehensive plan of unifying the finances of subway and tunnel construction. Such a plan has been worked out in a draft bill which provides for a 25-year extension of the three existing lines—the Tremont Street subway, the East Boston tunnel and the Washington Street tunnel—so that all will expire on July 1, 1936. Provision is also made that the lease of the Boston Hill tunnel now under construction and of the Riverbank subway which is authorized but not yet begun, shall expire on the same date. This would extend the lease of the Tremont Street subway for about 19 years, of the East Boston tunnel about 14 years, and of the Washington Street tunnel for about three years, and would extend for four years the lease of the Beacon Hill tunnel if such lease is made in 1912 to run for 20 years from its opening for use. On the other hand, the Riverbank subway lease would be shortened by about three years. The leases for the proposed South Station tunnel would also expire on the same date. The bill calls for no change in the rates of rental payable under existing leases until after such leases have expired. From and after the respective dates of expiration the rental is fixed at the uniform rate of $4\frac{1}{2}$ per cent per annum for all subways now constructed or authorized. The bill only establishes this rate of rental, however, until July 1, 1936, as it has not seemed wise to undertake a definite rate for a longer period than 25 years.

Certain provisions are made to give the city such opportunity to require such further extension as may be found necessary to provide for the retirement of all its subway and tunnel bonds at maturity, but the period of such extension beyond 1936 is limited to 25 years as the maximum.

A dissenting statement with regard to the foregoing report on leases was made by George G. Crocker, of the Boston Transit Commission, who thinks it desirable that a more definite provision should be made for payment of the bonds which have been issued or may be issued for subway and tunnel construction. He believes, first, that $4\frac{1}{2}$ per cent for the extension of city leases is insufficient and, second, that the plan proposed, while it does not require, nevertheless contemplates, the fixing of the rental from 1936 on a basis which will not wipe out the indebtedness of the city until 25 years from 1936, or practically in 1961. In his belief the payment of interest and sinking fund requirements calls for a rental of approximately 434 per cent per annum, continuing until the general expiration of all leases on July 1, 1950. This would give an average term of use of 40 years.

The report on the proposed consolidation of the Boston Elevated Railway Company and the West End Street Railway Company says that the advantages of a single control of these two systems are obvious. The present lease would expire 11 years hence. There are only two methods by which a continuance of this single control can be assured. These methods are either a long extension of the present lease or consolidation. The joint board is emphatically in favor of consolidation, and recommends unanimously that the acts of 1908 should be amended by extending to Dec. 30, 1911, the time within which the consolidation may be authorized by the stockholders of the two companies. The members of the joint board, however, are unable to agree as to the dividend rate which should be fixed upon the purchased stock, which would become the second preferred stock of the Boston Elevated Railway. The majority report recommends an 8 per cent rate rather than have the consolidation indefinitely postponed. The change from the present 7 per cent lease rate to the proposed 8 per cent would mean an additional fixed charge of \$125,000 a year.

The minority report states that an increase to 8 per cent would be an unwarranted gift to stockholders and would to that extent impair the ability of the Boston Elevated Railway to serve the public properly.

Boston & Worcester Street Railway, Boston, Mass.—The Boston & Worcester Street Railway has petitioned the Railroad Commission for authority to issue 4370 shares of preferred stock at \$110 a share. The proceeds of 2970 shares will be used to purchase or cancel a like amount of common stock, and the remainder will be applied to floating indebtedness.

Brooklyn (N. Y.) Rapid Transit Company.—At the meeting of the directors of the Brooklyn Rapid Transit Company on Feb. 7, 1911, the following officers were elected: A. N. Brady, chairman of the board of directors; Col. T. S. Williams, president; C. D. Meneely, vice-president, member of the board of directors and treasurer; J. F. Calderwood, vice-president; J. H. Bennington, secretary. The announcement of the retirement of Edwin W. Winter as a director of the company and as president was made in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911.

Central Pennsylvania Traction Company, Harrisburg, Pa.—The Central Pennsylvania Traction Company paid a dividend of 4 per cent on Feb. 1, 1911, on the 42,000 shares of capital stock of the company, which have a par value of \$50 a share, but with only \$46 heretofore paid in. The dividend is credited in payment of an assessment of 4 per cent called for payment at that date. The stock of the company, \$2,100,000, is now half paid in.

Chicago (Ill.) Railways.—Mention was made in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, of the purchase of \$15,000,000 of first mortgage, 5 per cent bonds of the Chicago Railways by Harris, Forbes & Company and the National City Bank, New York, N. Y. It is announced that this entire issue has been disposed of, a considerable amount of the bonds going abroad. Judge Grosscup in the United States Court has entered an order permitting Andrew Cook, who purchased the property of the Chicago Consolidated Traction Company, the right to take up a number of receiver bonds against the company. The amount and the holders of the bonds follow: North Shore Electric Railway, \$160,728; Chicago Electric Transit Company, \$98,500; Cicero & Proviso Railroad, \$381,200; Ogden Street Railway, \$49,772, and North Chicago Electric Railway, \$160,728.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—An increase from \$2,000,000 to \$3,500,000 in the capital stock of the Cleveland, Painesville & Eastern Railroad has been approved by the stockholders.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—On Jan. 31, 1911, the Fairmont & Clarksburg Traction Company purchased the stock and bonds of the Fairmont & Mannington Railroad and assumed active control of the road.

Federal Light & Traction Company, New York, N. Y.—At the annual meeting of the stockholders of the Federal Light & Traction Company, M. D. Thatcher was elected a director to succeed Dunlevy Milbank.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—The Duke interests propose to incorporate the Piedmont & Northern Railway with a capital stock of \$5,000,000 to take over the Greenville, Spartanburg & Anderson Railway and other properties which they control but which are not yet specified. The company will be incorporated by J. B. Duke, Somerville, N. J.; B. N. Duke, New York City; Samuel McRoberts, New York City; W. S. Lee, Charlotte, N. C.; Ellison A. Smyth, Greenville, and Lewis W. Parker, Greenville.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—The Indianapolis & Cincinnati Traction Company, reorganized, has made a mortgage under date of July 1, 1910, to the Central Trust Company, New York, N. Y., and E. Francis Hyde, New York, N. Y., as trustees to secure an issue of \$4,850,000 of bonds divided into classes A, B and C. Of these bonds \$1,300,000 of class A will be used to retire the receiver's debts, etc., and classes B and C will be used largely for extensions, improvements, etc. The German-American Trust Company, Indianapolis, Ind., has charge of the exchange of receiver's certificates for the new bonds.

Interstate Railways, Philadelphia, Pa.—The leases of the several properties controlled by the Interstate Railways are made to the following companies and run as follows: (a) Properties in and around Wilkes-Barre (Wilkes-Barre & Wyoming Valley Traction Company) from Jan. 1, 1910, for 800 years to the Wilkes-Barre Railway. (b) Those in and around Norristown, Reading and Lebanon (United Traction Company, Reading, etc.) from April 1, 1910, for 900 years to the Reading Transit Company. (c) Those in and around Trenton (Trenton Street Railway, etc.) to the Trenton & Mercer County Traction Corporation. (Incorporated in New Jersey on Oct. 6, 1910, by Geo. W. MacPherson, Rankin Johnson and Oscar T. Crosby, Warrenton, Va.). (d) Those in Delaware County, Pa. (Delaware County & Philadelphia Electric Railway), were leased July 1, 1910, for 999 years to the Southern Pennsylvania Traction Company. (Incorporated in Pennsylvania in June, 1910, with \$10,000 stock.) Incorporators, Geo. R. Webb, Baltimore, Md.; Oscar T. Crosby, Warrenton, Va.; Wm. Henry Snyder, Chestnut Hill, Pa. Treasurer, D. L. Evans, 111 North Hanover Street, Pottstown, Pa.) (e) Those in Delaware (Wilmington & Chester Traction Company, etc.) to the Wilmington & Philadelphia Traction Company from July, 1910, for 999 years. The two leasing companies last named are under the same management and executed the leases simultaneously.

Joliet & Southern Traction Company, Joliet, Ill.—Judgment for \$10,000 was entered in the Kane County Circuit Court in Illinois on Feb. 6, 1911, against the Joliet & Southern Traction Company in favor of John M. Raymond, Aurora. On the petition of Mr. Raymond, Joy Morton and other creditors, Judge Carnes appointed H. A. Fisher, Joliet, president of the Joliet & Southern Traction Company, and Daniel Peterkin, representing Joy Morton and the Continental National Bank, Chicago, Ill., as receivers to operate the road.

Kentucky Securities Corporation, Lexington, Ky.—Brief mention was made in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, page 243, of the incorporation of the Kentucky Securities Corporation. The company will take over the Lexington & Interurban Railways. It has an authorized issue of \$2,500,000 of 6 per cent preferred stock and \$2,500,000 of common stock. Of the preferred stock \$2,160,240 will be issued immediately and of the common stock \$2,053,100 will be issued immediately in exchange for securities of the Lexington & Interurban Railways and for cash. The officers of the Kentucky Securities Corporation follow: Percy M. Chandler, Philadelphia, president; John A. McCarthy, Philadelphia, vice-president; J. K. Trimble, Philadelphia, secretary and treasurer.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—Judge Buffington, in the United States Circuit Court at Pittsburgh, has confirmed the sale of the property of the Meadville & Conneaut Lake Traction Company and the Meadville Street Railway at foreclosure on Jan. 14, 1911, to a committee representing the bondholders of the companies, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 21, 1911, page 135.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—W. B. McKinley, president of the Illinois Traction System, on behalf of his associates, is negotiating with W. B. Strang, president of the Missouri & Kansas Interurban Railway, for an interest in that company and operating rights which will provide an entrance to Kansas City for lines which Mr. McKinley and his associates have in contemplation as part of their program for new construction. The McKinley interests now operate the street railway systems in Atchison and Topeka.

Ocean Shore Railway, San Francisco, Cal.—The sale of the property of the Ocean Shore Railway, under foreclosure to the bondholders, of which mention was made in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, has been confirmed by the court.

Oklahoma Railway, Oklahoma City, Okla.—A meeting of the stockholders of the Oklahoma Railway has been called for Feb. 24, 1911, to vote on a proposal to increase the authorized capital stock of the company from \$3,000,000 to \$15,000,000, of which \$5,000,000 is to be preferred stock and \$10,000,000 common stock, and to sanction an increase in the bonded indebtedness of the company to \$12,000,000.

Philadelphia (Pa.) Rapid Transit Company.—It was announced on Feb. 1, 1911, that 350,000 of the total of 600,000 shares of the stock of the Union Traction Company had been deposited with the officials of that company, or more than the number required to authorize the proposed financing plan.

United Railways Investment Company, San Francisco, Cal.—The series E 6 per cent notes of 1908 of the United Railways Investment Company, which are due Feb. 15, 1911, will be paid, principal and interest, at maturity at the office of the New York Trust Company, New York, N. Y., or at the office of the United Railroads of San Francisco, San Francisco, Cal.

Wilmington & Southern Traction Company, New Castle, Pa.—The Wilmington & Southern Traction Company has been incorporated at Dover, Del., to succeed to that part of the Wilmington, New Castle & Southern Railway between New Castle and Delaware City, which was purchased recently at foreclosure by R. H. Richards, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, page 183.

Dividends Declared

El Paso (Tex.) Electric Company, 2½ per cent, common.
Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.
Portland Railway, Light & Power Company, Portland, \$1.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.						
Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.
1m., Dec.	'10		\$124,874	\$85,363	\$39,511	\$34,850
1 "	"	'09	117,202	72,794	44,408	30,912
6 "	"	'10	934,457	593,834	430,623	201,893
6 "	"	'09	858,007	444,903	413,104	177,574
						235,530
BANGOR RAILWAY & ELECTRIC COMPANY.						
1m., Dec.	'10		\$47,515	\$20,826	\$26,689	\$12,165
1 "	"	'09	45,156	22,227	22,929	11,708
6 "	"	'10	310,332	135,600	174,732	72,080
6 "	"	'09	300,633	131,955	168,678	70,637
						98,041
CHATTANOOGA RAILWAY & LIGHT COMPANY.						
1m., Dec.	'10		\$75,659	\$47,331	\$28,328	\$18,862
1 "	"	'09	64,417	40,964	23,453	17,675
12 "	"	'10	875,078	511,453	363,625	220,897
12 "	"	'09	771,582	505,677	265,905	198,665
						66,240
EAST ST. LOUIS & SUBURBAN COMPANY.						
1m., Dec.	'10		\$202,814	\$98,246	\$104,568	\$44,989
1 "	"	'09	185,225	94,507	90,718	45,042
12 "	"	'10	2,364,142	1,287,604	1,076,538	541,212
12 "	"	'09	2,035,790	1,146,746	889,044	538,398
						350,646
GRAND RAPIDS RAILWAY.						
1m., Dec.	'10		\$96,274	\$59,872	\$36,402	\$14,349
1 "	"	'09	90,144	48,261	41,883	15,306
12 "	"	'10	1,132,578	619,646	512,932	181,272
12 "	"	'09	1,029,011	543,008	486,003	176,903
						309,100
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.						
1m., Dec.	'10		\$37,694	\$25,341	\$12,353	\$13,100
1 "	"	'09	36,117	25,423	10,694	11,687
6 "	"	'10	292,985	170,292	122,693	78,738
6 "	"	'09	293,088	161,140	131,948	86,694
						45,254
PORTLAND RAILWAY, LIGHT & POWER COMPANY.						
1m., Dec.	'10		\$529,960	\$233,695	\$296,274	\$123,333
1 "	"	'09	432,667	201,237	231,437	110,860
12 "	"	'10	5,638,896	2,724,378	2,914,518	1,398,029
12 "	"	'09	4,818,022	2,418,910	2,399,112	1,270,625
						1,128,487

Traffic and Transportation

Tacoma Safety League

According to the *Live Wire*, which is issued by the Seattle (Wash.) Electric Company for the benefit of Stone & Webster employees in the Northwest, the Tacoma Railway & Power Company is making a great effort to reduce its accidents to the lowest possible limit and to bring its trainmen to the highest possible degree of efficiency. The claim department of the company has formed a safety league and succeeded in interesting many hundreds in the scheme, the school children being members in large numbers. This safety league has the object in view of making the public more careful in their movements. In order to make the trainmen more painstaking and to give them a clearer understanding of the reason why certain rules and methods are desirable a daily bulletin is issued. In it an attempt is made to present different phases of the transportation business, in a terse, pointed way, in terms easily understood. Occasion is taken in this bulletin to commend trainmen for meritorious work, as well as to call attention to discipline administered.

The correspondent of the *Live Wire* in Tacoma, in discussing the work being carried out, says that the examples furnished by Portland and Seattle in this respect are being followed. He continues as follows in regard to the work being done among the school children:

"We succeed in getting the attention of the children by some appropriate story which in a manner will furnish an analogy to the production and use of electricity, and then warn them of the dangers of live wires and third rails. Then we impress on their minds that street cars are an economic necessity and that they, all their lives, will be compelled to make use of them every day, and that there are certain precautions on the streets that must be taken and that certain rules in regard to the cars must be observed.

"After the lecture each child is furnished with a button, the wearing of which makes him a member of the Tacoma Safety League. The children take their impressions home and talk them over with their parents, and in this way we reach the whole family and bring about a close relation between the company and the home."

Relations Between Public Service Corporations and Public

Henry E. Huntington contributed an article on the mutual relations between public service corporations and the public to a recent special edition of the *Los Angeles Times*, in which he said:

"I am asked to say a word in regard to the relation which should exist between a public service corporation and the city which it serves.

"The question is a large one, and every phase of the situations that arise calls forth some new side of the question. In spite of this fact, however, the principles involved are simple ones—and if they are kept in mind there should be no difficulty in adjusting the points of difference as they may come up from day to day.

"In the first place, it is the duty of the public service corporation—say in the case of a street railway—to provide safety, speed and comfort to the traveling public of the city which it serves.

"In this service safety must come first and all the time, and both for the sake of the city and the sake of the operating company other questions must be secondary. The *Los Angeles Railway* is doing its utmost to provide this through the pay-as-you-enter type of cars and innumerable safety devices that are placed in operation, and of which in many cases the public knows nothing.

"It must provide rapid and frequent service. In many cases it is impossible to live up to the highest demand which service requires through the inability to obtain cars for the service, but on the local lines we are doing our utmost in this regard.

"The question of cars also must be taken into consideration when the comfort of passengers is considered, together with the condition of the traffic of city streets.

"There is another duty of the companies. That is to

aid in the growth of the city served. We are building for the future. Many of the lines now constructed are operated at a loss, but in the end they will pay through the building up of the outlying territory and the bringing of additional thousands to the city.

"On the other hand, the city owes a duty to the financial interests that place their money in public service corporations that in their turn serve the city's needs.

"Like the corporations themselves, the city government is itself a servant of the people, and should not unnecessarily hamper a fellow servant in the carrying out of his duties.

"When a franchise is asked for to care for the city's growth, it is the duty of the city government not only to see that it is granted, but it is an additional duty, moral, at least—upon the city government—so to legislate as to make the burden upon the public service corporation as light as possible in the carrying out of its work.

"It is impossible to provide necessary lines for the growth of a city without proper franchises, and it is impossible to operate those already built without some profit from the money invested.

"When these facts are understood by the city, and when the duties of the corporations to the city are understood by the corporation officials, there is little difficulty in reaching any fair compromise.

"The average man is a pretty fair-minded individual and wherever it is possible to reach his ear with straight facts it is comparatively easy to settle any dispute at once and without argument."

Petition for Near Side Stops in Memphis.—The Memphis (Tenn.) Street Railway has been petitioned by citizens to stop its cars on the near side of the street.

Increase in Wages for Employees.—The employees of the Roanoke Street Railway received an increase in wages of 1 cent an hour, effective on Feb. 1, 1911.

Social Rooms for Employees.—The York (Pa.) Railways has fitted up social rooms in the city for its employees, and in the spring the company will add a reading room containing the latest books and magazines for their use.

Increases in Wages in Houston and Galveston.—The Houston (Tex.) Electric Company and the Galveston (Tex.) Electric Company, both controlled by Stone & Webster, Boston, Mass., have increased the wages of the motormen and conductors in their employ 6 per cent.

Appearance of Kansas City Trainmen.—The Metropolitan Street Railway, Kansas City, Mo., recently ordered its trainmen to wear white collars and ties while in service, since which a marked improvement in the appearance of the men has been noted at the monthly inspections.

Complaint Against Increasing Fares.—The Public Service Commission of the Second District of New York has received a complaint from residents of Bolivar, Pa., against the Western New York & Pennsylvania Traction Company, protesting against the increase in rates which the company proposed to put into effect on Feb. 5, 1911.

Change in Fare Between Wilmington and New Castle.—The Wilmington, New Castle & Southern Railway, New Castle, Pa., has announced a change in fare over its line between New Castle and Wilmington. Hereafter the fare will be 10 cents each way. Coupon tickets, however, good for the round trip will be sold for 15 cents.

Agreement Between Schuylkill Railway and Its Employees.—An agreement has been entered into between the Schuylkill Railway, Girardville, Pa., and its employees regarding wages and terms of service which will cover a period of two years. According to the new agreement the employees will receive an increase in wages of 15 cents per day and will be required hereafter to work one-half hour less than heretofore each day.

Loops Suggested in Downtown St. Louis.—The United Railways, St. Louis, Mo., has suggested to the joint United Railways committee of the Municipal Assembly of St. Louis a plan for the operation by the company of a number of loops in the downtown section of the city which would require grants of franchises on three streets. The construction of the new loops would, it is thought, tend greatly to reduce congestion, particularly in the rush hours.

Prizes for Subway and Elevated Motormen in New York.

—The Interborough Rapid Transit Company, New York, N. Y., has announced that prizes amounting to 10 per cent of the monthly wages of motormen operating subway and elevated trains will be awarded to the four men who show the best records on the coasting clocks with which the elevated and subway trains are being equipped. The installation of these clocks has been referred to previously in the *ELECTRIC RAILWAY JOURNAL*.

Complaint in Regard to Transportation of Newspapers Dismissed.

—The Public Service Commission of the Second District of New York has closed upon its records the complaint of Morris Manson, Rochester, against the New York State Railways as to the refusal of that company to carry newspapers and packages upon its cars in Rochester. An arrangement now in effect by the company provides for carrying newspapers on date of issue or the forenoon of the following day on the front vestibule of all schedule cars, at 25 cents per 100 lb., in accordance with the provisions noted in the item "Handling Newspapers in Rochester," which was published in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, page 241.

Another Hearing Ordered on Service in Albany.

—The Public Service Commission of the Second District of New York has appointed a further hearing to be held Feb. 16, 1911, on the order to show cause directed against the United Traction Company, Albany, N. Y., as to why it should not purchase large double-truck passenger cars for use upon its Pine Hills and West Albany lines. The reply of the company to the commission in regard to service over its Pine Hill and West Albany lines based on the investigation made for the commission by Charles R. Barnes, the electric railroad inspector of the commission, was referred to at length in the *ELECTRIC RAILWAY JOURNAL* of Jan. 28, 1911, page 183.

Portland, (Ore.) Employees as Stockholders.

—B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., has arranged to permit employees of the company to purchase stock of the company at \$75 a share, and many men have availed themselves of the privilege of becoming stockholders by subscribing for five shares of stock each. Mr. Josselyn in commenting on the plan was quoted as follows: "The employees have the privilege of buying as much as they can pay for; we have placed no limit on the amount that may be purchased, but it is understood that the purchasers will hold the stock a reasonable length of time, at least during their period of service with the company, otherwise the object sought would be defeated."

Operating Agreement Reported Between Detroit United Railway and Michigan United Railway.

—It is stated that the Detroit (Mich.) United Railway and the Michigan Railway are ready to enter into a traffic contract for through passenger and freight traffic between Detroit on the south and Lansing and Kalamazoo on the north. One line of the Michigan United Railway extends from Jackson to Lansing, and another to Kalamazoo. There is an arrangement with the Fruit Belt Line, which operates between Kalamazoo and Benton Harbor, for the quick shipment of freight between Detroit and Chicago, a boat line between Benton Harbor and Chicago filling in the link. Heretofore shipments made by the Detroit United Railway to any of the northern points had to be reloaded at Jackson. A new line between Lansing and Owosso will be in operation within a short time, and it is said that a line will be built from Morrice to Durand and Flint, so that the Detroit United Railway will have a double connection with the Michigan United Railway. Arrangements for passenger and freight terminals in Detroit have not been announced.

Dominion Commission Fixes Suburban Electric Railway Rate Outside of Montreal.

—The Board of Railway Commissioners for the Dominion of Canada, at a meeting in Montreal, on Jan. 25, 1911, refused the applications of the Montreal Terminal Railway and the Montreal Park & Island Railways, which operate in the rural districts surrounding Montreal, for the right to adopt a standard of 3 cents per mile and a minimum fare of 5 cents. Mr. Hague and Duncan McDonald, general manager, representing the two companies, contended that unless the railways were granted the

3-cent mileage rate their ability to expand would be destroyed. Chairman Mabce, in refusing the application, stated that as the representatives of the companies had acknowledged the possibility of operating the roads on a standard tariff of 2½ cents per mile, and as that tariff was in use by the other rural electric railways, the board was willing to allow the adoption of the 2½-cent tariff. Judge Mabce pointed out that a number of other Canadian rural electric railways were competing with steam railways on the 2½-cent basis, and, although they had a 3-cent tariff, none of them charged this rate in rural districts.

Stopping Cars at Street Crossings in Denver.

—On Dec. 20, 1910, the Denver (Col.) City Tramway adopted a rule which prescribes that all cars within the district bounded by Nineteenth Street, Broadway, West Colfax Avenue, Fourteenth Street and Wynkoop Street stop for the reception and discharge of passengers with the rear end of the car or train clear of the property line. The rule says: "Within this district cars moving in opposite directions must not pass one another within the space included between the two property lines of any street. Outside of the above-mentioned district cars will stop to take on or let off passengers, where there are crosswalks with the steps opposite the crosswalk, and, where there are no crosswalks, with the rear end of the car or train of cars clear of the curb lines. Cars moving in opposite directions must not pass one another while both are in motion within the space included between the two curb lines of any street or, where there are no curb lines, the traveled roadway. In passing cars near intersections, or which are stopped to either discharge or take on passengers, trainmen should exercise proper judgment and have their cars under reasonable control."

Fares Out of Baltimore.

—Attorneys Morris A. Soper and Allen C. Girwood, acting on behalf of the Federated Association of the Suburbs of Baltimore, filed a complaint with the Public Service Commission of Maryland as the direct result of the action taken by the company some time ago, when it discontinued the sale of commutation tickets to residents of certain suburban communities. In support of the application for a reduction in the rates on the suburban lines the petition avers that the returns to the company from lines which serve the territories in which the complainants reside are more than sufficient to pay expenses of operation, maintenance, repair, renewal and a fair return on the capital invested. Chairman Ambler, of the Public Service Commission, has decided in the case of Marion G. Dinsmore and others against the United Railways & Electric Company that the fare from Sparrows Point to Baltimore shall not be reduced from 15 cents to 10 cents. The chairman said that the charge of 15 cents is not exorbitant and that the situation did not warrant an investigation by the commission to ascertain whether the finances of the company warranted the reduction in fare asked by Mr. Dinsmore and others.

Another Whitridge Letter.

—Frederick W. Whitridge, receiver for the Third Avenue Railroad, New York, N. Y., whose correspondence with the Public Service Commission republished in book form at his own expense has attracted considerable attention, sent a letter recently containing a refund of 20 cents to a complainant whose housekeeper had dropped a quarter into one of the fare boxes on a pay-as-you-enter car. Change had been refused by the conductor, but he had given a receipt for the money. Mr. Whitridge cashed the receipt. He wrote as follows: "I inclose to you the 20 cents called for by the voucher of the conductor. The reason why that financial transaction could not have been concluded on the platform is that owing to the disabilities of most of the people who take the position of conductor—which in some cases are moral and in others intellectual—it has been found best to have a fare box to which the conductor cannot have access, and therefore a quarter once dropped in the box is gone beyond recall. We are trying a box in which the coin, when dropped in registers and after having thus recorded itself, may be obtained by the conductor for the purpose of making change, but most of our fare boxes are built on the first principle. I am sorry your housekeeper was inconvenienced, but as you will see from the inclosed 20 cents, I am still endeavoring to do right."

Personal Mention.

Mr. R. L. Payne has been appointed master mechanic of the San Angelo (Tex.) Street Railway to succeed Mr. H. H. Lyttle.

Mr. E. T. Thomas has been appointed superintendent of the Abilene (Tex.) Street Railway to succeed Mr. B. M. Dunlap.

Mr. John W. Harris has been elected president of the San Angelo (Tex.) Street Railway to succeed Mr. Samuel Crowther.

Mr. F. H. Murray has been elected treasurer of the Seattle-Tacoma Short Line, Seattle, Wash., to succeed Mr. A. G. Pritchard.

Mr. Joseph Winship has been elected vice-president of the Seattle-Tacoma Short Line, Tacoma, Wash., to succeed Mr. A. C. Ewing.

Mr. W. R. Nelson has been appointed chief engineer of the power station of the Springfield (Ohio) Railway to succeed Mr. F. E. Shank.

Mr. A. H. Chitty has been appointed comptroller of the International Transit Company, Sault Ste. Marie, Mich., to succeed Mr. J. S. Wynn.

Mr. S. Z. Dean has been appointed master mechanic of the Westmoreland County Railway, Pittsburgh, Pa., to succeed Mr. R. O. Kline.

Mr. Clyde M. Graves has been elected first vice-president of the Spokane & Inland Empire Railroad, Spokane, Wash., to succeed Mr. A. L. White.

Mr. Richard E. Cochran has been appointed associate to Mr. George S. Schmidt, who has been counsel for the York Railways for several years.

Mr. L. F. Wyman has been appointed master mechanic and electrical engineer of the Loyal Railway, Ballard, Wash., to succeed Mr. F. C. Henage.

Mr. Charles McCloud has been appointed comptroller of the Corning & Painted Post Street Railway, Corning, N. Y., to succeed Mr. F. E. Ramsen.

Mr. N. M. Fruehauf has been appointed acting auditor of the San Francisco Vallejo & Napa Valley Railroad, Napa, Cal., to succeed Mr. Charles E. Watkinson.

Mr. C. C. Graham has been appointed master mechanic and engineer of the power station of the Alexandria (La.) Electric Railways to succeed Mr. L. A. Williams.

Mr. W. M. Case has been appointed engineer of the power station for the Clarksville Railway & Light Company, Clarksville, Tenn., to succeed Mr. R. L. Edwards.

Mr. R. G. Arthur has been appointed general manager, superintendent and purchasing agent of the Douglas (Ariz.) Street Railway to succeed Mr. Daniel A. O'Donovan.

Mr. Alfred Anderson was appointed purchasing agent of the Metropolitan Street Railway, New York, N. Y., effective on Feb. 1, 1911, to succeed Mr. F. C. Nordsick, resigned.

Mr. L. E. Loomis has been appointed acting chief engineer of the Twin City & Lake Superior Railway, Minneapolis, Minn., to succeed Mr. H. L. Laughlin, who died recently.

Mr. M. C. Harper has been elected general manager of the Oklahoma, Kansas & Missouri I. U. Railway, Miami, Okla. Prior to entering promotion work Mr. Harper was for many years connected with the steam railroads of Texas and Oklahoma.

Mr. Winfield A. Huppuch, chairman of the Democratic State Committee of New York, has accepted the appointment by Governor Dix of New York as a member of the Public Service Commission of the Second District, to succeed Mr. John N. Carlisle, whose term of office has expired.

Mr. Smith Hood, general superintendent of the Fairmont & Clarksburg Traction Company, Fairmont, W. Va., which has taken over the Fairmont & Mannington Railroad,

will hereafter perform the duties relinquished by Mr. Wm. M. Laws as vice-president and general manager of the Fairmont & Mannington Railroad.

Mr. Leroy F. Wynne has been appointed claim agent of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed Mr. C. H. Matthews, whose appointment as assistant superintendent of transportation of the company is noted elsewhere in this issue. Mr. Wynne was formerly chief clerk to Mr. W. H. Glenn, manager of railways of the company.

Col. Theodore Roosevelt visited the car houses of the Third Avenue Railroad, New York, N. Y., on Feb. 3, 1911, as the guest of Mr. Frederick W. Whitridge, receiver of the company, and Mr. James A. Roosevelt, general superintendent of the company, who is a relative of Col. Roosevelt. Col. Roosevelt manifested particular interest in the club rooms which have been fitted up for the employees in the various car houses and in the benefit association which has been organized among the employees of the Third Avenue Railroad.

Mr. C. H. Matthews, claim agent of the Georgia Railway & Electric Company, Atlanta, Ga., has been appointed assistant superintendent of transportation of the company. Mr. Matthews entered the employ of the company as a stenographer in the claim department in 1903. In the fall of 1904 he was appointed a claim investigator, and in 1906 he was appointed claim agent of the company. Mr. Matthews was graduated from the high school in Atlanta in June, 1898, and was connected with Sanders, Swann & Company, Atlanta, in the cotton business for about three years. Before becoming connected with the Georgia Railway & Electric Company, Mr. Matthews was secretary to the general passenger agent of the Southern Railway at Washington.

Mr. C. D. Meneely, secretary and treasurer of the Brooklyn (N. Y.) Rapid Transit Company, was elected first vice-president, member of the board of directors and treasurer of the company at the annual meeting of the directors on Feb. 7, 1911. Mr. Meneely was formerly a member of the firm of G. R. Meneely & Son, with offices at Watervliet, N. Y. He entered the employ of the Brooklyn Rapid Transit Company on Feb. 1, 1896, as auditor, about the same time that Colonel Williams, the new president of the company, became connected with the company. In 1898 Mr. Meneely was appointed assistant secretary and assistant treasurer of the company. On Feb. 28, 1900, he was elected secretary and treasurer of the company and has continued in that capacity since that time.

Mr. Ira A. McCormack has been appointed assistant general superintendent of the New York Central & Hudson River Railroad, with headquarters at the Barclay Street station of the company in New York. Mr. McCormack was formerly manager of the Grand Central Station of the New York Central & Hudson River Railroad in New York and general superintendent of the electric division of the company out of New York and was also assistant to the general manager of the company. Mr. McCormack has been connected with steam and electric railroading for many years. He has been general superintendent of the Brooklyn (N. Y.) Rapid Transit Company, vice-president and managing director of the Syracuse (N. Y.) Rapid Transit Company and general manager of the Cleveland (Ohio) Electric Railway Company.

Mr. H. M. Hobart, the well-known author and consulting engineer, was tendered a dinner in London, Eng., on Jan. 21, by his professional friends in view of his coming departure from Great Britain to join the engineering staff of the General Electric Company at Schenectady. Mr. H. F. Parshall presided and about 100 of Mr. Hobart's friends were present. Mr. Hobart is a native of America and a graduate of the Massachusetts Institute of Technology. He went to Europe in 1895 to join the British Thomson-Houston Company. From 1900 to 1903 he was chief designing engineer of direct-current machinery with the Union Elektrizitäts Gesellschaft. Since that time he has been consulting engineer in London and has always given a great deal of attention to the design of motors for railway service and to other electric railway problems.

Mr. R. A. Harman, whose election as vice-president of the Cleveland Railway was announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, is primarily a manufacturer. He was a director of the East Cleveland Railway before its consolidation with the city roads, and has been a director of the Cleveland Railway since it was organized. Mr. Harman was secretary of the Cleveland Electric Railway from 1893 to 1900, when he was chosen vice-president. He served three years, a portion of the time under the administration of Mr. Henry A. Everett, until the consolidation of the Cleveland City Railway and the Cleveland Electric Railway, in June, 1903, when he resigned and Mr. C. E. Emery took the office as a representative of the Cleveland City Railway interests. This, therefore, makes the second time Mr. Harman has held the office. He was also interested in some of the Everett interurban and other electric railway properties.

Prof. Milton J. Brecht, superintendent of public schools of Lancaster County, has been nominated by Governor Tener of Pennsylvania as a member of the State Railroad Commission for five years. Professor Brecht is a native of Lancaster County, where he was born in December, 1855. He attended the public school until he was 16 years old, when he began to teach a district school. Later he attended Millersville Normal School, from which he was graduated in 1875. Subsequently he became principal of the schools of Manheim, Lancaster County. He was chosen principal of the Mount Joy Soldiers' Orphans School in July, 1880, and served in that capacity until 1883, when he was elected county superintendent of schools, to which position he was elected nine successive terms. He has been a trustee of Millersville State Normal School for 10 years. Professor Brecht is an Independent Republican and was twice a candidate for Congress, but was defeated both times.

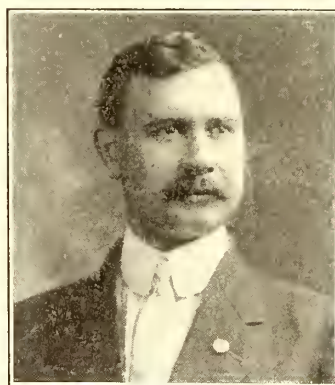
Mr. F. M. Johnston, auditor of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., whose appointment as purchasing agent of the company was noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, began his railroad career in the office of the superintendent of the Chicago, Burlington & Quincy Railroad at Keokuk, Ia., in 1888. In 1891 he resigned from this company to accept the position of car accountant in the office of the auditor of the Keokuk & Western Railroad, and was advanced to various positions in the auditor's office until that road was taken over in 1901 by the Chicago, Burlington & Quincy Railroad. From 1901 till 1909 Mr. Johnston was connected with the operating department of the Chicago, Burlington & Quincy Railroad as chief clerk to various division superintendents and was subsequently appointed auditor of the Fort Dodge, Des Moines & Southern Railroad. In addition to his duties as auditor of that company Mr. Johnston will hereafter act as purchasing agent of the company.

Col. Timothy S. Williams, vice-president of the Brooklyn (N. Y.) Rapid Transit Company, was elected president of the company at the meeting of the board of directors on Feb. 7, 1911, to succeed Mr. Edwin W. Winter, who resigned that day as president of the company, and whose resignation as a director and intended resignation as president was noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911. Mr. Williams was born in Ithaca, N. Y. He was graduated from Cornell University in 1884 and immediately entered public life. During the term of Roswell P. Flower as Governor of New York Mr. Williams acted as his secretary and since the close of Mr. Flower's term as Governor he has been connected with the Brooklyn Rapid Transit Company. Mr. Williams is chairman of the board of directors of the American Railway Traffic Company and is a director and officer of the subsidiary companies of the Brooklyn Rapid Transit Company. He is also a director of the Port Jefferson Light & Power Company, Sultepec Electric Light & Power Company, Toluca Electric Light & Power Company and the Mechanics' Bank of Brooklyn. He is a member of the University Club, Cornell University Society and other clubs.

Mr. W. E. Squires has been appointed superintendent of the lines of the Indiana Union Traction Company at Marion, Ind., to succeed Mr. B. E. Parker, whose appointment as superintendent of transportation of the Rockford & Interurban Railway, Rockford, Ill., was announced in the *ELEC-*

TRIC RAILWAY JOURNAL of Jan. 28, 1911. Mr. Squires began work with one of the constituent companies of the Indiana Union Traction Company in the mule-car days and has been promoted from time to time until recently he has been in charge of the Marion Flyer of the company as conductor. This is a train *de luxe* and as conductor of it and through his long previous service in Marion Mr. Squires is well known in all Grant County and between Marion and Indianapolis. The *Marion Chronicle* after complimenting Mr. Squires on his appointment took occasion to use his career as a text for an editorial on honest and faithful service by employees in the ranks which it concluded as follows: "The man who can wear the uniform of a conductor for 15 years without acquiring a trace of 'swell head' is not likely to catch it now. The qualities described in this editorial are within the reach of every one; they do not constitute genius, but they are better than genius. Common sense and good humor are within the reach of every one and they are the most valuable equipment any man can have for the duties of life and for the enjoyment of life."

Mr. J. H. Bennington, who has for some time been private secretary to Col. T. S. Williams, the newly elected president of the Brooklyn (N. Y.) Rapid Transit Company,



J. H. Bennington

was elected secretary of the company at the meeting of the directors on Feb. 7, 1911, to succeed Mr. C. D. Meneely, whose election as first vice-president and treasurer of the company is noted elsewhere in this column. Mr. Bennington has had a very interesting career with the Brooklyn Rapid Transit Company. He entered the employ of the company 16 years ago and served for a time as conductor on the Halsey Street line. Subsequently he was appointed a transfer agent. In 1899 he took a clerkship with the treasurer

in the general office of the company. In 1903 the work of Mr. Bennington came to the attention of Colonel Williams and he appointed Mr. Bennington his private secretary. Mr. Bennington's election to the position of secretary of the company comes in recognition of his faithful and efficient service.

OBITUARY

M. L. Newton, consulting engineer of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., is dead.

J. McM. Smith, formerly vice-president and general manager of the Northern Indiana Railway, South Bend, Ind., is dead.

William O. Seymour, a member of the Connecticut Board of Railroad Commissioners for 23 years, is dead. He was born in Ridgefield, Conn., on Oct. 16, 1833. In 1868 and in 1869 he was a member of the General Assembly. Last fall he was elected a representative from Ridgefield again.

E. John Nichols, the late secretary of the T. H. Symington Company, Baltimore, Md., was made the subject of the following resolution which was passed by the board of directors of that company Jan. 31, 1911: "Resolved, That in the untimely death of E. John Nichols, who, starting with the company as a stenographer at its formation, by ability and untiring industry rose to the position of secretary and who by his unfailing courtesy endeared himself to all his associates, this company has suffered irreparable loss."

Louis R. Alberger, president of the Alberger Condenser Company and of the Alberger Pump Company, New York, N. Y., died at his home in New York on Jan. 31, 1911. Mr. Alberger was born at Buffalo, N. Y., on April 10, 1864. After leaving Yale he went into business with his father, J. L. Alberger, Buffalo, who was experienced in the vacuum processes used in the salt industry. In 1887 Mr. Alberger entered the employ of Henry R. Worthington in New York, but left the Worthington employ in 1901 and formed the Alberger Condenser Company. The Alberger Pump Company was formed in 1907.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Humboldt & Eastern Railroad, Eureka, Cal.—Application for a charter has been made in California by this company to build a railway from Eureka to the Sacramento Valley, via Trinity County. Capital stock, \$250,000. Incorporators: W. S. Clark, C. H. Palmtag, H. J. Jackman, Brousse Brizard, William Metson and G. L. Dillman. [E. R. J., Dec. 18, '09.]

***Sacramento Short Line Railway, Oakland, Cal.**—Incorporated in California as a subsidiary company of the United Properties Company. Capital stock, \$10,000,000. Incorporators: B. M. Aikens, Gavin McNab, R. P. Henshall, L. Elkins, G. W. Mordecai and F. L. Stewart.

***San José Short Line Railway, Oakland, Cal.**—Incorporated in California as a subsidiary of the United Properties Company. Capital stock, authorized, \$80,000. Stock issued, \$44,000. Incorporators: Gavin McNab, B. M. Aikens, R. P. Henschell, Luther Elkind, George W. Mordecai, N. Schmulowitz, R. V. Whitney and F. L. Stewart.

***High River, Saskatchewan & Hudson Bay Railway, Ottawa, Ont.**—Application for a charter will be made by this company to the Parliament to build an electric railway in the provinces of Alberta and Saskatchewan, thence to Pas, in the northwest territories.

***Joliette & Lake Manuan Colonization Railway, Ottawa, Ont.**—Application for a charter has been made in Ontario to the Parliament by this company to build a steam or electric railway from Joliette, Que., to Montreal.

***Wilmington & Southern Traction Company, New Castle, Pa.**—Incorporated in Pennsylvania to succeed that part of the Wilmington, New Castle & Southern Railway between New Castle and Delaware City which was purchased recently at foreclosure by R. H. Richards, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, page 183.

FRANCHISES

Alameda, Cal.—The Southern Pacific Railroad will ask the City Council for two new franchises, one along Clement Avenue from Alameda mole to the High Street bridge, then to Fruitvale and Hayward; the other franchise is for a freight line along Blanding Avenue and Atlantic Avenue.

Hayward, Cal.—The Oakland Traction Company has asked the City Council for a franchise to build an electric railway from the foothills to the Southern Pacific Railway station in Hayward.

Modesto, Cal.—The South San Joaquin Improvement Company has asked the Board of Trustees for a 25-year franchise to build an electric railway system over certain streets in Modesto.

Petaluma, Cal.—The Petaluma & Santa Rosa Railway will ask the Petaluma Trustees for a franchise to extend its line through certain streets in Petaluma along the river to Point Pedro, where it will meet steamers and convey passengers and freight to San Francisco. E. M. Van Frank, president.

San Francisco, Cal.—Thomas W. Forsyth, representing the United Railways, has received a franchise from the Board of Supervisors to build a double-track extension on Parnassus Avenue and Ninth Avenue, in San Francisco.

Vallejo, Cal.—The San Francisco, Vallejo & Napa Valley Railway, Napa, has asked the City Council for a franchise to change the present existing span construction of its electric railway along Sonoma Street, from Illinois Street north to the city limits of Vallejo, to a single-pole-T-arm construction.

Belfast, Maine.—The Waldo Street Railway, Belfast, has received a two years' extension of time to its franchise in which to build its projected 19-mile electric railway between Belfast, Northport and Camden. John A. Jones, Lewiston, is interested. [E. R. J., Sept. 18, '09.]

Syracuse, N. Y.—The Syracuse Rapid Transit Railway has been granted permission by the Public Service Com-

mission to extend its double tracks in Willow Street, and to abandon its tracks in Lodi Street between Green Street and Willow Street, in Syracuse.

Chillicothe, Ohio.—The Scioto Valley Traction Company, Columbus, has received a franchise from the City Council to extend its railway on Bridge Street, in Chillicothe.

***Middletown, Ohio.**—E. E. Hackett, engineer of the American Rolling Mills, has received a franchise from the City Council to build an electric railway in Middletown.

Brantford, Ont.—The City Council has passed a bylaw providing that the Grand Valley Railway, Brantford, construct a line to Holmedale by April 1, in default of which the company must forfeit the franchise for operating there.

Johnson City, Tenn.—The Johnson City Traction Company has received a franchise from the City Council to build a 2-mile extension from Johnson City to the Soldiers' Home.

Memphis, Tenn.—The Memphis Street Railway has received a franchise from the City Commissioners to extend its railway on Lane Avenue, from Montgomery Street to Claybrooke Street, in Memphis.

Spokane, Wash.—The Spokane Traction Company will ask the City Council for franchises to extend several of its lines in Spokane. About 2 miles of track will be built.

TRACK AND ROADWAY

***Mobile, Ala.**—C. V. Shoub, Mobile, is promoting plans for the construction of a 1½-mile street railway in Mobile.

Edmonton (Alta.) Radial Railway.—This company will award contracts during the next two months for building 4 miles of track in Edmonton. It expects to place the line in operation during the coming summer.

Phoenix (Ariz.) Railway.—This company is now building a 3-mile extension from Phoenix to Glendale.

Little Rock Railway & Electric Company, Little Rock, Ark.—This company is rebuilding 2 miles of track in Little Rock, using Lorain high T-rail and hard steel center work from the Wm. Wharton, Jr., & Company. Creosoted ties are used on stone ballast and paving consists of creosoted blocks.

Oakland (Cal.) Traction Company.—This company will place contracts during the next six weeks for building 20 miles of new track in Oakland. J. Q. Brown, purchasing agent.

United Railways, San Francisco, Cal.—This company expects to build about 3 miles of new track in San Francisco during 1911.

Quebec Railway, Light & Power Company, Quebec, Can.—About 6 miles of track will be built from Beauport to Montmorency Falls by this company during this year.

Colorado Railway, Light & Power Company, Trinidad, Col.—About 1 mile of new track will be constructed by this company in Trinidad during 1911.

Pensacola (Fla.) Electric Company.—This company will soon reconstruct about 1 mile of track in Pensacola.

Chicago-New York Electric Air Line Railroad, Chicago, Ill.—The stretch of track between La Porte and Chesterton reported to have been placed in operation by the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is an extension of the Chicago-New York Electric Air Line Railroad and was opened by that company. [E. R. J., Feb. 4, '11.]

***Evansville, Ind.**—E. Q. Lockyear, Evansville, is promoting an electric railway from Paducah, Ky., to Fulton, Ky., by way of La Center, Wickliffe, Mayfield and Murray. A meeting of the Commercial Club was held at Paducah to discuss the plan and a committee of which S. B. Caldwell is chairman was appointed to look into the proposition.

Kokomo, Marion & Western Traction Company, Kokomo, Ind.—It is stated that this company will build a 27-mile extension from Kokomo to Frankfort during 1911.

Tri-City Railway, Davenport, Ia.—This company expects to build about 35 miles of track between Davenport and Muscatine and 5 miles of new track in Davenport and Muscatine during this year.

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company will extend its railway to connect with the city park in Pittsburg.

***Shelbyville, Ky.**—N. B. Waugh, Shelbyville, Ky., is promoting the construction of an electric railway from Shelbyville to Mount Eden. He has stated that financial backing for the construction of the line has been secured and is now engaged in securing the rights-of-way.

Berkshire Street Railway, Pittsfield, Mass.—This company will build a 30-mile extension to connect Great Barrington and Huntington and Berkshire.

Crystal Valley, Mich.—Irving C. Harwood, Crystal Valley, states that as yet nothing definite has been arranged for building an electric railway between Crystal Valley and Pentwater. [E. R. J., Jan. 28, '11.]

Granite City Railway, St. Cloud, Minn.—One mile of new track will be built by this company in St. Cloud during 1911.

***Irondale, Mo.**—James P. Ward, Irondale, states that preliminary arrangements are being made for building an electric railway and hydroelectric plant in Irondale.

Billings (Mont.) Traction Company.—This company announces that preliminary arrangements are now being made and that construction will begin in the spring on its projected line in Billings. John A. Connolly, Muskogee, is interested. [E. R. J., Nov. 26, '10.]

New Jersey Rapid Transit Company, Sea Isle City, N. J.—A 2-mile extension will be built by this company in Suffren during 1911.

Elmira, Corning & Waverly Railroad, Elmira, N. Y.—This company has awarded contracts and has completed more than half of the 12-mile line from Elmira to a connection with the Corning & Painted Post Street Railway in Corning. Equipment and material have been purchased and power is obtained from the Elmira Water, Light & Railroad Company. The Corning division, when constructed, with the Waverly division now in operation, will make a continuous line from Waverly to Corning.

Hudson & Manhattan Railroad, New York, N. Y.—About 3 miles of new track will be built by this company in New York during 1911.

Auburn & Syracuse Electric Railroad, Syracuse, N. Y.—This company will double-track several of its lines in Syracuse during 1911.

North Carolina Traction Company, Danbury, N. C.—It is reported that this company has let a contract to the Propst Contraction Company, Charlotte, to build from Winston-Salem north to Rural Hall, Lawsonville and Danbury, N. C., and Floyd, Va. This work includes one 600-ft. steel bridge and several trestles. H. P. MacKnight, Southern Pines, N. C., chief engineer. [E. R. J., Jan. 28, '11.]

Columbus, Mt. Vernon & Mansfield Railway, Columbus, Ohio.—Active preparations are being made by this company for building an electric railway to connect Columbus, Mansfield and Mt. Vernon, with a probable extension to New Albany and Johnstown. L. P. Stevens, general manager. [E. R. J., Nov. 26, '10.]

Sapulpa (Okla.) Interurban Railway.—This company will build a 15-mile extension from Sapulpa to Tulsa during 1911.

Mount Hood Railway & Power Company, Portland, Ore.—This company will construct a 22-mile extension from Portland to Bull Run during 1911.

Philadelphia & Easton Electric Railway, Doylestown, Pa.—It is said that this company is considering plans for building an extension from Lansdale to Doylestown in the spring.

Bristol (Tenn.) Belt Line Railway.—This company will build about 2 miles of new track in Bristol during 1911.

Lake View Traction Company, Memphis, Tenn.—This company, which holds franchises for the construction of 7 miles of track in Memphis, announces that it will now proceed with the construction of the line. W. W. Hayden is engineer.

El Paso, Tex.—Richard Burgess, El Paso, it is reported, is interested in a plan to build a 100-mile electric railway from Engle, N. M., to Febans, Tex.

Citizens Railway, Waco, Tex.—About 6 miles of track

will be built by this company in Waco during the present year.

Danville Railway & Electric Company, Danville, Va.—About 1 mile of new track will be built by this company in Danville during 1911.

Morgantown & Southern Railway, Morgantown, W. Va.—This company is building and expects to soon complete 5 miles of new track in Morgantown.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—This company has awarded a contract to Brown Land & Lumber Company, Rhinelander, for 20,000 ties. It has also let a contract for 1,000 tons of steel rails to be used in building its interurban railway to connect Janesville, Friendship, Easton, Portage, Lodi, Middleton, Wausau, Stevens Point, Madison and Merrill. Allen T. Russell, Chicago, general manager. [E. R. J., Feb. 4, '11.]

Wausau (Wis.) Street Railway.—This company is planning to double track Main street in Wausau during the summer.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company is considering plans for building a new depot at the corner of Fifth Street and Main Street in Chico.

United Railways of San Francisco, San Francisco, Cal.—This company will place contracts during the next two weeks for the construction of an addition to its repair shops in San Francisco. The cost is estimated to be approximately \$16,000.

Illinois Traction System, Champaign, Ill.—This company is considering plans for building a freight station at Peoria. The structure will be one story, 63 ft. x 130 ft., of brick construction. The cost is estimated to be about \$10,000.

Detroit (Mich.) United Railway.—This company expects to build an addition to its car house on Jefferson Avenue and St. Jean Road in Detroit. The structure will be three stories, 44 ft. x 56 ft., of brick construction. Smith, Hinchman & Grylls, Detroit, architects, are taking the bids.

Michigan Central Railway, Detroit, Mich.—This company has awarded the contract to H. L. Vanderhoist, Kalamazoo, for building a freight house at Kalamazoo. The cost is estimated to be about \$28,000.

POWER HOUSES AND SUBSTATIONS

Edmonton (Alta.) Radial Railway.—This company will soon purchase a 500-kw motor generator for its substation in Edmonton.

Little Rock Railway & Electric Company, Little Rock, Ark.—This company has purchased a 2500-kw Curtis turbine from the General Electric Company for its power plant at Little Rock.

Colorado Springs & Interurban Railway, Colorado Springs, Col.—A contract has been placed by this company for 2000-hp Green stokers for its power plant at Colorado Springs.

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company will soon build a power plant in Pittsburg. It also expects to purchase one 400-kw generator, one 600-hp engine and one 150-hp boiler for its new power plant. William A. Satterlee, Pittsburg, purchasing agent.

Elmira, Corning & Waverly Railway, Waverly, N. Y.—This company has purchased from the General Electric Company three 3000-kw rotary converters, with transformers and switchboard, for its power plant in Corning.

Cincinnati (Ohio) Traction Company.—This company has purchased and is installing two additional 525-hp Babcock & Wilcox boilers for its Pendleton power station, equipped with Murphy furnaces.

Wilkes-Barre (Pa.) Railway.—This company expects to purchase during the next two weeks one 1500-kw low-pressure turbine, one 750-kw motor-generating set and condensing outfit, four 500-kw rotary converters and two 300-kw rotary converters. Thomas A. Wright, general manager.

Charleston Consolidated Railway & Light Company, Charleston, S. C.—This company has purchased from the General Electric Company two 2000-kw turbo generators, two 125-kw turbo exciters and three 500-kw, 550-volt motor-generator sets for its plant in Charleston.

Manufactures & Supplies

ROLLING STOCK

Electric Power Company, Vicksburg, Miss., expects to purchase two passenger cars complete with trucks.

Detroit (Mich.) United Railways has ordered from the General Electric Company 60 two-motor, 70-hp car equipments.

Shreveport (La.) Traction Company has ordered five 28-ft. 10-in. closed cars and 10 Brill 39-E trucks from the American Car Company.

South Covington & Cincinnati Street Railway, Covington, Ky., has ordered 15 semi-convertible car bodies from the Cincinnati Car Company.

Northern Ohio Traction & Light Company, Akron, Ohio, has ordered from the General Electric Company eight four-motor car equipments, including controllers.

George Wehner, 420 Habersham Street, Savannah, Ga., expects to purchase a number of gasoline motor cars for service between Tybee Island and Savannah.

Elmira, Corning & Waverly Railway, Waverly, N. Y., has ordered from the General Electric Company five GE-87 quadruple motor equipments with type M control.

Edmonton (Alta.) Street Railway has ordered 14 cars of the single-end type, 10 to be built by the Ottawa Car Company and four by the Preston Car & Coach Company.

Central Kentucky Traction Company, Frankfort, Ky., has purchased one 50-ft. baggage and refrigerator car and two Brill 27-M C B trucks from the American Car Company.

Norfolk & Southern Railroad, Norfolk, Va., has purchased four 36-ft. semi-convertible passenger and smoking cars and eight 27-MCB trucks from The J. G. Brill Company.

Western Ohio Railroad, Lake Shore Electric Railway and the Fostoria & Fremont Railway have jointly purchased four 60-ft. interurban passenger cars from the Jewett Car Company.

Citizens' Railway, Waco, Tex., noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 28, 1911, as being in the market for six cars, has purchased five 20-ft. 8-in. semi-convertible cars from the Danville Car Company.

Second Avenue Railroad, New York, N. Y., has ordered from the General Electric Company 200 two-motor GE-216 car equipments with K-39-A controllers. These motors are of the latest commutating pole type and are rated at 50-hp each.

Pennsylvania Railroad, Philadelphia, Pa., has ordered nine electric locomotives of 4000 hp each from the Westinghouse Electric & Manufacturing Company. These locomotives are exact duplicates of those that were originally built by the Westinghouse Company for the New York tunnel service.

TRADE NOTES

Joseph T. Ryerson & Son, Chicago, Ill., have elected Clyde Mitchel Carr president of the company to succeed E. L. Ryerson.

E. S. Taylor has accepted a position with Forsyth Bros. Company, Chicago, Ill. Mr. Taylor formerly was employed in the sales department of the Pullman Company.

Indianapolis Switch & Frog Company, Springfield, Ohio, has opened a sales office in the Balboa Building, San Francisco, Cal. S. I. Wailes will be in charge as coast representative.

Robert Mather, chairman of the Westinghouse Electric & Manufacturing Company, who has recently returned from Europe, states that business conditions in Europe, particularly Great Britain, are very satisfactory.

Western Electric Company, Chicago, Ill., has recently opened branch houses at Buffalo, N. Y.; Portland, Ore., and Milwaukee, Wis., which gives the company 23 branch houses in different parts of the United States.

G. S. Ackley, proprietor of the Ackley Brake Company, has arrived in London, Eng., after a successful business trip in South America, where he reports having received orders from different South American tramways for 842 Ackley adjustable brakes.

American Bridge Company, New York, N. Y., has been awarded the contract for the construction of foundries No. 1 and No. 2 for the Westinghouse Electric & Manufacturing Company at Trafford City. The buildings will be of steel and reinforced concrete. One will be 250 ft. wide and 500 ft. long and the other, for smaller castings, will be 65 ft. wide and 200 ft. long. The foundries are the first of three large plants that are to form the central foundry plant of the company, and where all of the foundry work will be done in the future.

Wonham, Sanger & Bates, New York, N. Y., have received orders to equip 10 cars of the Ottawa Electric Railway and the same number for the Norfolk & Portsmouth Railway with "H. B." life guards. This company also states that repeat orders have been received from the East St. Louis & Suburban Railway, the Montreal Street Railway and the Westchester Street Railway, and that a contract has been received from the Sao Paulo Tramway, Light & Power Company for the equipment of all cars with the "H. B." life guards.

ADVERTISING LITERATURE

Carnegie Steel Company, Newark, N. J., has issued stock list No. 6 of the Waverly warehouses.

Archibald-Brady Company, Syracuse, N. Y., has issued a very tasteful desk calendar and memorandum pad for 1911.

Sangamo Electric Company, Springfield, Ill., has issued bulletin No. 22 describing portable and switchboard type graphic recorders.

Massachusetts Saw Works, Chicopee, Mass., have published a small booklet entitled "The Gentleman from Missouri," which describes by comparison the way Victor saws are made.

Hart & Hegeman, Hartford, Conn., have issued catalog No. H on "H. & H. Barrier 600-Volt Switches," illustrating and describing the different types of switches, and also containing a number of price lists.

General Vehicle Company, Long Island City, N. Y., has published "Elec-Tricks" for January, 1911. It contains a view and description of the first American electric automobile and other interesting articles relating to electric commercial vehicles.

National Electric Lamp Association, Cleveland, Ohio, has printed bulletins Nos. 5C, 8B and 15, describing different styles of lamps. Bulletin No. 5C shows the Tantalum multiple lamps, No. 8B the "Mazda" miniature and low-voltage lamps, and No. 15 lamps for electric sign lighting.

Sprague Electric Company, New York, N. Y., has published catalog No. 436 illustrating and describing "Sprague" conduit products. The company has also issued bulletin No. 111, giving a partial list of installations of engine type generators and showing a number of views of the generators after being installed.

General Electric Company, Schenectady, N. Y., has issued bulletins Nos. 4787, 4791, 4811, 4812 and 4813, which have the following titles: "Wires and Cables," "Feeder Voltage Regulators," "Drum Controllers for Industrial Service," "Small Direct-Current Belted Generators" and "Oil-Break Switches for Pole Line Service."

Joseph Dixon Crucible Company, Jersey City, N. J., has published "Graphite" for Feb., 1911. It contains articles on the "Advantage of Graphite for Boat Bottoms," "Phoenix Bridge," "The New Hudson County Court House," "American Manufacturers' Export Association" and the "Graphite Industry in the State of New York."

Electric Service Supplies Company, Philadelphia, Pa., in the "Keystone Traveler" for January, 1911, discusses the "pay-within" type of car which has been adopted by the Boston Elevated Railway. Some of the other articles in this issue are: "Protected Rail Bonds," "G. D. Arresters," "Reinforced Nose Brackets" and "Uncontrolled Power."

Ohio Brass Company, Mansfield, Ohio, has published the "O-B Bulletin" for Jan.-Feb., 1911, which contains articles on "O-B Extruded Trolley Ears," "Important Points Which Should Govern the Selection of High-Tension Insulators from the Standpoint of Line Operation," "Two New O-B Mine Hangers," "Modoc Trolley Clamp," "A Novel Mine Haulage System" and "Meeting of the West Virginia Mining Institute." This magazine is published every two months.

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CONTENTS.

Proposed Increase in Second-Class Postal Rates.....	289
Popular Finance.....	289
Committees on Safety.....	290
Power Transmission for Railways.....	290
Changes Desired in Cleveland Ordinance.....	291
Additions to Commerce Street Station, Milwaukee.....	292
Special Track Construction in Mobile, Ala.....	296
New Office and Substation Building of Kansas City Company.....	297
New Snow Plow Built by Chicago & Milwaukee Road.....	298
Improvements in Savannah.....	299
Report of the New York Commission, Second District.....	300
Recent Progress in Car Painting.....	303
Improvements for the Northern Ohio Traction & Light Company.....	304
Specializing Electric Heater Maintenance in Brooklyn.....	305
Locomotive Smoke in Chicago.....	305
Presidential Train on the Illinois Traction Line.....	306
A Company Publication in Sheboygan.....	306
New Officers for the St. Louis Car Company.....	307
Consolidation of Illinois and Central Electric Railway Associations Discussed.....	307
Automatic Ratchet-Type Slack Adjuster.....	307
Ampere-Hour Meter for Checking Car Operation.....	308
Single-Phase Railway Developments in Russia.....	308
The Rollway Rigid Axle Car Wheel.....	309
The Life and Cost of Gears and Pinions.....	310
Wire-Type Tungsten Lamp.....	310
A Sanitary Car Floor.....	310
News of Electric Railways.....	311
Financial and Corporate.....	315
Traffic and Transportation.....	319
Personal Mention.....	320
Construction News.....	321
Manufactures and Supplies.....	324

Proposed Increase in Second-Class Postal Rates

All subscribers to this paper should be concerned in the amendment to the post office appropriation bill which is now before the United States Senate and is attracting wide attention. This amendment increases from 1 cent to 4 cents per pound the postal rates on the advertising pages of popular magazines and of technical and trade journals (which have little or no political influence), but leaves at the old rate the great daily papers, with their enormous Sunday editions and so-called magazines, and the very small publications whose mailings amount to 4000 lb. or less per issue. As this change, if enacted, would seriously affect this paper as well as other technical and trade publications and would probably drive some journals out of business, we feel that we should briefly refer to the subject. The ELECTRIC RAILWAY JOURNAL is perfectly willing to pay what it should, as a good citizen, to meet the needs of the government. But it believes that Congress will see the unfairness of attempting to make up by such an enormous increase in charges upon one class of papers the deficit caused by the rural free delivery system, from which the publishers of most technical papers derive little or no benefit. A more equitable plan would be to stop the abuse of the franking privilege through which the government now sustains a large loss or else to adopt a slightly higher charge for second-class mail matter, to apply to all periodicals alike.

Popular Finance

The great interest being felt in New York over the rapid transit situation has led to many heated editorials and articles in the metropolitan press in which the writers have displayed a better knowledge of rhetoric than of the exact condition of affairs. Some of the statements relating to the profits earned by the present subway are especially amusing, irrespective of whether one believes that the interests of the city would better be served if the contract for the new rapid transit system should be awarded to the Interborough Rapid Transit Company or to an independent operator. Thus, a morning paper which claims to have one of the largest circulations, if not the largest, in the city solemnly says that the present subway has paid for itself in six years, and that, at the present rate of receipts, the entire construction cost would be covered in three and a half years. These statements would certainly be astounding if true, but an analysis of the accompanying figures shows the two errors into which the writer has fallen. In calculating the receipts of the subway he confused the gross revenue with the net income, a difference, for last year, equivalent to that between nearly \$14,000,000 and \$4,641,000. Moreover, he made no allowance for the cost of equipping the line with its power station, cars,

etc., of organizing the company, or of starting it as a going concern. This expense was nearly as much as that of building the subway itself. We have heard of some economists who believe in valuating a railway property at the sale price of its physical equipment, but it is certainly a very long step in advance of any which has yet been taken to eliminate everything except the right-of-way. If the writer of the paragraph mentioned will show the managers of the Interborough Rapid Transit Company how they can maintain their present gross receipts without paying out anything for operating expense or as interest on the cost of the equipment we believe that the managers of the road would be willing to admit that the cost of constructing a subway could be refunded in a very short time. Under these circumstances almost any business—even that of publishing newspapers—would be profitable.

Committees on Safety

Most of the accidents which are of daily occurrence on railways, in mines, factories, and in fact in nearly every industrial occupation, are the result of failure on the part of some one to observe rules made for the express purpose of preventing such accidents. Familiarity with the dangers of the day's work breeds contempt for them. The ironworker takes risks at the top of a skyscraper that make the pedestrian on the street shudder. The miner handles high explosives with careless abandon, and the motorman runs his car at high speed without thought of the danger to himself, his passengers or any one else. It is a most difficult task to make a large body of men realize individually and collectively the ever-present danger of their occupation, which involves risk not only to themselves but to their fellow-workmen and others whose safety depends on the close observance of all precautionary rules. Any campaign for the prevention of accidents, to be successful, must strike at the root of the trouble, which is the indifference of the employees and the public to danger. The Chicago & Northwestern Railway has attempted such a campaign, along new lines, through the formation among the employees of committees on safety. On each division of the system a committee composed of engineers, conductors, brakemen, switchmen, firemen, trackmen, shopmen and station employees has been organized. These committees make regular tours of inspection over each division. Dangerous conditions which can be corrected readily are righted at once on the recommendation of any member of the committee. Unsafe conditions of a general character are reported promptly, with recommendations to a Central Safety Committee, composed of operating and general officers of the company. The central committee acts at once to have the danger reduced or eliminated, and every division committee is notified of any action taken. As a badge of authority and to designate his office, each member of the safety committee wears a neat button in the lapel of his coat on which are the words "Safety First," which is the slogan adopted for carrying out the movement. The good points of this plan of enlisting representative employees to supervise the movement in each locality and spread the doctrine of safety will be recognized by every manager. No one man, however enthusiastic and earnest he may be, can accomplish as much in a movement of this kind as 50 or 100 men, each imbued with a sense of personal responsibility for its success. These men on the job will see many things that the manager or superintendent never sees; they can sow seeds of caution in the most fertile ground.

POWER TRANSMISSION FOR RAILWAYS

The paper by W. B. Jackson, read on Feb. 10 at the meeting of the American Institute of Electrical Engineers, on the "Advantages of Unified Electric Systems" calls renewed attention to the large number of long-distance transmission systems now supplying power to electric railways of various descriptions. In part this supply is the natural result of the development of transmission from hydraulic sources and in part it is due to the initiative of the railways themselves in organizing high-voltage systems for their own use over wide areas. As the electrification of the larger railway systems draws, as one may say, not nearer but to a less hopeless distance, the necessity for long transmissions, either from coal at the tidewater or at the mines or from hydraulic sources, becomes more and more evident. Electrification in the larger sense is chiefly a matter of power transmission. The beginnings of electric railway operation from transmitted power are not distant and the results already accomplished make the path of progress plain. The first electric railway to use electric power transmitted at what was then high tension from a hydroelectric station was the Norwich (Conn.) street railway, which in 1894 began taking power from one of the very early three-phase transmissions, having its generating station at Baltic, Conn. In the 17 years that have passed since then power transmission has grown beyond the utmost dreams of its originators. Yet it is interesting to see consistently being worked out the plan of utilizing purchased and transmitted power thus first brought into use.

At the present time it is so easy to transmit electric power over very long distances that, save in rare cases, it does not pay to operate a large network of lines from scattered individual power houses. The more economical plan is to have one, or preferably two, large generating stations able to provide power more cheaply, first, on account of the relatively large output, and, second, on account of the very much improved load factor which can generally be obtained by centralization. And the question which must be asked by many railroads is whether, on the whole, it pays to generate the power locally if it can be obtained on reasonable terms from a transmission system. Take, for example, the common case which exists in many parts of the country, namely, a large number of roads in contiguous territory, but serving, in the main, different districts. They are separate roads financially, if not physically, and have grown up, if the usual course of events is followed, at different times and under different conditions. The *ensemble* from the larger viewpoint is a network of electric roads covering a large territory and supplied with power under extremely bad economic conditions from many small stations. Of course, if the roads could be merged it would not be difficult to make very material savings by centralizing the power supply, but it often happens that there are serious objections to an actual consolidation of the properties. Fortunately, this is not at all necessary to secure the object sought.

We are suggesting only the extension to, say, the State of Illinois of what is done now in the City of Chicago. Usually the stations would be built by independent power companies, but we see no reason why, where there is no such company in the field, the managements of the roads themselves should not get together and form a power transmission company to build power houses and the lines necessary to supply the various roads concerned, taking stock perhaps pro rata on the capitalization or on

the power demanded, so that all would share in whatever profits might accrue. This would seem to be a possible solution of the power difficulties in many cases where a merger would be undesirable or impossible. Or, in some cases, it might be a perfectly feasible matter to unite in building a transmission system and arrange the purchase of power from an existing central station or transmission plant from which better rates could be obtained for the power in a single block than individual companies could secure for themselves, owing to the certainty of a better load-factor. The functions of the railway power organization would then be reduced to upkeep of the lines and arranging an equitable scheme for the division and metering of the purchased current. A big central station already doing a large business and with complete equipment for power generation can, as a general rule, supply power more cheaply than individual railways can generate it, and it is better fitted to deal with the large output required for a group of railways than are the railways themselves, since on the whole it is easier for the central station with a large, profitable and established business to obtain the necessary capital upon favorable terms. Such form of co-operative generation or purchase of power would solve a good many outstanding difficulties connected with power supply to contiguous street railway systems.

When one considers the possibilities involved in the electrification of large railway systems a similar procedure would seem sometimes desirable. The generation and distribution of power form no inconsiderable part of the expense of electrification, which is so great as very naturally to stagger many roads that might otherwise like to undertake it. The figures we recently published concerning the possible electrification of the roads around Boston emphasize this phase of the matter. The fact is that many American railways have so far strained their borrowing capacities that the raising of \$10,000,000, \$20,000,000 or \$40,000,000 for electrification of the service near termini is a very serious matter. And, upon the whole, as we intimated in discussing the Boston case, the public will not stand for an increase of suburban fares being charged to such electrification when the ordinary electric railway systems in the same territory are conducted at a profit on relatively much lower fares.

If, however, a railway system could undertake electrification knowing well that it would only have to pay for the upkeep of certain definite equipment and for power at a predetermined rate, its managers would be much more favorably disposed to the change than when they are confronted with the, to them, unknown cost and complication of a great generating and transmission system. On the other hand, a power company undertaking this work of generating and transmission would work for its part on known data, could estimate its costs from previous experience with a good deal of precision, and, with a long-term contract for power behind it, would find it easier to raise capital than would the railway itself, often already overburdened with securities. If it were possible to go a step further and purchase transmitted power from a company already existing and merely requiring added station capacity and appropriate lines, the problem would become still simpler. Centralization of all the power supply in any given territory has so many advantages that no general comment is needed on the subject. There is no reason why existing railways should not take full advantage of any source of power within their reach. In fact, there is every reason why they should, because it will greatly

reduce power expenses and will simplify the operation especially of electrified steam railroads since it eliminates practically all of the special electrical problems and brings down the questions of operation practically to those involving transportation and traffic problems.

CHANGES DESIRED IN CLEVELAND ORDINANCE

The new Cleveland ordinance appears to have flaws which weaken its protection of the capital investment. In the report published in last week's issue of the *ELECTRIC RAILWAY JOURNAL* President Stanley, of the Cleveland Railway, discussed the criticisms made by bankers that the ordinance (1) failed to provide a sinking fund for the retirement of the valuation placed by Judge Tayler upon the old franchises and (2) seemed to permit the company to maintain newly acquired property at a value equal to only 70 per cent of its cost, but provided no sinking fund to take care of the 30 per cent depreciation that it was assumed the property would suffer. These questions arise when the new ordinance has been in effect for less than a year and hamper the company in its efforts to raise needed capital for additions and betterments. They exist notwithstanding the declared purpose of the ordinance to "secure to the Cleveland Railway Company, unimpaired, the capital value" which was fixed by the late Judge Tayler, of the United States Circuit Court of Cleveland, who acted as an arbitrator representing both the city and the company.

The remedy which is asked by the company is the right, by amendment of the ordinance, to maintain future additions and betterments at 100 per cent of their reproduction value by means of a reserve fund. This fund, as proposed, would provide for the 30 per cent depreciation which the additions and betterments suffer theoretically and instantaneously because of the interpretation which the ordinance now permits, that the property shall be maintained at, and shall be worth, an average of 70 per cent of reproduction value.

A requirement that a standard condition of 70 per cent should be maintained was contained in the rejected arrangement between the Cleveland Railway Company and the Municipal Traction Company created by Tom L. Johnson. It was designed originally to safeguard the former company, the owner of the property, against the possibility that the lessee company would allow the property to depreciate below 70 per cent of its value and thus render it of less value than that which it was assumed would be a reasonable standard for working condition. As the new ordinance superseded the old arrangement, this clause was continued so as to assure a fair average working condition of the property, but by the present legal interpretation it becomes a deranging query concerning capital value.

It was generally believed that the many phases of street railway war and franchise negotiation historical in Cleveland had been succeeded by an ordinance under which at least the capital value of the property would be protected beyond question. Since uncertainty exists, it is fortunate, of course, that the fact has been made public before further and extensive investments in the property became irrevocable. If the inducement for investment is to be limited to a reasonable rate of return, as is the intent of the Cleveland ordinance, there is no element of hope for speculative profit. For the absence of this element the city can compensate only by such measures as will safeguard as far as possible the principal invested.

ADDITIONS TO COMMERCE STREET POWER STATION, MILWAUKEE

The electrical generating capacity of the Commerce Street power plant of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is being increased by the addition of two 14,000-kw, high-pressure turbine alternators and two 7500-kw, low-pressure turbine alternators, the latter utilizing the exhaust steam from the eight vertical cross-compound engines already installed. The new work involves the installation of very extensive and complete switching apparatus for the alternating-current section of the plant, including a number of interesting features embodying the most modern design and practice.

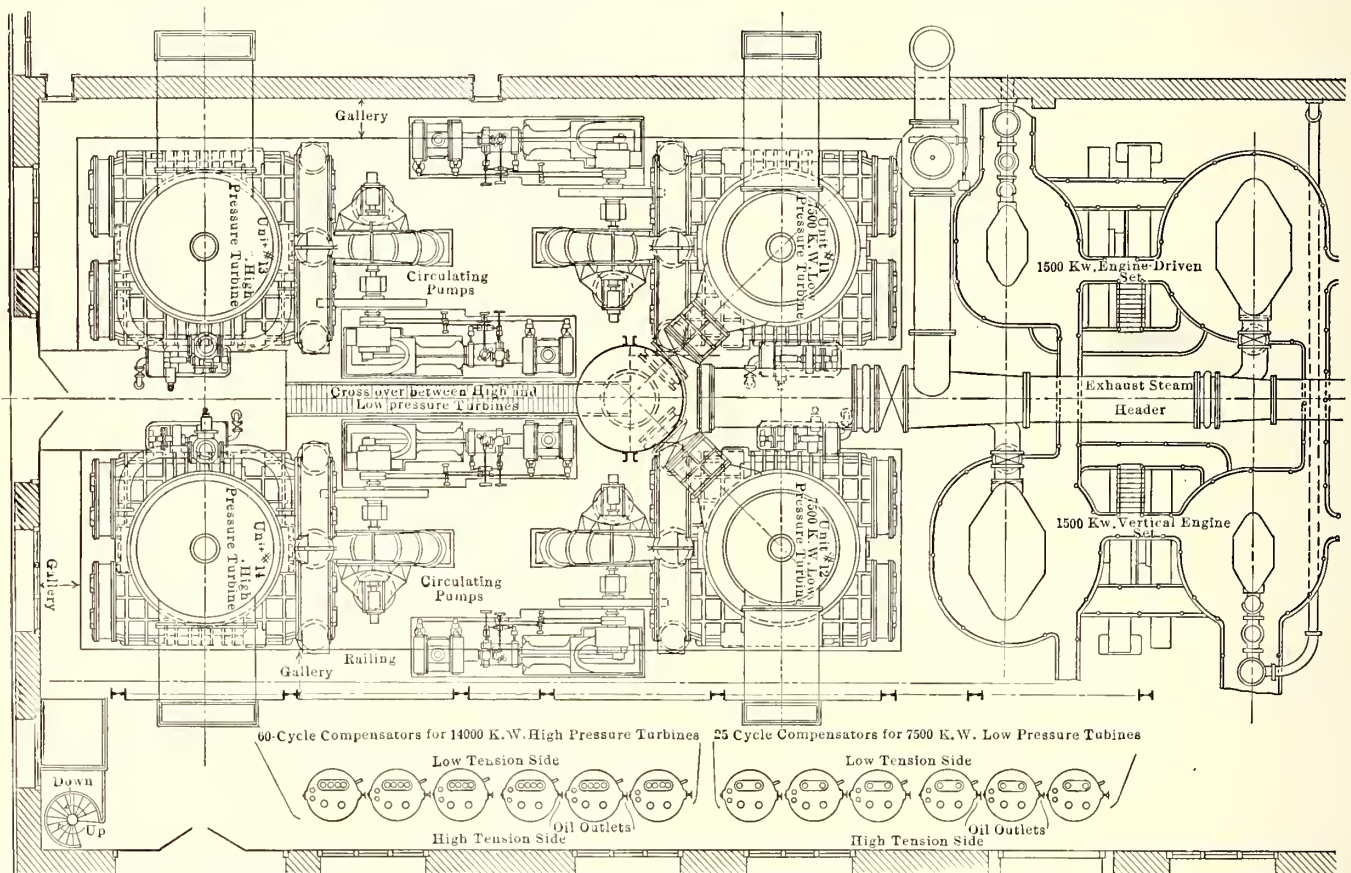
DEVELOPMENT OF THE PLANT

The construction of the original Commerce Street plant, with its engine-driven equipment, was commenced in 1902, at the time the steam turbine was first attracting the serious

interconnection), any unit may be operated independently of the other units.

In the early part of 1904 the requirements of the system had become such that additional power was necessary, the increased demand being chiefly for 600-volt direct current for the operation of cars in the congested section of the city. Although the dependability of the steam turbine had by this time been pretty well established, this was only in connection with alternating-current generators. As the Commerce Street station was a favorable point from which to distribute direct current it was decided on this account to add four additional engine units (32 in. and 68 in. x 60 in.) of the same type as before, driving 2000-kw, 600-volt direct-current generators. Simultaneously with this extension there was an increased requirement for 60-cycle alternating current for lighting and power purposes.

As space was available under the switchboard gallery, two 1000-kw vertical Curtis turbines driving 60-cycle, 2300-volt General Electric generators were installed. In connection with



Milwaukee Power Station—Plan Showing Location of New High-Pressure and Low-Pressure Vertical Turbines in Relation to Location of Old Vertical Engine-Driven Sets

attention of engineers. The plant was therefore originally designed with the idea of being only temporary to tide the system over such a period as might be required to determine the suitability from various points of view of the steam turbine for large power-plant work. Later, as the plans progressed, it was decided to make this plant of a substantial character, so that it might be permanent and be held as a reserve in case a large turbine plant was built which would supersede it for regular operation. Under these conditions four vertical, cross-compound Allis-Chalmers engines (28 in. and 60 in. x 48 in.) were installed, direct-connected to 1500-kw, 13,200-volt, 25-cycle General Electric generators. Each engine received steam from two Edge Moor boilers, having a combined heating surface of 13,000 sq. ft.

The plant was built on the unit plan so far as possible, each pair of boilers having a separate self-supporting steel stack, and each alternator a separate turbo-driven exciter. So far as the piping is concerned (although headers are arranged for

this installation there were added eight additional Edge Moor boilers each with approximately 7000 sq. ft. of heating surface. The same unit plan of arrangement was carried out in this extension as in the first. Although the units in each half are interchangeable so far as piping is concerned, there is no steam connection between the two sections, so that the bursting of a pipe or any similar accident cannot affect more than half of the plant. The coal-handling apparatus of this plant consists of hand-trolleys and special dumping wagons and Jones underfeed stokers.

PRESENT TURBINE ADDITION TO STATION

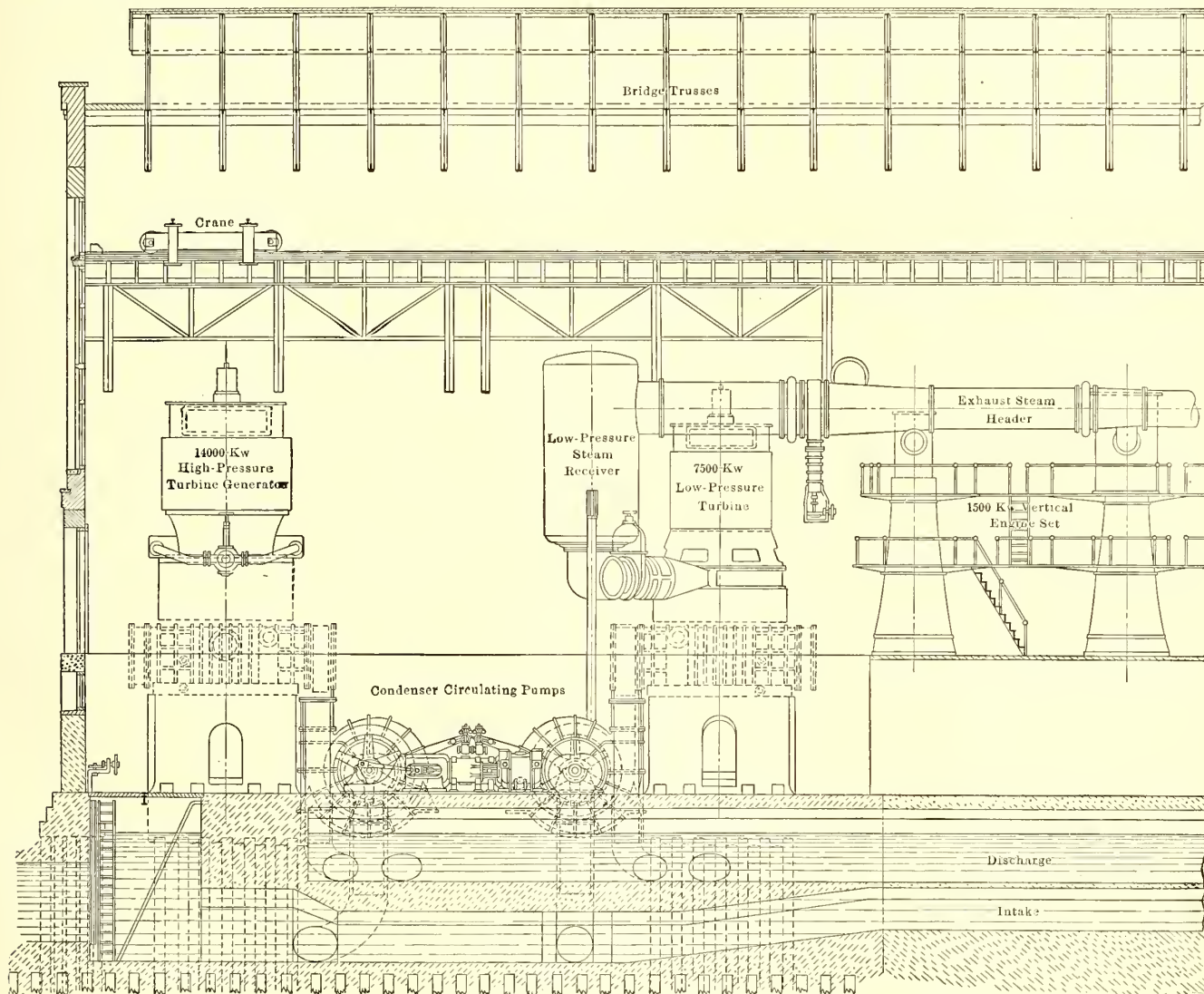
Early in 1910 it was determined that further extensions and additions must be made, as the existing equipment was severely overloaded. Accordingly, an 80-ft. tract of ground north of the plant was acquired. Contracts have been placed for the building and machinery, and a large part of the building work has now been completed. The machinery to be installed in this extension consists of two 7500-kw, low-pres-

sure, 25-cycle vertical Curtis turbines and two 14,000-kw, high-pressure, 60-cycle vertical Curtis turbines. The condensing apparatus for these four turbines is exactly alike both for the 7500-kw, low-pressure machines and the 14,000-kw, high-pressure machines, the actual amount of steam to be handled in each case being approximately the same.

These condensers will be of the Worthington base type, located wholly under the turbines, and each will have 25,000 sq. ft. of cooling surface in 1-in. tubing. The circulating pumps, having a capacity of 30,000 gal. per minute, will be of the 36-in. centrifugal type, each driven by a 22-in. x 24-in. Laidlaw-Dunn-Gordon Corliss engine. These engines will also drive the dry vacuum pumps, 31-in. x 24-in., direct-connected behind the steam cylinders. The wet vacuum pumps are 5-in., two-stage

each having 7500 sq. ft. of heating surface. For boiler feeding an arrangement of pumps with opposed cylinders is planned, using pot-form pumps with compound Corliss engines in connection with Hoppes heaters.

It will be noted that, considered on a conventional basis, the total capacity in kilowatts in this plant is very much in excess of the boiler capacity. Having determined that under peak conditions a boiler horse-power can be produced without difficulty on about 5 sq. ft. of heating surface without materially affecting the efficiency of the boilers, the company's engineers have concluded that it is better to do this during the peak, operating all the boilers, excepting those withheld for cleaning or repairs, during the lighter load periods of the day, than to have a much larger boiler installation, as is commonly done,



Milwaukee Power Station—Longitudinal Section Through Station

centrifugal pumps, and will be arranged to be driven by both induction motors and small steam turbines. It is the intention normally to adjust the turbine speed of these units so that the induction motor will be as nearly as possible in synchronism with the main generators, allowing the motor to float on the line. Should the turbine for any reason fail, the motor would then continue to operate the pump, or if, through any failure of the turbine governor, the speed should materially exceed normal, the motor would act as an asynchronous generator and tend to prevent disastrous over-speeding. Independent turbine-driven exciters will be provided, each directly connected to its respective generator.

BOILERS AND PIPING

The boiler installation for this extension will consist of eight additional boilers, similar to the original installation, and

operating at a ratio of 10 sq. ft. during the peak and having a large number of boilers banked all the rest of the day.

Each boiler is equipped with a superheater built on the top of the boiler and in reality an integral part of the boiler. This superheater has 25 per cent of the total boiler heating surface, and is used as an economizer through which the gases pass after leaving the water heating surface of the boiler. At normal rates of operation approximately 60 deg. of superheat is obtained from this source. In addition to this the eight new boilers which are to be installed and from which the high-pressure turbines will be supplied will be equipped with Foster superheaters which will deliver the steam to the turbines at 150 deg. above the temperature of saturation.

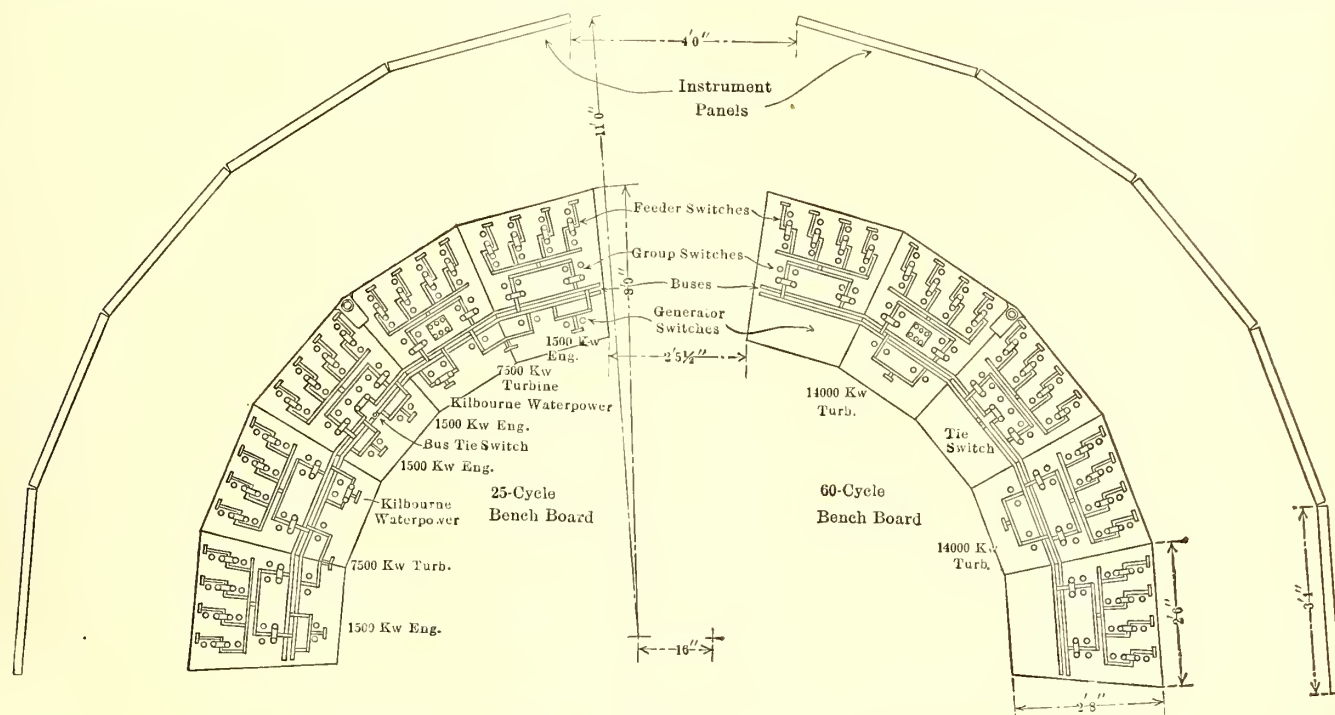
It has been found by test that the various engines, non-condensing, will have their maximum efficiency with a total ca-

capacity of about 4000 kw in excess of the rating of the generator, and as the generators will readily operate without excessive heating with this additional load the total station capacity is considered to be 63,000 kw. The real estate occupied by this installation is 143 ft. x 240 ft. So far as the power plant proper is concerned, there is therefore 1 kw installed for each 0.545 sq. ft. of ground area.

A feature of this installation which, in its construction, has involved much study is the low-pressure piping between the engines and the turbines into which they exhaust. To make this piping as short as possible and to avoid unnecessary bends it was decided to carry it overhead, and the last end of this pipe, next to the separator, was made 66 in. in diameter in order to reduce the velocity of the steam sufficiently to permit proper action on the part of the Hoppes separator. This separator is 10 ft. in diameter and approximately 22 ft. long. As the pipe referred to has a fairly rigid connection to each engine, the expansion must be necessarily taken up at intervals between the engines. However, as it was not considered safe to trust to the rigid connections as anchorages, it be-

ing a ratio of 1 to 2 between taps. These compensators will be installed under the operating switchboard gallery in the generator room and directly opposite the machines they serve. The 7500-kw, 25-cycle generators will be equipped with banks of three 1250-kw compensators, the total three-phase rating of these groups aggregating 3750 kw, or one-half of the generator rating, since only half of the generator output is actually transformed in the compensators. The 14,000-kw, 60-cycle generators will be similarly served by banks of three 2333-kw compensators, aggregating 7000 kw in three-phase rating. The use of these compensators with half-potential generators marks the newest practice in the installation of large turbo-generator units, and is designed to suppress surges and to protect the armature coils of the generators against severe shocks or short-circuits.

The incoming 25-cycle transmission lines from the 8000-hp Kilbourn water-power plant on the Wisconsin River, 120 miles distant, pass through the Commerce Street station from the West Allis substation, and are handled as local station generating capacity in making up the busbar connections at



Milwaukee Power Station—Feeder Control Benchboard in the New Switch House

came necessary to design a harness which would anchor the pipe to itself.

GENERATING EQUIPMENT

As has been already mentioned, the new generating equipment of the enlarged station will comprise two 14,000-kw, 60-cycle turbine generators and two 7500-kw, 25-cycle, low-pressure turbine machines. This apparatus will be in addition to the existing equipment of four engine-driven, 1500-kw, 25-cycle, 13,200-volt alternators, four engine-driven, 2000-kw, 600-volt direct-current generators and two 1000-kw, 4000-volt, 60-cycle turbine generators whose output is used directly for lighting purposes.

The 60-cycle, 13,200-volt feeders will thus be supplied from two 14,000-kw turbine alternators, while the 25-cycle generating equipment of the station will comprise the four existing 1500-kw, engine-driven, 13,200-volt, 25-cycle alternators, together with the two newly installed low-pressure turbines driving 7500-kw, 25-cycle alternators and utilizing the exhaust steam from the eight engines.

GENERATOR COMPENSATORS

The generator pressure of both the new 14,000-kw and 7500-kw turbine generators is 6600 volts, or one-half the bus potential of 13,200 volts. The energy from the generators will be fed through compensators of the auto-transformer type, hav-

ing the operating switchboard, being furnished with oil-switch remote control similar to the other generator units. In the case of these transmission line switches this control is duplicated at the feeder switchboard in the switch house.

The generator switchboard will be equipped with operating signals of the ship type, duplicate dials with pointers indicating positions labeled "Stop," "Start," "Field Off," etc., being installed on the gallery and at the side of the turbine units themselves, so that close communication can be maintained with the generator floor. The generators will also be equipped with totalizing watt-hour meters, while indicating wattmeters showing the load on each machine are to be installed near the steam gages for the engineer's reference.

SWITCH HOUSE

The electrical switching of the enlarged and reconstructed Commerce Street station will be divided between the overhead "operating" switchboard in the generator room itself and the dispatching or feeder benchboard in a new switch house erected just across Poplar Street from the power house. All operations pertaining to the actual manipulation of the machines themselves, including the connection of incoming generators to the busbars, will be controlled from the generator switchboard; while the switching of the 10 group and 40 feeder circuits will be handled from the feeder benchboard at one

end of the special structure in which the group and feeder oil switches are to be housed.

The switch house is a 117-ft. x 40-ft. brick structure, of one story and basement, and is about 60 ft. distant from the main power house. The engraving on page 294 shows the arrangement of the generator, group and feeder oil switches and the control switchboard, on the main switch floor level, while the basement contains the busbar compartments, lightning arresters, instrument transformers, etc.

The control benchboard in the switch house, locally designated as the "feeder benchboard," will comprise two five-panel sections, arranged in the arc of a circle. The left-hand section will control the 20 25-cycle feeders and the right-hand section the same number of 60-cycle feeder switches. On the vertical boards behind the benches will be mounted the instruments, etc. The arrangement of the switch contacts on the panels of the benchboard follows that of the oil switches themselves in the switch house.

The duplicate 60-cycle and 25-cycle generator buses are sectionalized at points of symmetry of connected apparatus, the main buses being broken by remote-controlled tie switches, while the auxiliary buses are equipped with simple disconnecting blades only. The tie switches will be operable from both the feeder benchboard and the operating switchboard in the power house, indicating lamps at both points showing the position of the switches. Each half of the 25-cycle buses will be arranged to be connected to two 1500-kw engine-driven alternators, two 7500-kw turbine-generators and one Kilbourn line, the corresponding switches being grouped symmetrically about the sectionalizing switches. These generator switches will be controlled entirely from the generator switchboard in the power house, indicator lamps showing the position of the switches at the feeder board. The Kilbourn or West Allis substation lines, however, will also have control points located on the feeder benchboard, so that they can be handled from either board.

The group switches, each controlling four feeder circuits, will be ranged in a row parallel with the generator switches and, like the four feeder switches under each of them, will be all controlled from the feeder switchboard. The feeder switches will be installed in parallel rows at right angles to the generator and group switches and directly over the group buses, at the end of each of which aluminum-cell lightning arresters will be connected. Ample room has been left in the busbar compartments, so that instrument transformers can be connected on any feeder to register the energy taken by it. At the control benchboard name plates will be attached to the group-switch contacts, showing the destination of the feeders connected under each group. The oil switches in the switchhouse

in conjunction with the other steam plants of the company at Oneida Street and in the Public Service Building. The Oneida station contains two 1050-kw, 600-volt engine-driven direct-current generators; one 1050-kw, 250-volt generator, and four 400-kw, 125-volt generators, besides two 1500-kw, 25-cycle, 250-volt motor generator sets, one 500-kw balancer set and a 1500-amp-hour, 250-volt storage battery. In the Public Service Building, which contains the company's offices, are three 1500-kw, 2300-4000-volt, 60-cycle, non-condensing, high-pressure steam turbines, exhausting into the steam heating system, from which the central section of the city is supplied with heat, and two 1500-kw motor generator sets similar to those in the Oneida station. The Milwaukee system also receives about 8000 kw from the Kilbourn water power plant. The company has also recently completed the construction of its Clinton Street substation on the south side of Milwaukee, which will contain four 2000-kw, 25-cycle, 600-volt rotary converters, three of which are being installed at once. This station has also been designed as a switching point for lighting service.

John I. Beggs is president and general manager of the Milwaukee Electric Railway & Light Company. C. J. Davidson is chief engineer of power plants, and O. M. Rau is electrical engineer.

SPECIAL TRACK CONSTRUCTION IN MOBILE, ALA.

In carrying out some track work during the year 1908 the Mobile Light & Railroad Company devised a special construction for Dauphin Street, which has a clay subsoil. This street contains a great many water, sewer and gas pipes, a very large storm sewer and telephone conduits, all of which had to be lowered on account of the new grade, so that the street was

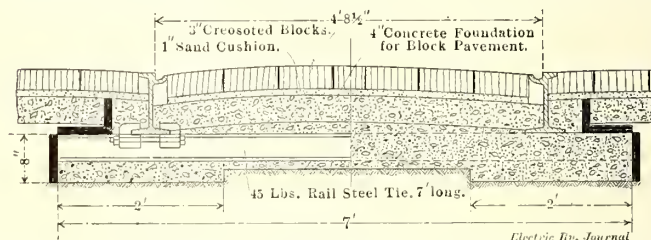


Fig. 1—Cross-Section of Mobile Track, Showing Old Rails Used for Ties

badly cut up with deep ditches which ran both parallel to and across the tracks of the street railway. The city does not take proper care of the back-filling, which naturally causes the earth to settle and so entails considerable trouble and expense in the maintenance of the track structure. It was, therefore, decided to put in an extraordinarily good track, the concrete work of which would form an arch capable of holding up the track even though the filling in the ditches underneath should settle.

The engraving (Fig. 1) shows a cross-section of this work.

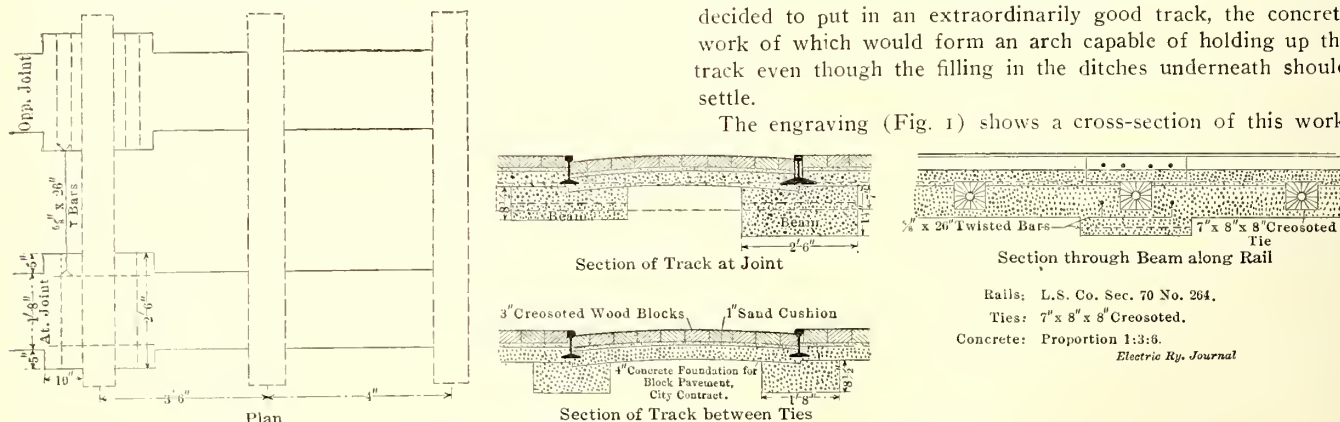


Fig. 2—Standard Concrete Beam Construction in Mobile, Ala.

will be inclosed in clear wire-glass doors, so that an unobstructed view of the operating parts and through successive rows of switch inclosures will be possible.

OTHER PLANTS OF MILWAUKEE SYSTEM

The new reconstructed Commerce Street plant of the Milwaukee Electric Railway & Light Company will serve the combined electric railway and central station load of the city in

Rails of Lorain section No. 89-319 are laid on ties which consist of old 45-lb. T-rails, spaced 5 ft. centers, with tie rods 7 ft. centers. In order to secure a suitable fastening between the ties and the rails, there was developed the two-piece base and tie clamp shown in the illustration. The two halves of the clamp are connected by two 7/8-in. bolts, the whole constituting a very firm attachment.

The construction, as shown in the engraving (Fig. 2), is that used on streets with sand foundation, and consists of longitudinal reinforced concrete beams varying in depth and width according to whether the construction is under continuous rail, under a joint or opposite a joint as shown in the drawings. The 7-in. x 8-in. x 8-ft. creosoted ties are laid at intervals of 4 ft. The paving construction required by the city is light, and consists of 4-in. concrete, a 1-in. sand cushion and 3-in. creosoted wood blocks. Although Fig. 2 shows a 7-in. rail, the company has adopted the 9-in. Loran section No. 89-319 as a standard on paved streets, preferring to have the base of the rail more thoroughly embedded in concrete than is possible with a 7-in. section.

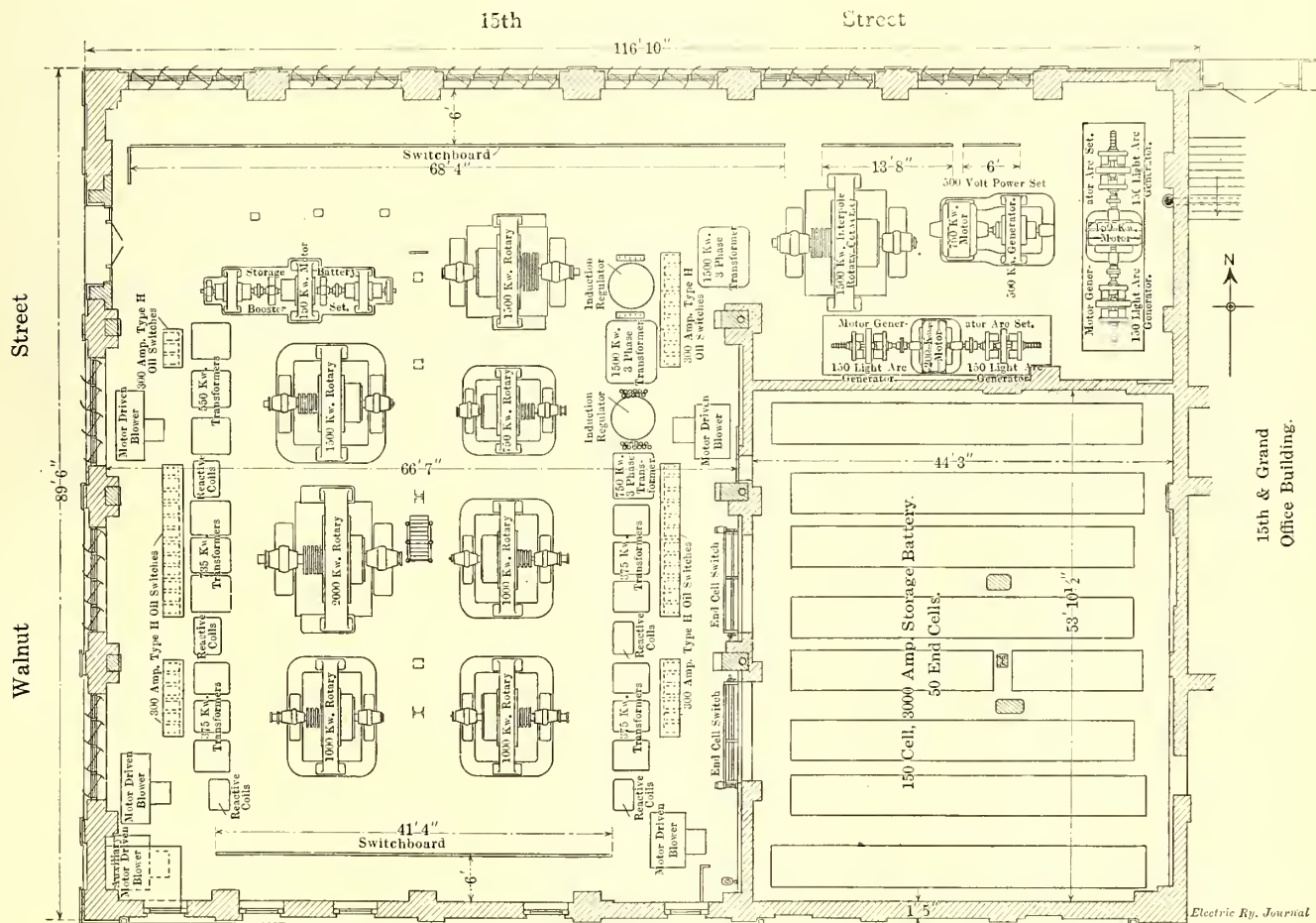
NEW OFFICE AND SUBSTATION BUILDING OF KANSAS CITY COMPANY

The Metropolitan Street Railway and the Kansas City Electric Light companies are just rearranging their offices in their greatly enlarged building. A view of this building taken while decorated for a carnival is reproduced on page 298. The front portion of the building is the older part. Some time ago this section was found inadequate for accommodating the entire executive and office forces of all departments so that it became

floor of the new section will be occupied by the testing department and by the lighting department; the second office floor will be occupied by the operating division of the lighting department; the third floor by the operating and executive departments of the railway, and the top floor by the claim and legal departments.

The new section of the building is slightly larger than the old. It has a floor space 112 ft. x 86 ft. and each floor is subdivided according to the needs of the department which will occupy it. A vault has been built to the full height of the building and is accessible from each floor. The new structure is made of brick and was built by day labor under the supervision of the engineering department of the railway and light company.

Each floor is so subdivided that a row of offices will extend around the outer walls and a large open space be provided in the center of the floor for the clerical assistants. This center space will be lighted by a light shaft extending from the first floor to the roof. The shaft is 36 ft. 10 in. long x 10 ft. 8 in. wide and is glazed for the full height of each floor with wire glass set in steel frames. The bottom of the air and light shaft inclosure is at an elevation just above the substation ceiling, or approximately that of the first office floor. This floor is directly above the roof of the former substation building now inclosed by the new addition to the offices. The roof remains



First Floor Plan of Walnut Street Substation, Metropolitan Street Railway, Kansas City, Mo.

necessary to quarter the claim department in another building. The new section shown in the rear of the view has just been completed and was so designed in connection with the older part, which has been rearranged, that modern quarters would be furnished to all departments. The new addition to the office building was erected over a large railway and lighting substation, the operation of which was not interrupted during construction work. This substation is described further on.

The older portion of the office building is four stories in height, and the new portion has four office floors and a substation floor equal in height to two office floors. The first office

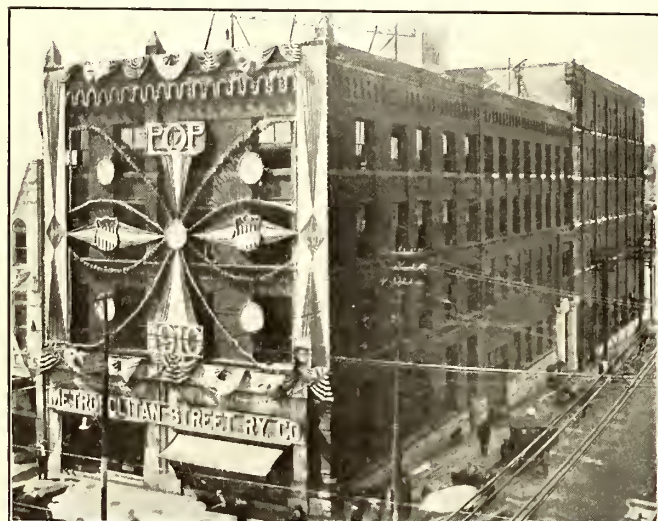
as it formerly was, except for the opening cut through into the bottom of the airshaft. This opening now is protected by steel doors so arranged that in event of fire they may be dropped and any water coming down through the airshaft will drain onto the old substation roof, which is of fireproof construction. Thus the substation is entirely separated from the office building by a fireproof structure inclosed within the office structure.

SUBSTATION ENLARGEMENT

The accompanying floor plan shows the arrangement of the railway and lighting substation apparatus as now installed in

the enlarged substation contained within the new section of the office building. The railway apparatus includes three 1000-kw, one 2000-kw and one 1500-kw rotary converter. The lighting circuits are supplied from two 1500-kw rotary converters and one 750-kw motor-generator set. These units are supplemented by a battery of 150 cells of chloride accumulators of 3000 amp-hours capacity, which is used principally in connection with the Edison circuits. Two 150-light arc generators are driven by a 200-kw motor. A 500-kw, 500-volt motor-driven generator has been installed to feed into a downtown power circuit. The motor of this set is a 6600-volt induction machine which during the daytime takes current from the substation transmission bus fed from the company's main generating station.

In addition to its main generating station, the company operates a smaller station close to the center of the commercial district, in which steam is generated at 160 lb. pressure and reduced to 5 lb. for distribution in heating mains. The high-pressure steam is used also to generate current for power circuits and for an Edison circuit load. At night, when the load on the 500-volt power circuit falls off, the 500-kw motor generator set connected with it in the substation automatically takes power through the tie line to the steam-heating station and operates as a 6600-volt motor generator delivering current to the light-



Combined Office and Substation in Kansas City, Mo.

ing company's 6600-volt buses. By this arrangement the fullest advantage is realized from the steam at the heating plant.

With the addition of the new apparatus to the substation and the erection of office floors above the substation, the power department has rearranged the incoming and outgoing lines and placed them all underground.

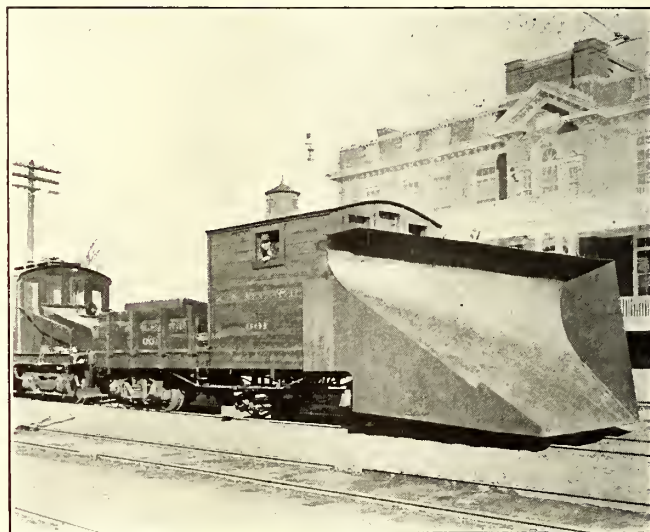
PERFORMANCE OF AUTOMATIC BLOCK SIGNALS IN HUDSON TUNNELS

A remarkable record of signal operations was made by the Hudson & Manhattan Railroad during the month of January, 1911. Out of a total of 8,916,157 movements of signals, automatic stops and interlocked switches there were only four failures, involving a total of seven minutes of train detention. The four failures occurred with the automatic signals, which made 5,515,441 movements. No failures were recorded against the automatic stops, which made 2,821,443 movements, or against the interlocked switches, which made 579,273 movements. The causes of the four signal failures were track fuse blown, dirt in magnet valve, track circuit broken and relay stuck. This fine record not only speaks well for the signal apparatus installed, but particularly for the care and thoroughness with which it is maintained by the railroad company's signal department.

NEW SNOW PLOW BUILT BY CHICAGO & MILWAUKEE ELECTRIC RAILROAD

The Chicago & Milwaukee Electric Railroad during the blizzard of Feb. 5 and 6 had an opportunity to demonstrate the serviceability of a large snow plow built during the past season at the company's shops in Highwood, Ill. This road operates high-speed trains, making the run of 74 miles between Evanston and Milwaukee in 2 hours and 15 minutes, and in addition has a service of local and suburban trains operating during a part of the day on 15-minute headway. E. E. Downs, general manager Chicago & Milwaukee Electric Railroad, states that the new plow, shown in the accompanying illustration, did very efficient work in removing drifts, some of which were higher than the plow itself. During the recent blizzard the road was enabled to keep its service operating with no trains more than 20 minutes off schedule at any time. Mr. Downs attributed this entirely to the use of the new plow and the Root track scrapers with which many of the interurban cars are equipped.

The new snow plow is mounted on a standard freight car carried on M. C. B. trucks. The length of the equipment over all is 38 ft. 9 in. and the width of the nose is 8 ft. 8 in. The



Snow Plow Built by Chicago & Milwaukee Electric Railroad

plow is made of sheet steel $\frac{3}{8}$ in. and $\frac{1}{8}$ in. thick and is carried on an extension of the car framing. The shape of the nose is arranged for double-track work so that the nose lifts and shears the snow to the right-hand side of the track. A set of heavy Root track scrapers is mounted under the middle of the car body which carries the plow, and these scrapers effectively clean the rails after the large mass of snow has been removed by the plow.

In fighting snow this plow is pushed by one or more of the company's sloping cab-type, 38-ton, all-steel electric locomotives. The plow is weighted with 18 tons of rail running the full length of the platform. Two supply boxes are carried on the rear of the platform, which has a heavy matched oak floor and is also surmounted by a cab 10 ft. x 10 ft. in size. In the two boxes at the rear of the car platform are supplies of salt and sand which are led to the rails by independent spouts from each box. This provides a good rail for the locomotive which pushes the snow plow. The substantial design of the new snow-fighting equipment is shown in the accompanying illustration. This equipment represents the combined ideas of the heads of the operating department of the road.

Trial runs have been begun on the electrified Dessau-Bitterfeld line in Germany. Speeds as high as 62 m.p.h. have been attained with 350-ton trains.

IMPROVEMENTS IN SAVANNAH, GA.

The Savannah (Ga.) Electric Company, which is under the general management of the Stone & Webster Management Association, Boston, and the local management of M. L. Sperry, has been making a number of important improvements during the past year in the track and power departments. A large part of the reconstruction of track is due to the increase in paved streets in Savannah. At this time the company operates about 57 miles of track, which include 21 miles of suburban lines, the general construction of which will remain as at the present

SUMMARY OF CAR DEFECTS						(3)
YEAR			MONTH OF			
LIST OF DEFECTS	Total	PER CENT	LIST OF DEFECTS	Total	PER CENT	
ARMATURES DOWN			GLASS BROKEN			
BELLS			NEATERS			
BRAKES (CAR)			NOT BEARING			
BRAKES (HAND)			LOOSE GEARS			
CAR BODIES INJURED			LOOSE PINION			
CIRCUIT BREAKER TROUBLES			MOTORS DOWN			
COLLISIONS			MOTOR LEADS			
COMPRESSOR			MULTIPLE CONTROL			
CONTROLLER TROUBLES			REGISTER			
DERAILMENTS			RESISTANCE			
DIRTY CAR			SAND BOXES			
DOORS			TROLLEY WHEEL			
FENDERS			TRUCK SPRINGS BROKEN			
FIELDS BURNED OUT			MISCELLANEOUS			
FLAT WHEELS			TOTAL			
GEAR CASE DOWN			DISABLED CARS "PULLED IN"			
			DISABLED CARS "PULLED IN"			
			PER 1000 MILES			
REMARKS						

Managers

Masters Mechanic

Monthly Summary of Car Defects

the same purpose where concrete could not be placed on account of the impracticability of diverting the cars during reconstruction. Although some of the streets are paved with

[illegible]

INVESTIGATION

Date _____ 19__

I have investigated this report and find that
the following facts relating thereto exist.

And in conclusion I believe _____
_____ to blame for the occurrence
and recommend _____

Master Mechanic.

Approved _____

Asst. Manager.

Front and Back of Defect Card

block, there is considerable asphalt paving. As a rule granite headers are used in the asphalt paving.

As a result of modernizing the power plant during 1910 the company is saving about 15 per cent in fuel. The former grade of coal had too much sulphur and clinker. The present fuel is a high-grade Pocahontas and is bought on a b.t.u. basis. In the summer of 1909 the company installed one 1000-kw, 1800-r.p.m. turbine, a Worthington surface condenser and a

50-kw Westinghouse exciter, direct-connected to a Terry steam turbine. The principal railway unit is a 800-kw generator connected to a Cooper-Corliss engine. When the load drops off this machine is shut down and the load is carried by one or two 300-kw, 500-volt generators. The 1000-kw turbine previously referred to was bought under the following steam consumption guarantee, assuming 180 lb. steam pressure and 28 in. vacuum at the turbine exhaust nozzle: Full load, 18 lb.; 25 per cent overload, 17.80 lb.; 50 per cent overload, 18 lb. The total capacity of the Savannah plant now comprises 2207 hp in boilers, 2920 hp in engines and 2250 hp in turbines. The turbines handle all a.c. lighting and power circuits. The d.c. lighting is cared for by one 300-kw 3-wire generator and four 3-wire generators which are direct-connected, two per engine, to a pair of Harrisburg engines. The total capacity of the four generators is 400 kw.

Shop maintenance records in Savannah are kept on standard forms, devised by the Stone & Webster Management Association, of Boston. Among these forms are car inspection

	Daily.	Twice a Week.	Weekly.	Monthly.	Yearly.	Special.
LUBRICATION						
Motor axle bearings—old types.....	150					
—new types.....		500				
Armature bearings—old types.....	150					
old style, new types		500				
new types			1000			
INSPECTIONS						
Inspect on of brakes & shoe renewals..	150					
Sweeping and dusting.....						
Tightening loose bolts and nuts.....						
Bells, signs, glass, etc.....						
MOTORS						
Brushes and holders.....	150					
Blow out motor cases with air.....			1000			
Clearance—old types.....		500				
—new types.....			1000			
Motor end play.....				5000		
COMPLETE OVERHAULING					50000	
CONTROLLERS, TYPE K						
Regular inspection—cleaning & adjust..		500				
Blow out with air.....			1000			
THOROUGH OVERHAULING					50000	
COMPRESSOR						
Regular inspection and oiling.....	}					
Test for air leakage.....			1000			
Brush holder and end of commutator wiped off.....						
Thorough overhauling.....					50000	
JOURNAL BEARINGS						
Inspected, oiled and packed.....				5000		
See if bearing is clear at edges.....						
Covers on journal boxes.....	150					
GEARS AND PINIONS						
Inspected and lubricated.....						1500
TROLLEY WHEELS						
Inspected and oiled, contact spring adjusted.....	150					
TROLLEY POLE AND BASE						
Tension on spring—pressure on wire 25 lb	150					
LIGHTNING ARRESTERS						
Clean and adjust after each storm.....				5000		
CIRCUIT BREAKERS						
Clean and adjust.....				5000		
CAR WASHING						
RESISTANCES			1000			
Clean, if exposed.....			1000			
PAINT						
Touching up and varnishing.....					50000	
BRAKE CYLINDERS						
Piston travel (not over 5 in.).....				5000		
COMPLETE GENERAL INSPECTION.				5000		

NOTE.—Figures indicate inspection periods on a mileage basis, which basis is recommended particularly for general inspection and overhauling.

NOTE:—Figures indicate inspection periods on a mileage basis, which basis is recommended particularly for general inspection and overhauling.

Car Inspection Mileage Chart

charts, which indicate when motors, controllers, compressors, bearings, gears, trolley bases and other parts should be inspected; defect cards which are turned in by the car crews, and a summary of car defects, including pull-ins, made up monthly by the master mechanic. All of these forms are shown in the accompanying cuts.

All motors, even the GE-800's, are lubricated with oily waste, at a cost of about 14 cents per 1000 car-miles. The oil is bought direct from the Standard Oil Company. Gears and

pinions are lubricated with West Virginia black oil, purchased from the same company. The substitution of oil for grease in motor lubrication cut the cost of babbitt in half. The standard babbitt metal for armature bearings is Adamant, furnished by the Magnolia Metal Company. This has a life of about 35,000 miles. The standard carbon brush in Savannah is the National Carbon Company's Partridge type. This brush is giving an average life of about 6073 miles and is applied at a tension of 6 lb. per square inch. The standard brake shoe is the American Brake Shoe & Foundry Company's design M-512. This shoe is applicable to all the heads used in Savannah on Peckham, Brill and Du Pont trucks. The average life of the shoe is 3015 miles. New shoes weigh 35 lb. and discarded shoes about 10 lb.

REPORT OF THE NEW YORK PUBLIC SERVICE COMMISSION, SECOND DISTRICT

The fourth annual report of the New York Public Service Commission, Second District, for the year ended Dec. 31, 1910, shows that at the close of the year there were 944 corporations, municipalities and individuals engaged in serving the public in some capacity, or incorporated for the purpose of rendering such service, that by operation of law placed them under the supervision of this commission. The street railroad corporations were as follows: Operating, 79; inchoate or dormant, 33; lessor, 17; total, 129.

The amounts actually expended by this commission since its organization, July 1, 1907, to the close of the State fiscal year, Sept. 30, 1910, are as follows: July 1, 1907, to Sept. 30, 1908, \$307,734; Oct. 1, 1908, to Sept. 30, 1909, \$276,575; Oct. 1, 1909, to Sept. 30, 1910 \$295,443. The foregoing do not include the State's expense in grade crossing eliminations ordered by the commission. For the fiscal year commencing Oct. 1, 1910, there was appropriated for the general expenses of the commission \$372,830. The estimate which was submitted by the commission for its expenses for the fiscal year commencing Oct. 1, 1911, was \$393,537.

ANNUAL REPORTS

Regarding the work of the division of statistics and accounts the report says in part:

"The division has undertaken to examine carefully each report filed with the commission. Where discrepancies or inaccuracies are discovered the corporation is asked to correct them. After two years' experience it may be said that the efforts of the division are met by most of the corporations with which it has to deal in a spirit of courtesy and co-operation. The reports filed by a few indicate, however, that there is either an intent to evade the accounting rules or that there is a lack of knowledge as to their requirements. With the limited force at its command the division has not been able to extend to the small corporations the assistance in arriving at a correct understanding that it would like to extend, but improvement in this direction is hoped for as a future possibility.

"The division has been somewhat hampered in its work through its inability to retain for any considerable period of time the services of many of the employees who have been engaged for its work.

"During the earlier days of the commission, and until the corporations had been given sufficient time in which to familiarize themselves with the more extended form of reports prescribed by the commission, it has been deemed unwise to attempt to enforce compliance with the law by bringing suits for penalties. It is now believed that the time for such leniency has passed. The forms of annual reports have become substantially settled, corporations have had sufficient time in which to install the uniform system of accounts prescribed, have learned how to make the reports properly, and there is no longer any reason why they should not obey literally, except in isolated cases, the requirements of the law with reference to the time of filing the report. The work of the commission is hindered and embarrassed by the delay, which it is believed

arises in most cases from mere inattention and neglect. The policy of the commission hereafter will be to exact the penalty prescribed by law in cases of disobedience."

TARIFFS

On Nov. 30, 1910, there were in force for electric street and interurban railways 218 freight tariffs and 166 passenger tariffs. In the year ended on that date the electric railroads showed an increase of 36 freight and 8 passenger tariffs.

Of the orders granted which involved reduction in rates 16 related to freight traffic of electric street and interurban railroads and 22 to passenger traffic of such roads.

On the subject of tariffs of street and interurban railroads the report says: "No material changes were made in fares applying to local one-way travel. It is noticeable, however, that interurban lines are more generally establishing fares applying to round-trip, 60-trip and school commutation travel. Many companies have provided such fares for such classes of travel during the year. Fares applying to the sale of interline tickets for through travel have also been provided by several of the larger interurban lines. Several of these companies have made extensions to their lines, and in all cases fares to cover travel to and from points reached by such extensions have been established.

"The managements of electric street and interurban properties have given much time and consideration to the subject of uniformity in certain of their rules and regulations relating to passenger travel, with a view of making them conform more closely, in order that they may thereby serve the public with greater convenience. A committee appointed by the Street Railway Association of the State of New York has the subject under consideration and has held several meetings, at all of which meetings the chief of the division of tariffs of the commission was present. This committee recently submitted a progress report to the association, which was approved, and the committee was instructed to continue its work, all of which tends toward the ultimate establishment of joint tariffs to cover through travel over such lines."

Regarding the freight traffic of street and interurban railroads the report says that generally the companies that engage in the transportation of property conduct the business upon a plan which is a combination of methods used by both express and steam railroad companies. During the year 89 schedules relating to transportation of property were filed. The percentage which the number of reduction changes bears to the total number of changes made was found to be approximately 71 per cent.

STREET RAILROAD INSPECTION

A section relating to street railroad inspection gives a list of roads inspected during the year. On Aug. 29, 1910, an assistant inspector of street railroads was appointed. This addition will permit attention to a number of important matters affecting service furnished by street railroad companies. During the calendar year 32 accidents and 31 complaints were investigated. The report adds:

"On the roads inspected during the year and by observation of physical conditions on others, it was found that the track, roadbed and structures of the electric roads in this Public Service district are generally maintained in a proper condition for safe operation. All the companies operating the interurban roads have been liberal in their maintenance expenditures during the past year; a large number of tie renewals have been made; a large amount of ballast has been put in; cuts have been sloped and ditched; shoulders have been widened on fills; in a number of cases right of way has been cleared of trees and brush which obstructed vision; and in nearly all cases a sufficient track force is maintained.

"A large proportion of the above improvements have been made in compliance with recommendations of this commission based on previous inspections.

"That the high-speed interurban roads are maintained in good operating condition is shown by the fact that during the past year very few, if any, accidents have occurred on them which were directly attributable to defective track or roadbed.

"There were no failures of structures of any kind on any of the roads, city or interurban, during the year.

"Generally, cars are maintained in good condition. During the past two years there has been a decided improvement in the maintenance of cars, especially in appearance and cleanliness. That this is in a measure due to inspection and investigation of complaints there can be no doubt.

"Several of the companies have increased their repair shop facilities.

"The use of air brakes on city cars is being extended.

"A number of additional pay-as-you-enter cars have been put in service during the year. These cars generally seem to receive public approval.

"During the year there were 1306 accidents on street surface railroads, including city and interurban roads: 1070 were of a minor character, such as persons falling from cars, vehicles being struck by cars, etc., on city lines; 29 were head-on collisions; 104 were rear-end collisions; 90 were derailments; 13 occurred at grade crossings of steam railroads. Of the above accidents, the following occurred on interurban roads: 3 head-on collisions; 9 rear-end collisions; 21 derailments; 1 at grade crossing of steam railroad. None of the derailments on interurban roads was caused by defective track or broken rails: 13 of the derailments on these roads were caused by running through switches, nearly all at meeting points where cars were running at slow speed; 8 were the result of brake beams and other parts of the equipment dropping, and other causes.

"There were 122 persons killed and 1521 injured during the year as the result of the operation of electric cars on city and interurban roads. Of these, 13 passengers were killed and 726 injured, 11 employees killed and 97 injured, 98 trespassers killed and 698 injured.

"During the year there were no passengers or employees killed on interurban cars, and 97 were injured. Of these, 10 were injured in head-on collisions, 50 in rear-end collisions, 35 in derailments, and 2 were injured at grade crossings of steam railroads.

"The above statements of accidents are based on the reports received from operating companies. These include persons who received slight injury, such as being cut by broken glass, bruises, sprains, and shock, which in a measure accounts for the large number of passengers injured.

"Trespassers killed and injured include persons struck by cars while walking or riding on city streets.

"The above figures are of interest, as the small number of accidents and their results show the high state of efficiency of maintenance and operation on the interurban railroads in this State. They also demonstrate by the large number of accidents and the number of persons killed and injured on city railroads that improvement in this direction should be made on these roads.

"The importance of the high-speed interurban railroad as a factor in the transportation facilities of this State has increased from year to year. At present there are several of this class of roads which on private right-of-way sections equal the speed of the fastest steam railroad trains. These roads are competing for the passenger traffic with the steam railroads and are securing a large portion of it.

"As an illustration of the density of some of this traffic, the Syracuse, Lake Shore & Northern Railway during the last State Fair carried between the fair grounds and the City of Syracuse in six days a total of 54,000 passengers, and a maximum of 13,000 in one day.

"On July 1, 1910, exclusive of electrified portions of the New York Central & Hudson River Railroad and the New York, New Haven & Hartford Railroad, there were 2709.57 miles of single track operated by electricity in this Public Service district, and 4118 cars in use.

"A number of serious collisions have occurred on interurban electric railroads outside this State. The volume of traffic, the speed and frequency of movements on the railroads in this district are equal to those of any other section of the country. The number of serious accidents on this class of railroads in this

district has been comparatively few. The managers of these railroads are to be congratulated upon this fact.

"This comparative record is neither the result of good fortune nor chance but has been produced by the closest attention to all of the details of track and equipment maintenance; by the care taken to insure the employment of competent and reliable motormen and conductors; by improved methods of operation, including rules, train dispatching, and proper schedules. The high state of efficiency maintained on these railroads was brought about by the united efforts of the operating officials and the suggestions and recommendations of this commission."

UNIFORM ACCOUNTS

Regarding uniform systems of accounts the report says in part:

"The Public Service Commission was fortunate when it entered upon the discharge of its duties with respect to accounting in that it was able to profit largely by what had already been done in the field of accounting under the supervision of governmental authority. The public service statute of this State, however, contemplates a supervision of greater scope than has heretofore been delegated in this country to any similar body, and has within it purposes not generally provided for elsewhere. The commission therefore had in mind for an ideal accounting system one that would not only afford publicity and enable a correct analysis for statistical purposes, but would, in addition, conserve the public interest by preventing as far as possible those ills arising out of the inflation of capital which distort the relation of investment and earnings, and that stock jobbing the success of which is based largely upon the ability to manipulate a corporation's accounts.

"Systems of accounts designed to cover the operations of the corporations then under its supervision were adopted in 1908. After two years' trial it is believed that in themselves they meet the purposes for which they were made. That the subject is one of general interest is evidenced by the fact that the systems promulgated by this commission have been sought by public authorities, managers of corporations, accountants, and students in many parts of the United States, and in some instances by public authorities and others in foreign countries.

"A brief outline of some of the general purposes held in view in preparing these schemes of accounts may be stated as follows:

"1. The cost of the property of the corporations must be neither overstated nor understated. When property forming a part of the corporation's fixed capital or investment is acquired, it is to be charged to the capital accounts at its actual money cost, and when any of it is abandoned or otherwise retired from service the original cost must be credited to those accounts. The inflation of property accounts to meet bonus stock issues or discounts on securities, or for any other purpose, is not permitted.

"2. The accounts should reflect the sources and true amount of all income accruing to the corporations, showing the amount in such detail as will enable a comparison of the relative values of the different operations conducted.

"3. The expense of conducting the business should be classified according to the definitions established, and a clear line should be drawn between the operating expenses and capital expenditures.

"4. The revenues of each period should carry their own burden of expenses, and no more. This burden includes not only the cost of conducting the operations and keeping the property in repair, but in addition a proper charge for capital (property) consumed during that period, whether it is wholly or partially consumed. Where capital is partially consumed and its replacement is deferred through choice or necessity until a later period, the revenue should, nevertheless, suffer a reduction equivalent to the value of the capital that is actually consumed during that period.

"Of interest, as bearing directly upon the first proposition that the cost of property must be stated at its actual cost in cash, is the provision for discount suffered on securities sold and expenses connected with their issuance and sale. The rule

adopted requires that these items shall be provided for out of the income or the surplus of the corporation. That a thing costs whatever is promised to be paid at some future date is held by many and particularly by those whose interests lie in that direction. Others, less numerous, perhaps, maintain that it is right not only to measure the cost of corporate property by that standard, but to add to the cost thus stated the par value of certain securities which represent wholly or in part the beneficial interest derived through the hoped for division of expected earnings.

"Such charges as discount, commissions and other expenses incident to securing the investment of borrowed capital are recognized as necessary in the promotion and enlargement of certain enterprises; but when necessary they should, like interest, be provided for out of income, and like interest charges they should also be reasonable in amount.

"The rule established requires, among other things, that the depreciation in plant and equipment due to wear and tear, inadequacy, and obsolescence shall be included in operating expenses. While the greatest practical economy in operation is or should be held constantly in mind as worthy of encouragement, too frequently a reduction in expenses which is accepted in its full measure as representing economies effected means, in a large degree, a mere postponement of necessary expenditures for repairs and replacements. When for any reason it is desired to make a good showing for any period, or when a dividend is at stake, there is an incentive to pass over to the future burdens that the present should bear. Under this rule, however, each year is charged with its own expenses.

"Rates of depreciation must necessarily be based largely upon estimates, and the estimates in turn should be grounded upon past experience and the business policy of the corporation. Whether it is better to drive a machine to its fullest capacity and discard it when it reaches a certain stage of deterioration, or to prolong its life by prompt repairs and good care, is a matter of policy. The character and demand of the service to which a piece of property is devoted affect its life and vary with individual needs, climate, etc., but are factors that must be taken into account in arriving at a rate that is to be approximately correct. Manifestly, the determination of the rates of depreciation can best be done by those who have the shaping of the policy and a knowledge of the experience and purposes of the corporation; and for the present responsibility for making such rates has been left to the corporations themselves. Compliance with the depreciation rule of the commission has, however, so far, not been altogether satisfactory. While almost every one is willing to admit that all things human are perishable, that many of man's productions deteriorate very rapidly, and that inadequacy and obsolescence are constant sources of loss through the rapid advances in our industrial activities, it is surprising to find that many of the managers of those industries contend that there is no depreciation beyond what is covered by repairs, and in fixing upon a rate of depreciation as they are required to do, establish one that is only nominal. That it should be necessary to insist upon the creation of reserves which are for the sole benefit of the corporation and its owners does not appear to be reasonable, but one must take into account that a fixed depreciation rate has a tendency to restrict the power of its managers to make a concern appear more or less prosperous than it is in actual fact. Unless corporations shall more actively interest themselves in this very necessary matter, and more efficaciously carry out the spirit of the accounting rule in this behalf, it may become necessary for the commission further to exercise its power.

"The demand for uniform accounting has come in no small part from investors. Their interest is secondary only to the larger public interest. Those who advance money to a corporation upon its promise to pay, the security holders, have a right to know that the corporation has the ability not only to earn the interest agreed upon, but that it is able to and does maintain in good condition the property upon which the security rests. If dividends are paid without provision for wear and tear, inadequacy, and obsolescence, the property installed by

stockholders' contributions and borrowed money is being returned to them, and when replacements or renewals become necessary the corporation finds itself obliged either to secure new loans or to increase its revenues."

PROBLEMS IN CAPITALIZATION

The report alludes to some of the more important questions which have engaged the attention of the commission during the year as follows:

"1. Capitalization of replacements: The practice of capitalizing replacements has been severely condemned by the commission in several written opinions. The effort to procure such capitalization continues somewhat, however, and it is made a point of jealous care by the commission that no such capitalization shall be authorized by it.

"2. Excessive proportion of bond issues to stock issues: There is a very strong tendency upon the part of corporations to make the proportion of bond issues to stock issues excessive. As is well known to all who have investigated the subject, such tendency is exceedingly dangerous and should be repressed wherever and whenever possible. It is not possible for the commission in all cases to obtain what it conceives to be the proper results in this class of cases.

"3. Capitalization of non-revenue-producing expenditures: There is a strong tendency on the part of many corporations to capitalize every possible expenditure. Experience confirms the theory that such a tendency should be checked and repressed wherever possible. The whole subject deserves careful treatment at the hands of the commission, which it hopes to be able to give in due course.

"4. Schemes to capitalize intangibles: Some corporations have submitted to the commission specious theories of capitalization of intangibles. Many intangibles are properly capitalizable. It is difficult to determine in many cases just where the line should be drawn between the intangibles which are capitalizable and those which are not. Great difficulty has been experienced in several cases in drawing the line of demarcation.

"5. Fixing values on reorganization: Some extraordinarily difficult questions have arisen as to the value of property upon the reorganization of bankrupt corporations. These questions have received very full and careful consideration.

"6. Reimbursement of the treasury: The Legislature of 1910 amended the Public Service Commissions law in such a manner as to admit of reimbursement of the treasury of a corporation for expenditures made for capital purposes paid for from income. These amendments are proper and were recommended by the commission. A greater degree of flexibility in financial operations has thereby been established, and so far no evil results have been noted in the practical working of these amendments. So far as has been observed the one thing which requires constant attention is the disposition in obtaining such reimbursements to endeavor to capitalize matters which under good practice should be paid for out of income."

Of the applications for the issue of securities which have been passed upon by the commission since July 1, 1907, the following relate to electric railroads: 1907, six months, bonds, etc., \$100,000; 1908, stock, \$14,230,200, and bonds \$1,365,000; 1909, stock, \$4,154,000, and bonds, \$4,950,360; 1910, stock, \$2,677,700, and bonds, \$8,737,434.

DIVIDEND-PAYING AND NON-DIVIDEND-PAYING SECURITIES

A table showing the amount of stock on which dividends are paid and the amount on which no returns are made gives the following information regarding electric roads, based on the reports for the fiscal year ended June 30, 1910:

	Electric Railroads.	Combined Elec. Railroads and Electrical or Gas Corp'ns.
Total number of corporations.....	66	7
Number paying no dividend on common stock...	54	5
Amount of common stock paying no dividends..	\$37,915,985	\$3,150,000
Number paying no dividends on pfd. stock.....	9	1
Amount of pfd. stock paying no dividends.....	\$8,125,000	\$2,029,000
Total number paying no dividends.....	52	5
Number paying dividends on common stock....	12	1
Amount of common stock paying dividends....	\$61,374,449	\$500,000
Number paying dividends on pfd. stock.....	5	2
Amount of pfd. stock paying dividends.....	\$8,432,372	\$830,000
Total number paying dividends.....	14	2

RECENT PROGRESS IN CAR PAINTING

BY F. A. ELMQUIST, SHERWIN-WILLIAMS COMPANY

The essential problem of the car maintenance department is to keep the rolling stock in operating condition, but this does not imply that the durability and appearance of the car bodies should be neglected. It is not always appreciated that a car which is kept in proper painting trim has two positive advantages: First, it favorably advertises the company and so attracts business; second, it possesses the maximum durability which means ultimate economy. Perhaps one of the great deterrents to painting cars at more frequent intervals is the loss of service on account of their long stay in the shop. In discussing painting problems in general, it may, therefore, be of interest to begin with the subject of painting schedules.

PAINTING SCHEDULES

At present two systems of painting schedules are in extensive use, one of which is a fourteen-day, nine-coat process and the other a nine-day, six-coat process. The longer schedule is favored for new cars on account of the greater porosity of new wood. It is a standard rubbing system in which block pumice stone and water are used. This schedule is shown in detail in Table I.

TABLE I.—14-DAY, 9-COAT SYSTEM FOR THE EXTERIOR FINISH OF ELECTRIC CARS

First day—Prime.
Second day—Putty.
Third day—First coat car surfacer.
Fourth day—Second coat car surfacer.
Fifth day—Third coat car surfacer.
Sixth day—Rub (block pumice stone and water).
Seventh day—First coat color.
Eighth day—Second coat color.
Ninth day—Letter and decorate.
Tenth day—One coat of durable railway rubbing varnish.
Eleventh day—Let stand.
Twelfth day—First coat durable railway finishing varnish.
Thirteenth day—Let stand.
Fourteenth day—Second coat durable railway finishing varnish.

The large steam railroads have universally discontinued the use of rubbing varnish on the outside of the car, as have also a large number of electric lines. In some cases this is replaced by an extra coat of finishing varnish. This substitution would not change the time of the schedule given in Table I. A good many railroads now, while requiring three coats of varnish on new equipment, give but two coats in the repair shop when the car is first refinished. Experience seems to commend this practice.

The nine-day process shown in detail in Table II is a six-coat system which has been adopted by several important electric railways.

TABLE II.—9-DAY, 6-COAT SYSTEM FOR THE EXTERIOR FINISHING OF ELECTRIC CARS

First day—Prime.
Second day—Putty.
Third day—One coat body leveling (knifed).
Fourth day—Sand and first coat body color.
Fifth day—Second coat body color.
Sixth day—Stripe and number.
Seventh day—First coat durable railway finishing varnish.
Eighth day—Let stand.
Ninth day—Second coat durable railway finishing varnish.

In this process the body leveling can also be used as a brush coat by thinning with turpentine to a brushing consistency, when a brush coat is preferred to the knifing coat.

Where speed is required it is possible in a well-ventilated shop to stripe and letter on the afternoon of the fifth day; to give the first coat of varnish on the morning of the sixth day and the second coat of varnish on the afternoon of the seventh day. This gives the same advantage in time that is obtained by some of the quick systems that have attracted some attention. While this practice may be safe in the majority of cases it nevertheless seems certain that it involves an element of risk which is not warranted except where the need to get the car in service again immediately is imperative.

There is probably but little difference in durability between the long and short systems given in Tables I and II. What difference there would be would theoretically be in favor of the system outlined in Table I. This opinion is probably con-

firmed by the fact that it represents almost the universal practice among the steam railroads and, to a large extent, among the electric railways. The system given in Table I will undoubtedly produce a better finish. On the other hand, the system given in Table II has the advantage of costing less for material and labor.

These two painting schedules also apply to steel cars, but in rubbing steel to a surface the users should avoid water and pumice stone. The best method is to employ a mixture of raw linseed oil and benzine and to do the rubbing with emery cloth. While this may not give so smooth a surface as water and pumice stone, no possible chance of starting corrosion can arise on account of rubbing through to the iron, which is unavoidable, and having water get around the rivets and open joints.

Some railroads are using the Enamelastic system shown in Table III on their steel cars. After the surfacing is done there is applied a first and second coat of Enamelastic finish with two coats of varnish. This gives better results than where a flat color is used, for in rubbing a steel car to a surface the men invariably rub through to the steel, more so than on wooden cars. By using the Enamelastic there is attained a much better adhesion to the metal where rubbed through than is possible with a flat color. The steam railways can use this method to better advantage than electric railways because they have less decoration and use dark colors. On the whole, this system gives better results on steel than the flat color system wherever it is practicable to use it. It is the best available standard for the durable painting of steel cars. This process requires 11 days, as is shown in Table III.

TABLE III.—11-DAY, 7-COAT ENAMELASTIC SYSTEM FOR STEEL CARS

First day—One coat steel primer.
Second day—Putty.
Third day—One coat surfacer.
Fourth day—Coat body leveling (knifed).
Fifth day—Sand (using two-thirds oil, one-third benzine and emery cloth).
Sixth day—First coat No. 1 Enamelastic.
Seventh day—Second coat No. 2 Enamelastic.
Eighth day—Letter and decorate.
Ninth day—First coat durable railway finishing varnish.
Tenth day—Let stand.
Eleventh day—Second coat durable railway finishing varnish.

This is cheaper than the 14-day, 9-coat method both in labor and material. With regard to the table, it may be added that in some cases the second coat of finishing varnish is not used, but the best results are obtained by applying the same, for thereby the cars can be kept in service for four months longer. The body-leveling coat should be knifed on letter boards, posts, belt rail and all panel work, but thinned to a brushing consistency with turpentine and brushed on all other work.

CHOICE OF COLORS

The most durable and economical colors for car painting, especially where re-shopping of cars is concerned, are the dark shades, such as Pullman, permanent Tuscan red, greens, and all solid opaque shades. With these shades, when a car is re-shopped, it is easy to cut in between the stripes where the panels are very much damaged or color-faded. This operation is almost impossible with the lighter shades because they are manufactured of a very heavy pigment and must be used heavy, and then will not cover with one coat. In late years it has been the practice of the railroads not to touch up a car when it is re-shopped, but to cut it in all over between the striping and lettering. Work done in this way makes the car look as if it were newly finished. There is no question, however, that electric cars painted with light colors look better for a longer time because the dulling of the varnish on a light color is not so apparent as on a dark color. The dark colors are best for electric cars, and look the richest only when a high varnish gloss is maintained and where revarnishing is properly kept up.

THE USE OF ENAMELS

There has been a great deal of talk about using enamels on electric cars, but I do not believe that this is practicable for the following reasons: First, the varnish color will not hold

its shade as well as a color which is applied flat. (This applies mostly to light colors.) Second, the use of light enamel colors involves extra cost, as it is necessary to apply one or two coats of flat color first to get the necessary covering qualities. When cars are re-shopped it is impossible to touch up or cut in with a varnish color. It has been the practice of some steam railroads to use enamels, and this is satisfactory in their case because steam cars usually have little decoration and their body colors are dark. Hence, when the cars are brought in for an overhauling they need simply to cut in or give one coat of enamel all over and revarnish. It follows from this that street railways should not use varnish colors unless they dispense with exterior decorations and light body colors.

MAINTENANCE OF WOODEN AND STEEL CARS

Daily washing with water can never hurt a car, even if it is customary to bring it in for a regular cleaning as often as every two weeks. The advantage of daily washing with water is that it immediately removes mud and dust, which may contain ammonia and other elements injurious to paint and varnish. With regard to the general cleaning of cars, there is no objection to using an oil car cleaner if the right men handle it. In most cases, however, the men employed for this work do not understand that the varnish will take up all the cleaner necessary for the good of the varnish and that all surplus cleaner must be thoroughly wiped off. If this is not done, dust and dirt will be caught and held in the cleaner, thereby injuring the varnish and giving the car a mottled, soiled appearance. Where an intelligent class of men are not employed to scrub cars it is preferable to use an oil soap

TABLE IV.—DETAIL WEIGHT OF MATERIALS REQUIRED TO PAINT A VESTIBULE CLOSED CAR WITH 30-FT. BODY.

Carpenter or joiner's lead.....	20 lb.
Painting all framing.....	25 lb.
Car primer.....	7 lb.
Car surfacer.....	15 lb.
Putty.....	5 lb.
Body color (light colors).....	20 lb.
Varnish (exterior).....	22 lb.
Roof paint.....	55 lb.
Truck paint.....	10 lb.
Black for iron work.....	8 lb.
Sundries for stripes and decorations.....	2 lb.
Ceiling paint.....	25 lb.
Varnish (interior).....	15 lb.
Floor and platform color.....	25 lb.
Filler and sundries.....	10 lb.
	264 lb.

which will not destroy paint and varnish. It is an axiom that any material that will eat dirt and grease without the use of elbow grease will eat off paint and varnish also.

With regard to the general re-shopping periods of cars, it is advisable that a new car should not be allowed to run over 12 months before returning to the paint shop. After the first re-shopping, it may be kept out for longer intervals, say 16 months. It is understood, of course, that such a car must be painted and repainted with a first-class system and best material throughout.

Some electric railways appear to be much concerned about possible painting troubles with steel cars. The experience of steam railroads, however, shows that the painting of such cars can be maintained for about the same cost as wooden cars. Neither the steam railroads nor such pioneer users of electric steel cars as the Interborough Rapid Transit Company, New York, have had any special difficulties with the painting of them. Experience with steel cars to date has proved that if they are finished with first-class material under favorable conditions there is no reason why the results should not be as satisfactory as on wooden cars. The painting of steel passenger cars really is a comparatively simple problem when one considers how successful has been the painting of locomotive tenders which operate in a smoke-laden atmosphere.

WEIGHT OF PAINT ON CARS

There is an impression quite current among railway men that paint adds a considerable item to the weight of a car. Thus an editorial entitled "Weight of Car Paint and Varnish" in the *ELECTRIC RAILWAY JOURNAL* of Sept. 17, 1910, stated

that a certain double-truck closed car with prepayment platforms required nearly 600 lb. of finishing surface. It is difficult to understand just why so much paint was required in this case. In my experience, 225 lb. to 300 lb. is ample for a vestibule closed car with 30-ft. body. In general, 250 lb. is all that can be used with the best results on new cars. It would be impossible to paint a new car well with much less, and it would be useless to employ more. Less than 100 lb. of painting materials usually is enough for cars which are re-shopped.

The accompanying Table IV gives an idea of the weight of the different materials required for the painting of 30-ft. closed cars.

In this case, the amount will vary between 225 lb. and 300 lb. The difference in weights is due to the fact that light colors weigh more than dark, and it also depends upon whether or not the ceiling is painted. It will be observed from the above table that even the carpenter's or joiner's lead has been included so that it cannot be said that any legitimate weights have been overlooked.

IMPROVEMENTS OF THE NORTHERN OHIO TRACTION & LIGHT COMPANY

Important improvements are planned by the Northern Ohio Traction & Light Company, Akron, Ohio. They include a large new power house, a car house and shops, and the construction of additional single and double track on private right-of-way.

The company owns a tract of 178 acres at Akron on which there is an amusement resort called the Gorge Park, and the power house will be built at this point. A subsidiary company, the Northern Ohio Power Company, has been organized to conduct the work of construction, and William Ellsworth Davis, consulting engineer, Cleveland, has been engaged as engineer in charge. It is expected that the plans will be completed within a few weeks. The Cuyahoga River flows through the gorge and a 50-ft. dam will be built to form a reservoir for water-power purposes. There will be a head of 105 ft. and provision will be made for 2000 kw of hydroelectric capacity. The power house will also be equipped with a steam turbine of 10,000 kw capacity and boilers of 7500 hp capacity. Preparations will be made for the addition of another 10,000-kw turbine later. The company is now operating three power houses on the northern division, which extends from Akron to Cleveland, and these will be abandoned when the new development is completed. Power for the Canton-Akron line, as well as the northern division, will be generated at the new power house. Substations equipped with 750-kw rotary converters will be built at Bedford, Town Line, Akron and Barberton. The Kent-Ravenna division will be operated by a storage battery plant.

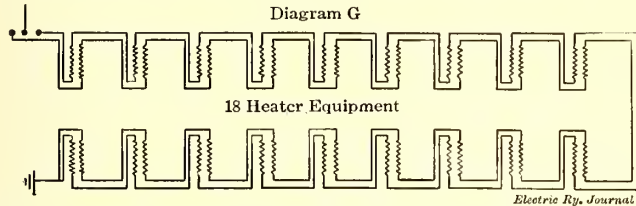
For the proposed new car house and shops the company has purchased a tract of land in the southern part of Akron. Modern shops will be constructed and storage capacity provided for about 100 cars. The plans for this development will follow somewhat those of the new car house and shops at Syracuse (N. Y.) of the Oneida Railway, which were described in the *ELECTRIC RAILWAY JOURNAL* of Nov. 6, 1909.

The company expects to complete the double track on the division between Cleveland and Akron. Of the total distance of 36 miles between these two cities, about 16 miles will be double-tracked and this will complete the work. In this work 80-lb. rails will be substituted for 56-lb. rails, and the entire line will then have 70-lb. and 80-lb. rail. The track between Akron and Canton will be straightened and nine curves will be eliminated. About 8 miles of the 21 miles of road between Akron and Canton are now on private right-of-way and the elimination of the curves will add about 2 miles to the portion built on private right-of-way.

The foregoing information has been received from Charles Currie, second vice-president and general manager, Northern Ohio Traction & Light Company.

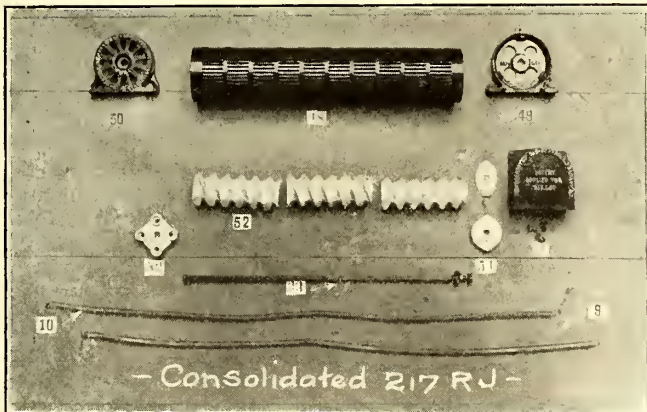
SPECIALIZING ELECTRIC HEATER MAINTENANCE IN BROOKLYN

The mechanical department of the Brooklyn Rapid Transit System inaugurated this winter the specialized maintenance of electric heaters. Formerly the regular maintenance force was employed for this work, but it was found that some of the men did not have enough knowledge of the construction and



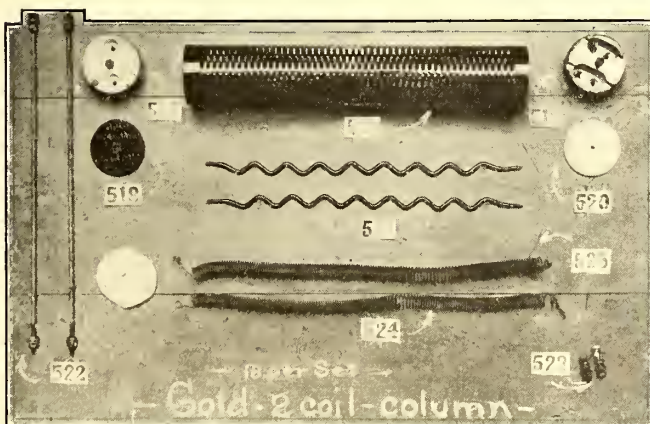
Coils of the Consolidated 217 R J and Gold Two-Coil Column Heaters

the circuit arrangements of the heaters to do the most effective work. This practice has been changed by employing three heater experts, two for the surface division and one for the elevated division. These men go from depot to depot in turn until all of the heaters on the system have been examined and



Supply Parts of Consolidated 217 R J Heater

put into first-class condition. In order to make accurate investigations the men are provided with a low-reading ammeter and a voltmeter. The ammeter is used to check up the current consumption at the different switching points. If the current consumption varies widely from the standard the coils

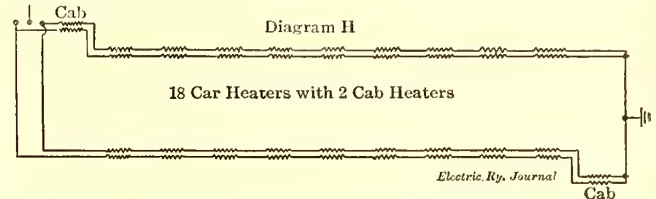


Supply Parts of Gold 2-Coil Column Heater

and their connections are examined. The voltmeter is used to get the drop of potential across the heaters and to ground; also to trace the connections when determining if wrong coils are in the heater or if right coils are misplaced. The heater specialists are furnished with a descriptive schedule of the various types of heaters on the system with accompanying wiring

diagrams so that the heaters can be readily identified and be correctly connected. Two typical descriptions and diagrams are presented in this article.

It will be noted from the instructions that an allowance is made for the increased current consumption of heaters on account of their aging in service. In some instances, however, the original ratings were too high, so that no excess current ratings are now required.



Wiring Scheme of the Consolidated 146 X Heater

CONSOLIDATED 217 R. J. HEATER.
Cross-Seat Heater with Junction Box 23 in. long,
Double Coil, Single Spindle,
18 Heaters per Car.

Diagram G.

Original current consumption, 4-8-12 amp. Allowable amount on account of aging, 4.2 to 5 amp on first point and 8 to 9 amp on second point.

CONSOLIDATED 146 X HEATER.
Panel Heater, Two Spindles, Punched Steel Front.
18 Car Heaters, with 2 Cab Heaters, 118 W. and 146 G.

Diagram H.

Original current consumption, 6-12-18 amp. Allowable amount on account of aging, 6.5 to 7 amp. on first point and 13 to 14 amps on second point.

GOLD TWO-COIL COLUMN HEATER.
Cross-Seat Heater, Two Coils,
18 Heaters per Car.

Diagram G.

Original current consumption, 4-7-11 amp. Allowable amount, 3 to 4 amp on first point and 6 to 7 amp on second point.

To minimize errors in orders from the shops for heater supplies the mechanical department has prepared a series of numbered photographs of the several parts of each type of electric heater in service. Two sample groups are reproduced in the accompanying illustrations. A bound set of these photographs is furnished to each shop and storeroom. The photographs were made direct from disassembled heaters in the shops of the Brooklyn Rapid Transit System.

LOCOMOTIVE SMOKE IN CHICAGO

On Feb. 15 Paul P. Bird, smoke inspector of the City of Chicago, presented before the Western Society of Engineers a paper entitled "Locomotive Smoke in Chicago." The study, made with a view to determining the relative density of smoke in the territory adjacent to various steam railroads, Mr. Bird said "indicates very strongly that electrification offers the only final and satisfactory solution of the locomotive smoke problem. The use of special fuel for preventing smoke from steam locomotives is only a makeshift and will not satisfy the public." Mr. Bird's paper first called attention to the low grade of bituminous coal used by the railroads and manufacturing plants in and about Chicago. It is often stated by railroad officials that the railroads make a very small proportion of the total smoke and that from the standpoint of smoke prevention the electrification of railway terminals is unwarranted. Mr. Bird's paper described the investigations made by the Department of Smoke Inspection of the City of Chicago to determine the proportion of total smoke made by the railroads. The results of this study may be summarized as follows:

(1) Although the locomotives in the city use only 18.5 per cent of the total coal, they make 43 per cent of the total smoke and over one-half of the total dirt.

(2) The locomotives consume within the city limits 5600 tons of soft coal daily.

(3) According to the Ringlemann system of judging the density or blackness of smoke, the average density of locomotive smoke in Chicago is 23 per cent.

(4) The lowest average density of smoke produced by any one road is about 10 per cent. This figure probably represents as low an average as can be maintained with steam locomotives using soft coal.

PRESIDENTIAL TRAIN ON THE ILLINOIS TRACTION LINE

As the guest of Congressman William B. McKinley, president of the Illinois Traction System, President Taft made a trip over the interurban lines of that company from Decatur to the State House at Springfield, Ill., where he was the guest and principal speaker at the Lincoln Centennial Association. The trip was made in the official car of the vice-president executive of the Illinois Traction System, H. E. Chubbuck, to which was attached the private car of Mr. McKinley. No attempt at speed was made, as lunch was served en route and the distance of 40 miles was made in one hour and a half.

Careful preparations had been made by officials of the Illinois Traction System for the safety of the chief executive. All opposing train movements were stopped when the special left Decatur and no train was allowed out of that city until the presidential train had passed Mechanicsburg Junction half way to Springfield. All switches were spiked and a flagman was stationed at every highway crossing. Two flagmen were placed at each railroad crossing and the track was patrolled the entire distance. A pilot car preceded the presidential train by 10 minutes. In the cab with the motorman of Mr. Chubbuck's car was General Superintendent C. F. Handshy, and J. M. Bosenbury, superintendent of equipment and motive power, was on the train with a kit of tools. The dispatching was attended to by J. R. Gilhuala, superintendent. A special was also run out of Springfield the same day and carried Governor Deneen, State officials, members of the legislative committee and newspaper men to Decatur. Returning a party of newspaper men and other guests occupied the pilot car. Lunch was served in all three cars.

A COMPANY PUBLICATION IN SHEBOYGAN

The Sheboygan Railway & Electric Company has commenced the publication of a small company pamphlet entitled "Sparks from the Wire." Its purpose is clearly set forth in the salutatory story on the first page, which, somewhat abbreviated, follows:

"The Sheboygan Railway & Electric Company has for a long time wished for some medium whereby it could communicate with its customers and friends, as well as its near-friends, in some direct manner, without doing so through the ordinary mediums of communication. The publication of a company magazine, or what is generally known as a 'house-organ,' is the best way of accomplishing this purpose, but, unfortunately, it is a very expensive plan. Nevertheless, the company has decided to risk the expense, and if there is not talent enough in the company to make this publication readable and interesting to our customers then it deserves to die a natural death, and the sooner we know it the better. There is no one individual who is the sole editor of the paper. It is contributed to by the entire staff of the company, and it is intended for reading by the company's employees as well as by the public generally.

"We hope to be able to say a great many things which we cannot say either in the advertising columns or news columns of the ordinary newspapers. This is not any fault of our friends the editors of the various newspapers, but is due to causes entirely beyond their control. They have their own interests to serve and they cannot blow anybody's horn overly much, and particularly not that of any corporation. We pay our compliments to these editors and hope to keep on the friendliest footing with all of them.

"Oh, yes, we will not deny it—occasionally we shall have something to say about politics and politicians, and we hope that mostly it will be pleasant reading—for them. The company has no quarrel with the city administration as such; we respect most of these officials very highly. It so happens that at this time we have a mayor who does not like the street railway management, but that does not worry us any more than would the bite of a hungry fly at the end of the fly season. If the mayor chooses to use lawless threats and grand-stand methods,

we do not resent it—for we all, corporations and politicians, get our life from the public and it has been our experience that the public as a whole can be trusted to do right. If we are wrong, we expect to be punished, and deserve to be. If the mayor is wrong, he 'will get his good and plenty' whenever the public wakes up. So we are serene and smiling and without a care about politics and politicians. We wish them all a happy new year.

"To our customers and friends we extend the greetings of the season with our compliments and thanks for their favors. We promise to do all we can to promote their interests and those of the city and county of Sheboygan. We bow and say 'How do you do?' to all and hope the answer will be as one man, 'Pleased to meet you.'"

In addition, the first issue contains articles on "That Interurban Schedule," "Accidents," and "Fixed Charges Explained." The latter article describes the method followed by the company in charging for light and power.

IMPROVING RESISTANCES IN BROOKLYN

The Brooklyn Rapid Transit System is working toward the elimination of old-type grid resistances with the object of standardizing the installations on 272 single truck cars of open and closed types, 507 double truck closed cars, 750 double truck open cars, and 563 double truck semi-convertible cars. This list embraces more than one-half the surface rolling stock in service. The new equipments are of the Westinghouse three-point suspension type. The old resistances had 60 grids, but although the new ones have only 48 their total capacity is greater. The resistance steps have been so arranged that the

RESISTANCE STEPS FOR DOUBLE TRUCK CARS WITH TWO MOTORS, K-11 CONTROLLERS AND THREE-POINT SUSPENSION RESISTANCE.

Point.	Connection.	Ohms.
1	R ₁ to R ₅	4.416
2	R ₂ to R ₅	2.40
3	R ₃ to R ₅	1.12
4	R ₄ to R ₅	.48
5	Full Series	All out
6	R ₂ to R ₅	2.40
7	R ₃ to R ₅	1.12
8	R ₄ to R ₅	.48
9	Full Multiple	All out

WESTINGHOUSE THREE-POINT SUSPENSION RESISTANCE GRIDS USED ON DOUBLE TRUCK CAR WITH TWO MOTORS AND K-11 CONTROLLERS.

From.	No. of Grids.	Pattern No. of Grids.	Resistance Each, Ohms.	Total Resistance, Ohms.	In Circuit on Points.
R ₁ to R ₂	16	N-3210	.126	2.016	1
R ₂ to R ₃	16	N-3353	.08	1.28	1-2-6
R ₃ to R ₄	8	N-3353	.08	.64	1-2-3-6-7
R ₄ to R ₅	8	N-3354	.06	.06	1-2-3-4-6-7-8
				4.416	

current on the first notch will be low enough to avoid jerky starts. In series running the maximum current will be obtained on the third point, and in parallel running on the last point, notching at the rate of one second per point. The accompanying tables show the resistance steps for double truck cars with two motors, K-11 controllers and three-point suspension resistances, the total amount of resistance in circuits at various points and other data.

The new installations are being made on a renewal basis only. The old resistances removed are being used for the maintenance of other cars which are still equipped with the old types.

TROLLEY-ADJUSTING DEVICE

A simple device used by the Chicago City Railway Company for obtaining uniform tension between the trolley wheels and wires consists of two wooden rods with a spring balance hooked between them. On the end of the upper rod is a hook which is inserted in the trolley harp. Another hook on the lower rod fits the end of the car hood, and thus the device serves to hold the trolley wheel at the regular operating height. It is the practice to keep the trolley base spring so adjusted that the wheel bears against the wire at a pressure of 22 lb. When using this simple device the workman can stay on the car and observe the tension while he adjusts the springs.

NEW OFFICERS FOR THE ST. LOUIS CAR COMPANY

A special meeting of the stockholders of the St. Louis Car Company was held Jan. 31, at which all of the stock was represented and a new board of directors was elected, consisting of John I. Beggs, Capt. Robert McCulloch, E. B. Meissner, Richard McCulloch, George J. Kobusch and W. S. McCall. These directors were elected in pursuance of an agreement by which Mr. Beggs and others consented to purchase a certain amount of preferred stock of the company at par and the commercial creditors of the company agreed to take in payment for their claims preferred stock at par. In accordance with this arrangement it is understood that Mr. Beggs individually has purchased from the company for cash 7500 shares of the company's preferred stock at par, amounting to \$750,000, and that others associated with him have purchased preferred stock to the extent of about \$300,000. Mr. Beggs is also understood to be a large holder of the common stock of the company.

About \$600,000 was required to liquidate the indebtedness of the company not provided for by the issue of preferred stock to the creditors, so that the company now has about \$450,000 actual cash in its treasury as a nucleus of a working capital. This places the company on a substantial financial basis. As soon as the floating and commercial indebtedness of the company has been paid off, which will be done as rapidly as possible, the company will have no indebtedness except an outstanding bond issue of \$1,000,000 in 6 per cent bonds and a small land purchase mortgage of \$40,000 on its automobile plant. The amount of outstanding 7 per cent cumulative preferred stock will then be \$1,600,000.

At the meeting of the board of directors held after the stockholders' meeting, Mr. Beggs was elected president and general manager of the company, and he will have general charge of its affairs, financial, administrative and operative. George J. Kobusch was elected chairman of the board of directors and will give his attention principally to the sales department of the company. J. M. Taylor, formerly assistant secretary and treasurer of the company, was elected secretary and treasurer. The office of vice-president was not filled. E. B. Meissner was appointed assistant to the president.

Every effort will be made under the new management to place the plants of the St. Louis Car Company abreast of the best in the country, and it is expected that owing to the acquaintance of those in charge of its affairs with the requirements of electric railway companies the company will be able to supply equipment equal to that of any other company and fully up to all guarantees which are made in its behalf. The company has a large and well-equipped car building plant which in 1907 turned out \$6,000,000 worth of work. In addition it owns the factory formerly belonging to the Laclede Car Company and also has a very finely equipped factory for building automobiles. The machinery in this factory is understood to be worth approximately \$500,000. It is the intention of the company to put this automobile plant in operation as promptly as possible, as the "Standard Six," the name of the automobile manufactured by the company, is a well-known and widely used type of machine. In addition to building this automobile it is the company's intention to develop and build a complete line of commercial automobile trucks.

At the present time the company is working in its car factory upon 100 large pay-as-you-enter city cars, semi-steel construction, 51 ft. over all in length, for the Milwaukee Electric Railway & Light Company. It is also completing 100 cars for the Los Angeles Company and is under contract to build 100 additional cars for the Los Angeles company similar to those now going through the shops. It also has other contracts on its books, but is in position to fill orders promptly.

The Chilean government commission appointed about a year ago to study the question of electrifying the government railway between Valparaiso and Santiago has made a favorable report on the project and the matter is now before Congress for its approval.

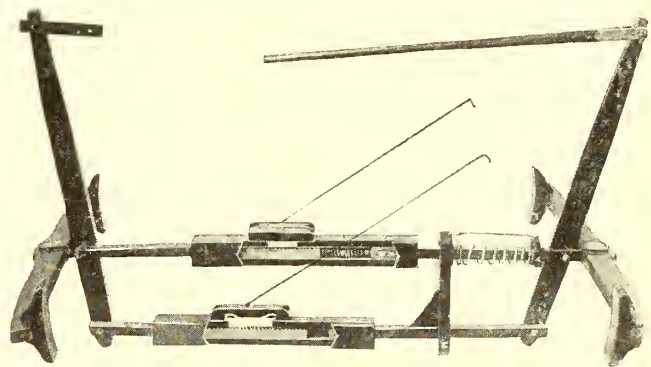
CONSOLIDATION OF ILLINOIS AND CENTRAL ELECTRIC RAILWAY ASSOCIATIONS DISCUSSED

A meeting was held in Chicago on Feb. 11 at which representatives of the Central Electric Railway Association, the Central Electric Traffic Association and the Illinois Electric Railway Association were present to discuss the advisability of consolidating the organizations of the two adjacent territories. At an earlier meeting of the Illinois association H. J. Vance, general superintendent Chicago, Ottawa & Peoria Railway, and B. E. Merwin, general superintendent Aurora, Elgin & Chicago Railroad, were appointed to meet the representatives of the Central Electric associations and report on the advisability of consolidation. At the conference on Feb. 11 the Central Electric Railway Association and the Central Electric Traffic Association were represented by E. B. Peck, president, J. H. Crall, F. D. Norviel, F. I. Hardy and C. C. Collins.

The representatives of the Central Electric associations brought with them data regarding the work of the traffic association, sample tariffs, maps, etc., to show how well conducted have been the affairs of this association and how great assistance the organization has been to its member roads. The Illinois men took notes on the points presented and, it was understood, will present a written report to their association at its meeting in Chicago on Feb. 17.

AUTOMATIC RATCHET-TYPE SLACK ADJUSTER

A. R. Duffy & Company, Manhattan, Kan., have recently brought out a slack adjuster in which a ratchet construction equalizes the brake-shoe wear and regulates the brake piston travel. The construction and application of this adjuster is shown in the accompanying cut. The lower mechanism between the live and dead levers comprises the slack adjuster; the upper mechanism comprises the retainer. Both parts are



Ratchet-Type Brake Slack Adjuster

connected by a yoke which slides freely on the upper rod but is rigidly fastened by a friction clamp to the lower adjuster rods.

The mechanism of each ratchet embraces a pawl; a toothed piston rod which engages with the pawl; a slotted eye to limit the movement of the shoes, and the housings to protect the parts from mud and dust. In addition the toothed rod of the retainer is connected to a coil spring. The retainer rod also carries a chain which limits the back-throw of the live lever and prevents one ratchet from taking up any slack greater than the movement of the other ratchet. This chain is attached to the clamped spring-stop on the retainer piston rod and to a hook on the yoke connecting the upper and lower rods.

The pawl of the adjuster mechanism is controlled by a flat spring which can be released by an upper eye bolt. The rods for releasing, for changing the brake shoes, etc., are run from this eye bolt.

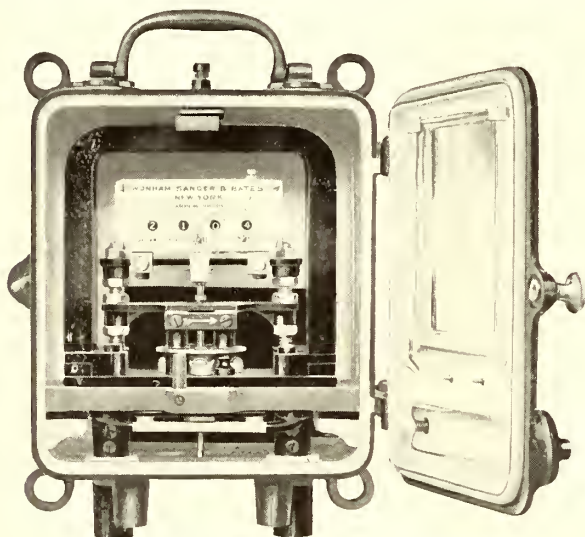
The release of the brakes and the movement of the ratchets occur through the operation of the outer spring on the retainer rod. The tension of this spring is adjusted by moving the yoke or the spring clamp along the rod. The yoke can be

eliminated by attaching the same spring to the junction of the live lever and the main brake rod.

This outfit is installed by cutting out of the lower brake rod a piece equal to the length of the ratchet. If it be assumed in practice that the brake is very slack, the setting up of the brakes will cause the retainer rod to be pushed inward from the brake beams. Then, when the brakes are released, the eye slot permits the brake shoes to fall away from the tread of the wheels for a slight distance. The outer spring on the retainer rod will then pull the brake lever back. It will also pull the retainer in the same direction at the same time, thereby pushing the slack adjuster in the opposite direction and so taking up the slack. When inside brake rigging is used the ratchet works in the opposite direction.

AMPERE-HOUR METER FOR CHECKING CAR OPERATION

The use of some form of meter to check the operating characteristics of motormen has been common practice abroad for some time and it is now being taken up in this country. Some of the instruments are shunt-current clocks which register either the current-on or coasting intervals; others are purely electrical devices like watt-hour and ampere-hour meters. The ampere-hour meter is especially popular among British tramways, some 85 per cent of which are using a type made by Chamberlain & Hookham, Ltd., Birmingham, Eng. The excellent results secured by means of this meter have finally led to its introduction to the American electric railway field by Wonham,



Ampere-Hour Meter for Car Service

Sanger & Bates, New York, who also introduced the "H-B" wheel guard. The following paragraphs will present a description of this meter and of its installation and give typical examples of its ability as a current and brake-shoe saver.

The "C-H" ampere-hour meter is of the mercury motor type, consisting essentially of a permanent magnet between the poles of which revolves a copper disk submerged in mercury. This disk or armature is slotted radially to prevent eddy currents and also to concentrate in a straight path the current to be measured. Mounted on the same spindle as the armature disk is another and larger disk which revolves between other pole pieces of the same magnet and in magnetic parallel with the pole pieces between which the armature revolves. This second disk acts as a Foucault brake to control the speed of the meter. The rotation of the armature is communicated through pinion and gears to a "jump" counter which registers ampere-hours. Simple means are provided to set the dial to zero by authorized persons.

A correction coil which counteracts the braking force is used to compensate for the fluid (mercury) friction which occurs when the meter is working on lighter loads. This coil decreases the braking effort (therefore speeds the meter) as the square of the current passing; and as the fluid friction rises as the

square of the speed, which in turn is proportionate to the current passing, the two opposing factors exactly balance each other.

Permanence of calibration is insured by using a special grade of tungsten steel and by employing a magnet of great length and sectional area in proportion to the air gap in the magnetic circuit. The rotating element is very light and floats in mercury. Inertia, therefore, is almost non-existent in this meter. The mercury forms an ideal cushion to prevent the bottom pivot from being affected by the jarring of the car—consequently no spring suspension is necessary.

The meter is shipped to the user with the mercury chamber empty, the correct amount of mercury being sent with it in a separate bottle and then installed according to simple directions. The two meter terminals can be connected into the main circuit anywhere between the trolley pole and the controller. The meter is attached in a vertical position by means of screws passing through porcelain insulators to the woodwork of the car. Each meter has an inside paper label containing the "testing constant" which is used for standardizing the meter.

The financial value of this ampere-hour meter will be appreciated by noting the results obtained on one large and one small English tramway. Thus, under date of Dec. 15, 1910, Alfred Baker, general manager Birmingham Corporation Tramways, wrote the meter maker that in July, 1910, 300 cars on his system as operated over three routes had shown respective current savings of 15 per cent, 16 per cent and 16½ per cent. Mr. Baker estimated that this was equivalent to an annual reduction of £10,000 in energy cost and 33½ per cent in brake-shoe labor and material outlay. He found that the meter encouraged careful and economical car operation and that it enabled a manager to detect both careless motormen and defective cars. Another letter, written on Dec. 21, 1910, by T. B. Goodyear, manager of the Croydon Corporation Tramways, mentions a current reduction of about 25 per cent in the operation of 50 cars. From April 1 to Dec. 16, 1910, inclusive, this was equivalent to a saving of practically £4,006. The saving in brake shoes was about £25, while the cost of maintaining the meters was nothing.

SINGLE-PHASE RAILWAY DEVELOPMENTS IN AUSTRIA

Work in various stages of completion is now under way in the single-phase electrification of several Austrian narrow gage and standard gage railways. One of the first electric lines is a 50-km (31-mile) standard gage branch line from Waizen to Budapest and Gödöllő. This line is furnished with passenger cars of 300-hp motor capacity and freight locomotives of 480-hp motor capacity each. The trolley potential is 10,000-volt, 15-cycles. The Mittenwaldbahn now under construction will furnish a shorter connection between Munich and Innsbruck, via Partenkirchen and Seefeld. This line is 102 km (63.24 miles) long and one-fifth of the entire distance has a maximum grade of fully 3.5 per cent. It is intended for operation with locomotives of 800-hp motor capacity each, using 10,000 volts, 15 cycles. During the years 1908 to 1910 the St. Pölten-Mariazell-Gusswerk narrow gage branch railway 91 km (56.42 miles) long was converted for 6000-volt, 25-cycle, single-phase operation with locomotives of 500-hp motor capacity each. A project now under way is the electrification of the standard gage branch railway from Vienna to Pressburg. This line will be 68 km (42.2 miles) long, of which 19 km (11.8 miles) will be operated on direct current in the terminal districts.

The *Light, Railway and Tramway Journal*, London, England, has published its annual Diary for 1911. In addition to the blank pages for entering the events of each day in the year the volume includes a directory of officers of all the central stations, steam and electric railways and manufacturers of electrical apparatus in Great Britain, a directory of German tramways and lists of officers of the principal technical societies of the world. Miscellaneous articles on electric railway subjects occupy 32 pages.

THE "ROLLWAY" RIGID AXLE CAR WHEEL

The article on the Beach-Edison storage battery car published on page 1068 of the *ELECTRIC RAILWAY JOURNAL* for Nov. 26, 1910, contained a brief reference to its equipment with non-rotating axles and the new "Rollway" wheel of the Railway Roller Bearing Company, Syracuse, N. Y. The following details of the design and merits of this anti-friction traction device as arranged for gear or chain drive have now been made available by this company.

Of the accompanying illustrations, Fig. 1 shows a "Rollway" wheel with the truck frames placed inside the wheels. This was practically the design made for the double-truck accumulator car previously mentioned. Fig. 2 shows a form where the axle extends through the wheel and the truck frame rests on the axle outside the wheel. The end thrust in this pattern is taken at opposite ends of the journal sleeve, while in the first design the end thrust is taken in both directions at the outer end of the journal. Fig. 3 shows the "Rollway" wheel hub with a seat for the gear at the inner end and provision for a rolled steel wheel or chilled iron wheel to be pressed on the hub against a shoulder.

The wheels in the original design, as illustrated in Fig. 1, were made of a single steel casting which included the hub,

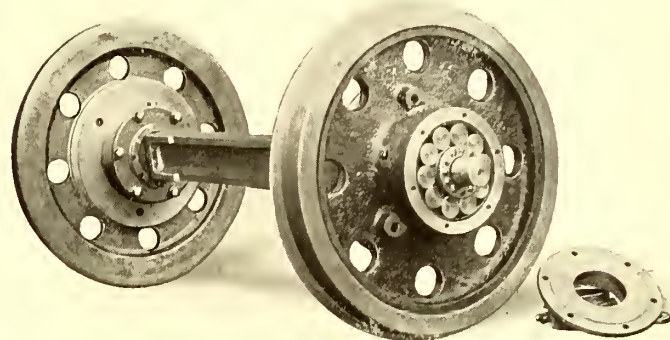


Fig. 4—Roller-Bearing Wheels and Axle

sleeve in this wheel presents a different condition from the "Rollway" journal box, in that the pressure of the rollers in the wheel is always against the bottom of the journal, while in the rotating journal this pressure is distributed around the

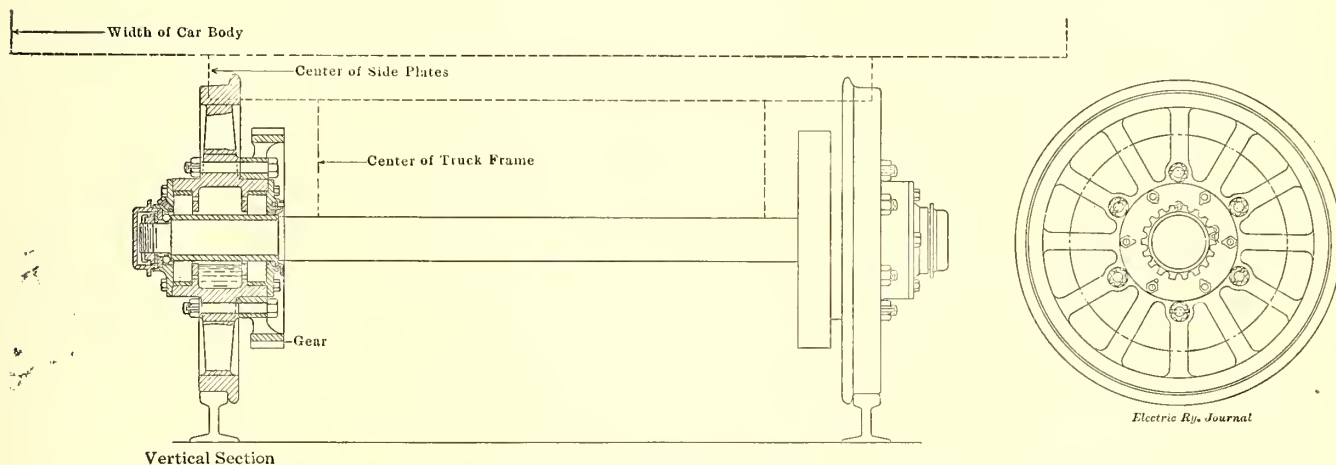


Fig. 1—Section, Side View and End View of Roller-Bearing Car Wheel

and the steel tires were shrunk on. The end covers were made of a special grade of malleable iron and the roller raceways of nickel steel hardened and ground like this company's journal boxes.

The elimination of flange friction on curves is apparent in

entire circumference of the journal sleeve. Thus far there has been no evidence of wear of the journal sleeve, but should this eventually develop the sleeve may be shifted readily on the

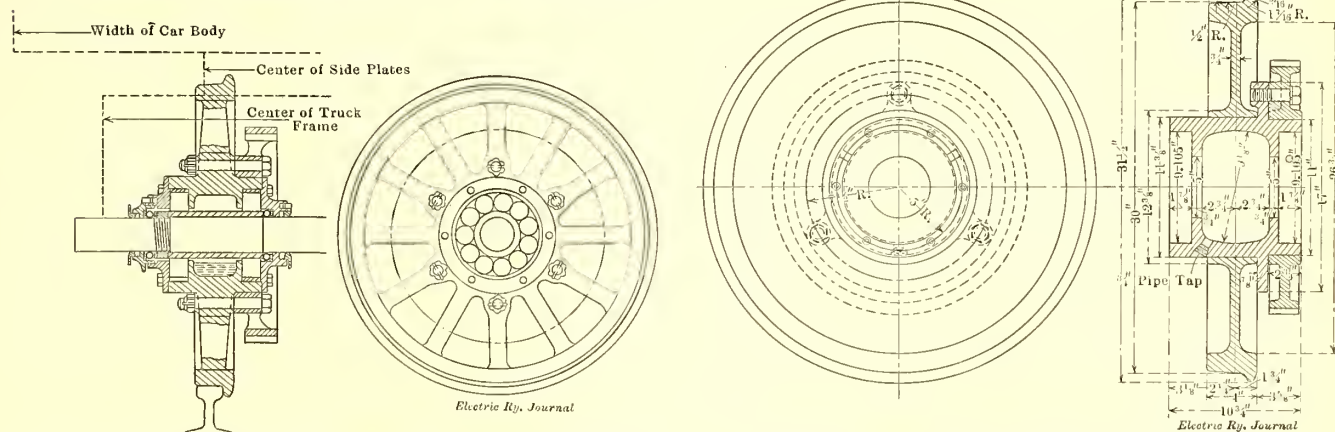


Fig. 2—Roller-Bearing Car Wheel with Extended Axle

Fig. 3—Details of Roller-Bearing Car Wheel

the operation of the car which is equipped with these wheels. This appears not only in the absence of grinding when rounding curves or passing through switches, but also in the exceptionally low power consumption. It will be noted from Figs. 1 and 2 that the two lines of rollers placed within the wheel

axle from time to time in order to bring a new arc under pressure.

The central portion of the wheel affords such a large reservoir capacity for oil that the wheels are expected to operate for a year with one lubrication. During the first six weeks

of the test runs with the storage-battery car one of the driving wheels operated without any lubrication, and yet it developed no high temperatures, nor did it show any abrasion of the roller or raceway surfaces.

From the evidences thus far obtained it appears that these wheels not only will prove durable, but will also show a considerably higher efficiency even than this company's journal. Reducing the various results to a common watt-hour per ton-mile basis, the tests showed a saving of 34 per cent for "Rollway" journal boxes in current consumption as compared with plain journals and 51 per cent saving for "Rollway" wheels as compared with plain journals. The car and track conditions, however, were not identical in all cases, so that these results can be considered only as approximate.

THE LIFE AND COST OF GEARS AND PINIONS

The life of gears and pinions is very difficult to estimate owing to the great variations in tooth pressures and pitch line speeds even on the same size motor with different gear ratios, differences in lubrication methods, condition of bearings and gear case, and to the misleading results obtained with pinions running with new or half worn-out gears. As showing the wide variations in the life of gears and pinions the following data taken from the records of the R. D. Nuttall Company are of interest. The highest grade of oil-treated carbon steel pinions have worn out after running 10,000 miles, while other pinions of the same grade have made as high as 60,000 miles in the same service. One road which has in service 40 40-hp motors with a gear ratio of 15:69 reports that two pinions and no gears changed after running an average of 140,000 miles. The average life of 14-tooth pinions on another road is from 25,000 miles to 30,000 miles.

While the life of gears and pinions in any particular service cannot be accurately forecast, some measure of the wearing qualities of different grades of steel can be had by comparing their relative hardness or elastic limits. This conclusion has been reached by the R. D. Nuttall Company after examining the records of large numbers of gears in actual service. Using the standard cast steel or machinery steel pinion as the basis, the following table shows the comparative first cost and estimated life of five grades of gears and pinions made by this company:

Grade.	First Cost.	Life.
Standard cast or untreated machinery steel.....	100	100
Special cast-steel gear or N. S. pinion.....	108	133
X. N. cast-steel gear.....	127	160
S. S. pinion.....	148	200
Case-hardened gear or pinion.....	200	300

It will be seen that the cost and life do not increase in the same ratio. The highest-priced pinion is the most economical in any service where the standard pinion will last less than four or five years. Where the service is less severe and the maintenance and lubrication are better the lower-priced gears and pinions will show a marked saving.

WIRE-TYPE TUNGSTEN LAMPS

The constant increase in the demand for tungsten lamps on account of their economy and extreme high efficiency has been accompanied by a demand for a lamp of greater ruggedness. Under the old processes of manufacture where it was impossible to obtain filaments in long lengths it was necessary to make the lamps up out of a large number of short lengths bent in the form of an elongated U, each end of this U-shaped filament being connected to the leading-in and anchor wires by fusing the metal of the leading-in and anchor wires around the tungsten filament. The support of the tungsten filament in this way by a large number of rigid fused joints caused a great many early failures because the filaments broke just above the rigid joint.

To overcome the disadvantages of this method of construction the Westinghouse Lamp Company, Bloomfield, N. J.,

decided that it would be necessary to obtain tungsten filaments in long lengths and to design an internal construction which would permit of the free movement of the tungsten filament so as to take up the shock and jar. These problems were finally solved and at the St. Louis convention of the National Electric Light Association, held in May, 1910, the Westinghouse Lamp Company showed samples of tungsten filaments up to 84 ft. in length. The company also showed lamps made from this filament in which the filament was wound, like wire from a spool, on the anchors of the spider, the ends of the filament were wrapped around the leading-in wires and the leading-in wires were fused to the ends of the filament. This construction leaves the filament free to vibrate in the anchors. At the same time the two joints with the leading-in wires are flexible because of the coil spring effect of the filament where it is wrapped around the leading-in wire.

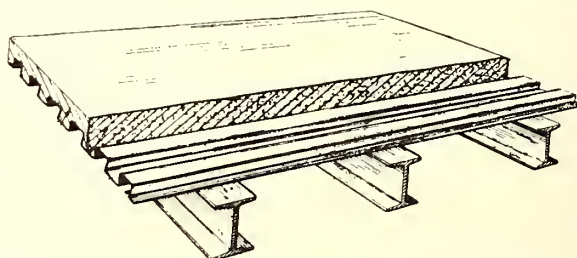
Numerous jar tests have shown these wire-type lamps to be radically stronger than the old fused-type lamp and that the life of the lamp is much longer than was the life of fused-type lamps. In some tests recently made at 1 watt per candle, average lives of as high as 400 and 500 hours have been obtained, and in tests at high efficiency voltage the average life has far exceeded the hours guaranteed.

The life of these lamps in train-lighting service on steam railroads and in industrial plants where they have been subject to shock and jar has proved very satisfactory and the Westinghouse Lamp Company is now prepared to recommend them for electric railway cars.

A SANITARY CAR FLOOR

A plastic material that will form an absolutely jointless, smooth and durable floor surface is the ideal flooring for passenger car construction. In all cars carrying a large number of people the floor should be one that can be kept clean with the least amount of work, that is not cold to the touch, that is fireproof and that has a surface good for resisting wear.

The American Monolith Company, Milwaukee, Wis., is manufacturing a flooring, under the name of "Monolith," which, when applied on a plain or corrugated sheet metal foundation, can be used in the construction of the entire car floor. It can be curved up against the side walls, forming a cove corner baseboard, or it can be formed in a tight joint around the lower construction of the seats. It can also be



Special Floor Composition Installed on Base of Corrugated Sheet Metal

formed into slabs as covers over the openings in the floor of the car, such as may be necessary to get at the machinery or motors.

This flooring has been widely used for passenger coaches, sleepers, dining cars, as well as mail and express cars, by many steam railroads. It is asserted that cars with this kind of flooring are almost free from vibration and that the deadening quality of the material takes up the noise of the trucks and the roadbed. As the material is plastic, it holds the entire floor construction rigid and firm. This flooring weighs only 55 lb. per square foot when applied on metal sheets to a thickness of $\frac{3}{4}$ in. at the weakest point. Its cost and installation are stated to be little higher than ordinary wooden construction.

News of Electric Railways

F. H. Goff on Changes in the Cleveland Ordinance

F. H. Goff, president of the Cleveland Trust Company, who was mediator for the Cleveland Electric Railway during the Goff-Johnson negotiations, expressed himself in part as follows in the *Cleveland Plain Dealer* on Feb. 10, 1911, in regard to the changes in the Tayler ordinance suggested by the officers of the company to aid them in financing present and future needs:

"There is no question in my mind but that the Cleveland Railway should be permitted to amortize any discount it may be compelled to make in selling its bonds. The injustice of requiring stockholders to bear the loss might be illustrated by supposing that the company was required to market \$30,000,000 of bonds at 50. The discount would entirely wipe out the value of the stock.

"A dead level 6 per cent return to stockholders, regardless of whether service is good or bad or whether economy is practised, will not secure the results desired. It has always seemed to me that some provision should be made penalizing the stockholders by decreasing dividends if the property is inefficiently or indifferently managed and rewarding them by permitting an increase in the dividend rate if it is efficiently and economically managed.

"The crucial test is going to be whether the company can finance its requirements not only by sale of bonds but by sale of stock on satisfactory terms and whether as efficient management can be secured as would obtain under private ownership. If both results cannot be accomplished the plan will prove a failure.

"If the Cleveland Railway is permitted to sell either bonds or stock on a 6 per cent basis the annual charge on \$15,000,000, which is perhaps the least amount required for immediate improvements and refinancing, would be \$150,000 more than if the rate were 5 per cent.; \$300,000 more than if the rate were 4 per cent. This excess during the life of the franchise would amount to \$7,500,000, a loss which would have to be borne by the car riders either in the way of increased fare or poor service.

"The actual interest charge, as I understand it, at the price offered for bonds now proposed to be sold is in the neighborhood of 5¼ per cent, a reasonable offer, as it seems to me, under existing conditions, but if it is within the power of the city to enable the company to obtain funds in the future at a lower rate, it would seem the part of wisdom and prudence to consider whether such assistance ought not to be given. Of course, the city cannot lend its credit, but it can create such value in the grant as will afford unquestioned security to investors. I certainly would not favor amending the ordinance to increase the maximum rate of fare unless every precaution and safeguard are taken to make it impossible for the company ever to enjoy the higher rate for its own advantage.

"In the valuation of the Cleveland Railway's property, as determined by Judge Tayler, there was an allowance made of something like \$3,800,000 for franchise value, which is represented by stock issued. The fact that the city has the right to purchase the property at the expiration of the grant without making compensation for this item has created a feeling of distrust in the stock as a safe investment, which is reflected in the market price.

"To enable the company to obtain funds by the sale of stock on satisfactory terms, I believe the form of this option will have to be changed, making the price to be paid the amount of capital value plus 10 per cent, which would put the option at the expiration of the grant on the same basis as that given during the life of the grant. So long as under any contingency the city can compel the sale of the property at a price which would yield less than 75 per cent of the par value of the stock, it will be difficult to interest investors at par or better, and any successful financing through sale of stock should contemplate, it seems to me, a sale from 110 to 115."

On Feb. 11 City Solicitor Baker rendered an opinion to the street railway committee of the City Council to the effect that amendments cannot be made to the Tayler grant

without passing an entirely new grant. He further said that a new grant cannot be passed unless it contains provisions that would inure to the advantage of the city in terms positive enough to warrant the action taken. Mr. Baker said that the grant contains no provision for amortizing discounts on bonds and that the city cannot enter into an agreement with the company to guarantee amortization.

A report of street railway operation in Cleveland for the 10 months ended Dec. 31, 1910, was filed with the City Council on Feb. 6, 1911, by G. M. Dahl, street railway commissioner. His figures follow:

1901.	Surplus.	Deficit.
March	\$18,880.94	.....
April	25,257.93	.....
May	26,355.29	.....
June .....	.....	\$8,221.26
July .....	.....	7,769.76
August .....	.....	7,036.73
September .....	.....	8,466.70
October	11,111.30	.....
November	9,306.89	.....
December	20,257.96	.....
Deficit	\$111,170.31	\$31,494.45
Net surplus.....	\$79,675.86	.....
Surplus in operating fund for six months.....	22,294.06	.....
Total surplus.....	\$101,969.92	.....
Interest charges improperly deducted.....	9,740.00	.....
Grand total surplus.....	\$111,709.92	.....

Right of Minneapolis to Order Railway Extensions

W. J. Hield, vice-president and general manager of the Twin City Rapid Transit Company, Minneapolis, Minn., has issued a statement in regard to the opinion filed with the city clerk by Judge Daniel Fish, city attorney of Minneapolis, who held that the city had power to order and enforce construction of new lines and extensions and to regulate service by the Minneapolis Street Railway. The opinion was referred to in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, page 236. Besides dealing with the opinion of Judge Fish Mr. Hield outlined some of the important work which the company has in contemplation in Minneapolis and St. Paul. Mr. Hield's statement follows:

"The opinion of the city attorney was submitted to the Council at its regular meeting on Jan. 27, 1911. At an adjourned meeting of the Council on the following day six resolutions were introduced calling for the construction of new lines or extensions. Some of these were repetitions of orders already passed by the Council, while others called for lines not previously mentioned. All these resolutions were referred in the regular way to a committee made up of one alderman from each ward, where they now rest pending further discussion of the subject with the city attorney. Whether other and similar resolutions will be introduced before further action is taken on those above mentioned is a question concerning which I have no knowledge.

"As the opinion of Judge Fish was not made public until after our annual meeting, it was not a subject for discussion, and I am therefore not in position to make any statement as to the attitude of our company until the resolutions now before the committee of the Council have been acted upon and the whole matter brought before our board of directors.

"The company's plans which have thus far been approved, covering improvements for the current year, include the completion of work begun last year on the installation of a 14,000-kw turbine unit and auxiliary apparatus. Additional boiler capacity will also be installed. The construction of improved smoke consuming furnaces and stoking devices, which was interrupted last year on account of shortage of water power, will be completed during the summer. When this work is finished the entire boiler plant will be provided with the most thoroughly modern boiler furnace construction and stoking equipment.

"These improvements will not only make impossible a recurrence of the troubles which existed during the greater part of last year as a result of the unprecedented water shortage (a situation which was further aggravated by a se-

ries of accidents to power generating apparatus), but should also render the steam plant practically smokeless in operation. In order to improve power conditions in general throughout the system, the construction of two additional substations will be undertaken, as well as the installation of a large amount of underground and overhead copper incident to the building of the substations and in order to provide for increased load and the maintenance of a suitable reserve capacity in transmission lines.

"The improvements in track and roadway to be undertaken this year include the reconstruction of considerable existing track and paving, in addition to a large amount of new work which must be done in order to keep pace with the paving which the city will order during the year. For a number of years past annual expenditures of more than \$1,000,000 have gone into improvements such as those outlined."

B. S. Josselyn on Public Service Commissions

The Portland *Carman* for January, 1911, which is issued monthly for the Brotherhood of Electric Employees of the Portland Railway, Light & Power Company, Portland, Ore., contains an expression of opinion by B. S. Josselyn, president of the company, in which Mr. Josselyn says that the editorial "Merit as a Requirement for Commission Service," published in the *ELECTRIC RAILWAY JOURNAL* of Dec. 3, 1910, page 1090, expresses his ideas so fully that "I can add very little thereto, except to reiterate that public utility concerns have problems to meet that cannot readily be understood by a layman and it would greatly facilitate the work of both commission and public utilities if these matters were handled by reliable experts, rather than by those who have no practical experience in the matters they strive to regulate."

Mr. Josselyn says in part:

"I am not opposed to the institution of a commission that will have for its purpose a better understanding between public utility concerns and the public. In fact, such a commission is desirable in order that complaints may be lodged in the hands of people who are qualified to investigate and apply proper remedies for improvement, or who are able to explain to the public why some conditions complained of cannot be overcome—a course in which the general public would have more confidence than is usually expressed in public utility concerns.

"The main cause for friction between public service commissions and corporations which they strive to regulate is the fact that in many instances so-called experts selected by commissions to assist them in their work are men who have not proved themselves capable.

"Properly managed public utility concerns have nothing whatever to conceal from the general public. Their business cannot be successful unless the public is properly and satisfactorily served; but just what constitutes these requisites is a subject for debate; and the public should select men to represent it in these considerations who are qualified to handle intelligently the questions arising. Then both the public and the public utility concerns would be served to the utmost.

"I have no criticism to make as to the selection of our present Railroad Commission, which I believe has performed excellent service for the public."

Mr. Josselyn incorporated in his article the editorial "Merit as a Requirement for Commission Service" substantially as it appeared in the *ELECTRIC RAILWAY JOURNAL*.

Development of Interurban Railways Near San Francisco

Indications point to an extensive development of electric railways in the central part of California near and tributary to San Francisco. The Oakland & Antioch Railway will soon begin to operate its road from Bay Point to Walnut Creek, while work is being carried on to complete the road into Oakland. The Northern Electric Railway is operating from Sacramento north, the Central California Traction Company has established service between Sacramento and Stockton, several lines are projected at and near Stockton, Fresno and Merced, the United Properties Company has announced as a part of its plan the extension of the Oakland lines to San José and Sacramento, and

the Ocean Shore Railroad, now that it has been sold to the bondholders and been taken out of the receivers' hands, will be completed between San Francisco and Santa Cruz.

Great interest is being taken in a project to build a tunnel under San Francisco Bay so as to connect the transportation systems of Alameda County with San Francisco. It is known that a thorough investigation of the engineering problems involved in the construction of such a tunnel was made for the Southern Pacific Company before that company authorized the construction of the Dumbarton bridge. It was determined at that time that the present traffic did not warrant the expenditure, and the depth of the bay between Goat Island and the San Francisco shore presented a difficulty in the matter of grades. A more recent plan is to construct the tube from a point on the Oakland shore to the vicinity of Islais Creek on the San Francisco side, thus obviating the grades that were involved in the shorter route. It has also been pointed out that the properties of the Ocean Shore Railroad Company, would furnish an admirable terminal on the San Francisco side of the bay, thus landing Alameda County passengers in the center of San Francisco, at the corner of Twelfth Street and Market Street.

A San Francisco engineer, L. R. Jorgensen, has estimated the cost of a tunnel from the Key Route pier of the San Francisco, Oakland & San José Railway, on the Oakland side of the bay, to San Francisco, coming to the surface at Kearney and Market Streets and traversing Goat Island in its course. For such a single tube, 23 ft. in outside diameter, and having a total length under water of 16,500 ft. and 7000 ft. under Goat Island and Market Street, he estimates that \$10,576,000 would be required, and twice that amount for a double tube. Adding \$1,000,000 for terminal property, the entire cost would be \$23,392,000, which at 6 per cent and 1 per cent for depreciation would result in a fixed charge of \$470 per day. This charge, he finds, would be greater than the traffic of any single railroad could bear, but he thinks that if all the roads were to unite in bearing the capital expense the project might be feasible at the present time.

New conditions have arisen, and in particular the prophesied effect of the Panama-Pacific Exposition in increasing the population on both sides of the bay, and it is not unlikely that eventually the Ocean Shore Railroad and a new line down the peninsula will be a part of the system which is now in process of formation.

Meeting of New York Association.—It has been decided to hold the next quarterly meeting of the Street Railway Association of the State of New York at the Hotel Onondaga, Syracuse, N. Y., on Tuesday and Wednesday, March 21 and 22, 1911.

Meeting of New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on the evening of Feb. 23, 1911. Dinner will be served at 6:45 p. m. At 8 o'clock the regular business meeting will be held, after which Henry Gulick, president of the Gulick-Henderson Company, inspecting engineers, Pittsburgh, Pa., will address the club on "Inspection of Electric Railway Material and Equipment."

Honorary Degrees by University of Nebraska.—On the evening of Jan. 18, 1911, the University of Nebraska awarded the degree of doctor of engineering to Dean M. C. Cooley of the University of Michigan and J. A. L. Waddell, Kansas City, in recognition of the services which they have rendered to the engineering profession. The degree of doctor of engineering has also been conferred by the same university on Bion J. Arnold, Chicago, Ill., as noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 28, 1911, page 168.

Charter Revision in Detroit.—It is believed that the Common Council of Detroit, Mich., will soon take action toward placing before the voters at the April election the question of revising the charter in order that the home rule, municipal ownership and other amendments may be made to it. Mayor Thompson and Corporation Counsel Hally favor asking the Legislature to amend the law governing this matter, so that the city may have the advantage of the municipal ownership feature sooner than would be possible if the charter is submitted for revision.

Development of Montauk Point.—Ralph Peters, president of the Long Island Railroad, has announced that the company has signed a contract for the purchase of 160 acres of water front on Fort Pond Bay, on the north side of Montauk Point, at the end of Long Island. The company for some time has held 60 acres of the water front land at that point and Mr. Peters states that the additional holdings are to be acquired to provide terminal and docking facilities in case it becomes necessary for the ocean liners to dock at Montauk instead of New York.

C. V. Weston on Public Service Commissions.—A short paper entitled "The Public and the Public Service Corporation" was presented at the meeting of the Western Society of Engineers held in Chicago, Ill., on Feb. 1, 1911. C. V. Weston, president and general manager of the South Side Elevated Railroad, Chicago, Ill., favored "supervision" by commission, but not "administration" by commission. He referred to the powers of the commissions in New York State as excessive. He thought the Massachusetts method better. Proper regulation should secure the integrity of the investment. He thinks that the time is rapidly approaching for a change in the method of administering the public service business in Chicago.

Public Service Property in the Mexican Danger Zone.—Stone & Webster, Boston, Mass., control the El Paso Electric Railway and the El Paso Electric Company, which operate in El Paso, Tex., and Juarez, Mex., territory within the zone in which the insurgents under Orozco and the federal cavalry of Mexico are skirmishing. The Boston *Herald* said recently: "Messages received from H. S. Potter, of Stone & Potter, said that little anxiety was felt because of the presence of the rebels. The rebel leader had sent word, both to the American consul at Juarez and the Mayor of El Paso, that American property would not be damaged in the least. The messages said that, in spite of the expected assault upon the city, the street car traffic both ways between El Paso and Juarez was normal. This was taken to indicate little popular unrest. The car houses and power house are all on the American side of the river, and the property on Mexican soil is only trackage and trolley poles."

Labor Compensation Bill.—The Executive Council of the National Civic Federation, to which was referred at the annual meeting of the Federation in New York in January, 1911, the questions of a proposed compensation bill for workmen injured by industrial accidents, which had been prepared, and amendments proposed by President Seth Low to the labor law of New York State, met in New York on Feb. 4, 1911, and took up these questions. One of the measures proposed was an amendment to the present laws to be suggested to the different States by which whenever a strike or lockout has occurred or is threatened involving public service corporations, either side of the dispute or any 10 citizens may ask the Governor of the State to appoint a board of mediation, and, if need be, of arbitration, if acceptable to both sides, to try to prevent the interruption of traffic by the adjustment of all questions in dispute. Another proposal is to give to the boards of mediation of each State authority to confer with similar boards in other States in order that groups of States having a common interest, such as the States bordering on the Great Lakes, may be able to co-operate in adjusting an interstate dispute. Mr. Low was authorized by the Executive Council to prepare a bill for uniform State legislation on these lines and a draft of the bill is now ready. The bill aims to concentrate public attention upon the non-interruption of service due to the public in connection with the public service utility, and it was stated also that it proposes to trust public opinion with the adjustment of all controversies of this kind. Details of this plan were drawn up at the meeting on Feb. 4. The amendments to several sections of the labor law proposed by Mr. Low at the annual meeting and referred to the council were discussed. If the bill becomes law workmen would be assured of compensation for industrial accidents which were not caused by negligence on their part without the expense and uncertainty of lawsuits.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Alabama.—Representative Long introduced at the session of the House on Feb. 7 a bill to enlarge the powers of the Railroad Commission so as to give that body jurisdiction

over all public utilities. The measure would provide two additional members of the commission, or for a commission of five members, to be appointed by the Governor at a salary to be fixed. The bill has been referred to the committee on commerce and common carriers.

California.—The bill introduced by Senator Burnett to amend Section 499 of the California Civil Code has been passed by the Senate. The bill relates to the use of the same street or tracks by two street railways so as to afford San Francisco freedom from the present five-block restriction in laying out its municipal railroad. The purpose of a bill which Senator Haus has introduced is to enable the Alameda County Board of Supervisors to construct a tunnel or subway under the estuary dividing Alameda and Oakland. Its provisions are broad enough, however, to permit tunneling between two counties. This would make possible the tunneling of San Francisco Bay between Oakland and San Francisco via Goat Island, or otherwise. This scheme has been proposed from time to time, but abandoned because of restrictions contained in the present laws. The consent of such municipalities as are affected is necessary. Two or more counties may share the cost. Several measures have been introduced toward conservation of the State's resources. Two of these provide for the creation of boards of control to govern appropriations of water for electric and power purposes. The Railroad Commission bill has been passed by the Assembly. The important feature of the Bohnet-Stetson bill compared with the Wright act, under which the Railroad Commission is now operating, is that \$100,000 is appropriated to carry out an investigation into the physical valuation of railroads operating within this State, to obtain figures upon which to base freight and passenger rates.

Connecticut.—The second hearing on bills introduced into the Legislature to create a public utility commission was held before the judiciary committee on Feb. 8. E. C. Terry, New Haven, appeared in behalf of employees of the railroads in opposition to the public utility measure. F. F. Lendewig Plainfield, criticised the commerce court suggested by Mr. Mellen, president of the New York, New Haven & Hartford Railroad. B. H. Douglas, New Haven, who represented the United Commercial Travelers' Association, urged particularly a provision to compel the railroads so to adjust their schedules that better time would be made in making connections between trains. Speakers were also in attendance representing the business men of Bridgeport, South Norwalk, Norwich and other cities. At the close of the hearing it was announced that on Feb. 21 Mr. Mellen would be heard in behalf of the court of commerce bill which he advocates, and that those who object to a utilities bill will also be heard at that time.

Iowa.—Senator Sammis has introduced a bill to establish a public service commission for the regulation and control of public utilities, assuming the powers and duties of the executive council as prescribed by the General Assembly so far as they relate to public service corporations; also the powers and duties of the Railroad Commission. The commission would consist of five members, to receive \$5,000 a year each. The new law would go into effect on July 1, 1911. It seems likely that the Sammis-Crist public utility bill in amended form will pass. The measure was referred to the committee on judiciary of the House, which in turn through its chairman recommended that the bill should be referred to the committee on railroads. This was done. The chairman of the committee on railroads conferred with the chairman of the committee on municipal corporations and arrangements have been made for a joint meeting of these committees. Following the joint hearing there will be separate hearings.

Massachusetts.—Among the bills relating to transportation matters which have been introduced are the following: A bill to provide for the extension of the Washington Street tunnel to the vicinity of Dudley Street; a bill to extend the term of office of the Boston Transit Commission three years; a bill to construct a subway from the South Station to South Boston and Dorchester; a bill to provide that all extensions of steam and street railway lines hereafter shall be double tracked; a bill to require street railways to provide suitable waiting rooms for passengers; a bill to require street railways to

provide special service for working men and women between the hours of 5 a. m. and 8 a. m. and 5 p. m. and 7 p. m., with the permissive requirement of special rates for such service; a bill on behalf of street railways in connection with the issue of preferred stock, to the effect that such stock may be issued upon a two-thirds vote of all the outstanding stock at a special meeting called for the purpose in substitution for outstanding common stock under conditions approved by the Railroad Commission; a bill to place the ventilation of street railway, subway and elevated cars in the hands of the district police; a bill to reduce the hours of labor of street and elevated railway employees; a bill to repeal the act which provides for the construction of an east and west tunnel and subway in Boston; a bill to provide for the construction of a subway from the Charlesgate District of Boston under Boylston Street to the South Station, with an extension of the Boston terminus of the Cambridge subway from Park Street to Park Square, with the object of providing for underground transit in the business section of the Back Bay and to establish a new center of distribution for incoming traffic; and another bill to provide for the construction of a subway from the Charlesgate District under Boylston Street and Boston Common to Park Street.

Despite the unfavorable report of the Massachusetts Railroad and Boston Transit Commissions regarding the construction of a loop subway in the West End of Boston, the Codman interests have introduced a bill to this end in the present session. A bill has been filed in the House which authorizes the Boston & Northern Street Railway to acquire the franchise and property of the Old Colony Street Railway. Another bill provides that a street railway shall not employ a motorman unless he has been examined within a year to determine whether it is safe for him to perform the duties of the position. The Massachusetts Street Railway Association has petitioned the Legislature to amend the existing law respecting crossings at grade of steam and street railways, to the effect that the Railroad Commission may, in its judgment, permit crossing of a street railway with a railroad built for industrial purposes only. A bill has been filed in the House to require street railways to accept as legal fare transfers issued by them at any hour of the day on which they are issued. A bill introduced into the House provides that pole and wire locations may be granted by municipal authorities, no approval of the Railroad Commission being specified in the proposed act. A bill is now before the House which provides that all street railway cars using headlights of high candle-power shall be equipped with a device to turn the light automatically on curves so as to confine the rays to the center of the track. Another House bill provides that conductors and motormen shall have one day off in 15. A bill attacking the fare-adjudging authority of the Railroad Commission provides that the fare charged by the Old Colony Street Railway in Weymouth shall not exceed that charged by the company for a like distance in Braintree and that transfers shall be given to a like extent. An attempt is being made to secure the passage of a law by which municipal authorities would be permitted to grant limited franchises to street railways for the carriage of baggage and express matter.

The joint special committee of the Legislature gave a hearing on Feb. 9 on the five public utility measures which have been introduced and on the recommendations in regard to public utility legislation which were contained in the message of Governor Foss. The principal measure to receive attention was House bill 1378. This measure is based on the lines of the law creating the Public Service Commissions of New York. Travis H. Whitney, secretary of the Public Service Commission of the First District of New York, was the principal speaker. He was interrogated at length with regard to the workings of the commissions in New York. Mayor Fitzgerald thought that the bill drafted in accordance with the ideas of Governor Foss as expressed in his message was too comprehensive. He expressed the opinion that the metropolitan district of Boston should constitute a separate district from the rest of the State and that a commission should be created for Boston. The joint report to the Senate by the Railroad Commission and the Boston Transit Commission was referred to in the *ELECTRIC RAILWAY JOURNAL* of Feb. 11, 1911, page 279.

New Jersey.—Senator Osborne's bill to provide for the creation of a new Board of Public Utility Commissioners has been referred to the judiciary committee. Should the measure become a law it would legislate out of office the present utility board, composed of Republicans. It would also mean that the new board might be made up of Democrats and it is not regarded as possible that the Republican majority in the Senate will lend their aid to the enactment of a measure which might deprive the party of such patronage. Under the present utility law it will be impossible for the control of the board to pass out of the hands of the Republicans until May 1, 1913. Even then the Republicans will have one member on the board, assuming, of course, that Governor Wilson appoints Democrats in the places of the Republicans whose terms will expire during his three years as chief executive of the State. The term of Frank H. Sommer, president of the board, will expire on May 1, 1911, while that of Robert H. Williams will expire on May 1, 1913. The term of Thomas Hillery will not expire until 1915. The Osborne bill carries with it rate making power, and while a measure with such provisions will probably be passed at the present session it seems certain that the Osborne measure is doomed to be defeated. Feb. 12 marked the sixth week of the Legislature. Owing to the holiday on Lincoln Day the usual session on Monday night was omitted. Hearings were set for Feb. 14 on public utility legislation and on the pending employers' liability legislation.

New York.—Senator Grady introduced a bill on Feb. 11 which provides that in New York City no contract for building or operating a rapid transit railroad built wholly or in part by public funds shall be awarded to any person or corporation at present operating such a railroad without the unanimous consent of the Board of Estimate. In other cities the same unanimous consent must be obtained from the board or "analogous local authority." The employers' liability commission, of which Senator Wainwright is chairman, held a hearing on Feb. 10 on the causes and prevention of industrial accidents. Very few persons attended the hearing, and Chairman Wainwright was quoted as saying it was amazing, in view of the importance of this matter and the nature of the legislation that might be enacted, that those most directly concerned showed such a lack of interest. A bill has been introduced to amend the Public Service Commission Law so as to eliminate street railways from the prohibitive clause which relates to the issuance of free passes. A radical measure has been introduced in regard to the laws governing the relations between capital and labor. One of the provisions of this measure would make it an offense not to state in a help wanted advertisement that there was trouble between employer and employees, if such condition actually existed. Under this measure it would be a crime to hire or aid in hiring persons to guard with deadly weapons other persons' property, and persons coming from other cities so armed for that purpose without the consent of the Governor would be deemed guilty of felony.

Pennsylvania.—Only one bill of interest to electric railways has thus far passed either branch. That is the measure to authorize the Valley Forge Park Commissioners to enter into agreements with railways and railroads and to regulate travel through the Park, which was passed finally in the Senate and sent to the House. Mr. Feeny has introduced a bill in the House to impose a penalty of \$500 fine and one year in jail upon the officers of any electric railway operating two-car trains without having air brake or other equipment so that the brakes of the rear car may be operated by the motorman of the leading car. Representative Hoover introduced a bill requiring railroads to maintain safety devices, gates and gongs at all grade crossings. Representative Mills has introduced a bill to grant the right of eminent domain to electric light, heat and power companies, also a companion bill to allow such companies to build a line midway to any stream forming a boundary between Pennsylvania and an adjoining State. This bill is similar to the eminent domain bill introduced in the session of 1907 in the interest of the McCall's Ferry Power Company. If it becomes a law it will give the McCall's Ferry Company the right to string wires and cables through every municipality within a radius of 200 miles of the company's plant, recently completed.

Financial and Corporate

New York Stock and Money Market

Feb. 14, 1911.

The Wall Street market is still marking time. After several weeks of advance there has come a pause—not a reaction. It is not likely there will be any pronounced change until after the trust and rates cases are decided and it is hardly to be hoped that before that time the outside public will become interested.

There is still an excellent demand for good bonds and the money market is very easy. Rates to-day were: Call, $2\frac{1}{4}$ @ $2\frac{1}{2}$ per cent; 90 days, $3\frac{1}{4}$ @ $3\frac{1}{2}$ per cent.

Other Markets

There was a trifle more activity last week in traction shares in the Philadelphia market, although transactions were at no time heavy. Prices were in no wise improved by the increased activity and for both Rapid Transit and Union Traction were a trifle lower at the close to-day than they were one week ago.

In the Chicago market there has been very little doing during the week in traction shares. Beyond a few scattered sales of Series 2 and 3 of the Chicago Railways Company transactions have been ignored. Prices have not improved.

In Boston Massachusetts Electric and Boston Elevated have both continued to appear in small lots almost daily, but there has been no definite tendency to the trading. Prices are a trifle easier.

Some fair-sized blocks of United Railways stock have been sold in the Baltimore market during the past week, the price for the most part being in the neighborhood of $17\frac{1}{2}$. The bonds have also maintained their usual activity.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 7	Feb. 14
American Light & Traction Company (common).....	a288	a290
American Light & Traction Company (preferred).....	a105	a106
American Railways Company.....	a45	44 $\frac{3}{4}$
Aurora, Elgin & Chicago Railroad (common).....	a8 $\frac{1}{2}$	44 $\frac{1}{2}$
Aurora, Elgin & Chicago Railroad (preferred).....	a8 $\frac{1}{2}$	85
Boston Elevated Railway.....	a128	a129
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	a71 $\frac{1}{2}$	a71 $\frac{1}{2}$
Boston & Worcester Electric Companies (common).....	a9	a9
Boston & Worcester Electric Companies (preferred).....	a9	40 $\frac{1}{2}$
Brooklyn Rapid Transit.....	78 $\frac{3}{4}$	78 $\frac{3}{4}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84 $\frac{1}{2}$	84
Capital Traction Company, Washington.....	129 $\frac{7}{8}$	129 $\frac{1}{4}$
Chicago City Railway.....	a200	*200
Chicago & Oak Park Elevated Railroad (common).....	*3 $\frac{1}{4}$	*3 $\frac{1}{4}$
Chicago & Oak Park Elevated Railroad (preferred).....	*7 $\frac{1}{4}$	*7 $\frac{1}{4}$
Chicago Railways, ptctpg., ctf. 1.....	a93	93
Chicago Railways, ptctpg., ctf. 2.....	a25 $\frac{1}{4}$	25 $\frac{1}{4}$
Chicago Railways, ptctpg., ctf. 3.....	a9 $\frac{1}{2}$	9 $\frac{1}{2}$
Chicago Railways, ptctpg., ctf. 4.....	a6 $\frac{1}{4}$	6 $\frac{1}{4}$
Cleveland Railway.....	*91 $\frac{1}{2}$	*91 $\frac{1}{2}$
Consolidated Traction of New Jersey.....	a75 $\frac{1}{2}$	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Detroit United Railway.....	72	72
General Electric Company.....	a154	a155 $\frac{1}{4}$
Georgia Railway & Electric Company (common).....	a123	a126
Georgia Railway & Electric Company (preferred).....	a88	a88
Interborough-Metropolitan Company (common).....	19 $\frac{1}{4}$	20 $\frac{1}{4}$
Interborough-Metropolitan Company (preferred).....	a53 $\frac{3}{4}$	a54 $\frac{1}{4}$
Interborough-Metropolitan Company (4 $\frac{1}{2}$ s).....	78 $\frac{7}{8}$	79
Kansas City Railway & Light Company (common).....	22	22
Kansas City Railway & Light Company (preferred).....	71	71
Manhattan Railway.....	*137 $\frac{3}{4}$	*137 $\frac{3}{4}$
Massachusetts Electric Company (common).....	a18 $\frac{1}{2}$	a18
Massachusetts Electric Companies (preferred).....	a88	a88
Metropolitan West Side, Chicago (common).....	a20 $\frac{3}{4}$	a20 $\frac{3}{4}$
Metropolitan West Side, Chicago (preferred).....	67	67
Metropolitan Street Railway, New York.....	*19 $\frac{1}{2}$	*19 $\frac{1}{2}$
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	71 $\frac{1}{2}$	72
Northwestern Elevated Railroad (common).....	a22 $\frac{1}{2}$	a22
Northwestern Elevated Railroad (preferred).....	a63	a62
Philadelphia Company, Pittsburgh (common).....	53	52 $\frac{3}{4}$
Philadelphia Company, Pittsburgh (preferred).....	44 $\frac{1}{4}$	42 $\frac{3}{4}$
Philadelphia Rapid Transit Company.....	*20 $\frac{1}{2}$	a19 $\frac{3}{4}$
Philadelphia Traction Company.....	*86 $\frac{1}{2}$	a85
Public Service Corporation, 5 per cent col. notes.....	a96 $\frac{1}{2}$	a96 $\frac{1}{2}$
Public Service Corporation, cfs.....	*103 $\frac{1}{2}$	105 $\frac{1}{2}$
Seattle Electric Company (common).....	a110 $\frac{1}{2}$	a111 $\frac{1}{2}$
Seattle Electric Company (preferred).....	a101 $\frac{1}{2}$	a100 $\frac{1}{2}$
South Side Elevated Railroad (Chicago).....	a71	a72
Third Avenue Railroad, New York.....	11	*11
Toledo Railways & Light Company.....	8	8
Twin City Rapid Transit, Minneapolis (common).....	a110 $\frac{3}{4}$	110 $\frac{3}{4}$
Union Traction Company, Philadelphia.....	a47 $\frac{3}{4}$	a47 $\frac{1}{2}$
United Rys. & Electric Company, Baltimore.....	a18	18
United Rys. Inv. Co. (common).....	47 $\frac{1}{4}$	46
United Rys. Inv. Co. (preferred).....	74	74
United Rys. & Electric Company (common).....	a36	a36
Washington Ry. & Electric Company (preferred).....	a89	a88 $\frac{3}{4}$
West End Street Railway, Boston (common).....	a92 $\frac{1}{2}$	a92
West End Street Railway, Boston (preferred).....	*105	102 $\frac{1}{2}$
Westinghouse Elec. & Mfg. Co.....	69	a71
Westinghouse Elec. & Mfg. Company (1st pref.).....	*119	a120

a Asked. * Last sale.

Annual Report of the United Railways of St. Louis

The annual report of the United Railways Company of St. Louis for the year ended Dec. 31, 1910, shows the following results:

Revenue from transportation:	
Passenger revenue.....	\$11,373,465
Special cars.....	13,724
Mail.....	47,452
Express.....	12,466
Miscellaneous transportation.....	671
Total.....	\$11,447,778
Revenue from operation other than transportation:	
Car privileges (advertising).....	\$54,000
Rent of tracks and terminals.....	2,980
Rent of buildings and other property.....	3,840
Sale of power.....	25,739
Miscellaneous.....	3,437
Total.....	89,996
Total operating revenue.....	\$11,537,774
Operating expenses and depreciation:	
Operating expenses.....	\$6,096,794
Depreciation.....	1,153,777
Total.....	7,250,571
Surplus over operating expenses and depreciation.....	\$4,287,203
Taxes.....	655,531
Net income from operation.....	\$3,631,671
Income from other sources:	
Income from securities owned.....	\$36,554
Interest on deposits.....	3,671
Miscellaneous.....	2,842
Total.....	43,067
Gross income (less operating expenses, depreciation and taxes).....	\$3,674,738
Deductions from income:	
*Interest on funded debt (in hands of public)....	\$2,726,266
Interest on notes payable.....	67,017
Total.....	2,793,283
Net income.....	\$880,995
*Dividend on preferred stock in hands of public (April and July).....	409,580
Surplus.....	\$471,415

*Does not include any amount for interest or dividends on bonds and stock of the company's own issue held in the treasury, whereas figures shown in last annual report did include such items as both a debit and a credit.

President Robert McCulloch says in his report in part: "The passenger revenue for 1910 was \$11,373,465, an increase over 1909 of \$467,320. Other revenue from transportation increased \$4,011. Revenue other than transportation decreased \$2,457, and income from other sources increased \$535. The gross earnings and other income for 1910 were \$11,580,841, an increase of \$469,410 over 1909.

"Operating expenses, depreciation and taxes increased during the year \$877,924. After payment of the dividend on preferred stock in hands of the public for the six months ended June 30, 1910, the surplus earnings for the year 1910 were \$471,415.

"The total number of revenue passengers carried during the year were 230,691,532; transfer passengers, 104,904,281, making the total number of revenue and transfer passengers 335,595,813, an increase of 14,840,732 over 1909.

"By contract with the Mississippi Valley Trust Company and Francis Brothers & Company, the 5 per cent bonds of the St. Louis Railroad maturing on May 1, 1910, amounting to \$1,948,000, were extended to May 1, 1920, with interest at the rate of $4\frac{1}{2}$ per cent, thereby reducing the fixed charges \$9,740 per annum.

"During 1910 the amount paid out for personal injuries, property damages and other expenses connected with the claim department increased \$23,309 as compared with the year 1909. The sum of \$271,565 was transferred from this reserve account to the credit of profit and loss, leaving a balance to the credit of the injuries and damages reserve on Dec. 31, 1910, of \$700,000.

"During the year the fire insurance reserve was increased in the sum of \$35,384, making the amount to the credit of this account on Dec. 31, 1910, \$261,935.

"The charge to operating expenses for depreciation during the year was 10 per cent of the gross earnings, experience having shown this proportion of the gross earnings is required to provide for the present annual depreciation of the property.

"During the year we expended and charged to depreciation reserve the sum of \$970,041, leaving to the credit of depreciation reserve on Dec. 31, 1910, the sum of \$338,064.

"On Sept. 13, 1910, the board of directors, impelled by

their duty in caring for the interest of the stockholders of the company, suspended the payment of dividends. Improvements, betterments and additions to the physical property of the company had necessitated borrowing from banks and trust companies in St. Louis the sum of \$1,300,000, and as further improvements, betterments, etc., were necessary and demanded it was deemed wise, prudent and for the best interest of the stockholders to pay off this indebtedness and accumulate a fund for future improvements, betterments and additions, before any further dividends were paid. The notes payable on Dec. 31, 1910, not including \$55,000 real estate note due March 4, 1915, were \$1,050,000, showing a reduction of \$250,000 since Sept. 13, 1910.

"During the year there was expended and charged to capital account, for new construction, betterments and improvements, the sum of \$325,792, as follows: Real estate, buildings, tools and fixtures, \$98,593; track and roadway construction, \$150,281; electric line construction, \$28,342; power plant buildings and equipment, \$50,027; miscellaneous equipment, \$293; total, \$327,536; less cars and electric equipment of cars sold, \$1,744; total, \$325,792.

"During the year a new survey was made of all the track of this company. The mileage on Dec. 31, 1910, was as follows: City track, 347 miles; county track, 108.81 miles; total track on streets and private right-of-way, 455.81 miles. During the year 4.13 miles of track were added and 1.66 miles of dead track removed. During the year there were rebuilt 28.99 miles and resurfaced 12.22 miles of track. During the year 23.63 miles of T-rail track on the county lines were retied and rebalasted, putting this track in thoroughly good condition. To the paved track there were added during the year 15.71 miles. The character of the roadbed of the 347 miles of city track, of which 19.21 miles are laid in private right-of-way, is as follows: Granite block pavement, 164.74 miles; brick pavement, 92.33 miles; creosoted wooden block, 6.46 miles; asphalt, 7.49 miles; macadam pavement, 57.18 miles; macadam ballast, no paving, 16.24 miles; plank on bridges, 0.07 mile; creosoted wooden blocks on bridges, 2.03 miles; trestles, 0.46 mile; total city track, 347 miles.

"Since 1904 the amount of reconstruction, renewal and extensions of track by the company in the city and county was as follows: During 1904, 21.56 miles; during 1905, 8.90 miles; during 1906, 29.18 miles; during 1907, 21.65 miles; during 1908, 32.99 miles; during 1909, 39.93 miles; during 1910, 45.34 miles; total for seven years, 199.55 miles. These figures include work done on the track of the St. Louis & Suburban Railway since Jan. 1, 1907. With the new work done during the past few years the physical condition of the track was constantly improved, but in order to keep it in good operating condition it will be necessary to rebuild between 20 miles and 25 miles of the old track each year.

"During the year, besides the necessary maintenance of bridges and buildings, there was completed the following work among various improvements:

"The erection of a brick terminal station at the Wellston loop, which is the junction of two downtown lines, one crosstown and three suburban lines. This station contains a waiting room for passengers, toilets, a store and a division office.

"The building of a car storage yard at Kossuth and Obea Avenues on property belonging to the company. This yard contains 5140 ft. of straight track and storage space for 109 cars. The old building on this property was repaired to serve as a division office. It is expected that considerable saving will be effected in the use of this car storage yard on account of the dead mileage eliminated.

"The erection of a sand drying plant on the terminal railroad tracks. During the spring of 1910 the old sand drying plant was destroyed by fire. At certain seasons of the year there is used as much as two carloads of dry sand per day, and as the old plant was poorly located and required an excessive amount of labor in its operation it was decided to build a new sand drying plant on property owned by the company adjacent to the terminal railroad tracks which should be fireproof and automatic in operation. It is expected that the saving in freight charges and labor will entirely pay for this plant in a few years.

"The power stations were thoroughly maintained and are all in first-class operating condition. During the year 1910

the power plants of the United Railways Company of St. Louis were operated at a maximum capacity of 44,600 hp, and 21,400 hp were supplied by the Union Electric Light & Power Company, making a total capacity of 66,000 hp required for the operation of the road. The kw-hours furnished during the year were as follows: Kw-hours from United Railways plants, 98,970,715; kw-hours from Union Electric plants, 62,178,573; total, 161,149,288. There were burned in the plants of the United Railways Company of St. Louis 313,412 tons of coal.

"In addition to the regular maintenance work there were built in the shops of the United Railways Company of St. Louis 25 steel fireproof cars of the most modern design. Fifty-six cars were overhauled, repainted and changed to the pay-as-you-enter plan. Six automobile tower wagons were built in the shops of the United Railways Company of St. Louis and are now in service. All of the emergency calls are now answered by automobiles."

Earnings of Public Service Railway

The Public Service Corporation of New Jersey, Newark, N. J., has reported the earnings of the Public Service Railway to the New York Stock Exchange for the year ended Dec. 31, 1910, as follows:

Gross earnings	\$12,822,621
Operating expenses	7,687,191
Net earnings	\$5,135,430
Fixed charges	4,305,757
Combined surplus of Public Service Railway and subsidiary companies for twelve months ended Dec. 31, 1910.....	\$829,673
Less surplus of subsidiary companies not declared in dividends and not taken up in accounts of Public Service Railway....	23,002
Total	\$806,671
Less dividend paid during year (2 per cent Dec. 31, 1910)...	754,326
Total	\$52,345
Amount to credit of profit and loss Dec. 31, 1909.....	3,890
Balance to credit of profit and loss Dec. 31, 1910.....	\$56,235

The statement of the company to the Stock Exchange contains the following information in regard to the terms on which the property of the New Jersey & Hudson River Railway & Ferry Company was taken over:

"On Oct. 1, 1910, the Public Service Corporation purchased 24,447½ shares (par value of shares \$100 each) of a total of 25,000 shares of common stock outstanding of the New Jersey & Hudson River Railway & Ferry Company. There is also outstanding \$742,800 par value preferred stock of an authorized issue of \$750,000. The New Jersey & Hudson River Railway & Ferry Company stock was purchased under an agreement dated July 1, which provided for the payment for each share of \$108 in Public Service Corporation of New Jersey 5 per cent general mortgage bonds and \$12 in cash, with interest at 5 per cent from July 1 to Oct. 1. All the shares purchased, except nine standing in the names of directors, have been deposited with the trustee subject to the Public Service Corporation general mortgage."

Report of The J. G. Brill Company

On Feb. 8, 1911, James Rawle, president of The J. G. Brill Company, Philadelphia, Pa., presented his annual report to the stockholders of that company. An abstract of the report follows:

"The output from the five plants owned and operated by The J. G. Brill Company for the 12 months ended Dec. 31, 1910, amounted to \$5,960,778.61. For comparison the amounts of the combined sales of the five companies for the four years last past are here given: 1907, \$9,211,825.72; 1908, \$3,845,173.91; 1909, \$4,261,204.90; 1910, \$5,960,778.61.

"After charging to repairs to buildings, machinery and tools the sum of \$161,083.20, the profit on the output for 1910 amounted to \$440,955.78, from which has been set aside for depreciation \$114,623.78, leaving a net profit for the year of \$326,332. At a directors' meeting held Jan. 27, 1911, the regular quarterly dividend on the preferred stock at the rate of 7 per cent per annum, amounting to \$80,150, was declared, and was paid Feb. 1, 1911.

"During the year the well-established policy of keeping up your properties in good physical condition was fully maintained. I have indicated to you above the large sum expended for this purpose and charged to operating ex-

penses. In this connection you will note the conservative amount set aside during the year into reserve for depreciation.

"While the output increased over the years 1908 and 1909 the depreciation of these years, especially 1909, was reflected in the output of the first part of 1910. Though business was then beginning to return to a somewhat normal condition, much of the work turned out early in the year represented contracts taken under strong competition in the latter part of 1909. The output for the latter part of the year showed an improvement, and the work now on hand has been taken on a satisfactory basis.

"I need only call your attention in passing to the excellent financial condition of your company, as indicated by the statements submitted to you herewith. On Dec. 31, 1910, your combined companies had orders in process of completion amounting to \$2,046,218, with a much improved outlook for profitable work. I submit the following condensed balance sheet as of Dec. 31, 1910, and also a condensed statement of the sales and expenditures for the year 1910."

THE J. G. BRILL COMPANY AND SUBSIDIARY COMPANIES.

COMBINED BALANCE SHEET, DEC. 31, 1910.

ASSETS.

Cost of properties.....	\$8,353,684
Materials, raw and in process.....	1,492,485
Bills and accounts receivable.....	2,009,096
Investments	305,828
Cash	343,027

\$12,504,120

LIABILITIES.

Preferred stock.....	\$4,580,000
Common stock.....	5,000,000
Bonds (John Stephenson Company).....	400,000
Bills and accounts payable.....	1,496,180
Surplus of Wason Mfg. Company set aside as working capital of that company.....	429,123
Net surplus.....	598,817

\$12,504,120

THE J. G. BRILL COMPANY AND SUBSIDIARY COMPANIES.

SALES AND EXPENDITURES FOR YEAR 1910.

Total sales and other income.....	\$5,960,778
Less operating, general and administration expenses.....	5,519,822
Profit for year.....	\$440,956
Less amount set aside and added to reserve for depreciation....	114,624

Net profit undistributed, added to surplus.....	\$326,332
Surplus account, from previous year.....	\$1,080,000
Less adjustments.....	57,797

\$1,022,207

Profit as above.....	326,332
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\$1,348,539

Less dividends paid during year.....	320,600
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\$1,027,939

Total combined surplus.....	\$1,027,939
Less part of this combined surplus represented by surplus of Wason Manufacturing Company, and now set aside for permanent surplus of that company as an addition to its working capital	429,122

Net surplus..... \$598,817

Third Avenue Railroad Reorganization

James N. Wallace, chairman of the bondholders' committee of the Third Avenue Railroad, New York, N. Y., has made public a letter written recently by the committee to Robert A. Chesebrough in answer to certain statements made by him in a circular which he proposes to send to the holders of the first consolidated 4 per cent bonds of the Third Avenue Railroad. Mr. Chesebrough and the Chesebrough Building Corporation some time ago brought suit against the bondholders' committee to enjoin it from carrying out the reorganization plan.

Mr. Wallace asserts that the reorganization has not been unduly delayed by the committee. He reviews the various proceedings before the Public Service Commission and the ultimate rejection of the reorganization plan by the commission, followed by application to the Supreme Court in certiorari proceedings. Unless delayed by the Public Service Commission, counsel for the committee expects to argue the matter before the Appellate Division within the next 60 days, and to have the matter passed upon by the Court of Appeals by April or May, 1911, Mr. Wallace says. His letter adds:

"You state in your proposed circular that under the plan of reorganization the former stockholders of the Third Avenue Railroad Company were allotted \$6,400,000 of bonds which you say are given to them. As a matter of fact, the stockholders are assessed \$7,200,000 in cash, and against

this assessment they are entitled to \$6,400,000 of new bonds taken at their face value, and to stock for only 45 per cent of the par value of their present holdings, which stock was originally issued at par for cash. To characterize this issue of \$6,400,000 of bonds as a gift or bonus to the former stockholders, as you do in your proposed circular, is both inaccurate and misleading."

Mr. Wallace asserts that the reorganization plan has been approved by more than 98 per cent in amount of the holders of the consolidated mortgage bonds.

There is also made public a letter to Mr. Wallace by F. W. Whitridge, receiver of the Third Avenue Railroad, stating that gross receipts of the company for the six months ended Jan. 1, 1911, exceeded those of the corresponding period in 1909 by \$165,000, and that the net earnings for the same period, after the payment of all taxes and interest of the underlying bonds, as well as on \$3,000,000 receivers' certificates, were \$995,764. Mr. Whitridge added: "Included in the operating expenses for this six months was an increase in the wages, my own salary, and about \$125,000 of track and car work which I had expected to pay from the funds raised upon the reorganization. January shows an increase in gross over last year of \$45,464. All this makes it reasonably certain that the net earnings of the property for the current year ending July 1, 1911, will exceed \$2,000,000, the whole of which would be applicable to the payment of interest and dividends on new securities, less only a proper provision for depreciation."

Court Urges Adjustment of Chicago & Milwaukee Electric Railroad Affairs

Peter S. Grosscup, judge of the United States Court at Chicago, is quoted as having stated emphatically that unless the affairs of the Chicago & Milwaukee Electric Railroad are adjusted or the road is reorganized by March 15, 1911, he will not delay foreclosure proceedings against the company and that he will appoint another receiver to take charge of the company's affairs and bring about an immediate settlement. The present receivers have agreed to remain with the court as representative advisers. These receivers are: W. I. Osborne, vice-president of the Central Trust Company, Chicago; D. B. Hanna, Toronto, Can., vice-president of the Canadian Northern Railroad, representing Canadian interests; George M. Seward, representing the interests of A. C. Frost, who organized the road.

One of the principal reasons which urge the speedy termination of the receivership and more stable operating conditions is the need for an entrance into Chicago for the trains of this road. The present double-track line extends from Evanston, 12 miles north of Chicago, to the center of the business district of Milwaukee, 84 miles north of Chicago. The south half of the road serves a very thickly populated suburban territory. At present this suburban business to and from Chicago is handled very largely by steam railroad. The trains of the Chicago & Milwaukee Electric Railroad now connect at North Evanston with trains of the Northwestern Elevated Railroad Company, which require more than an hour to reach the business district of Chicago. The court in urging early settlement of the affairs of the company is stated to recommend the termination of the receivership because of the desire to hasten the negotiations for an entrance to Chicago over which the company can run its trains to the business center of the city. Two such entrances are said to be open: one by way of the present roadway and structure carrying the elevated trains now connecting at North Evanston with the trains of the Chicago & Milwaukee Electric Railroad and the other by way of an extension to connect with the Logan Square branch of the Metropolitan West Side Elevated Railroad, which has offered a plan for this route.

In adjusting the affairs of the Chicago & Milwaukee Electric Railroad it is expected that \$1,250,000 will be required to take up receivers' certificates, about \$1,750,000 more to rebuild temporary bridges, pay for the present floating debts and meet the present obligations to municipalities, and about \$1,080,000 for miscellaneous improvement and to retire outstanding car trust certificates and judgment liens. Judge Grosscup pointed out that the main financial problem is to raise about \$4,000,000 on the first mortgage of the road from Evanston to Milwaukee.

Chicago (Ill.) Consolidated Traction Company.—The bondholders' protective committee, consisting of William F. Harrity, chairman; John B. Parsons and Benjamin Wolf, Philadelphia; Henry G. Foreman and Edmund A. Cummings, Chicago, Ill.; Clarence J. Housman, New York, N. Y., and J. Nedson Vance, Wheeling, W. Va., in the matter of Chicago Consolidated Traction Company 4½ per cent bonds, has notified the depositing bondholders under the agreement of July 1, 1908, that the securities and cash to which they will be entitled will be distributed by the depositaries, viz., the Mercantile Trust Company, New York, and the Commercial Trust & Savings Bank, Chicago, Ill., upon presentation of their certificates of deposit. The Harrity committee, representing minority bondholders, obtained a judgment against the Chicago Railways. After negotiations with representatives of that company, the claim of the bondholders' protective committee was settled by the acceptance of \$675,000, payable in bonds of the Chicago Railways, being \$425,000 in first mortgage rehabilitation bonds; and \$250,000 in "B" 4 per cent bonds, which will bear 5 per cent interest from and after Feb. 1, 1912. For each \$1,000 Chicago Consolidated Traction Company bond deposited each depositor will receive \$299.26 in first mortgage bonds and \$187.56 in "B" bonds. Sufficient of the bonds received have been sold, the first mortgage bonds at 98¾ and the "B" bonds at 82¾, to provide funds for the payment in cash of fractional parts of bonds. The depositing bondholders have been notified to present their certificates of deposit and receive the securities and cash to which they are entitled under the terms of the agreement.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—The coupons due on Aug. 1, 1910, on the first refunding mortgage 5 per cent bonds of the Columbus, Delaware & Marion Railway were paid on Feb. 1, 1911, with interest on the amount due, by the Mercantile Trust Company, New York, N. Y., with funds received from the receiver of the company. The interest due on Jan. 1, 1911, on the bonds of the Marion Railway, Light & Power Company was paid at maturity at the office of the Standard Trust Company, New York, N. Y.

Detroit (Mich.) United Railway.—The Detroit United Railway, Detroit, Mich., has declared a quarterly dividend of 1¼ per cent, payable on March 1, 1911. This is the first dividend which the company has paid since 1907, when 3¾ per cent was paid.

Fort Dodge, Des Moines & Southern Railroad, Boone, Ia.—Judge McPherson, in the Federal Court, has entered an order overruling the application to compel the Fort Dodge, Des Moines & Southern Railroad to operate the portion of the line between Newton and Des Moines Junction, 30 miles, which is part of the Newton & Northwestern Railway. The receiver has, however, directed the company to send cars with a locomotive twice a week for four weeks over the road to handle any freight that has accumulated. The statement is made that the gross receipts of this part of the line are much less than the operating expenses and that the \$250,000 which would be necessary to electrify this division cannot be raised.

Hudson & Manhattan Railroad, New York, N. Y.—Holders of the 6 per cent notes of the Hudson Companies, due Oct. 15, 1911, have received from Harvey Fisk & Sons, New York, N. Y., a circular embodying an offer of the company to extend the notes for two years, to Oct. 15, 1913. A cash payment of \$15 will be made on each \$1,000 note if the holder accepts the offer of extension. The extended notes will also be convertible into bonds of the Hudson & Manhattan Railroad, which are pledged as security for the notes of the Hudson Company.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railway, the sale of which under foreclosure was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, page 182, was taken over by the new owners in the name of the Ocean Shore Railroad, which is organized temporarily as follows: S. W. Reynolds, agent for owners; A. H. Otis, general manager; J. W. Crosby, auditor; W. F. Gleeson, general freight and passenger agent; F. M. Liston, purchasing agent and storekeeper; H. M. McCartney, chief engineer; C. M. Stansbury, master mechanic. It is reported that the recently incorporated United Properties Company of California is considering the purchase of the

Ocean Shore Railroad with the idea of making it a part of the extensive system which it proposes to develop.

Philadelphia (Pa.) Rapid Transit Company.—The special committee of the directors of the Union Traction Company, consisting of Robert A. Balfour and George W. Elkins, which has been considering the plan proposed by E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., for refinancing the Philadelphia Rapid Transit Company has reported to the directors of the Union Traction Company the details of the plan and the report has been approved. The special meetings of the stockholders of the Philadelphia Rapid Transit Company and the Union Traction Company at which the plan will be presented will be held on Feb. 28, 1911.

Portland Railway, Light & Power Company, Portland, Ore.—A quarterly dividend of 1 per cent has been declared payable on the \$16,250,000 of stock of the Portland Railway, Light & Power Company, as readjusted according to the plan to retire the preferred stock by redemption at 105, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 19, 1910, page 1044, and Dec. 10, 1910, page 1170. The dividend is payable on March 1, 1911, to holders of record of Feb. 11, 1911, and is the same rate as was paid from September, 1909, to December, 1910, on the \$10,000,000 of common stock of the company, the amount outstanding prior to the retirement of the \$5,000,000 of preferred stock.

Rochester Railway & Light Company, Rochester, N. Y.—The Public Service Commission of the Second District of New York has authorized the Rochester Railway & Light Company to issue \$832,000 par value of its first consolidated 5 per cent gold mortgage bonds. The proceeds derived from the sale of the bonds are to be used to pay indebtedness incurred for proper capital purposes. The order requires that the bonds shall be sold at not less than 95.

York (Pa.) Railways.—A special meeting of the stockholders of the York Railways has been called for March 21, 1911, to act on the question of approving a proposed issue of not exceeding \$700,000 par value of short-term 6 per cent collateral trust gold notes of the company, secured by a pledge of the company's first-mortgage 5 per cent gold bonds maturing Dec. 1, 1937, in the sum of \$840,000, or a ratable part thereof, as collateral security for payment.

Dividends Declared

Detroit (Mich.) United Railway, 1¼ per cent.
Elmira Water, Light & Railroad Company, Elmira, N. Y., 2½ per cent, preferred.
Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; quarterly, 1½ per cent, common.
Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

CENTRAL PENNSYLVANIA TRACTION COMPANY.						
Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.	
1 m., Dec. '10	\$73,791	\$51,073	\$22,718	.....	.....
1 " " '09	66,741	49,292	17,449	.....	.....
12 " " '10	831,167	591,501	239,666	.....	.....
12 " " '09	754,488	558,812	195,676	.....	.....
DETROIT UNITED RAILWAY.						
1 m., Dec. '10	\$779,973	\$494,278	\$285,695	\$166,760	\$118,935	
1 " " '09	708,864	427,941	280,923	156,730	124,193	
12 " " '10	9,497,987	5,981,065	3,516,922	2,030,622	1,486,300	
12 " " '09	8,192,389	5,042,724	3,149,665	1,880,129	1,269,536	
MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.						
1 m., Dec. '10	\$428,652	\$285,203	\$143,448	\$10,860	\$132,589	
1 " " '09	400,354	271,626	128,728	23,031	105,697	
12 " " '10	4,789,815	3,304,902	1,484,912	527,076	957,836	
12 " " '09	4,355,007	2,844,384	1,510,623	543,345	967,278	
MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.						
1 m., Dec. '10	\$177,294	\$51,255	\$126,039	\$48,161	\$77,878	
1 " " '09	166,770	46,584	120,187	55,610	64,577	
12 " " '10	1,847,788	645,170	1,202,619	656,411	546,207	
12 " " '09	1,519,780	549,774	970,006	621,640	348,366	
NORFOLK & PORTSMOUTH TRACTION COMPANY.						
1 m., Dec. '10	\$179,111	\$94,878	\$84,233	\$60,491	\$23,742	
1 " " '09	163,444	95,393	68,051	65,242	2,809	
6 " " '10	1,070,822	598,058	481,764	377,260	104,504	
6 " " '09	988,412	554,735	433,677	381,394	52,283	
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.						
1 m., Dec. '10	\$96,048	\$51,015	\$45,033	\$19,221	\$25,812	
1 " " '09	92,087	49,329	42,758	17,967	24,791	
12 " " '10	1,038,056	*601,973	436,083	221,485	214,598	
12 " " '09	979,554	*551,612	427,942	210,926	217,016	

*Includes taxes.

Traffic and Transportation

Marketing Farm Products by Electric Railway

Edward C. Spring, traffic manager of the Lehigh Valley Transit Company, Allentown, Pa., addressed the Movable School of Agriculture at Allentown recently on "The Relation of the Farmer to the Transportation Companies." Mr. Spring said, in part:

"Much has been told the farmer about how to prepare the ground, till the soil and plant to produce the best results, but little has been told him about how to find a market for his product after its development. The electric railways during the past few years have brought about a wonderful change in the farming communities. The handling of fruit and garden truck on account of the dispatch of carrying these perishable goods is fast becoming of great importance not only to the interurban companies, but to the farmer. The placing of the farmer in close touch with the markets of the civilized world through the medium of electric railways offers in itself one of the greatest inducements to a farming community. Freight stations and platforms are erected along the lines to enable the handling of freight more carefully and with greater dispatch, which also make a convenient place for the transfer of goods to the teamster. In all cases the interurbans are offering better inducements to the shippers than the steam roads, and as the industrial and commercial needs press the electric railways to keep pace with the demand for greater freight transportation, this need will be met in the same energetic and progressive manner as has characterized the past development of passenger transportation. The carrying of the daily papers and mail by the electric railways, with rural free delivery, causes them to reach the farmer as soon as the business man in the large cities, putting him in an independent position in placing his commodities.

"The community in and about Allentown is splendidly served, as far as the farmer is concerned, by the Lehigh Valley Transit Company, which, having recently established a fast express service at freight rates between points on its line and Philadelphia, is in a position to cater to the wants of the farmer in the placing of his product. The establishment of a brokerage department by the company, whereby the farmer can secure a market for his commodity without going to the city or taking up his time, but by simply getting in touch with the Electric Express Company, which is in communication with the markets of Philadelphia and vicinity, enables him to have his goods placed almost immediately. The company performs the service without any expense to the farmer. Such features as these make an ideal service, which cannot but appeal to the farmer and be appreciated by him.

"The time is past when the farmer does not put a valuation upon his own time and that of his team. With up-to-date farming management these two factors are entering in the maintenance account to a large extent. Where the farmer can place his commodities upon the electric cars he can utilize not only his own time but that of his team to a great advantage at home rather than driving to market. There is no agency that has done more than the advent of the electric railways to broaden out the social conditions of the farmer and his family; his children can enjoy the advantages offered by adjacent cities in the matter of education, libraries and many other things which tend to elevate and make the home more beautiful and more attractive.

"The exodus of the young man from the farm to the cities is an extremely alarming problem. The seductive environment of our large cities has attracted many boys into a problematical future, and every father and every mother should see to it that the home environments and the pleasures and recreations that are allowed the boy are of such a nature and of such attraction that the boy will have inducements to keep him in a position which offers him greater possibilities to-day and a greater future than any line, either professional or commercial, can offer him in the large cities of the country. Every boy on the farm should weigh well his condition and compare his station in life with that which must needs come after he leaves the farm. The independence, the freedom of action, the unre-

stricted life and healthy environments which are characteristic of the farmer's life are not to be found in any other walk of life. You have no greater ally than the transportation companies in the development and the maintenance of your great work."

Hartford & Springfield Street Railway's Express Service.—The Hartford & Springfield Street Railway, Warehouse Point, Conn., has established express service between Somers, Somerville, Thompsonville, Enfield and Warehouse Point.

Freight Service Between Philadelphia and Reading.—The Reading (Pa.) Transit Company has announced that it will establish freight service between Chestnut Hill, Philadelphia, and Pottstown. The plan is eventually to establish service between Philadelphia and Reading.

Complaint About Service in Troy.—The Public Service Commission of the Second District of New York has received a complaint from the Common Council of Troy asking for an investigation and report as to the need of better service by the United Traction Company in the north end of Troy.

Transfers in Bronx Borough.—Frederick W. Whitridge, receiver of the Union Railway, has notified the Public Service Commission of the First District of New York that he has arranged with the New York City Interborough Railway to exchange transfers between lines of the two companies at West Farms. The New York City Interborough Railway, which is controlled by the Interborough Rapid Transit Company, recently put a line into operation in Tremont Avenue as far east as Unionport. Ultimately it will be extended to Locust Point, on the Sound. Transfers will be exchanged between this line and the Boston Road and Southern Boulevard lines of the Union Railway in the Borough of the Bronx.

Fare Between St. Louis and East St. Louis.—Alleging that a reduction of the rate of fare across the Mississippi River at St. Louis would be ruinous to them, the street railways operating between St. Louis and East St. Louis asked an injunction against the City of East St. Louis in the Federal Court at Danville, Ill., on Feb. 8, 1911, to prevent a change. Judge Francis Wright took the matter under advisement. Attorneys for the complainants in their bill assert the bridges across the Mississippi were constructed at great cost and if the fare is reduced from 10 cents to 5 cents it would be impossible to realize a sufficient percentage on the investment to pay the interest, operating expenses and accumulated debts. The East St. Louis Railway and the East St. Louis Electric Railway are the complainants in the action.

Increase in Fare by Toledo & Chicago Interurban Railway.—The Toledo & Chicago Interurban Railway, Kendallville, Ind., announced an increase in its round-trip fares and in its single tickets from Fort Wayne to Kendallville, Auburn and Waterloo, effective on Feb. 1, 1911. Previous to Feb. 1, 1911, the round-trip fare from Fort Wayne to Kendallville was \$1 and the single fare 55 cents. Under the new schedule the round-trip rate is \$1.15 and the single fare to Fort Wayne 65 cents. The round-trip rate to Auburn previous to Feb. 1, 1911, was 85 cents and the single fare 50 cents, while under the new tariff the rates are 90 cents and 50 cents respectively. An increase of 5 cents and 10 cents is made in the single and round-trip rates to Waterloo. The present round-trip rate is \$1, while the new rate is \$1.10. The single-trip rate, formerly 55 cents, is now 60 cents.

Interstate Commissioner Inspects Illinois Traction System.—James S. Harlan, of Illinois, member of the Interstate Commerce Commission, announced recently that he would inspect the Illinois Traction System principally to obtain information whereby the provisions of the safety appliance law could be interpreted with regard to the interurban electric railways engaged in interstate commerce. Mr. Harlan was quoted as follows in regard to the proposed inspection: "I wish to become thoroughly informed about the business of the Illinois Traction System, and a considerable part of the distance between St. Louis and Chicago will be included in a trip over that company's lines. The electric railways engaged in interstate traffic are subject to the commission, and we have had

several cases relating to the Illinois Traction System. I desire to learn all I can about the properties."

Proposed Traffic Agreement in Detroit.—Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of Feb. 11, 1911, page 283, of the proposed operating agreement between the Detroit United Railway and the Michigan United Railway. Wm. B. Thompson, Mayor of Detroit, has expressed himself as being opposed to any operating agreement being entered into between the companies, and has written the following letter to the Michigan United Railways: "I have been informed from reliable sources that your company is about to enter into a contract or agreement with the Detroit United Railway whereby your cars will be operated in this city upon the lines and over the tracks of the Detroit United Railway. I wish to call your attention to the fact that the Detroit United Railway has no franchise rights upon a great many of the streets in this city, and we hope that within a short time the courts, where litigation to that end is now pending, will have so declared. You are therefore hereby notified that this city will, so far as my power extends, resist the right of your company to occupy the streets and operate cars upon tracks now laid or hereafter to be laid unless you first secure permission from the municipality. If you proceed to carry out any arrangement with the Detroit United Railway to bring your cars into this city over its tracks you may expect to meet with the opposition of the authorities of this city so far as I am able to control the situation."

Bridge, Tunnel and Ferry Traffic in New York.—The Public Service Commission has issued a report showing the annual count of passenger traffic across the East River between Manhattan and various parts of Long Island taken on Nov. 10 and 11, 1910, beginning at midnight on Nov. 9. The Brooklyn and Williamsburg bridges and the ferries were taken on Nov. 10; the subway, the Pennsylvania Railroad tunnels and the Queensboro Bridge on Nov. 11. A separate count of the Manhattan Bridge was made on Nov. 17, 1910. The Queensboro Bridge showed the largest ratio of increase over 1909, namely, 68.5 per cent; the Williamsburg Bridge increased 13.5 per cent, the subway 8.5 per cent and the Brooklyn Bridge 4.6 per cent. The ferries showed a loss of 1 per cent. The count includes passengers crossing the ferries in horse vehicles and automobiles, which were not included in the count of 1909. The total number of persons crossing from Long Island to Manhattan was 491,220, an increase of 47,555 over 1909; the total number crossing from Manhattan to Long Island was 487,797, an increase of 50,575. In percentages the traffic to Manhattan increased 10.7 per cent, while that from Manhattan increased 11.3 per cent. The combined figures show that the total traffic both ways across the river is closely approaching the 1,000,000 mark, having been 979,023 for one day in 1910. Allowing for the loss of 1418 in ferry traffic, this was a net gain for the year of 96,712, or 11 per cent.

Effort to Reduce Railway Casualty Records.—The League of Public Safety, with headquarters at Chicago, Ill., is making a national effort to reduce the loss of life in railway operation throughout the United States by seeking statutes to prohibit trespassing on rights of way, which is one of the major causes for casualties, the enlistment of railway officials and employees in a systematic war on accidents and also the adoption of safeguards. According to the last bulletin of the League of Public Safety the efforts will be along well-defined and constructive lines. It states that "about half of the persons killed and injured in railway accidents in the United States are making a thoroughfare of dangerous ground and in a great many cases railway rights of way. In most States there are no laws to prohibit trespassing and children and others who do not know the hazard may go into that danger and do and are killed because no one is empowered to stop them." The bulletin also states that "signal safeguards must be more generally adopted. Only 65 per cent of the steam railway and practically none of the electric interurban mileage is protected." The organization, practically completed, is now in the hands of a board representing the State railroad commissions of Indiana, Mississippi, Illinois and Louisiana, the Red Cross Society, Federation of Women's Clubs, casualty insurance interests and other organizations. W. J. Wood, Railroad Commissioner of Indiana, is chairman.

Personal Mention.

Mr. A. E. Peters, formerly assistant secretary of the Detroit (Mich.) United Railways, has been elected secretary of the company to succeed Mr. Edwin Henderson.

Mr. John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been elected president of the St. Louis Car Company, St. Louis, Mo.

Mr. Edward Missner, chief clerk of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been appointed assistant to Mr. John I. Beggs, president of the St. Louis Car Company, St. Louis, Mo.

Mr. T. E. Rust, chief engineer of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., will hereafter perform the duties which devolved upon the late M. L. Newton as consulting engineer of the company.

Mr. L. H. Lathrop has been appointed superintendent of the Menominee & Marinette Light & Traction Company, Menominee, Mich., to succeed Mr. W. R. Putnam, whose resignation from the company was announced recently in the *ELECTRIC RAILWAY JOURNAL*.

Mr. James P. Kineon has resigned as superintendent of transportation of the New York & Long Island Traction Company and the Long Island Electric Railway, Jamaica, N. Y., and has accepted a position as superintendent of the Ocean Electric Railway, Glen Cove Railway, Northport Traction Company, Nassau County Railway and the Huntington Railway, all controlled by the Long Island Railroad, effective Feb. 15, 1911.

Mr. W. A. Haller has again become connected with Sanderson & Porter, engineers and contractors, New York, N. Y. Mr. Haller was associated with Sanderson & Porter from 1900 until 1908, at which time he became general manager of the Mobile Light & Railway Company, Mobile, Ala. Early in 1909 he took the position of general manager and engineer of the Oklahoma Railway Company, which position he has filled until recently.

Mr. V. W. Berry, who has been master mechanic of the Houston (Tex.) Electric Company, has been appointed superintendent of the Galveston-Houston Electric Railway, and superintendent of rolling stock of the Houston Electric Company, Galveston Electric Company and the Galveston-Houston Electric Railway. Mr. Berry has been in the employ of the Stone-Webster Management Association for six years as master mechanic of the Dallas Street Railway, master mechanic of the Houston Electric Company and district master mechanic for all the Stone & Webster properties in Texas. He has had 15 years' active experience in handling city and interurban railways.

Mr. I. B. Clarke has been appointed superintendent of the New York & Long Island Traction Company, with headquarters at Hempstead, Long Island, and of the Long Island Electric Railway, with headquarters at Jamaica. Mr. Clarke has recently been assistant superintendent of elevated lines of the Brooklyn Rapid Transit Company and as such won an enviable record in the successful handling of men. He is a native of Atlanta, Ga., and a graduate of Cornell University in the class of 1900. After leaving college Mr. Clarke was with the Westinghouse Air Brake Company for a short while and became connected with the Brooklyn Rapid Transit Company in 1905 as supervisor of elevated motormen. While in this position he devised and placed in execution a very successful method of training the men in charge of the elevated trains. He extended this system later when he was made supervisor of motormen for both the elevated and the surface lines. Mr. Clarke was appointed assistant superintendent of elevated lines of the Brooklyn Rapid Transit Company on June 21, 1908.

OBITUARY

William La Croix, president of the Nahant & Lynn Street Railway, Lynn, Mass., is dead.

George Moses, Eastern and Southern representative for James B. Sipe & Company, died Jan. 15, 1911, at Pittsburgh, Pa.

Edward Merritt, president of the Brooklyn (N. Y.) City Railroad, a subsidiary of the Brooklyn Rapid Transit Company, is dead.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Sand Springs Interurban Railway, Tulsa, Okla.—Incorporated in Oklahoma to build a 6-mile electric railway to connect Tulsa and Sand Springs. Capital stock, authorized, \$50,000; issued, \$50,000. Power will be obtained from the Tulsa Corporation, and repair shops will be located at Sand Springs. Officers: Charles Page, Tulsa, president; W. E. Rohde, Tulsa, superintendent, and W. H. Henderson, chief engineer. Headquarters, 417 First National Bank Building, Tulsa, Okla. [E. R. J., Feb. 4, '11.]

Pittsburgh, Butler, Slippery Rock, Grove City & Northern Street Railway, Butler, Pa.—Application for a charter will be made in Pennsylvania on Feb. 29 by this company to build a 26-mile electric railway to connect Butler, Slippery Rock, Grove City, Prospect, West Liberty, Center, Franklin, Brady, North Liberty and Pine. Incorporators: William C. McCandless, John Troutman, F. L. Forrester, John C. Kerr and William M. Galbraith. [E. R. J., Oct. 8, '10.]

Moose Jaw (Sask.) Electric Railway, Ltd.—Incorporated in Saskatchewan to build an electric railway in Moose Jaw and to the adjoining towns. Capital stock, \$500,000. Incorporators: D. R. Street, A. H. Dion and N. J. Ker, all of Ottawa. [E. R. J., Nov. 26, '11.]

Terrell Well Company, San Antonio, Tex.—Incorporated in Texas to build a 5-mile electric railway to connect San José and San Antonio. Construction has begun. The company will purchase power from the San Antonio Traction Company and will operate five cars. Capital stock, authorized, \$100,000. Stock issued, \$100,000. Officers: C. D. Garrett, St. Louis, president; J. D. Oppenheimer, San Antonio, vice-president; A. L. Matlock, San Antonio, secretary; Dr. Frederick Terrell, San Antonio, treasurer; A. D. Powers, San Antonio, general manager and purchasing agent; H. W. Hamilton, superintendent, and W. J. Kelly, chief engineer. [E. R. J., Jan. 21, '11.]

Washington & Barcroft Traction & Power Company, Barcroft, Va.—Incorporated in Virginia to build a 7-mile electric railway through Alexandria and Fairfax counties. Officers: F. C. Handy, Barcroft, president; W. W. Wright, Barcroft, vice-president, and C. B. Munson, Arlington, secretary.

FRANCHISES

Los Angeles, Cal.—The Los Angeles-Pacific Railway has asked the City Council for permission to electrify the old Santa Monica steam railroad, which extends from Clements Junction, at Thirty-eighth Street and Alameda Street, west across Los Angeles to the west boundary, and then directly to Santa Monica.

Los Angeles, Cal.—The Los Angeles Railway has asked the City Council for a franchise to build a cross-town line in Los Angeles.

Modesto, Cal.—The San Joaquin Valley Electric Railway has received a franchise from the Trustees to build its railway over certain streets in Modesto.

Petaluma, Cal.—The Petaluma & Santa Rosa Railway has received a franchise from the City Council to build an extension along the river to Point Pedro. E. M. Van Frank, president. [E. R. J., Feb. 11, '11.]

Meriden, Conn.—The Meriden, Middletown & Guilford Railway, Meriden, has asked the General Assembly for an extension of time in which to build its proposed 20-mile electric railway from Meriden to Guilford, via Middletown, and for the right to extend the line into North Branford and in Middletown. Francis Atwater, Meriden, president. [E. R. J., Nov. 20, '09.]

Gary, Ill.—The Gary & Interurban Railway has received a franchise from the Council to extend its line to the city limits on South Broadway in Gary.

***Paris, Ill.**—Charles F. Propst will ask the Council for a franchise to build a line into Paris. The railway is projected between Mattoon and Charleston.

Urbana, Ill.—The Danville, Urbana & Champaign Railway has received a franchise from the City Council to build its electric railway on Cunningham Avenue, in Urbana.

New Bedford, Mass.—The Union Street Railway, New Bedford, will ask the Board of Aldermen for a franchise to extend its railway to Bolton Road in the south end of New Bedford.

***Scituate, Mass.**—The citizens of Scituate will ask the Council for a franchise to build an 8-mile electric railway between Scituate Harbor and Rockland.

Lambertville, N. J.—The New Jersey & Pennsylvania Traction Company has received a franchise from the Board of Public Utility Commissioners to extend its tracks in Lambertville.

White Plains, N. Y.—The Hudson River & Eastern Traction Company, Ossining, has filed an application with the Public Service Commission for permission to construct its railway from Ossining to White Plains, via Sherman Park.

***Rocky Mount, N. C.**—W. H. Howell, Scotland Neck, and Robert McDonald, Tarboro, representing Baltimore capitalists, will ask the Aldermen for a franchise to build an electric railway through Rocky Mount.

Geneva, Ohio.—The Cleveland, Painesville & Ashtabula Railroad, Cleveland, will ask the City Council for a seven-year extension of its franchise to build its railway in Geneva.

Youngstown, Ohio.—The Lake Erie & Youngstown Railway has received a franchise from the City Council to build its line in Youngstown. It will connect Conneaut, Andover and Youngstown, also with the Youngstown & Southern Railway, which extends from Youngstown to East Liverpool. [E. R. J., Aug. 28, '09.]

Ottawa, Ont.—The Morrisburg & Ottawa Electric Railway, Ottawa, has asked the Council for a franchise to build its railway along Main Street to connect with the Ottawa Street Railway in Ottawa. C. M. Willard, Morewood, Ont., president. [E. R. J., Nov. 14, '08.]

Sarnia, Ont.—The Imperial Traction Company, Hamilton, has asked the Common Council for a franchise to build an electric railway in Sarnia. It will connect Hamilton, Guelph, Berlin, Stratford, St. Mary's, London, Ingersoll, Woodstock, Brantford, Niagara Falls and Sarnia. L. B. Howland, Toronto, is interested. [E. R. J., Dec. 31, '10.]

Campbelltown, Pa.—The Lebanon & Campbelltown Street Railway has asked the City Council for a franchise to build an electric railway in Campbelltown. S. M. Hershey is interested. [E. R. J., Dec. 31, '10.]

***Mauch Chunk, Pa.**—Franchises are being obtained by Philadelphia capitalists from the Councils to construct an electric railway between Slatington and Lehigh, to connect with the Lehigh Traction Company at Slatington and with the Carbon Transit Company at Lehigh. This railway will be 12 miles long, and when completed will be the connecting link from Pottsville to Philadelphia. It will pass through Palmerton, Hazard, Bowmanstown, Parryville, Harritty and Weissport.

Waco, Tex.—The Citizens' Railway has received a franchise from the City Commissioners to extend its railway on North Ninth Street in Waco.

Norfolk, Va.—The Norfolk & Portsmouth Traction Company, Norfolk, has received a franchise from the Mayor and City Council to lay T-rails on Olney Road and Botetourt Street in Ghent.

Spokane, Wash.—The Spokane & Inland Empire Railroad has received a franchise from the City Council to extend its line over certain streets in Spokane.

Wheeling, W. Va.—The Pan-Handle Traction Company, Wheeling, has asked the City Council for a 50-year franchise to construct a third-rail line from Jonathan's Ravine north to the city limits.

TRACK AND ROADWAY

Fresno, Coalinga & Tidewater Company, Fresno, Cal.—This company advises that it proposes to build the Fresno, Coalinga & Monterey Railway and as soon as surveys are made it will begin the construction of the railway to connect Fresno, Coalinga, Hollister, Salinas and

Monterey. Capital stock authorized, \$100,000; capital stock issued, \$30,000. Officers: T. C. White, Fresno, president; Charles J. Shaw, Hollister, vice-president and general manager; Albert Albrecht, Fresno, secretary; H. H. Alexander, treasurer, and J. S. Bates, Fresno, electric engineer. [E. R. J., Feb. 4, '11.]

Monterey & Del Monte Heights Railway, Monterey, Cal.—During this year this company will build a 1½-mile extension from the center of Monterey to the city limits and a 16-mile extension from Del Monte Heights to Salinas.

Northern Electric Railway, San Francisco, Cal.—Contracts have been awarded to the American Bridge Company, New York, N. Y., by this company for steel work and machinery for two 125-ft. fixed spans and one 400-ft. draw span constituting material for joint railway and highway bridge across the Sacramento River at foot of M Street, Sacramento, connecting Yolo and Sacramento Counties. The Missouri Valley Bridge & Iron Company, Leavenworth, Kan., has been awarded the contract for piers, abutments and foundation for above bridge. The company will soon award the contracts for the erection of steel work and electrical machinery and interlocking signal system.

Brooklyn, Conn.—William Clewley, who is promoting an electric railway to connect Brooklyn, Danielson and Ballouville, is making preparations to survey the route. [E. R. J., Nov. 19, '10.]

Middle Georgia Interurban Railway, Atlanta, Ga.—Work has been begun by this company on its railway between Jackson, Griffin and Social Circle. Grading is being done from Indian Springs to Jackson.

Indianapolis, Crawfordsville & Western Traction Company, Crawfordsville, Ill.—An extension of 42 miles will be built by this company to connect Crawfordsville, Ind., and Danville, Ill., during 1911.

Chicago, Ottawa & Peoria Railway, La Salle, Ill.—This company, which is a part of the Illinois Traction System, advises that it will award contracts within the next few weeks for grading and for concrete and bridge construction work on its 25-mile extension between Morris and Joliet. F. E. Fisher, superintendent of construction, Joliet, Ill., is in charge of the work.

Illinois Traction System, Peoria, Ill.—This company is preparing plans for a 30-mile extension from Beatrice to Adams. The proposition provides that the amount of \$300,000 of stock must be subscribed by Gage County in order to build this extension. The matter is being considered by the Commercial Club of Beatrice.

Albia (Ia.) Interurban Railway.—A 9-mile extension will be built from Albia to Baxton by this company during 1911.

Tri-City Railway, Davenport, Ia.—Surveys are being made and construction is about to begin by this company on its 20-mile extension between Davenport and Muscatine. The company plans to double-track the line on the principal streets of all the cities in which it operates. Funds to carry out these plans will be raised by the sale of bonds.

Lexington & Interurban Railways, Lexington, Ky.—About 2 miles of new track will be constructed by this company in Lexington during 1911.

Winnipeg (Man.) Electric Railway.—Several extensions, including a line to Winnipeg Beach, will be built by this company during this year.

Winona Railway & Light Company, Winona, Minn.—About one mile of new track will be built by this company in Winona during 1911.

Mankato (Minn.) Electric Traction Company.—This company expects to make a permanent survey in the spring for its proposed extension between Mankato and St. Peter. Henry E. Hance, Mankato, general manager.

Interstate Railway, Kansas City, Mo.—About 48 miles of main track and 5 miles of sidings will be built during 1911 by this company.

Kansas City, Lawrence & Topeka Electric Railroad, Kansas City, Mo.—A 24-mile extension to connect Zarah and Lawrence will be constructed by this company during 1911.

Grands Forks (N. D.) Street Railway.—This company expects to build during the year a 1-mile extension from Grand Forks to East Grand Forks.

Ohio Electric Railway, Cincinnati, Ohio.—As a result of recent arrangements for financing the needs of this company it is stated that the line extending from Columbus to Newark and Zanesville will be greatly improved, the interurban depot at Columbus will be built and connections and extension east of Columbus will probably be made.

Fostoria & Fremont Electric Railway, Fostoria, Ohio.—The temporary injunction which prevented this company from entering the land owned by the Lake Erie & Western Railroad at Hamler was dissolved by Judge W. P. Henderson on Feb. 6, and the work delayed at this point will be completed at once. J. D. McDonel, secretary. [E. R. J., Jan. 7, '11.]

***Lancaster, Ohio.**—J. H. Litteral, Dr. F. P. Barr and C. W. Rowlee, Lancaster; D. L. Mauger, Basil; E. E. Haskins, Granville, and George Ruffner and Clark Suphen, Baltimore, Ohio, are at the head of a movement to build an electric railway between Lancaster and Buskey Lake, a distance of 20 miles, and it is said that a company will be incorporated shortly for that purpose. The line will pass through Thurston and Pleasantville, and have its northern terminus at Summerland Beach. It will enter Lancaster over the tracks of the Scioto Valley Railway, it is said. At Buckeye Lake it will connect with the Newark line of the Ohio Traction Company. Spurs will be built to Basil and Baltimore.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—It is said that the directors of this company have decided to extend the railway from Crooksville to New Lexington, Ohio, during the coming summer. It will not follow the Cincinnati & Muskingum Valley Railroad, as at first planned, but will run direct across the country through McLuney, Wilbren and Rehoboth.

Toronto (Ont.) Railway.—This company will finish building about 20 miles of single track in Toronto during 1911.

Toronto Suburban Railway, Toronto Junction, Ont.—A 15-mile extension from Toronto to Brampton will be built by this company during 1911.

Oregon Electric Railway, Portland, Ore.—This company will build from Albany to Eugene, a distance of 70 miles, during 1911.

Schuylkill & Dauphin Traction Company, Pottsville, Pa.—A 3-mile extension will be built by this company during 1911.

Scranton & Binghamton Traction Company, Scranton, Pa.—It is stated that this company will soon begin work on an extension of the Northern Electric Railway from Factoryville to Nicholson, Binghamton, Brooklyn and Montrose. Rights-of-way have been secured and surveys made as far as Binghamton. This proposed 62-mile electric railway will connect Franklin Forks, Lansville, Conklin, Corbettville, Brooklyn, Lindaville, Montrose and Binghamton. W. L. Connel, Scranton, president. [E. R. J., Oct. 29, '10.]

Shawinigan Water & Power Company, Montreal, Que.—This company expects to electrify about 5 miles of steam railroads in Montreal during 1911.

Sioux Falls (S. D.) Traction System.—About 3 miles of new track will be built in Sioux Falls by this company during 1911.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—During 1911 this company will build about 6 miles of new track in Corpus Christi.

Spokane Northern Electric Railway, Spokane, Wash.—This company advises that it has completed surveys, secured rights-of-way and begun grading for its proposed 35-mile railway to extend from Spokane to the top of Mount Carlton. The company will probably furnish power for lighting purposes. Capital stock authorized, \$250,000. Stock issued, \$250,000. Officers: Francis H. Cook, 307 Howard Street, Spokane, president; L. C. Cook, secretary, and Silas W. Cook, treasurer. [E. R. J., March 23, '07.]

Tomahawk, Wis.—S. S. Fuller, who is promoting a 25-mile electric railway to connect Martinsburg, North Mountain, Hedgesville, Tomahawk, Jones Spring, Shenhei, Ganotown and Glengary, states that he has been appointed treasurer to raise funds for constructing this line. Work will not be begun until spring. [E. R. J., Jan. 7, '11.]

SHOPS AND BUILDINGS

Los Angeles (Cal.) Railway.—This company is having a paint shop built on Fifty-ninth Street and San Pedro Street in Los Angeles. The structure will be two stories high, 640 ft. x 110 ft., of reinforced concrete construction. [E. R. J., Sept. 24, '10.]

Southern Pacific Railroad, Los Angeles, Cal.—This company will erect a new car house on the site of the narrow-gage station at Fourteenth Street and Franklin Street extending through to Webster Street in Los Angeles. The first floor will contain the ticket offices, waiting rooms and the telegraph and dispatching departments.

Tampa (Fla.) Electric Company.—Plans are being prepared by this company for building new car houses on the tract near the river in the northern part of Tampa. The cost is estimated to be about \$150,000.

Detroit (Mich.) United Railways has recently made extensive improvements to its repair shops and has added a vacuum drying and impregnating apparatus for its field coil work. The company has purchased the improved type of apparatus, having cast-iron steam-jacketed tanks, manufactured by the Buffalo Foundry & Machine Company, Buffalo, N. Y.

Great Falls Electric Properties, Butte, Mont.—This company is considering plans for the construction of new car houses and repair shops and the purchase of new equipment to replace the structures and stock lost in the recent fire.

Public Service Railway, Newark, N. J.—It is reported that this company will erect car houses on its property recently acquired in Hilton.

Portland Railway, Light & Power Company, Portland, Ore.—This company has purchased ten acres of land in southeast Portland, on which it proposes to erect its general shops. Plans for the new structures are now being prepared. They will be built in units and will consist of a machine shop, blacksmith shop, carpenter and paint shops. The company now operates shops at four different points and this new plan will provide for a consolidation of all these shops into one plant. It is also the intention of the Portland Railway, Light & Power Company to build its own cars at this plant eventually.

POWER HOUSES AND SUBSTATIONS

Kentucky Securities Corporation, Lexington, Ky.—Plans are being considered by this company for building a large power plant in Lexington. J. K. Trimble, Philadelphia, secretary. [E. R. J., Feb. 4, '11.]

Michigan United Railways, Detroit, Mich.—This company is now considering the advisability of installing its own power plants. To this end an engineering corps composed of expert electrical engineers under the direction of G. N. Lemmon, chief engineer for the Michigan United Railway, with headquarters in Jackson, has been set to work making necessary observations and preliminary calculations. In planning the installation of a new system the location of a number of plants and substations will come under the jurisdiction of the engineers in charge of the work, and it is not anticipated that anything definite as to the location of the plants will be ready for announcement before 60 days.

Metropolitan Street Railway, New York, N. Y.—This company is said to be considering plans for building an additional coal hoist at its power station at First Avenue and Ninety-sixth Street in New York. The cost is estimated to be about \$50,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has ordered from the General Electric Company one 1000-kw motor generator set and one 75-kw motor generator and one 1500-hp motor and switch-board.

San Juan Light & Transit Company, San Juan, Porto Rico.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for seven 30-kva, single-phase, 60-cycle, 1100/110-220-volt transformers; five 25-kva, single-phase, 60-cycle, 1100/110-220-volt transformers and a total of 200 hp in small back-g geared motors for a machine shop.

Manufactures & Supplies

ROLLING STOCK

Mountain Railway, West Orange, N. J., expects to purchase two passenger cars.

Cleveland & Erie Railway, Girard, Pa., will purchase one 47-ft. 2-in. interurban car.

Lincoln (Neb.) Traction Company has ordered one 21-E truck from the American Car Company.

South Bethlehem & Saucon Street Railway, Bethlehem, Pa., expects to purchase four open single truck cars.

Augusta-Aiken Railway, Augusta, Ga., has purchased eight Brill 21-E trucks from The J. G. Brill Company.

Detroit (Mich.) United Railway has ordered from the General Electric Company 60 two-motor, 70-hp car equipments.

Ottawa Electric Railway, Ottawa, Ont., has ordered 18 cars of the pay-as-you-enter type from the Ottawa Car Company.

Hummelstown & Campbelltown Street Railway, Hershey, Pa., has purchased one 31-ft. baggage car from The J. G. Brill Company.

Marshalltown Light, Power & Railway Company, Marshalltown, Ia., has ordered two 21-E trucks from the American Car Company.

Western New York & Pennsylvania Traction Company, Olean, N. Y., has purchased two Brill 27-G1 trucks from The J. G. Brill Company.

La Crosse & Onalaska Street Railway, Onalaska, Wis., has ordered one 20-ft. closed car and one Brill 21-E truck from the American Car Company.

Smith, Kerry & Chace, Winnipeg, Man., are issuing specifications for the purchase of a motor car by the Board of Control. Bids will be received until March 3, 1911.

Frankford, Holmesburg & Tacony Street Railway, Tacony, Pa., has purchased two 33-ft. 4-in. semi-convertible pay-as-you-enter type car bodies and four 39-E trucks from The J. G. Brill Company.

Public Service Railway, Newark, N. J., has purchased from the General Electric Company 40 GE-216 commutating pole railway motors, 38 K-35 controllers and 140 air-brake equipments, with CP-27 compressors.

Chattanooga Railway & Light Company, Chattanooga, Tenn., has ordered two cable cars from the C. G. Kuhlman Company for use on the incline up Lookout Mountain. A new feature is that the cars will be equipped with full vestibules at both ends, these being entirely inclosed in glass for observation purposes.

Wilmington & Philadelphia Traction Company, Wilmington, Del., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, as having ordered 22 cars through J. G. White & Company, from The J. G. Brill Company, has specified the following details:

Type of car...	semi-convertible	Hand brakes.....	Ackley
Seating capacity.....	36	Heating system,	
Bolster centers, length,		Consol. 118W.	
	17 ft. 4 in.	Headlights....	Elec. S. S. Co.
Length of body.....	26 ft.	Journal boxes	Brill
Over vestibule.....	37 ft.	Motors	West. 101-B.
Width over sills...7 ft. 10½ in.		Push button signal...	buzzer
Over posts at belt..8 ft. 2 in.		Registers....	International R5
Body	wood	Roofs	monitor deck
Interior trim	cherry	Sanders	Brill dumpit
Underframe	metal	Sash fixtures	Brill
Air brakes	West.	Seats,	
Bumpers...Brill angle iron		Heyw'd Bros. & Wakefield	
Car trimmings	bronze	Seating material	cane
Center bearings	Brill	Side bearings	Brill
Couplers	Brill radiating	Springs	Brill
Curtain fixtures ...	Forsythe	Step treads	Brill
Curtain material...Pantasote		Trolley poles	Nuttall
Destination signs,		Trucks	Brill 39E
Hunter illuminated		Varnish	Murphy
Fenders	Phila.	Ventilators	Perry
Gongs	Dedenda	Wheels...Lobdell cast steel	

Denver (Col.) City Tramway, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, as having ordered 16 closed

cars and 25 trail cars from the Woeber Carriage Company, has specified the following details for the closed cars:

Length over all...43 ft. 10 in.	Heating system.Consolidated
Interior trim.....Oak	Motors .....4 GE-58
Air brakes.....West.	Registers Ohmer
Bumpers.Hedley anti-climber	Roofs monitor
Couplers Tomlinson	Seats.....H. & K. No. 11
Curtain fix....Curtain S. Co.	Step treads.....Mason
Curtain material...Pantasote	Trolley base.....U. S. 13
Fenders.....Rocky Mt.	Wheels.....30-in. cast iron
Gongs.....14-in.	

For trail cars:

Length over all...38 ft. 1 in.	Roofs arch
Air brakes .....West.	Step treads.....Mason
Bumpers.Hedley anti-climber	Trucks .....arch bar
Couplers..... Tomlinson	Wheels.....30-in. cast iron
Registers Ohmer	

TRADE NOTES

Ackley Brake Company, New York, N. Y., has recently received orders for 100 Ackley adjustable brakes from several tramways in Japan.

Consolidated Car-Heating Company, New York, N. Y., reports that since its buzzer system was introduced about two years ago over 2000 cars have been equipped.

Pawling & Harnischfeger Company, Milwaukee, Wis., has opened a branch office at 533 Baronne Street, New Orleans, La., under the management of T. W. Waddell.

Cooper Heater Company, Carlisle, Pa., has established its main sales office at 29 Kenton Street, Dayton, Ohio, from which office all matters relating to sales and correspondence will be handled.

Nachod Signal Company, Philadelphia, Pa., has installed Nachod automatic signals on the Green Ridge Suburban line of the Scranton Railway. The signals are being tried out by the railway, with a view to putting them in use on the Moosic Lake line.

Whipple Supply Company, New York, N. Y., will equip the eight new cars of the Norfolk & Portsmouth Traction Company and the two new cars of the Norfolk City & Suburban Railway with light-weight, rolled steel section Hedley anti-climbers.

Langslow, Lamon Sales Company, Rochester, N. Y., has been incorporated with a capital of \$50,000 to deal in and manufacture the Langslow pre-payment system and other similar devices for use at entrances to amusement parks and pleasure resorts.

H. R. Langslow Company, Rochester, N. Y., has recently been incorporated with a capital stock of \$250,000 to manufacture the Langslow pre-payment system consisting of fare box and turnstile for electric railway cars, as recently described in these columns.

Nichols-Lintern Company, Cleveland, Ohio, has recently received an order from the Nashville Railway & Light Company, Nashville, Tenn., for 250 improved ventilators. This company also reports an increased demand for sand traps and valves from electric railways in the Western States.

McClintic-Marshall Construction Company, Pittsburgh, Pa., has opened an office in the Morris Building, Philadelphia, Pa., in charge of C. H. Chubbuck, contracting engineer. This company also has contracting offices at New York, Pittsburgh, St. Louis, Chicago, San Francisco and Columbus, Ohio.

Pennsylvania Railway Motor Company, Warren, Pa., has been incorporated in Pennsylvania by J. A. Viele, Frank M. Knapp, O. W. Ensworth and R. W. Brown, to make cars, engines, machinery and boilers, of which the Viele motor car will be the principal product. The company has been capitalized for \$200,000.

Goldschmidt Thermit Company, New York, N. Y., has appointed Dr. E. A. Beck metallurgist of the company. Dr. Beck was formerly connected with the Crucible Steel Company of America. This company has also appointed H. D. Kelly traveling engineer. Mr. Kelly was formerly connected with the Chicago & North Western Railroad.

National Brake & Electric Company, Milwaukee, Wis., calls attention to a typographical error which appeared in its advertisement in the *ELECTRIC RAILWAY JOURNAL* of

Feb. 4. The advertisement related to National air-brake equipments and read "125,000 equipments in use," whereas the statement should have been made as "Over 25,000 equipments in use." The publishers of this paper apologize to its readers and to the manufacturer for the error.

Linde Air Products Company, Buffalo, N. Y., manufacturers of oxy-acetylene welding apparatus, has increased its capital from \$500,000 to \$1,000,000. The company has secured two sites, one at North Trafford, Pa., the other at South Elizabeth, N. J., and will immediately start the construction of large factories, which, it is expected, will be completed by June, 1911. This company now has two factories in operation, one at Buffalo, N. Y., and the other at East Chicago, Ill.

United States Steel Products Company, New York, N. Y., has elected Eugene P. Thomas president of the company, to succeed James A. Farrell, who was recently elected president of the United States Steel Corporation. Mr. Thomas has had considerable experience in the steel trade, having been foreign representative of the American Steel & Wire Company, the Illinois Steel Company and the Lorain Steel Company from 1899 to the time when these companies were taken over by the United States Steel Corporation, at which time Mr. Thomas accepted a position with the company of which he is now president.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received an order from the Nikkon Gas & Electric Company, Nikkon, Japan, for one 200-kva rotary converter, designed for operation at 365 volts, two-phase, 60 cycles a.c. and 550 volts d.c.; two 125-kva oil-insulated self-cooling transformers and one three-panel switchboard. This company has also received an order from the Rio de Janeiro Tramway Light & Power Company for two 2500-kva, 3000 r.p.m., 6300-volt, three-phase, 50-cycle turbo-generators. The turbines, which will be equipped with No. 11 Leblanc condensers, have been ordered from the Westinghouse Machine Company.

Wonham, Sanger & Bates, New York, N. Y., report an order for the equipment of all the cars of the Montreal (Que.) Street Railway with "H-B" wheel guards. This railway experimented for several years with a sample guard and about one year ago equipped 50 cars. The installations proved so successful that as a result an order was given for the equipment of the 700 cars operated by this company. The order is considered a great compliment to the efficiency of these automatic guards, owing to the steep grades in Montreal and the consequent crowning of large masses of snow between the rails, sometimes to a height of 9 in. The company has also received orders from Galveston and Houston, Tex., for the equipment of all cars in both cities with "H-B" wheel guards.

ADVERTISING LITERATURE

Allis-Chalmers Company, Milwaukee, Wis., has issued bulletin No. 1445, illustrating and describing different styles of electric hoists.

Frank Ridlon Company, Boston, Mass., has published a catalog for February, 1911, giving a list of second-hand electrical machinery.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued booklet No. 253, on the inter-comm-phone systems.

Under-Feed Stoker Company of America, Chicago, Ill., has published the February, 1911, number of "Publicity Magazine," which is devoted to the interests of the Jones stoker. It contains views and a description of an installation of the Jones stoker at the power plant of the Toledo Railways & Light Company, and also analyses of coals mined in Maryland, Kentucky, Tennessee and West Virginia.

NEW PUBLICATION

Metal Statistics for 1911. American Metal Market & Daily Iron & Steel Report, New York. 50 cents.

The 1911 edition of this work contains all the important statistics covering the production, consumption and price movements of all metal and iron and steel products dating back in some cases as far as 1883. It should prove a valuable reference manual for large users of these metals.

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CONTENTS.

Chicago Subway Policy.....	325
Eminent Domain for Transmission Lines.....	325
Method in Economizing Supplies and Working Time.....	326
Experimental Changes in Schedules.....	326
The Smoke Problem.....	327
The Simultaneous Installation of Seven High-Tension Submarine Cables.....	328
Electric Express Development in Massachusetts.....	332
B. J. Arnold to Investigate Providence and Buffalo.....	333
President Taft's Trip Over Illinois Traction System.....	333
The Proposed Scranton-Binghamton Railroad.....	334
Mail Service on Electric Railways.....	334
Transfer Talks in Toronto.....	335
Temporary High-Tension Overhead Crossing in Brooklyn.....	336
First Regular Meeting of the New Illinois Electric Railways Association.....	337
Boston Rapid Transit Plans.....	338
Transportation Facilities in Charleston, S. C.....	339
Railway Cross-Ties Purchased in 1909.....	340
Watt-Hour Meters for Car Service.....	340
Pneumatic Ash-Handling System.....	341
Electric Railway Legal Decisions.....	342
News of Electric Railways.....	345
Financial and Corporate.....	348
Traffic and Transportation.....	351
Personal Mention.....	354
Construction News.....	355
Manufactures and Supplies.....	357

Chicago Subway Policy

Like most of the other large cities in the United States, Chicago's rapid transit needs have far outgrown its facilities, which already overtax the capacity of the streets in the business district. The four elevated roads are operating the maximum possible number of trains around the double-track "Loop" and the surface lines cannot crowd more cars on the streets during the rush hours. The only adequate remedy for the present congestion seems to be the construction of a system of subways under the streets to handle both elevated and surface cars. Because the situation is so complicated by the diversified ownership of existing surface and elevated roads, which hinders concerted action on the part of private capital, and because the city at the present time is unable to finance the construction of any adequate municipally owned subway system there is little prospect of the immediate adoption of definite routes and details of construction. Nevertheless the city authorities are endeavoring to anticipate the future and formulate a definite policy to be followed when the necessity for subways becomes so imperative that action can no longer be delayed. Last year Bion J. Arnold was retained as consulting subway engineer for the city, and his recent report to the Mayor and the City Council, which was noted in this paper for Feb. 11, 1911, page 272, was in the nature of an outline of a comprehensive system designed to meet the needs of all the transportation lines for many years to come. Even if his proposed plans are never carried out in whole or even in part, the report at least affords a good basis for discussion and the adjustment of differences between all the parties at interest pending developments in the all-important matter of financing and ownership. It is to be hoped that when the time for action arrives actual construction can be begun promptly and the desired relief from congestion afforded in the least possible time without a discussion lasting for months or even years over the location of routes, stations and levels. The unhappy situation in which New York is entangled, due to the total lack of any definite municipal policy regarding the construction and operation of new subways, should be an object lesson to the authorities of other cities in the United States which soon may have to face the same perplexing problem.

Eminent Domain for Transmission Lines

The question of giving power transmission companies the right of eminent domain for their transmission lines has received renewed attention this month owing to a recent report on the subject rendered in Massachusetts. In that State the Board of Electric Light Commissioners recommends against such legislation at present on the ground that the advocates of eminent

domain for such lines did not present sufficient evidence of the increased cost of construction due to the absence of the privilege of condemning land and property to warrant the recommendation of the policy. They further urge that the granting of eminent domain rights to transmission companies supplying a limited number of private consumers is probably unconstitutional, since the condemnatory privilege can be granted only for a demonstrated public use. It is notable, however, that the commission has recommended a law giving it the right to grant a line location through a town or city which obstructs the erection of circuits of a through character. Such a law is analogous to that passed a few years ago in the same State whereby the Railroad Commissioners are authorized to overrule the local authorities in regard to street railway locations when a through route is blocked by a municipality unwilling to give its neighbors the advantages of transportation connection. Judging from the evidence presented at the hearings, the commission's position is well taken for present Massachusetts conditions. But there can be little doubt that as high-tension transmission systems multiply in that and other States, following hydroelectric developments now under active consideration, the time will come when it will be a serious hardship if the power of eminent domain is permanently withheld. The object sought is directly in line with that of the conservation of national resources, which has now been adopted as a government policy. If the right is denied companies will be forced to continue the old wasteful methods of individual power generation and distribution from fear of being mulcted by mercenary land owners, as many companies have been in New England and elsewhere.

Method in Economizing Supplies and Working Time

Nothing can indicate lax shop management more plainly than the unsystematic handling of both old and new car supplies. In many shops there appears to be no one man who is responsible for gathering up and assorting the various odds and ends which are taken off during inspections and overhauls. Furthermore, when the individual workers must get their own supplies, they are bound to lose a good deal of time, especially if the supply centers are some distance from the job in hand. As a matter of fact, there should be no more reason for the men leaving their work to get supplies than for soldiers to go to their water boy instead of having the boy come to them. The practice of a central New York railway will show the aptness of this comparison. On this property the truck and motor department has one man who serves as scrap collector and traveling storekeeper. Discarded articles are carefully examined. Those parts which are badly worn are taken to the scrap heap at once, but the rest are laid aside for renewal. Bolts are retapped and rethreaded, bent bars and plates straightened, burnt controller segments cut down for use elsewhere, etc., under the direction of this specialist, who is thoroughly acquainted with the salvage possibilities of the company's rolling stock equipment. In this way, it has been found possible to reclaim many items which otherwise would have been replaced by new material. As this man makes his rounds among the men he learns their wants in advance and hastens to supply them. If the need can be fulfilled by a revamped article no requisition is necessary and the men can even help themselves if they so desire; otherwise, a formal requisition is required after actual proof that only a new part will do. A somewhat similar system of furnishing supplies

is carried out in the paint shop, where one man keeps track of every painter's progress and so can prepare his colors and brushes ahead of time. The practice of this railway shows that there are ungrasped opportunities to specialize profitably in a very important branch of car maintenance. Whether an installation is small or large the management ought to follow the policy of holding specified individuals responsible for assigned phases of the work from motor inspection to shop housekeeping.

EXPERIMENTAL CHANGES IN SCHEDULE

As a means for testing the chances of increasing the traffic, occasional experimental changes in schedules are to be recommended. Such changes can be introduced experimentally on some lines without danger of dissatisfaction on the part of the traveling public.

Where traffic density is light because of small tributary population, however, a change in schedules causes inconvenience to people who conform their hours of work and meals to the infrequent movement of cars. In cases where the headway of cars is well known to the public the experiments should be conducted so as to cause the least possible disarrangement of the plans of patrons. When a headway of 15 or 20 minutes is maintained, as for instance in a small community, it appears to the ordinary passenger like an imposition to increase or seriously to change the schedule, at least until he changes his habits of life to accord with the change.

However, experience has shown that in many instances changes have produced heavier traffic on lines whose maximum growth was thought to have been reached. There are properties upon which a new manager, employed with the expectation that he would decrease the service and thus lessen expenses, has followed a contrary policy in the hope of realizing better earnings and has won creditable results. If more service will induce more people to ride it is a simple matter to determine whether enough additional traffic has been developed to yield a profit above the full cost of operation of the additional equipment.

The advantage of short headways is that they invite the short-haul traffic. Many cities have so developed that they afford very little regular short-haul traffic, but in other places the companies have not taken advantage of their opportunities to grasp a short-haul business that might be had by a change in schedules. Of the large cities, New York furnishes the most familiar illustration of a series of unique business, theatrical, hotel and residential centers. Its enormous population and its transient visitors traveling from one district to another create a volume of short-distance business that suggests possibilities in other cities where new centers are undoubtedly being created in a less conspicuous degree.

Terminal limitations so restrict the headway maintained on some lines that the full possibilities of traffic have rarely received a fair test. These paralyze the system and there can be no improvement until they are corrected. The introduction of large cars has tended to prevent the upbuilding of short-haul traffic in the degree in which the headway has been lengthened. It is a question whether the saving in platform expense which results from the larger type of equipment is sufficient to compensate for the possible destruction of short riding, but this question can be answered only by a full investigation and an-

alysis of the facts prevailing in each locality. This analysis will not be complete unless it includes, not only a consideration of the present and visible distribution of traffic centers, but also intelligent speculation regarding the future. Larger cars may effect a present saving in platform expense per passenger, but they may commit the company to a program of service from which it will be difficult to escape if future years should disclose short-haul possibilities that may be realized most successfully by investment in smaller cars, involving less outlay for maintenance and power.

Elimination of service means a sure reduction of expense, but expansion in the service may disclose latent possibilities of business that will cause a substantial increase in gross and net revenues, and it is worth experimentation.

THE SMOKE PROBLEM

We noticed briefly last week a report on locomotive smoke in Chicago. The public has long been acquainted with the sins of locomotives in the matter of smoke production, but protest has generally been met with bland denial or aggressive invitation to prove the allegation. Proof, if any were necessary, is now at hand, and while measurements of smoke density are of necessity only approximate it is safe to say that they treat with fairness, at least, the comparative situation as regards various sources of smoke. From Mr. Bird's figures the locomotives in Chicago are responsible for the yearly consumption of about 1,850,000 tons of coal, mostly soft coal of none too good quality. On a conservative estimate they deposit between 500 tons and 600 tons of cinders per day within the city limits of Chicago and produce more than 40 per cent of the smoke of the city in addition to the filthy deposit of cinders. All the miscellaneous power plants of Chicago together produce less than 75 per cent as much smoke as the locomotives, although they burn nearly three times as much coal.

The smoke production of a locomotive is a natural result of the degree to which combustion has to be forced and also of the impossibility of watching the offending smoke-stack for any considerable period of time. If an ordinary chimney belonging to an industrial plant poured out cinders and smoke as does a locomotive stack the proprietors would be enjoined as a nuisance, but the locomotives, being on the move a large part of the time, cannot be rigidly inspected, and it was only by most persistent efforts that Mr. Bird obtained sufficient evidence to be worth considering. It would be interesting to know, but difficult to determine, how great loss to the community in the way of fires, personal injuries and damage from dirt is inflicted by the locomotives running through the city. That the account would be a long one and sum up somewhat formidably can scarcely be doubted. Certainly the locomotive is in Chicago, as in most places, by far the worst offender in the way of smoke production.

The amount of smoke produced by ordinary heating apparatus seems to be trivial. In Chicago the coal consumption chargeable to heating figures up to a little less than 30 per cent of the whole, and only half of this amount belongs to the heating in the central district of the city, where low-grade coal is commonly used. Apartment houses and dwellings generally use a higher quality of coal than can be economically used in the larger railroad plants. The only plants comparable

to locomotives in their contribution to the smoke nuisance are some special industrial furnaces which show results even a trifle worse than those obtained from locomotives, although on a much smaller scale.

Now, the practical outcome of all this investigation of smoke resolves itself into the question of what is going to be done about it. So far as the railroads are concerned the instinctive answer that at once suggests itself is electrification. The same remedy would apply to the smoke produced from the miscellaneous power plants. These seem to aggregate in Chicago something between 500,000 hp and 750,000 hp in spite of the very active and successful campaign for motor service which has been carried on by the Chicago central-station men. The figures show that this campaign must be continued and broadened so as to decrease the smoke production to the minimum possible. It is altogether likely that at least half this miscellaneous power could be furnished by electric motors at considerably less than the present actual cost, and it is by no means certain that the proportion is not even considerably larger than this. The special furnaces shown by Mr. Bird's report to be particularly troublesome ought to be controlled by smoke inspection rigorous enough to compel the installation of so-called smoke-consuming furnaces wherever they are possible, which is in no small proportion of total cases. It has been proved that even the Indiana and Illinois coal can be burned with a very trifling amount of smoke provided the furnaces are designed for the particular work, so that in the long run this matter should be taken care of without difficulty. The railroads, however, remain, and it is reasonably safe to say that no effective smoke consumer for low-grade coal can ever be applied to a locomotive on account of the necessity for forcing combustion.

Mr. Bird considered various possibilities of preventing steam locomotive smoke, but concluded his remarks on this subject with the emphatic declaration: "The study that has been made along these lines indicates clearly that electrification offers the only final and satisfactory solution of the locomotive smoke problem. The use of special fuel for preventing smoke from steam locomotives is only a makeshift and will not satisfy the public." This statement was made after an analysis of the possibilities of using some other fuel than bituminous coal.

Anthracite would, of course, help matters, but is too costly. The other two available fuels are coke and oil. The former can certainly be used with good results in locomotives, and although its tendency is to produce sparks and cinders freely, this difficulty is not uncontrollable. Fuel oil is perhaps equally promising. Experiments made on some Eastern railroads, as well as many experiments abroad, show that petroleum can be worked successfully in locomotives at moderate cost and with production of very little smoke. In this country such use is hardly more than experimental, but looks practicable. It therefore appears that if electrification, undoubtedly the most desirable remedy, is too expensive, as it seems to be in some cases, a remedy at least partially effective can be found in the use of coke and oil. At all events the smoke nuisance from locomotives is a very serious matter in a densely built up city and ought to be suppressed so far as is possible. If the railroads are not willing to electrify their lines within the city limits, they certainly should be willing to go to the length of working out the smokeless fuel problem to a point at least which will improve the present situation.

THE SIMULTANEOUS INSTALLATION OF SEVEN HIGH-TENSION SUBMARINE CABLES

The Union Railway Company, of New York, has recently added to its high-tension distributing plant seven submarine cables across the Harlem River from its main generating station at 216th Street, Manhattan, to a point opposite on the Bronx shore. This makes a total of 17 cables crossing at this point, and the details of the recent installation of seven of

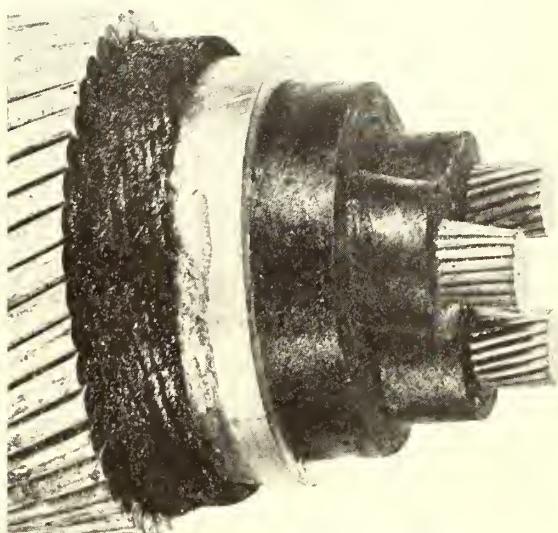


Fig. 1—Harlem Cables—Component Parts

them, simultaneously, are of more than passing interest owing to the engineering features involved.

A large portion of the trackage of this company lies in the Bronx, whereas the power station is on Manhattan Island. This necessitates the transmission across the Harlem River of all current to the substations in the Bronx. Up to September, 1910, 10 three-conductor No. 0000 paper-insulated, lead-cov-

engineering standpoint was brought out in the later installation, the plans for which were materially altered.

The contract for manufacturing the cables as well as for their installation was let to the Waterbury Company, of New York. During preliminary operations by this company it was found expedient to remove one of the then existing cables. A suitable steam lighter with boom, hoist and tackle was brought to the ground and the heaving lines were attached to the cable to be removed. It was found after several ineffectual attempts to raise the cable that the trouble lay in the fact that the cable



Fig. 3—Position of Reels on Lighter

being operated upon was lying under several, if not under all, of the others. The disturbance to the remainder of the cables was noted at the cable houses when a strain was put upon the one cable and, after careful consideration, the attempt was abandoned as likely to cause serious damage to the other cables. Thus on account of the method followed in laying the original cables, namely, one at a time, it was necessary to abandon the

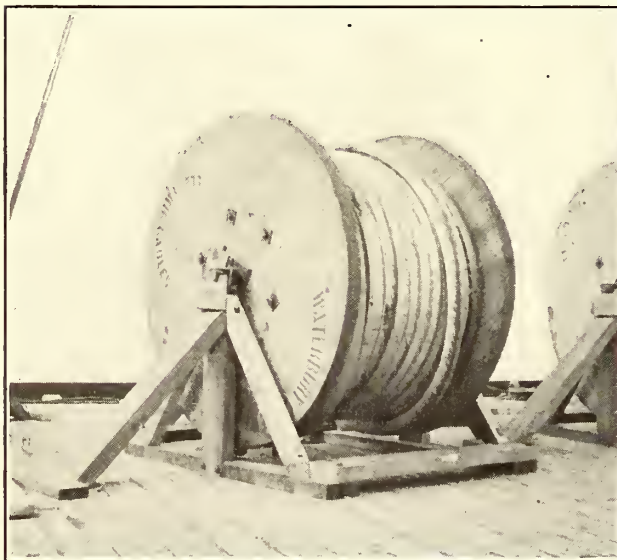


Fig. 2—Harlem Cables—Special Cradle Construction

ered and armored cables at a pressure of 6600 volts gave the desired transmission capacity, but increased trackage, traffic and heating load, with a desire to establish relief cables, led to the installation of seven additional cables of the same capacity and type. The original cables were installed between cable houses one at a time, tested and tagged and put in service. That this method of installation where a large number of cables is involved is not economical or good practice from an



Fig. 4—Method of Lashing Leader to Cable End

cable which was to have been removed. As this type of cable, exclusive of installation charges, costs in excess of \$1.50 per foot, and as the distance between cable houses was something over 650 ft., the value of the abandoned cable can readily be seen to be an appreciable amount.

The Waterbury Company proposed to T. F. Mullaney, chief engineer of the Union Railway Company, a plan whereby the cables to be installed could be laid simultaneously, so that they

would occupy the same position in relation to each other throughout their length from one termination to the other. By following such a plan no cable could become fouled with another, and should an occasion arise demanding the removal of any one of them it could be done at no danger to the remaining cables. That this was a considerable undertaking can be noted from the specifications for the cable involved, especially in the matter of weight. Fig. 1 is a view of the cable laid, showing its component parts. The conductors are three in number, No. 0000 B. & S. gage stranded. Thirty-seven 0.0756-in. wires composed the strand. Around each conductor is a $7/32$ -in. wall of saturated paper. The three conductors are laid up into a core with jute fillers to make round, and a $7/32$ -in. belt of saturated paper is placed about them as shown. Over the belt is placed a $6/32$ -in. lead sheath containing 2 per cent tin. The lead sheath is served with tarred jute to act as a bedding for the armor wires, which are 42 in number and of No. 0000 B. & S. gage galvanized steel. The completed cable weighs 18.7 lb. per foot, or a total of 40 tons for the entire amount installed. The electrical features of the cable are as follows: Working voltage 6600, three-phase, at 25 cycles. The test pressure placed upon the cables at the factory of the manufacturer was 30,000 volts and, after laying, 20,000 volts.

In accordance with government regulations, a trench for the reception of these cables was dredged in the bed of the river to a depth of 26 ft. below mean low water. This necessitated an average cut of about 8 ft. in the dredging work. When finished the trench was approximately 10 ft. on the bottom,

transport the reels and for holding them while laying. The dimensions of the deck space available for storing the reels were 30 ft. x 65 ft. This was just sufficient. Special cradles were constructed to care for the cable reels and their design may be seen in Fig. 2. Owing to the slant of the deck, a side thrust was created which was cared for by the bracing shown, extending at the proper angle from just below the shaft to the deck.

Owing to the necessity for paying the cable off the lighter



Fig. 6—Harlem Cables—Diver Cutting Servage Straps



Fig. 5—Harlem Cables—Taking Slack Off Reel to Get at Cable End

widening to about 20 ft. at the surface of the river's bed, and extended the full width of the navigable portion as designated by the United States Engineers' Office. The time necessary to complete this work was about one week, 3500 cu. yd. of material being removed and towed to sea and there dumped.

In order that every facility for handling the cable reels should be ever present during installation operations, a 75-ton steam lighter with a complete equipment was employed to

so that a spacing of approximately 12 in. would be maintained between every two cables—that is, so that all the cables would be brought within a space of about 7 ft. at the point of paying off—it was necessary to set the cradles in the form of an arc, with the paying-off point as the center. This arrangement is illustrated in Fig. 3, which shows the seven reels in position. The four cables at the right had been made fast to the racks in the east cable house at the time the photograph was taken and show the angle maintained between the reels and the paying off point.

The east or Bronx shore ends were made fast first. Owing to shallow water and bulkheads it was impossible for the lighter to approach the cable house entrance nearer than 70 ft., as shown in Fig. 3. This distance was overcome easily, however, as the lighter was equipped with a "gipsy engine," a boom with a right-angle reach of 90 ft. and three sets of hoisting falls. When the boom was full out it was easily possible to place it at the cable-house entrance. To the cable end a "leader" or pulling line was lashed by means of servage straps spaced about 3 ft. apart. The leader extended along the cable from its end about 25 ft., which was 5 ft. more than the length of cable to be pulled into the cable house. The other end of this leader was passed through a snatch-block secured to the cable house wall at about the level of the entrance holes and thence back to the drum of the gipsy engine. A set of falls were attached to the end of the cable and a slight strain was put on.

When this rigging was complete the leader was hauled in, carrying the cable toward the house. At the same time the boom and falls supporting the cable were moved out with the cable end and lowered so that the proper entrance level for the cable end could be obtained. The lashings on the cable end are shown in Fig. 4. When the end reached the entrance to the house the first servage strap holding the leader to the cable was cut. This freed the cable for a distance of about 3 ft., or to the point where the second strap was secured. Tension was again applied to the leader. This pulled out more cable, until the second servage strap was against the entrance. This strap was then cut, which freed 3 ft. more of cable, and

the working continued. This operation was kept up till the desired 20 ft. of cable was inside the house.

Surprisingly few men were required to secure these ends in the manner described. The machinery was made to do practically all of it. It was necessary to have a diver to stand at the house and cut the servage straps as they approached the entrance as the cable was worked up into the house. This was an arduous task. Fig. 6 shows the diver at work at the east cable house entrance, and to the extreme left of the house may be seen the snatch-block with the leader passing through it. In this way one after another of the seven cable ends was made fast.

The most dangerous portion of the work followed that just described, and consisted in getting the lighter across stream, paying the cable out meanwhile. The tides in the Harlem River at the point of work are probably as strenuous in their fashion as any to be encountered in and about New York Harbor. For this reason all attempts to cross were delayed until the first slack high water. This period lasts only about 15 minutes and quick action must be taken. Two tugs were chartered for the purpose, and their captains were made

can occur should a bend be made less than the allowable limits of curvature. The protection from such a hazard consisted in providing an empty reel under each cable when handled and having the drum of this reel of such a diameter that when the cable was over it the radius of the bend was ample to avoid an unsafe bend. The basic problem of the west shore landing consisted in removing the cable ends from the reels and then from the deck of the lighter, at the same time keeping them in their proper interrelations. This was accomplished in the following manner: An empty reel was placed under the outside or most southerly cable just back of the containing reel. This reel was then attached to the boom falls by a wire rope sling attached to the reel bar. A spreader was provided in this sling so as to allow the reel free movement about the bar. This reel was then raised, thus carrying the cable from off the retaining reel. When the end was free it was lashed to a hand line running up on the shore. Fig. 5 shows this detail of the work and the height to which the empty reel had to be raised to clear the cable from the containing reel. The spreader provided in the sling may be seen just above the reel in the illustration mentioned.

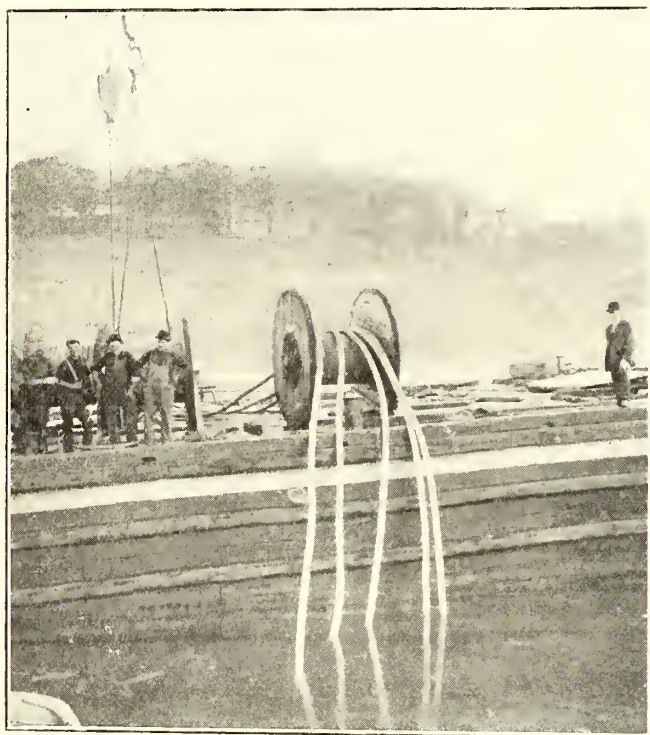


Fig. 7—Harlem Cables—Cables on Empty Reel

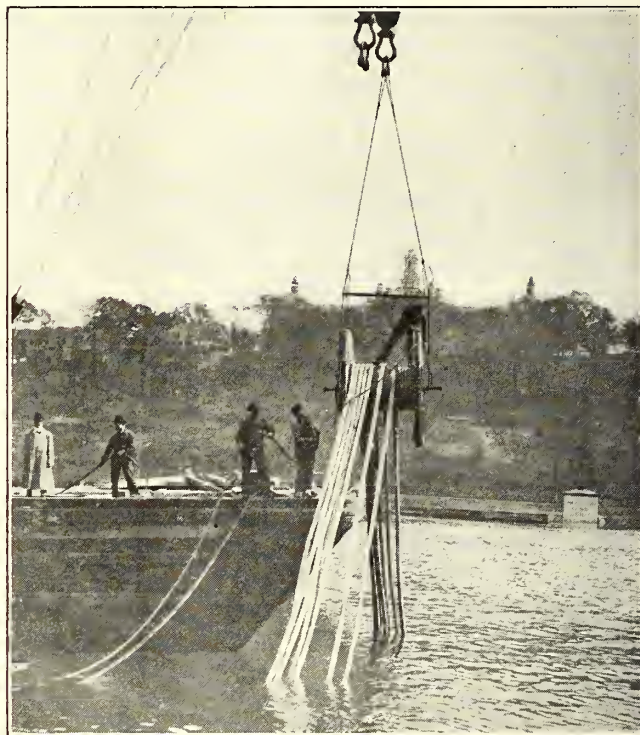


Fig. 8—Raising Reel and Cables to Clear Lighter

acquainted with the features of the work and received full instructions as to signals, etc. The center line of the trench was marked by range poles carrying white flags. J. B. Adams, of the Waterbury Company, directed the movements of the tugs from the deck of the lighter, where he could keep in range with the markers. When everything was in readiness the tugs began their portion of the work and the stream was crossed. Each reel was manned, and a braking strain was obtained by means of 2-in. x 6-in. timbers placed under the flange of each reel. By concerted action produced by signaling each cable was payed off with the same amount of slack, which was regulated by the strain, and by means of spacing blocks at the rail of the lighter were maintained at the proper separation of 12 in. and in the same relation to each other. The crossing of the river occupied about 10 minutes.

The landing of the west shore ends presented obstacles entirely at variance with those of the opposite side, for there remained on each reel, when the lighter was tied fast to the west dock, about 60 ft. of cable. The manipulation of the cables on account of this condition required extreme care. With cables such as these were, serious and irreparable damage

Another empty reel was set up on the deck of the lighter near the bow, and over the drum of this reel all of the cables were to be placed. When a cable was freed of its reel by the foregoing method and the shore line was fast to it, it was lowered onto the drum of the second empty reel, the hand line being used to haul the slack cable up on the shore as it was lowered. The most southerly cable on the deck, as originally placed, was in the same position on the reel as that commonly used for all of the cables in the west shore landing. This reel, still on the deck of the lighter, with five of the cables in place upon it, is shown in Fig. 7. When all seven cables were in place upon this reel it was slung from the boom falls and slightly raised above the deck. The lighter was then backed out of the way, leaving the cables suspended from the boom but free of the deck. This was possible because the boom of the lighter had an overhang forward when full out of about 30 ft. Fig. 8 shows the seven cables in the common reel just clear of the lighter's deck. The east cable house may be seen in the background to the right.

One of the deck reels with its cradle was then mounted on the shore opposite the point at which the cables were suspended

from the boom, and all the ends which had been pulled up on shore when the cables were being lowered into the one reel were raised and placed over the drum of the shore reel. Tackle was then made fast to a manhole in 216th Street and run to the seven cable ends and to the drum of the gipsy engine on the lighter. As this line was heaved the seven cables were simultaneously pulled farther up on the shore, the

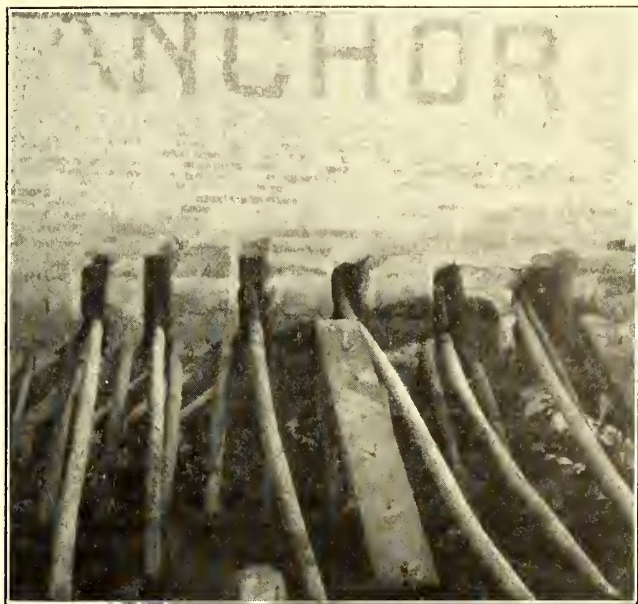


Fig. 9—Harlem Cables—East Cable House with Cables in Position

boom carrying the suspended reel being lowered to furnish the slack. The shore reel in its cradle acted as an idler wheel or pulley, greatly reducing the strain necessary to pull the cables. This operation when completed left all the cables in their proper relation, extending from the shore straight down into the water, the carrying reel having been taken out from under them.

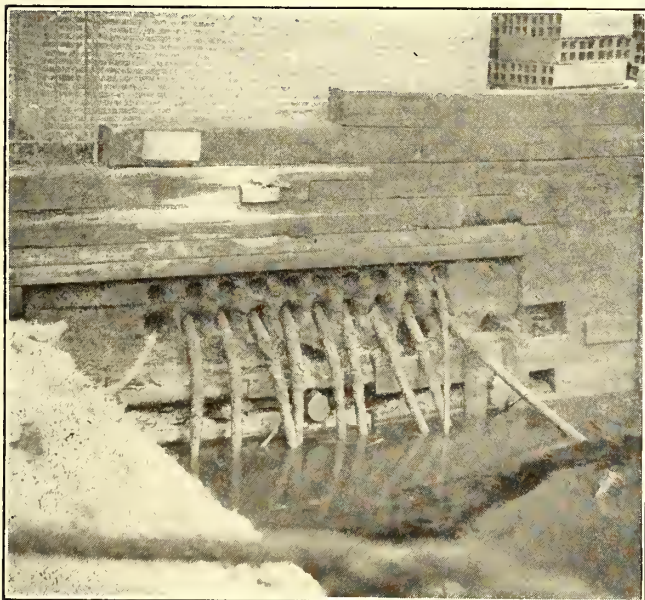


Fig. 10—Harlem Cables—West Cable House, Showing Duct Entrances

The same methods of pulling the ends of the cables into the house as were adopted for the east side were used in securing the west ends, namely by a pulling line secured to the cable at several points by servage straps which were cut at the entrance to the cable house as the cable was worked inside. The west side landing was more difficult because of the fact that the cables enter the house at right angles to their direc-

tion in crossing the river. The east cable house entrance is directly in line with the crossing. Fig. 9 shows the east cable house entrance, the top cables being those under consideration. For some reason ducts were not provided in the walls of this house for additional cables, so that holes had to be put through the concrete foundations as shown. The bottom cables in this case are those existing at the time of this installation and previously referred to. Fig. 10 shows the west cable house entrance, which is at right angles to the direction of the cables lying in the river bed. Spare ducts were provided in this house, as may be seen. This photograph was taken previous to the installation of the seven cables just described, and these cables later occupied seven of the top row of ducts shown.

The cable to the extreme right in Fig. 10 was pulled into the position indicated while the effort to raise the existing cable already mentioned was in progress. It clearly illustrates the interference caused by position. It was this fact, together with a logical review of conditions, which caused the simultaneous installation plans to be perfected. It was the consensus of opinion of those interested in this installation that whenever several cables are to be laid at one time they should be so laid as to preserve the same relations in the matter of location from one termination to the other. In submarine work it is impossible to view the progress of the work in the water, so that simultaneous installation in some such manner as that followed in this work is to be recommended.

The work described was completed and put in service about the first of January, 1911.

RECENT IMPROVEMENTS BY THE CORSICANA GAS & ELECTRIC COMPANY

The Corsicana (Tex.) Gas & Electric Company has recently constructed the car house illustrated in the accompanying engraving. It is of concrete throughout, the roof being concrete with a coating of bitumen to shed the water. The building is 30 ft. wide x 120 ft. long. It is lighted by three skylights 6 ft. x 12 ft. The skylights and windows are glazed with wire glass set in metal framing. The company has recently put two new



New Concrete Car House in Corsicana

pay-as-you-enter cars in operation and during the last year has ballasted most of its tracks.

This work has been carried on under the immediate direction of J. W. Carpenter, president and general manager of the company. Mr. Carpenter was formerly with the General Electric Company at Schenectady, but has been associated with the Corsicana Gas & Electric Company for the past four years. The Corsicana company operates 4 miles of track and 6 cars.

ELECTRIC EXPRESS DEVELOPMENT IN MASSACHUSETTS

Electric express service is rapidly coming to the front in Massachusetts as a source of income from street railway operation. During the past seven years the companies have had the benefit of working under a general law placing final jurisdiction regarding freight and express franchises in the hands of the Massachusetts Railroad Commission and are no longer dependent upon special legislation in this connection. The returns of the companies, as filed with the board for the nine months ended June 30, 1910, show that a revenue of about \$175,000 was derived by the companies during that period from the carriage of express matter and freight. About 35 companies have had authority given them to carry express matter or freight at the present time, franchises having been granted in about 100 municipalities.

Prior to 1903 special legislation had to be secured to permit a company to engage in the carriage of freight or express matter, unless such provision was included in the charter of the company. The passage of Chap. 202, Acts of 1903, replaced with a general law the course of special legislation which in the past had conferred vague rights upon particular companies. The law now stands in an amended form as Chap. 402, Acts of 1907, and provides that a street railway company may become a common carrier of newspapers, baggage, express matter and freight upon such portions of its system and to such an extent as, after public notice and hearing, upon the petition of any interested party, the aldermen or selectmen of municipalities and the Railroad Commission may approve. In case the local authorities act adversely or fail to act within 60 days from the date of the filing of the petition an appeal may be taken to the Railroad Commission, which then determines through public hearing whether public necessity and convenience require the granting of the petition. The board then is required to issue a finding, either dismissing the petition or setting forth the conditions upon which the company is to act as common carrier. Any company acting under this authority is subject from time to time to the regulations of local authorities, with the approval of the board as a final tribunal. The authority conferred upon any company by this act may be revoked or terminated at any time wholly or in part by the Board of Aldermen or Selectmen, with the approval of the commission. Since the passage of this law there have been efforts to obtain legislative authority for the grant of limited franchises for freight and express service, but the policy of the commission has been to favor the indeterminate franchise. Chap. 278, Acts of 1908, authorized all street railway companies within the State to carry milk and cream, subject only to the supervision of the Railroad Commission and regardless of any previous restrictions.

The companies now authorized to carry express or freight are as follows: Springfield Street Railway Company, Old Colony Street Railway Company, Boston & Northern Street Railway Company, Blue Hill Street Railway Company, Brockton & Plymouth Street Railway Company, Interstate Consolidated Street Railway Company, Springfield & Eastern Street Railway Company, Westboro & Hopkinton Street Railway Company, Natick & Cochituate Street Railway Company, Concord, Maynard & Hudson Street Railway Company, Connecticut Valley Street Railway Company, Lexington & Boston Street Railway Company, Middlesex & Boston Street Railway Company, Berkshire Street Railway Company, Boston & Worcester Street Railway Company, Citizens' Electric Street Railway Company (Newburyport), Fitchburg & Leominster Street Railway Company, Gardner, Westminster & Fitchburg Street Railway Company, Hartford & Worcester Street Railway Company, Haverhill & Amesbury Street Railway Company, Milford, Attleboro & Woonsocket Street Railway Company, Worcester & Southbridge Street Railway Company, Providence & Fall River Street Railway Company, Shelburne Falls & Col-raine Street Railway Company, Taunton & Pawtucket Street Railway Company, Holyoke Street Railway Company, New Bedford & Onset Street Railway Company and Dartmouth & Westport Street Railway Company.

Franchises have been granted for the carrying of express, baggage or freight in the following municipalities:

Westfield, Russell, Huntington, Abington, Rockland, Whitman, Bridgewater, Middleboro, Springfield, Chicopee, Agawam, West Springfield, Canton, Milton, Plymouth, Kingston, North Attleboro, Taunton, Brockton, Dighton, Rehoboth, Raynham, Easton, Seekonk, West Bridgewater, Hopkinton, Ashland, Sherborn, Brimfield, Waltham, Westboro, Natick, Wellesley, Watertown, Lakeville, Freetown, Fall River, Quincy, Randolph, Avon, Hudson, Stow, Maynard, Acton, Concord, Deerfield, Whately, Hatfield, Cheshire, Stoughton, Newton, Marlboro, Southboro, Framingham, Billerica, Hanson, Pembroke, Somerset, Palmer, Monson, Wilbraham, Hinsdale, Ware, Lee, Stockbridge, Newburyport, Fitchburg, Leominster, Lunenburg, Gardner, Westminster, Sturbridge, Plainville, Great Barrington, Andover, Chelmsford, Ipswich, Lawrence, Hadley, Amesbury, Haverhill, Salisbury, Attleboro, Bellingham, Blackstone, Franklin, Hopedale, Mendon, Milford, Wrentham, Southbridge, New Bedford, Braintree, Holbrook, Egremont, North Adams, Sheffield, Merimac, Shrewsbury and Northboro.

Two types of electric express and freight orders are issued by the Railroad Commission, the first covering cases where the local authorities approve the petition of the company, and the second cases where the local authorities are for some reason overruled by the commission. An example of the first is given in the petition of the Berkshire Street Railway Company for authority to act as common carrier of baggage and freight in Great Barrington, and of the second in the similar petition of the Boston & Northern Street Railway Company in the town of Andover. The decisions of the commission in each case are appended.

EXPRESS, STREET RAILWAY.

Petition of the Berkshire Street Railway Company for authority to act as common carrier of baggage and freight in Great Barrington.

The petitioner has obtained from the selectmen of the town of Great Barrington, by an order dated Aug. 12, 1907, and amended by an order of said selectmen adopted Feb. 28, 1910, authority to conduct the business of a common carrier of newspapers, baggage, express matter and freight within that town.

After notice and hearing, — it is
Ordered, That the board hereby certify that public necessity and convenience require that the Berkshire Street Railway Company act as a common carrier upon the lines of railway named in the order of the selectmen granting said authority, to the extent of receiving, carrying and delivering such baggage and freight, described in the schedule on file with the petition, as is usually transported by express companies, restricted to exclude besides explosives all articles and commodities the transportation of which may be hereafter prohibited by the board, upon the understanding that the facilities by which and the manner in which the business is conducted shall be subject to supervision and regulation by the board from time to time as the public interests may require.

Attest: CHARLES E. MANN,
Clerk.

March 10, 1910. [6732]

Petition of the Boston & Northern Street Railway Company that it be required to act as a common carrier of baggage and freight in Andover.

It appearing, after notice and hearing, held under the provisions of Chapter 402 of the Acts of 1907, that the Boston & Northern Street Railway Company has heretofore filed with the selectmen of the town of Andover a petition for approval of the right to act as a common carrier in that town; and the selectmen having acted adversely on said petition, and the Board being of opinion that the rights petitioned for ought to be granted, — it is

Ordered, That the board hereby certify that the public convenience and necessity require the granting of this petition, and therefore that the Boston & Northern Street Railway Company be required to act as a common carrier upon the lines of its railway in Andover, to the extent of receiving, carrying and delivering such baggage and freight, described in the schedule on file with the petition, as is usually transported by express companies, restricted to exclude besides explosives all articles and commodities the transportation of which may be hereafter prohibited by the board.

This order is made subject to the following regulations and restrictions:

1. The company shall receive and deliver baggage, express and freight at suitable places or stations, and without discrimination or favor to any person or corporation.

2. All baggage, express and freight shall be transported in suitable cars to be provided with proper fenders, brakes and safety appliances, and to be run at no time at a higher rate of speed than that at which the company operates passenger cars.

3. The exercise of the authority herein granted shall in no way alter or abridge the duties and obligations of the company relative to the transportation of passengers, nor in any way interfere with the conduct of the passenger service.

4. The company shall be subject to such further regulations and restrictions as shall be lawfully made from time to time.

5. The authority herein granted is given upon the express condition that it shall not operate in any way to enhance the value of the assets of the company in the event of a purchase of the railway property by the town or State.

By the Board,

CHARLES E. MANN, Clerk.

June 30, 1910. [7824]

The accompanying table shows the approximate earnings of

the different companies from the carriage of express or freight in the nine months ended June 30, 1910:

TABLE SHOWING GROSS INCOME AND INCOME FROM FREIGHT AND EXPRESS, VARIOUS COMPANIES IN MASSACHUSETTS, FOR YEAR ENDED JUNE 30, 1910.

Company.	Gross Income.	Express and Freight Income.
Old Colony	\$2,141,044	\$63,980
Boston & Northern	3,432,902	.....
Connecticut Valley	140,097	2,684
Middlesex & Boston	469,839	2,117
Boston & Worcester	368,943	.....
Berkshire	342,470	7,232
Brockton & Plymouth	72,415	2,592
Pittsfield (now Berkshire)	137,920	1,453
Providence & Fall River	30,916	12,709
Shelburne Falls & Colraine	19,164	11,230
Springfield	1,179,582	13,791
Worcester Consolidated	1,283,067	1,821
Worcester & Southbridge	183,279	2,268
Fitchburg & Leominster	195,438	3,205
Gardner, Westminster & Fitchburg	45,364	2,401
Holyoke	361,391	9,639
New Bedford & Onset	80,403	7,453
Dartmouth & Westport	170,494	20,030

NOTE.—Companies earning less than \$1,000 from carriage of express or freight are omitted from above tabulation.

The Railroad Commission has long recognized the advantages of electric express service, and comparatively little difficulty has been encountered by the companies in receiving carrier rights from the board, although in some cases the commission has issued special instructions. Thus in the granting of rights to the Old Colony Street Railway Company in Quincy the commission ordered the company to carry baggage, express matter and freight without discrimination in suitable cars equipped with proper brakes, fenders and safety appliances and without interference of any kind with the passenger service. The company is further informed that its assets are not to be considered enhanced by the common-carrier privilege, in the event of the purchase of the road by the State. It is not permitted to receive or deliver merchandise within the limits of any street or public way, and not more than two freight cars are to be run at any one time, nor can they be run in the highways between 12 p. m. and 5 a. m. The company is authorized to transport commodities usually handled by express companies, with the exception of explosives.

A provision in the Massachusetts law enables street railway companies to carry liquor, but in cases where the local authorities object the word "liquors" is usually stricken out by agreement between the company and the town authorities. The Railroad Commission has no authority to refuse to grant a franchise which includes liquors in the list of articles a company may carry.

The Boston Elevated Railway Company has as yet no freight or express carrying rights, but recognizes a growing demand for such facilities from companies which seek to send goods into Boston and transport them from the city into outlying districts. The company recently petitioned the Boston City Council for freight-carrying rights, but, pending the development of comprehensive plans, the petition has been denied, the matter not having as yet been considered on its merits. It is probable that legislation will be proposed at the 1911 session of the General Court to extend further the possibilities of electric express and freight carrying.

B. J. ARNOLD TO INVESTIGATE PROVIDENCE AND BUFFALO

At the request of the Mayor and Common Council of Providence, R. I., B. J. Arnold, chief engineer board of supervising engineers, Chicago Traction, will conduct an examination of the surface railway conditions of Providence and will present a report on this subject with recommendations as to improvements. On Feb. 11 Mr. Arnold outlined in a speech before the Conservative Club at Providence some of the problems which were confronting street railways at the present day and the methods which had been adopted in other cities, particularly in Chicago, to improve the local street railway system. According to Mr. Arnold the best results are secured only when the subject is approached in a broad and co-operative

spirit by the public, the company, the city government, the property owners and the financiers interested in the property. Other speakers were Edward G. Buckland, vice-president of the New York, New Haven & Hartford Railroad, which controls the electric railways in Providence, and Henry Fletcher, Mayor of the city.

Mr. Arnold has also been engaged by the International Traction Company, Buffalo, to appraise its properties. This appointment was made because of proposed refinancing plans of the company for which the Public Service Commission, Second District, New York, required an appraisal of the physical property of the company. The company submitted the name of Mr. Arnold as appraiser to meet this requirement and the commission approved his selection.

PRESIDENT TAFT'S TRIP OVER THE LINES OF THE ILLINOIS TRACTION SYSTEM

A short account was published last week in the *ELECTRIC RAILWAY JOURNAL* of the trip taken by President Taft on Feb. 11 over the lines of the Illinois Traction System as a guest of William B. McKinley. The accompanying illustration shows the President about to board the private car No. 233 of the Illinois Traction System at Decatur, Ill. For this view this



Reception by President Taft During His Trip Over the Illinois Traction System

paper is indebted to the International Stereograph Company, Decatur.

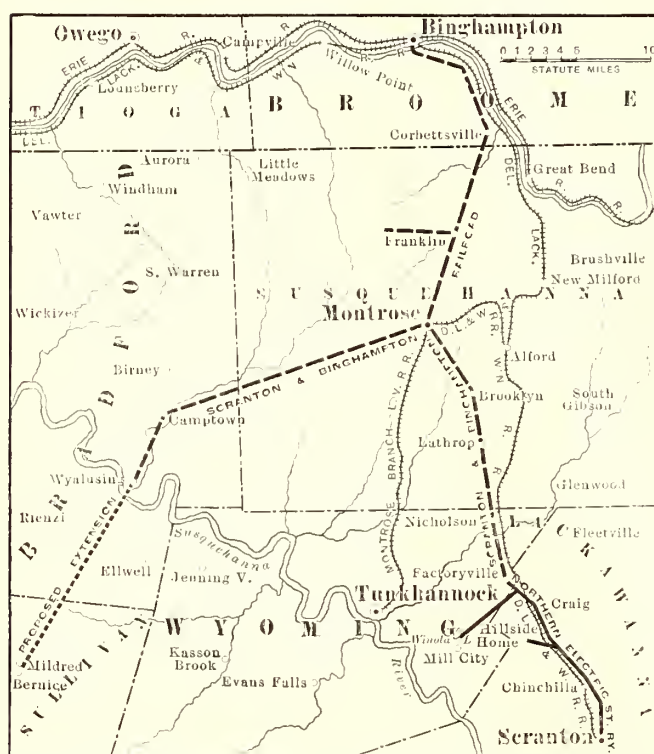
In the view President Taft is shown shaking hands with C. F. Handsby, general superintendent Illinois Traction System. At the President's left is standing Mr. McKinley with his hand on H. E. Chubbuck, vice-president executive of the company. At the steps of the car is J. M. Bosenbury, superintendent of equipment and motive power. The others are members of the reception committee from Springfield and of the President's party.

A municipal coal supply, with the Corporation Tramways as distributing agency, is a project which the Social Democratic and Independent Labor parties in Huddersfield, England, are advocating. Though not yet general, coal trucks are operated on the tramways in Huddersfield. The coal is carried from the railway sidings to three of the largest mills, and it is stated that the cost of carriage is about half what is charged for carrying coal in the ordinary way and that the corporation makes a substantial profit. The Labor party contends that in its tramway system the corporation is admirably equipped to handle, carry and deliver coal, and that by so doing the cost of coal to the household would be cheapened about 5d a ton. Quite a number of English municipal railways carry light freight in competition with wagon service.

THE PROPOSED SCRANTON-BINGHAMTON RAILROAD

The Northern Electric Street Railway Company, of Scranton, was leased on July 1, 1910, to a new corporation known as the Scranton-Binghamton Railroad Company, which is to construct two lines—one from Scranton, Pa., to Binghamton, N. Y., and the other from Montrose, Pa., to Wyalusing, Pa. The first line will begin at Factoryville, a point on the line of the Northern Electric Street Railway 15 miles from Scranton, and will terminate at Binghamton, 50 miles distant, by way of Montrose, the county seat of Susquehanna County, Pa. The branch line through the Wyalusing Valley will be 30 miles long. The subsidiary Northern Electric Street Railway now has over 20 miles in operation and shortly will add 10 miles more, so that the system when completed will embrace 110 miles of track.

The Scranton-Binghamton Railroad Company has a steam railroad charter, but the Wyalusing branch only will be operated by steam until such time as it will pay to electrify it. It is



Map of Northern Electric Street Railway, Scranton, and Projected Extensions by the Scranton & Binghamton Railroad

expected that the main line will get most of the large summer-resort business which is now brought to Montrose in a round-about way by the Delaware, Lackawanna & Western Railroad. In fact, the electric railway will save 11 miles each way. Freight and express matter will be an important factor on both new routes. The completed system will serve a population, adjacent and tributary to the lines outside of Scranton and Binghamton, of approximately 50,000, or about 500 per mile of track. The total population, including Scranton and Binghamton with their suburbs, is figured at 270,000.

The company has obtained a 60-ft. right-of-way which will not only permit double-tracking eventually, but also will allow the high-tension transmission poles to be set at a safe distance from the railway. Locations and surveys have been completed, and as much preliminary grading and similar work is under way as the winter weather permits. The first 2 or 3 miles of the main line will require rock cuts up to 1000 ft. in length, but the rest of the system will offer no physical difficulties. The first section to be completed will be from Factoryville, Pa., to Nicholson, Pa., a distance of 7 miles. It is planned to have this division in operation by the fall of 1911.

The standard track construction throughout will include 75-lb. T-rail. The overhead construction will be of the bracket type, similar to that of the Northern Electric Street Railway, with No. 0000 trolley throughout. The initial power requirements will be met by installing two 750-kw turbines in the enlarged plant of the Northern company at Dalton, 11 miles from Scranton. The transmission circuit to the three 400-kw substations will be 33,000 volts, three-phase, 25 cycles, the potential being double that which is now transmitted from Dalton. The new rolling stock for the Scranton-Binghamton lines will be of full interurban type, with baggage compartment, toilet room, etc. The smaller Northern rolling stock, however, will be fitted for train operation over the new line by installing automatic multiple unit control.

The handling of dairy products will be a very important feature of the new system. The district to be opened up now produces at least 5000 40-quart cans of milk a day, which have to be transported by teams to the steam railroad stations 8 miles to 20 miles distant. In connection with the development of the dairy business it is planned to establish a central creamery for the production of high-grade milk products. The milk products, as well as other perishable articles, will be handled like express matter. It is probable that electric locomotives and freight cars will be employed for this purpose. Sidings will be established wherever suitable terms can be made. In some instances farmers have offered right-of-way in exchange for this privilege.

The Scranton-Binghamton Railroad Company is owned by the same interests which built the Northern Electric Street Railway. The officers are as follows: President, T. J. Foster, president International Text Book Company, Scranton; vice-president, F. W. Wollerton; secretary and treasurer, W. L. Connell; general manager, and in charge of construction, R. W. Day.

MAIL SERVICE ON ELECTRIC RAILWAYS

There were in operation on June 30, 1910, a total of 539 United States mail routes on electric and cable railways, covering an aggregate length of 7197.54 miles and involving an annual expenditure of \$673,830. The annual report of Joseph Stewart, second assistant postmaster-general, covering the year ended on that date, relates to the transportation of mails. It gives the following results for the year, as compared with the preceding year:

ELECTRIC AND CABLE CAR SERVICE.			
	Year Ended June 30, 1910.	Increase Over No.	Prev. Yr. Per Cent.
Number of routes.....	539	14	2.67
Length of routes (miles).....	7,197.54	228.20	3.27
Annual travel (miles).....	11,629,652.15	*309,720.96	*2.59
Annual rate of expenditure.....	\$673,830.26	\$29,852.48	4.64
Av. rate of cost per mile of length.....	\$93.61	\$1.21	1.31
Av. rate of cost per mile traveled.....	5.79 cts.	*0.40 ct	*7.42
Av. number of trips per week.....	15.53	*0.94	*5.71

* Decrease.

In his report Mr. Stewart says:

"The appropriation for the fiscal year was \$730,000; the amount expended, as reported by the auditor, was \$662,155, leaving a balance of \$67,845, out of which unsettled accounts must be paid. The appropriation for the fiscal year of 1911 is \$720,000. The annual rate of expenditure was: July 1, 1910, \$692,727; Sept. 30, 1910, \$690,684. The sum estimated as necessary for the fiscal year ending June 30, 1912, is \$740,000, being \$20,000, or 2.77 per cent, more than the appropriation for the current fiscal year.

"In accordance with the provision of law allowing the maximum rates of compensation to be paid for electric and cable car service, readjustments have been made, where the facts and circumstances would justify them, which have resulted in a net increase of \$9,708 for the fiscal year.

"The act making appropriations for this service for the fiscal year of 1910 includes a provision that not exceeding \$30,000 of the sum appropriated may be expended, in the discretion of the Postmaster-General, where unusual conditions exist or where such service will be more expeditious or efficient

and at no greater cost than otherwise. Under this provision the total annual rate of \$7,844 has been authorized. The act making appropriations for the fiscal year ending June 30, 1911, reduces the sum available to \$10,000. At the time of the writing of this report the annual rate of expenditure under this provision was \$8,565. It will be advisable, therefore, to increase the amount available for the year 1912 to \$15,000.

"In the last annual report attention was called to the desirability of making a certain amount of the appropriation for electric car service available for substituted motor wagon service, to enable the department to care for cases where it becomes advisable to substitute motor wagon service for electric car service. This could not otherwise be done on account of the fact that the appropriation for regulation screen wagon service is generally no more than sufficient to care for present contract obligations and increases which are foreseen. The appropriation act for the fiscal year of 1911 contains a provision in connection with the item for electric and cable cars authorizing the expenditure of not exceeding \$100,000 of the appropriation for regulation screen or motor screen wagon service, which may be substituted in lieu of electric or cable car service. . . . (in case of) unreasonable demands by electric car companies . . . in large cities."

Railway post office cars are operated on 681.63 miles of electric lines, an increase of 13.55 per cent over the previous fiscal year, and they furnished 625,044 miles of service in the year, an increase of 1.59 per cent. Closed-pouch service was furnished on an aggregate length of 6197.33 miles of electric lines, an increase of 2.65 per cent, furnishing 9,135,302 miles of service, or an increase of 4.18 per cent.

ELECTRIC AND CABLE CAR SERVICE IN OPERATION ON JUNE 30, 1910.

State or Territory	Number of Routes.	Length of Routes, Miles.	Distance Traveled per Annum, Miles.	Annual Rate of Expenditure, Dollars.
Maine	14	151.94	202,327.89	7,214.36
New Hampshire	10	76.85	118,703.88	7,011.98
Vermont	7	40.80	83,581.92	2,736.47
Massachusetts	63	614.03	1,175,037.91	72,301.01
Rhode Island	10	131.21	298,453.54	11,020.35
Connecticut	27	242.48	350,825.95	11,301.83
New York	40	548.69	1,148,790.30	68,839.42
New Jersey	14	148.07	278,974.88	12,476.95
Pennsylvania	73	908.46	1,586,736.06	82,456.24
Delaware .....	..	..	..	..
Maryland	12	229.05	528,545.61	48,274.46
Virginia	8	86.11	89,529.32	3,020.16
West Virginia	6	52.65	77,723.05	2,478.45
Total first section...	284	3,230.34	5,939,230.31	329,131.66
North Carolina	3	15.38	28,089.12	1,005.35
South Carolina	4	24.02	36,580.46	1,141.37
Georgia	4	28.75	61,343.07	2,043.15
Florida	3	19.78	29,005.97	998.18
Porto Rico	1	7.37	17,304.65	519.13
Alabama	6	47.03	122,699.92	3,751.29
Mississippi	2	3.80	5,152.80	229.51
Tennessee	6	80.27	156,860.60	6,484.26
Kentucky	2	29.70	81,851.79	2,455.54
Total second section.	31	256.10	538,897.38	18,627.78
Ohio	69	1,072.72	1,598,210.59	68,390.71
Indiana	13	241.90	198,093.43	5,972.87
Illinois	21	283.16	590,397.12	71,633.48
Michigan	20	414.45	550,504.23	23,052.56
Wisconsin	5	35.49	58,607.02	2,217.79
Minnesota	7	117.30	157,840.13	4,794.46
Iowa	11	257.06	267,503.64	10,570.09
Missouri	4	128.02	422,691.01	61,379.53
Total third section..	150	2,550.10	3,843,847.17	248,011.49
Arkansas .....	..	..	..	..
Louisiana	2	17.44	62,671.80	1,958.33
Texas	5	127.89	156,128.55	4,731.26
Oklahoma	3	26.40	33,805.93	1,105.03
Kansas	5	45.81	62,204.76	1,866.12
Nebraska	2	35.35	127,492.22	5,099.68
South Dakota .....	..	..	..	..
North Dakota	1	2.51	2,473.15	175.00
Montana .....	..	..	..	..
Wyoming .....	..	..	..	..
Colorado	3	48.91	75,047.92	2,263.89
New Mexico .....	..	..	..	..
Arizona	1	4.07	5,730.56	250.00
Utah	2	24.73	37,252.36	1,212.49
Idaho	4	72.02	85,887.82	3,828.84
Washington	11	256.37	316,457.22	19,203.70
Oregon	8	102.16	150,528.11	5,927.49
Nevada .....	..	..	..	..
California	27	397.34	191,996.89	30,437.50
Alaska .....	..	..	..	..
Hawaii .....	..	..	..	..
Total fourth section.	74	1,161.00	1,307,677.29	78,059.33
Grand total	539	7,197.54	11,629,652.15	673,830.26

TRANSFER TALKS IN TORONTO

For some time the Toronto Railway Company has been following the practice of posting on the bulletin boards of its car houses from time to time "talks" on the subject of transfers and other topics dealing with the operation of cars. The information contained in these talks is taken from private reports, complaints or complimentary letters received at the head office, or from other reliable sources where the information obtained is thought to be of benefit in educating the men to a better conception of their duties. The plan is followed of illustrating the points made, where possible, with actual incidents and of giving the trainman's number as proof to the men that the story is bona fide. This, it is believed, assists in bringing the lesson home. A few of the transfer talks follow:

"TRANSFER TALKS TO CONDUCTORS. THE VALUE OF A PROPERLY MADE TRANSFER REPORT"

"No doubt some conductors think that the filling in of transfer reports is a piece of red tape invented by somebody in the head office who liked to make work for other people. A lot of the older men can remember when there was no report to fill in, and some of the younger fellows haven't been long enough on the job to see why anyone wants to keep track of the transfers.

"If you will think for a minute that 40 per cent of the people who pay a fare ride on another car without paying a fare and with only a transfer to hand in you will see that the company has a very good reason for keeping tab on the transfers. You don't need any long argument to prove that side of the question. It may not have occurred to you, however, that the transfer reports are important from the conductor's point of view. Well, here is a little instance that happened the other day:

"A well-known citizen came into the head office to complain about a conductor on a Belt Line car for punching his transfer an hour late. He said he got on a Belt Line car at the corner of King and Sherbourne Streets, rode up to Spadina and Queen, and there boarded a Dundas car. When he handed in his transfer the Dundas conductor refused it because it was an hour late. He looked at the transfer and sure enough it was punched for 12:10 instead of 1:10. Moreover, instead of being punched for Dundas the transfer was punched King. The conductor seemed to have made a nice mess of it, and the man was good and mad.

"However, the Belt Line conductor's transfer report was looked up and the transfer traced. Then it was found that the transfer was punched at the right time and was properly recorded. The conductor was right; the man wouldn't lie, and he wasn't trying to beat the company out of a fare. Everybody was puzzled for a minute. Then the passenger remembered that an hour earlier in the day he had ridden on a Belt Line car and had got a transfer to King East. When he got off he didn't see a car right on the spot and as he had only a little way to go he shoved the transfer in his pocket and walked. An hour later he got another transfer, correctly punched, but made a mistake and handed in the wrong one.

"It was one on him all right, so he apologized and went home. If the company wanted a testimonial for its system of checking transfers he would give a good one.

"Now, if this system hadn't been adopted, or if the Belt Line conductor hadn't made up his report properly, he would have had no way of proving that he hadn't made a bad break. It would have been his word against the passenger's, and the circumstantial evidence against the conductor would have been strong. Suppose he had had the bad luck to get into trouble like this two or three times. He might have been right every time, but he would have had no way of proving it.

"This ought to prove that the transfer reports aren't red tape any more than bookkeeping is. The conductor who doesn't look well after his transfer report and the business man who tries to muddle through without books are in the same boat.

"THE OBSERVER."

"TRANSFER TALKS TO CONDUCTORS. THE WELL-DRESSED BEAT"

"Conductor No. 1769 let a man bluff him out of a fare on a Bloor car a couple of weeks ago, probably because Mr. Passenger was well dressed and carried himself as if he amounted to something out of the ordinary. This chap got on the car at the corner of College and Spadina with three others. The conductor called for the fares and collected three, but as the fourth man paid no attention to him he evidently came to the conclusion that he had paid.

"When the car got down McCaul Street our friend the dead-head asked for a transfer to King East. At this the conductor balked, for he probably had a suspicion of the passenger. Anyway, he told him that he should have asked for his transfer when he paid his fare. So the passenger took the conductor's number and got off, telling him he would have him fired.

"Conductor No. 1769 needn't be alarmed about that. He won't be fired for declining to give a man a transfer long after the time he is supposed to have paid his fare. He is much more likely to get into trouble for not collecting fares. There wasn't much excuse for him this time, for there weren't many people on the car. Next time he won't be bluffed just because a man is well dressed.

"Whether he was suspicious of the passenger or not, No. 1769 was dead right in not giving him a transfer when he didn't remember whether he was entitled to one or not. The time to give a transfer is when the fare is paid. Passengers are getting used to this habit and a few object lessons such as No. 1769 gave the deadbeat on the Bloor car will help a whole lot.

"Deadbeats are nearly all well dressed. If they weren't they could not get away with it, and as they don't intend to pay for their clothes they might as well order a \$40 suit as a \$10 one.

"There is one tall, elderly man who lives in South Parkdale. I have ridden on the car with him a dozen times and have never yet seen him pay a fare when the car was anyway crowded. When the conductor calls out 'Fares, please!' this aristocratic old chap takes a peek at the conductor over the edge of his paper and goes on reading. He is well dressed and looks like a banker. But he's just a 'beat' and one of these days he'll get what's coming to him.

"THE OBSERVER."

"The Following Extracts Were Taken from Reports Received at Head Office:

"Took King West at 3:05 p. m. Car 1116. Run 10. Conductor 205. Car well filled, several standing, first-class service given here. Conductor neat, very prompt, did not miss a fare, handled fare box well, examined and punched transfers carefully. One passenger gave an old transfer, but conductor detected it at once and had the passenger give a good one. Another passenger, seeing the incident, remarked to his friend: 'I always carry a stock of old transfers and often pass one off on a conductor, especially when a car is crowded.' All streets called regularly. Running all right.

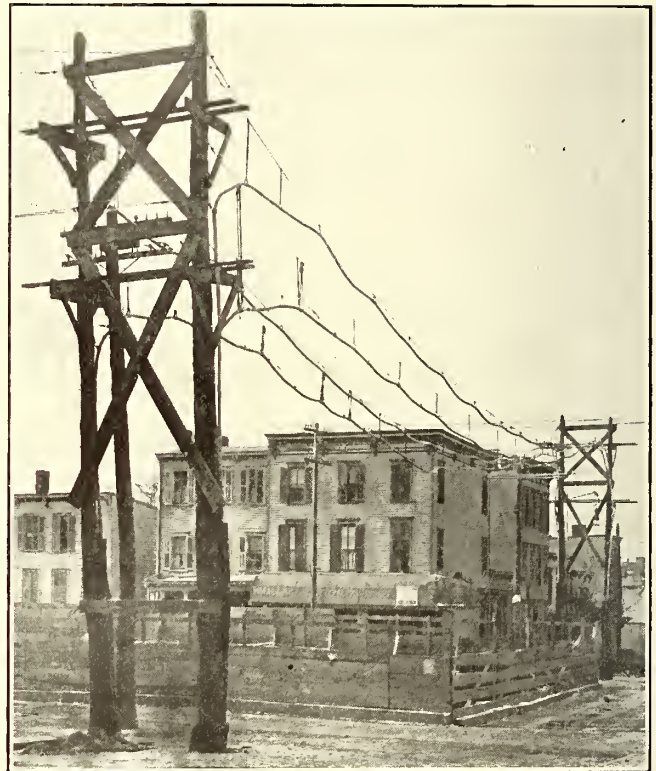
"Bloor 674. Conductor 1521, running east on College, 12:54 p. m. Twenty-two on car, five got on at Spadina. Conductor collected fares promptly; one very well-dressed man wearing a fur coat handed conductor a Spadina transfer. Conductor looked it over carefully and said: 'Pardon me, but this transfer is away late.' The man said: 'I have just got off the other car.' Conductor said: 'It is your business as well as mine to see your transfer is punched correctly. I can't accept this transfer.' The man put in another ticket. I have noticed this man getting on cars several times and his transfer is always late, but this is the first time he has had to pay the second fare.

"Yonge car at Carlton Street at 8 p. m. Run 20. Conductor 755. There were about 28 passengers on during this trip to Cottingham Street. A transfer was not collected from a woman who sat beside the stove. She boarded car at Bloor Street and held the transfer in her hand all the time. The fare box was handled in a very clean manner during the trip. Conductor knocked all tickets down into the slot as soon as

they were collected, and the table was kept clear all the time. I did not see this conductor give any transfers out during the trip. Those he received were examined carefully. Conductor was neat in appearance. Car was clean; well handled by motorman."

TEMPORARY HIGH-TENSION OVERHEAD CROSSING IN BROOKLYN

The accompanying illustration shows the method used by the Brooklyn Rapid Transit System to maintain the continuity of four high-tension lead-covered cables at the corner of Fourth Avenue and Twentieth Street, Brooklyn. Owing to the construction of an underground railway along Fourth Avenue it was found necessary to remove the cable duct which crossed the subway through Twentieth Street. Four heavy messenger wires were attached to these poles and extended to the ground



Temporary High-Tension Cable Crossing Over the Fourth Avenue Subway, Brooklyn

level for anchorage by "deadmen." The four high-tension cables, weighing about 9.5 lb. per foot each, were brought directly up the poles from the conduit subway and suspended by marlines from the messenger cables. The installation has been in place since October, 1910, and has proved entirely satisfactory. The construction is such that any damage which could happen to cables of this kind can be quickly located and repaired. A cable used in this manner will last a long time under conditions similar to this installation, but it would hardly be advisable to use it underground again. Special attention was paid to the protection of each cable where it leaves the ground and where it is attached to the poles in order to prevent boys or other maliciously inclined persons from causing damage. Had wood been used it would have been stolen and the cable left exposed; consequently, heavy galvanized iron was employed. In order to prevent boys from climbing up the ground portion of the messenger wires the space was fenced off and the wires were covered with greased barbed wire.

The Moscow-Windau-Rybinsk Railroad in Russia has recently installed on its Tsarskoe-Selo branch some A. E. G. motor cars operated by Hagen storage batteries.

FIRST REGULAR MEETING OF THE NEW ILLINOIS ELECTRIC RAILWAYS ASSOCIATION

The first regular meeting of the new Illinois Electric Railways Association was held at the Great Northern Hotel, Chicago, on Feb. 17. At this meeting 25 railroads were represented. The two sessions were presided over by H. E. Chubbuck, president of the new association and vice-president executive of the Illinois Traction System. C. E. Flenner, auditor of the Aurora, Elgin & Chicago Railroad, who has been actively engaged in the work of forming the new association, acted as secretary of the Chicago meeting. The important features of the meeting included the adoption of a constitution and by-laws, the completion of the list of officers of the association and the hearing of a report on the advisability of consolidating with the Central Electric Railway Association. On this latter subject it was the judgment of the meeting that the work of the two associations could be unified in some respects, but that it would be inadvisable, from the standpoint of the Illinois roads, to amalgamate the two associations.

At the close of the afternoon session announcement was made that the representatives of the traffic departments of a number of roads had decided to form an auxiliary association and carry on work supplementary to that of the Illinois Electric Railways Association.

The program of the Chicago meeting included the reading and approval of the minutes of the preliminary meeting held in Chicago on Jan. 19 and the approval and acceptance of the work of the temporary organization and its committees. W. L. Arnold, general manager Elgin-Belvidere Electric Company, made a report as chairman of the membership committee, stating that practically all of the companies represented at the Jan. 19 meeting had become members of the association and that since that meeting he had sent out membership letters and received encouraging replies from a comparatively large number of roads. C. L. Wilcoxon, general manager Chicago, Lake Shore & South Bend Railway; G. T. Seeley, general manager South Side Elevated Railroad, and E. C. Noe, general manager Northwestern Elevated Railroad, spoke in turn regarding the interest which their companies had taken in the formation of an Illinois association, and during the course of the meeting announced that their companies would become members.

CONSTITUTION AND BY-LAWS

The proposed constitution and by-laws next were read by the secretary. The association then went into executive session. At the close of the executive session it was announced that the articles governing the formation and operation of the association had been approved and made effective. A summary of the clauses of most general interest follows:

"CONSTITUTION

"Article 2.—Object

"The object of this association shall be to promote knowledge on all matters relating to the construction and management of electric railways which may be brought before the association for consideration and discussion, to collect and disseminate information of value to electric railway interests, to promote the interchange of traffic, to encourage social relations among its members and in all other proper ways to advance electric railway interests.

"Article 3.—Membership

"Section 1.—The membership of the association shall be confined to the State of Illinois; provided that the association may at any regular meeting by vote of two-thirds of all the members present extend the scope of the association so as to include any State or States.

"Section 2.—The membership of this association shall be divided into two classes—i.e., active and associate.

"Section 3.—The active membership shall consist, first, of interurban roads and city surface and elevated lines located wholly or in part within the territory embraced by the organization, to be known as 'railroad members'; second, persons engaged in or connected with railway supply business in all its branches, to be known as 'supply members.'

"Section 4.—'Associate members' shall consist of officials of electric lines outside of the territory and officers of other like associations.

"Article 5.—Duties of Executive Committee

"Section 1.—The executive committee shall exercise a general supervision over the interests, finances and affairs of the association, provide suitable quarters for meetings and make all necessary purchases, expenditures and contracts required to conduct the current business of the association; but shall have no power to make the association liable for any debt to an amount beyond the funds which at the time of contracting shall be in the hands of the treasurer in cash and not subject to prior liabilities.

"Section 2.—The executive committee shall recommend to the association for its approval a salary to be paid to the secretary-treasurer.

"Article 9.—Election of Members

"Section 1.—To become an active, supply or associate member a candidate's name shall be proposed in writing to the executive committee by at least two members in good standing at least two weeks previous to a regular meeting. All applications must be accompanied by the dues for the first calendar year. The fitness of the candidate for membership shall be considered by the executive committee, and, if approved, shall be reported to the association at the next regular meeting. The name of the candidate shall be acted upon, unless withdrawn at said regular meeting, and election to membership shall be by ballot, hand, yea or nay vote, a majority electing as the meeting may determine.

"BY-LAWS

"Article 1.—Time and Place of Meeting

"Section 1.—The regular meetings of this association shall be on the third Friday of each January, March, May, September and November at 10 a. m., subject to change by the executive committee after due notice.

"Article 3.—Voting

"Section 1.—On matters pertaining strictly to railroad method and standards or rules each railroad member is entitled to one vote, to be cast by the highest ranking officer present, supply, associate and honorary members not voting on these subjects.

"Section 2.—On all subjects except those mentioned in Section 1 all representatives of member companies, supply members and associate members may exercise the right of franchise.

"Article 4.—Dues

"Section 1.—The initiation fee shall be \$10 per company, and the annual dues shall be 50 cents per year per mile of track.

"Section 2.—The annual dues for supply members shall be \$25 for each company, and shall be payable at or before the annual meeting.

"Section 3.—The annual dues for associate members shall be \$5, and shall be payable at or before the annual meeting."

MEETINGS WITH THE RAILROAD COMMISSION

At the beginning of the afternoon session Mr. Chubbuck, speaking for the executive committee of the association, reported that it had held meetings and signified its willingness to accept the invitation of the Illinois Railroad and Warehouse Commission for any conferences which that body might announce.

REPORT ON CONSOLIDATION WITH CENTRAL ELECTRIC RAILWAY ASSOCIATION

B. E. Merwin, general superintendent Aurora, Elgin & Chicago Railroad, read the report of the committee of three which had been appointed to consider the feasibility of consolidating the new Illinois association with the Central Electric Railway Association. Mr. Merwin announced that a conference had been held with representatives of the Central Electric association and that the committee was impressed with the work which that association had done. He then called attention to the size of the association and to the benefits which its members obtained by co-operating in the solution of electric railway problems. He also spoke highly of the work of the Central Electric Traffic Association and described its rate and mileage bureaus. The committee, for which Mr. Merwin was speaking,

held that much good could be accomplished by consolidating the two organizations. The report of this committee was accepted and placed on file. The association then voted to continue this committee, consisting of B. E. Merwin, H. J. Vance and Charles Cox, instructing it to continue negotiations with the Central Electric Railway Association to determine whether or not it would be feasible for the roads in Illinois to join with the members of the Central Electric association in so far as the sale of interchangeable mileage was concerned. The committee was also instructed to determine, if the preceding arrangement could not be made, what plans should be put into effect to revive the sale of interurban interchangeable mileage in Illinois.

The association voted to continue the membership committee and instructed Mr. Arnold, chairman of that committee, to continue his campaign for new members and include in his correspondence the newly adopted requirements for admission.

ELECTION OF VICE-PRESIDENTS

Two vacancies in the list of officers were next filled by the election of Garret T. Seeley, general manager South Side Elevated Railroad, as first vice-president, and E. C. Noe, general manager Northwestern Elevated Railroad, as second vice-president.

TRAFFIC AUXILIARY

At the lunch hour the traffic representatives of eight roads in Illinois discussed the formation of a State traffic association which, among other things, could supervise the work of selling interchangeable mileage.

During the afternoon session of the Illinois Electric Railway Association Robert A. Barnett, traffic manager Chicago & Southern Traction Company, said that a number of Illinois roads, including the five interurban lines reaching Chicago, the Illinois Traction System and the Chicago, Ottawa & Peoria Railway, had considered the advisability of establishing a joint information bureau, ticket office and traffic office in Chicago. Mr. Barnett thought that the cost of such an office would be about \$10,000 a year. This would include the salary of a joint representative and would furnish an attractive location.

Mr. Chubbuck said that the Illinois Traction System and the Chicago, Ottawa & Peoria Railway had discussed having such an office to represent their two roads and that, therefore, they would very gladly co-operate with the other roads. He hoped that such an office might be established, but first thought it desirable for a committee to lay out carefully a scheme of work which would include the organization necessary, the cost and complete plans for apportioning the expense. A joint information bureau and ticket office would be valuable as city headquarters for representatives of outlying lines when visiting Chicago on business.

The association instructed the chair to appoint a committee of traffic men to prepare the information suggested by Mr. Chubbuck and to report at the March meeting of the association. The following committee was appointed: Robert A. Barnett, Chicago & Southern Traction Company; George Quackenbush, Illinois Traction System; Richard Breckinridge, Aurora, Elgin & Chicago Railroad; W. O. Woodward, Chicago, Lake Shore & South Bend Railway; E. H. Vivian, Chicago & Milwaukee Electric Railroad; A. W. Jordan, Chicago & Joliet Electric Railway. C. N. Wilcoxen spoke of the benefits to be obtained by the establishment of a joint ticket office and information bureau, and signified the willingness of his company to co-operate with other roads.

SIGNAL COMMITTEE

Following a short discussion on signals and their application to interurban railways, the chair appointed the following standing committee to collect information on signaling: G. T. Seeley, South Side Elevated Railroad; John Leisenring, Illinois Traction System; E. F. Gould, Aurora, Elgin & Chicago Railroad; T. M. Childs, Chicago, Lake Shore & South Bend Railway; L. E. Gould, ELECTRIC RAILWAY JOURNAL.

At the close of the Chicago meeting C. E. Flenner, speaking for E. C. Faber, general manager Aurora, Elgin & Chicago Railroad, invited the members of the Illinois Electric Railways

Association to make a trip over the Aurora, Elgin & Chicago line in one of the company's combination parlor and dining cars. Because of the lateness of the hour the trip was postponed.

The next meeting of the Illinois Electric Railways Association will be held at Bloomington on March 17. H. E. Chubbuck, vice-president executive Illinois Traction System, extended to the association the courtesies of a special train for a ride over the Illinois Traction lines which it is planned to take at the conclusion of the Bloomington meeting.

COMMUNICATION

BOSTON RAPID TRANSIT PLANS

Boston, Mass., Feb. 20, 1911.

TO THE EDITORS:

In the recent considerable discussions of plans for the improvement of rapid transit in Boston some important considerations have been too much left out of sight. The fundamental difficulty here in Boston is lack of foresight on the part of those who had the responsibility of planning the subways thus far constructed. As a consequence these have been merely palliative measures, unable to effect a radical cure of the existing evils. As you remarked in a recent article, the fundamental trouble in Boston is that all the transit lines converge inward like the ribs of a fan and are bound to produce congestion. The first subway served as a handle to the fan with the result to be expected, and the connection of this subway with the lines of traffic centering in the South Station was circuitous and ineffective. When the Washington Street subway was completed and the elevated trains removed from the original subway the case became even worse and the very heavy traffic converging at Park Street was practically cut off from the South Station. The transfer privileges readily granted by the Elevated Railway Company at Boylston Street involved going out of the subway, crossing perhaps the most crowded corner in Boston, waiting for a car and then pursuing a circuitous route thoroughly blocked during the rush hours, so that as a matter of fact the traveler could always save time in good weather by throwing away the transfer and walking to the South Station. A suitable union of traffic between the old subway and the new, with efficient connections to both railway stations, for some reason does not seem to be considered favorably by the projectors of the new route.

Now the third subway, which is approaching initiation, is temporarily held up pending further consideration. The project as it stands will relieve congestion in the Back Bay district by adding to the congestion at the Park Street terminus, and a movement is now on foot to have its route changed from the river bank to one through Boylston Street. Further, a subway connection between the North and South Stations is planned.

Now, the particular point which the writer wishes to make is that these plans, which will undoubtedly relieve the situation for a while, leave out of account the unmistakable tendency of the city as regards growth. The business district is moving westward, primarily along Boylston Street, but inevitably also along other parallel and cross streets of the Back Bay, and none of the subway schemes thus far projected takes adequate account of this tendency. The projected subway down Boylston Street would be an excellent thing for the merchants along a comparatively short stretch, but it would not meet the other requirements demanded by the coming development of neighboring territory. Nor would it be advantageous for railway transportation. The hotel district, like the business district, is moving westward, and within a few years the Back Bay station will become the important passenger station in Boston. In other words, the center of traffic 10 years from now is pretty certain to be near Copley Square instead of near Park Street. The railway congestion from trains coming in from westward and southward lies between

the Back Bay stations and the South Station. The construction of the South Station, indeed, was another piece of temporizing.

Bearing this in mind, one evident solution of the difficulty would seem to be a compromise between the two rival routes for the new westward subway, by which it would follow the river-bank course to Exeter or Dartmouth Streets, cross through the very heart of the Back Bay district, touch the Back Bay stations, which ought to be united instead of scattered as at present, and then swing around through Park Square and the Boylston Street subway to the North Station, either over substantially the old route or via the Washington Street route. In connection with this, a direct tunnel between the North and South Stations might or might not be necessary. The fact is, at all events, that 10 years from now Park Street will not be a central traffic point, nor will the South Station have anything like its present importance as regards the local passenger service. The city would be, in fact, better off if it were abandoned as a passenger station altogether and used merely as a freight station for the accommodation of the wholesale districts which lie near it. It seems a short-sighted policy to arrange the rapid transit situation with a view to the traffic conditions of 10 years ago instead of taking into account those which are likely to exist 10 years hence. Any subway construction superimposed on that already existing in Boston involves engineering difficulties, but they would not be substantially more serious under the arrangement here suggested than under those now projected. It is not always easy to foresee future lines of development in the growth of a city in time to allow for them, and plenty of mistakes have been made in the past, as they will be made in the future. Nevertheless, in the case of Boston the handwriting on the wall is perfectly plain so far as general tendencies go, and it should not be overlooked in executing the important and costly works for the betterment of the city.

ENGINEER.

TRANSPORTATION FACILITIES IN CHARLESTON, S. C.

The City of Charleston, S. C., which now has a population of 65,000, is situated on a peninsula $1\frac{1}{2}$ miles wide and 3 miles long. The electric railway service for this city and the nearby Sullivan's Island and Isle of Palms is furnished by the Charleston Consolidated Railway & Lighting Company, which operates a total of 41 miles of standard gage track and two ferryboats under the management of George H. Waring, general manager, and T. W. Passailaigue, superintendent of the railway division. The trackage is divided as follows: Six city lines on East Belt, West Belt, Meeting, King and Broad Streets, Rutledge Avenue north, Suburban and Navy Yard line to the extensive fertilizer works, lumber mills and government Navy Yard; and the Seashore division for trans-bay traffic, including the service to the company's noted pleasure resort on the Isle of Palms. The latest construction is a 4-mile extension, including 1 mile of double track, to the northwestern suburbs of Charleston. The line ends at a park called the Schuetzenplatz and also reaches the baseball grounds located at Hampton City Park. All curves on this line are double-tracked to insure maximum safety in operation. The United States Electric Signal Company's block signal system has been in successful use for over two years on both the Seashore and Suburban divisions.

CITY SERVICE

About 31 cars are regularly operated on the six city lines. The East Belt and West Belt lines give a 7-minute service, while a 10-minute headway is used on the other routes. Most of the cars are of the single-truck type, 25 ft. over all. However, the Belt lines have recently been equipped with Brill semi-convertible cars which seat 32 passengers. The new cars have 20-ft. bodies, are 28 ft. 7 in. over all and are equipped with two GE-67 motors each. The seat-use factor in the Charleston city service is about 66 per cent.

As elsewhere in the South, the Charleston company also has to cope with the problem of race separation on the cars. The

South Carolina "Jim Crow" law calls for the separation of the races only on suburban lines over 5 miles long, but by agreement with the Charleston municipality white and colored passengers are not allowed to sit together. This practice has been found more satisfactory to both races than the use of compartments or movable partitions.

SUBURBAN AND NAVY YARD LINE

The Suburban and Navy Yard line carries thousands of black and white workers to and from the fertilizer works. For obvious reasons this traffic is confined to separate cars during the rush hours. Between 6 a. m. and 7 a. m. and between 4.30 p. m. and 6.30 p. m. groups of six cars are sent out on 15-minute headway. Three cars of each group are for white and three for colored people. As the traffic decreases, similar cars are run two and two. A half-hour service is maintained with single cars during the day, and the passengers are then separated, white on one side of the aisle and colored on the other.

The principal rolling stock for this service comprises 15 semi-convertible cars 37 ft. over all with 30-ft. bodies mounted on DuPont trucks, which are equipped with two GE-57 motors. With these cars the 8-mile trip from the Battery in Charleston to the Navy Yard is made in 45 minutes. The latest cars for this service comprise six Brill full-convertible cars 46 ft. over all, with slat seating for 56 passengers. These cars will be used principally as trippers.

THE SEASHORE DIVISION

The Seashore division is an 8-mile line passing through the United States government reservations on Sullivan's Island, several summer resorts and the Isle of Palms, which last is the property of the Charleston Consolidated Railway & Lighting Company. The Mt. Pleasant terminus is reached by ferry from Charleston in 15 minutes. The boats, which are owned and operated by the railway and named "Lawrence" and "Sappho," are of 1500 and 750-passenger capacity respectively. Only the smaller boat is required in winter, but between May 15 and Sept. 15 the traffic is very heavy. The round trip to the Isle of Palms, including ferriage, costs only 30 cents for 22 miles. The one-way trip by car and ferry from Charleston is made in the fast time of 40 minutes. The Sunday and holiday travel to the Isle of Palms varies from 3500 to 5000 people, some of whom are brought into Charleston on reduced rate combination steam railroad tickets. The natural attractions of the island are enhanced by a dancing pavilion 1000 ft. x 140 ft. in size, which is large enough for 1500 dancing couples and 2000 pavilion seats at one time. There are a hurdy-gurdy and a Ferris wheel. On Sundays concerts are given by the Metz Military Band at a cost of \$3,500 for the season. Hotel Seashore, which can accommodate 300 guests, is located on the beach near the pavilion. There is also a large café adjoining the pavilion which caters to the large crowd of Sunday guests.

The rolling stock for this service consists of 19 double-truck cars seating 40 passengers and each operated by two GE-57 motors. During the periods of heavy travel each motor car takes a 40-passenger double-truck trailer. Two box cars, each equipped with two GE-57 motors, and two flat trailers are used to handle the freight business on this line. Express packages received from the Southern Express Company's agent at Sullivan's Island are handled at an average rate of 15 cents. The company also has a contract with the United States government for carrying mail. The annual revenue from mail transportation is about \$1,300, based on three cents per pouch-mile. Mail is carried on the Suburban division at the same rate.

The maintenance of way department of the Michigan United Railways has erected neat and substantial fixed signals at all places along the tracks between Jackson and Battle Creek where obstructions require that a snow plow be lifted. Each signal consists of a 6-ft. length of 1-in. pipe, to one end of which is attached a triangular-shaped flag of sheet steel. The pipe is painted black and the flag yellow. These markers can easily be set in the track grade at snow-plow obstructions and serve their purpose during the winter and easily be collected and repainted during the summer.

RAILWAY CROSS-TIES PURCHASED IN 1909

The Bureau of the Census of the Department of Commerce and Labor has just issued Bulletin No. 8 on forest products which gives the statistics of cross-ties purchased by the steam and electric railways of the United States in 1909. The total number of ties purchased in that year was 123,751,000. This is an increase of 11,285,000 ties, or 10 per cent over the number purchased in 1908, but it is 29,950,000, or 19.5 per cent, less than the number reported for 1907. The number of ties purchased for new track is especially significant of improvement. More than 13 per cent of the total number purchased in 1909 were for use in new track, whereas in 1908 only 6 per cent of the total number purchased were intended for new construction. The electric railways bought 2,615,000 ties for new track, which was equivalent to 31.4 per cent of their total purchases.

Ten kinds of wood supplied 97.3 per cent of all ties purchased. About 46 per cent of the total number purchased were cut from oak, whereas ties made from Southern pine, the wood ranking next in importance, represented only 17.6 per cent of the total. The increase in the use of inferior species of wood, especially gum, spruce and beach, is noteworthy as an evidence of the growing use of the method of wood preservation through chemical treatment. Approximately 77 per cent of all ties purchased in 1909 were hewed. Douglas fir is the only important lumber from which more ties are sawed than hewed. Of the ties purchased by electric railways 67.5 per cent were hewed and 32.5 per cent were sawed. Next to oak ties the electric roads purchased more chestnut ties than any other species. Almost as many Southern pine ties were purchased by them, and ties of cedar, redwood and Douglas fir ranked next in importance. The less durable woods are but little used by the electric roads, doubtless because they lack the facilities for applying preservative treatment which a number of the largest steam railroads now possess.

The total cost of all ties purchased in 1909 was \$60,320,700. The electric railways purchased ties to the value of \$4,181,700. The average price paid by electric railways for ties was 50 cents, whereas the average price paid by the steam roads was 49 cents. While the steam railroads paid an average of 49 cents for sawed ties the electric railroads paid an average price of 53 cents. Although the average ties used by electric railroads are smaller than those used by steam railroads, the prices paid for them are generally higher. This is due not only to the disadvantages incident to contracting for smaller quantities of material, but also to the fact that electric roads usually purchase ties at points where the price includes railroad transportation charges. The highest average price reported by electric roads was 82 cents for treated Western pine ties, while the lowest average price paid by them was 31 cents for hewed hemlock.

A total of 22,030,000 ties were treated by some preservative process. Of these electric roads purchased only 835,000. The ties which were treated before purchase by electric railways numbered 582,000 and 253,000 ties were treated after purchase. There are now 70 wood-preserving plants in the United States, a number of which are owned by the steam railroads. The principal preservatives used are creosote, oil and zinc chloride. The electric railways own only a few cylinder-treatment plants and the open-tank method is the one principally used for applying preservative treatment.

COMMITTEE ON FREIGHT AND EXPRESS TRAFFIC

The full personnel of the committee on freight and express traffic of the Transportation & Traffic Association has been announced by President Page. It consists of H. E. Reynolds, Boston, Mass. (chairman); Charles F. Berry, Portland, Maine; George W. Quackenbush, Springfield, Ill.; F. W. Watts, Utica, N. Y.; F. D. Norviel, Anderson, Ind., and A. R. Piper, Brooklyn, N. Y.

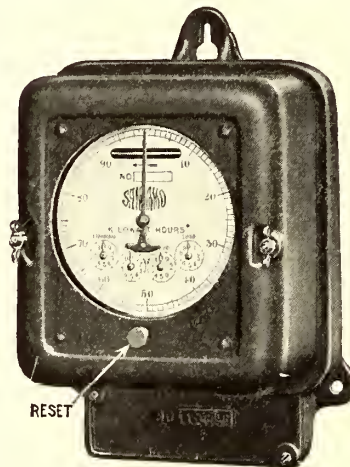
WATT-HOUR METERS FOR CAR SERVICE

Recognizing the growing demand for a suitable street car meter, which can be installed and operated with minimum attention, the Sangamo Electric Company, Springfield, Ill., has placed on the market the watt-hour meter illustrated herewith, after making exhaustive tests in regard to the amount of jarring, pounding and vibration which a mercury floated meter system could withstand. During the past two years the mercury flotation type meter has been in continuous service on many electrically lighted steam railroad cars, and has withstood successfully the rough usage and shocks unavoidable in traction operation. Street car service was also successfully met. The results have been so satisfactory that a complete line of meters designed especially for electric railways has been produced.

In general, the mercury meter consists essentially of a disk-like motor element partly or entirely submerged in mercury, so that current can be led in and out from this element by the mercury through fixed metallic contacts set in the walls of the chamber containing the mercury and disk. The reaction of the current passing radially or diametrically across the armature, with a magnetic field properly set with respect to

the armature, will cause a rotation which will be proportional to the amount of current passing through the armature.

The registering dials are five in number, four small and one large dial, all reading in kw-hours. The four small dials perform the usual functions of totaling the entire energy consumption, the readings being taken at any desired interval. The large dial and pointer constitute a trip register in which the gearing is so proportioned that energy consumption per trip or per diem causes the pointer to travel over



Watt-Hour Meters for Car Service

practically the entire circle. This long pointer can be reset by removing the seal cap on a reset mechanism and inserting a small key. When it is desired to eliminate the use of keys the meter is provided with a small push button reset mounted on the case.

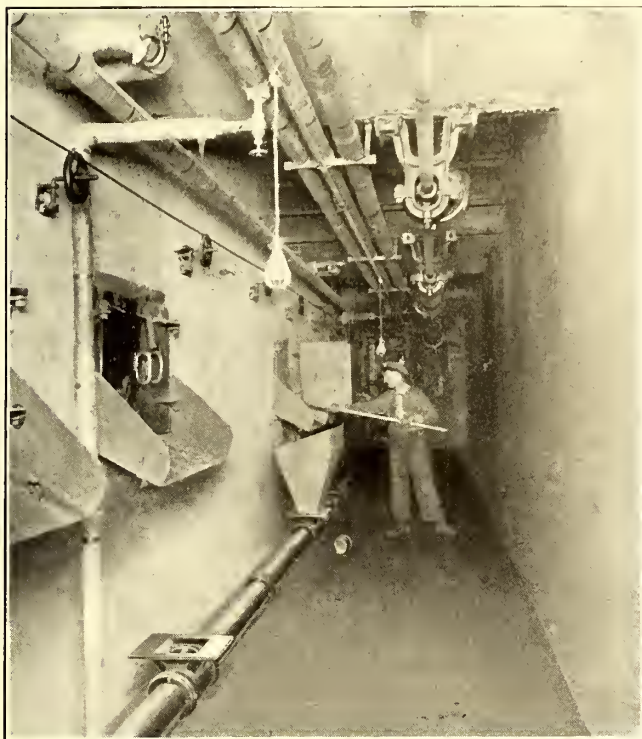
Before starting out a car the inspector sets the long hand to zero. Upon completion of the trip or day's run the reading of the register is noted in the inspector's record book, after which the hand again is reset to zero position ready for the next run. This resetting of the trip or day registering hand in no way affects the registering of the small dials, which totalize the entire amount of energy consumed.

The advantage of this fast moving reset pointer is obvious, as the amount of power required each day can be accurately determined, the motorman is constantly checked as to his skill in handling the equipment and the inspector has a definite basis on which instructions tending to better the service can be based. A meter of this type is also available as a check against station output, line losses, defective apparatus, etc.

The sixteenth annual report of the Boston Transit Commission for the year ended June 30, 1910, contains a large map in colors showing the routes of the Boston subway, the East Boston and Washington Street tunnels, the tunnel for the Cambridge connection and the proposed Riverbank subway. Acting Chief Engineer Edmund S. Davis presents an account of the construction work done to date on the tunnel under Beacon Hill for the Cambridge connection. He also refers to the preliminary studies made for the proposed Riverbank subway.

A PNEUMATIC ASH-HANDLING SYSTEM

A striking development in ash disposal has been worked out by the Green Engineering Company, Chicago, Ill., under the name of the "Geco" pneumatic ash-handling systems. In these systems a conveyor pipe is located adjacent to the pits where ashes from the furnaces are deposited. This pipe has intakes into which the ashes may be conveniently raked or shoveled. A continuous high-velocity air suction is maintained in the intakes for the ready feed of the ashes. The conveyor pipe is led to a separator and accumulating ash tank in which the high velocity of the air current which bears the ashes in suspension is suddenly reduced to almost no velocity by expansion, and the ashes are deposited in the tank at once. Further to facilitate such deposit, the ashes are subjected to a water spray just before entering the tank. The water serves to wet the ash particles, increasing their weight, as well as to attach the dust of suspension to the larger ash. An exhaust pipe which is placed at an angle radically opposed to the angle of entry of the ashes serves



Pneumatic Ash-Conveying System in Operation

to withdraw the air entering the tank. In fact, the exhaustor produces the air current through the entire system and its suction on the tank is sufficient to produce the high velocity in the conveyor pipe connected thereto.

Between the tank and the exhaustor there is placed a dust collector, through which the air, separated from ashes, must pass in a somewhat helicoidal path. This arrangement also provides for imminent contact of air currents with water surfaces still further to extract any particles of dust which may not have been deposited in the ash tank. The exhaustors are driven by the most convenient power available in the plant.

The systems are built in various sizes, rated by the amount of ashes to be conveyed per minute. Thus, for example, a 6-in. system has capacity of 150 lb. per minute; an 8-in. system, 300 lb., and a 10-in. system, 500 lb. The great conveying capacity of pneumatic ash-handling systems exceeds the ordinary ability of one man shoveling ashes under usual circumstances. It is therefore necessary to arrange the intakes convenient to the pits where the ashes accumulate to permit one man to feed the full capacity of the system.

Only one ash intake should be open at any one time, and only at that point can ashes be fed to the conveyor pipe. If two ash intakes were open at the same time the one farther re-

moved would be without air suction, as suction will naturally be spent at the opening nearest the separator tank.

The necessity of restricting the ash intakes to but one opening at any one time is really considered a decided advantage from the standpoint of labor required, as the relatively enormous carrying capacity of these systems makes it readily possible to handle as high as 9 to 15 tons of ashes per hour with one operator. There are few power plants in which the ash accumulation cannot be handled by one man in 10 working hours. It is customary to make the ash pits of such a size that one man can attend to the work of ash handling.

The weight of ashes to be handled will determine the relative volume of air to be exhausted, and the friction loss through the system will determine the amount of suction and corresponding power requirements. In some 6-in. systems 15 hp is sufficient, whereas the same size system may require 60 hp if the latter should employ an extremely long conveyor pipe, with several elbows or bends. Similarly, either of these systems of the same size conveyor pipe may require 15 hp to 40 hp more if intended to handle heavier ash. The corresponding figures for 8-in. systems may involve from 30 hp to 100 hp, and 10-in. systems from 50 hp to 150 hp.

The ash immediately travels toward the center of the pipe, where the greatest air velocity is maintained because there the retardation from the skin friction of the conveyor pipe is least. In other words, the ash does not touch the pipe after entering the air current and while continuing at maximum velocity. However, when the ash-laden air current reaches a bend in the conveyor pipe the heavier ash particles are projected forward to the outer surface or back of the bend. Owing to their high velocity the ashes at once attack this surface in the same manner as a sand blast. Suitable provisions, therefore, are made for the easy replacement of the surfaces so exposed at the bends. The life of wearing backs may vary from 10 days to two years, according to the velocity, nature and amount of ashes. The cost of replacing and maintaining these wearing pieces is insignificant in comparison with the possible savings over other methods of handling ashes. Inasmuch as the disturbance at elbows may, under some conditions, be continued by rebounds of ash from the wearing back to piping immediately beyond the fitting, it is customary to provide short replaceable lengths of pipe directly beyond the fittings.

The operation of these systems depends only on an engine or motor and its exhaustor as the entire moving machinery. These are both conveniently located and away from the ashes to be handled. They may be housed to protect them from the machinery-deteriorating conditions usually existing in boiler rooms or incident to the handling of ashes. The simplicity of the moving machinery, and particularly its remoteness from the point where ashes are accumulated, greatly reduces the maintenance cost, and always readily permits inspection under most favorable surroundings.

Conspicuously clean boiler rooms and surroundings are some of the attractive features contributed by the pneumatic system. Furthermore, the absence of moving machinery in boiler rooms and ash pits makes it most desirable when compared to ash-conveying devices of any other type. No possible danger can confront the operator while feeding ashes into the conveyor or in lubricating any moving parts. Since ashes are finally stored in sealed tanks, danger from fire is eliminated.

The conveyor pipe line can be arranged to avoid conflict with other apparatus and pass either around, above or below where no other system is possible. The ash storage tank may be located either inside or outside of the building, wherever most convenient to final discharge by gravity to either car or carts. A suitable valve for this purpose is attached to the cone-shaped bottom of the separator tanks. The final discharge from the exhaustor set is ordinarily conducted into the chimney or breeching serving the furnaces or directly into the atmosphere. The piping connections to the water spray are usually located convenient to the controller which is used to operate the motor, or to the engine throttle, as the starting of the entire apparatus involves only turning on power and opening the water spray.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Georgia.—Right-of-Way—Right to Excavate.

Where a grantor in a deed conveys to the grantee a strip of land "for the purpose of right-of-way for a street railroad," and subsequently the same grantor conveys a lot of land to another party by deed in which the right-of-way of the railway company is called for as the southern boundary of the lot conveyed to such other party, the latter is not entitled to maintain an action for damages against the railway company for excavations made upon its right-of-way in broadening and lowering its bed for a railway track where there is no physical invasion of the property of such other party and no negligence upon the part of the company in constructing its roadbed affecting the property rights of the complainant. (*Darnell v. Georgia Ry. & Electric Co.*, 68 S. E. Rep., 584.)

Indiana.—Eminent Domain—Evidence—Admissibility.

Admissions of one joint owner of land sought to be condemned for an electric railroad right-of-way made in the absence of other owners are incompetent.

In proceedings to condemn land for an electric railroad right-of-way the damages must be determined by the fair cash market value of the land before and after the taking, and a witness testifying on the subject may not testify as to what he would pay for the land. (*Indianapolis & Cincinnati Traction Co. v. Wiles et al.* (No. 21,599), 91 N. E. Rep., 161.)

Iowa.—Breach of Contract—Failure to Carry to Destination—Damages.

Where a street railroad passenger left the car because it was not going, as usual, to the end of the line, and was compelled to walk some distance, his remedy, if any, was for breach of contract, and he could not recover in the absence of evidence of damage. (*Gustafson v. Cedar Rapids & M. C. Ry. Co.*, 126 N. W. Rep., 145.)

Kansas.—Injury to Abutting Property—Nature of Remedy.

If the public officers who are charged with the control of such matters authorize a subway for a car line in a public street an owner of abutting property the value of which is thereby diminished cannot interfere to prevent its construction, however seriously he may be inconvenienced by it. In such case his only remedy, if any, is by an action for the consequential damages. (*State ex rel. Dawson v. Parsons St. Ry. & Electrical Co. et al.*, 105 Pac. Rep., 704.)

Kentucky.—Corporations—Real Estate—Escheat.

The time within which a corporation must dispose of its real estate or allow it to escheat under Constitution, Section 192, begins to run on the corporation abandoning its purpose to use the property for its business. (*Commonwealth v. Kentucky Traction Co. of Louisville*, 131 S. W. Rep., 17-18.)

Kentucky.—Establishment and Maintenance—Franchises—Constitutional Provisions.

Where a street railroad company having a franchise to operate in a city was granted by the city, through its Council, the right to lay its tracks and operate its cars on a street not before used by it, in consideration of which it gave up the use of two other streets and conveyed to the city a piece of land abutting on the streets to which the tracks were moved for the purpose of widening it, this did not amount to the granting of a new franchise to the company which was required to be advertised and sold under the Constitution, Section 164, requiring cities to award franchises to the highest bidder. (*Woodall v. South Covington & C. St. Ry. Co.*, 124 S. W. Rep., 843.)

Louisiana.—Carriage of Passengers—Assignment of White and Colored Races to Separate Compartment—Insult of Passenger by Conductor—Right of Recovery.

The discretion vested in street railway companies and their officers and agents by Act No. 64 of 1902 with regard to the assignment of the white and colored races respectively to separate compartments in street cars is to be exercised by them at their own peril.

To apply the term "negro" to a white person is humiliating and insulting, and a suggestive question, such as "Don't you belong over there?" addressed to a white person by the conductor of a street car, who points to the seats reserved for negroes, is but little less so. In either case, and whether the language used be heard by others or not,

an action in damages will lie against the carrier. (*May v. Shreveport Traction Co.*, 53 So. Rep., 671-672.)

Massachusetts.—Street Railroads—Location—Abandonment.

A location for a street railway granted by the selectmen of a town was not abandoned by the president's unauthorized notification to the selectmen of an abandonment and request that the location be granted to another company, though it did not appear that all the conditions of the grant had been performed, abandonment being necessarily a corporate act. (*Clemons Electrical Mfg. Co. v. Walton*, 92 N. E. Rep., 459.)

New Jersey.—Establishment—Consent of Property Owners—Construction of Statute.

A consent of an abutting landowner required by the act of April 21, 1896 (P. L. p. 329), to confer jurisdiction upon the governing body of a municipality to grant permission for the construction of a street railway in the street contained a proviso "but without switch."

Held: (1) That the proviso "but without switch" in the consent is illicit and hence nugatory in two respects: First, because it is for the exclusive personal benefit of the consenting landowner, and second, because it is the substitution of another will for that of the representative of the public interests.

Held: (2) That the proviso did not nullify the consent.

Held: (3) That the consent, notwithstanding the proviso, was effectual for the purpose of conferring jurisdiction upon the legislative body of the municipality to grant permission for the construction of the railway.

Held: (4) That having thus acquired jurisdiction over the subject matter the legislative body could lawfully disregard the proviso "but without switch." (*St. Columba's Church of Newark v. Public Service Ry. Co.*, 78 At. Rep., 219.)

New Jersey.—Laying of Tracks—Location—Ordinance—Removal—Injunction—Gross Earnings Tax—Reduction.

When a trolley road has laid its tracks through the streets of a township in pursuance of an ordinance fixing location of its tracks, equity has jurisdiction to enjoin the removal of such tracks by the township.

Where a trolley road agreed to pay to a township annually 5 per cent of the gross receipts of the business of the road, it is not relieved from a portion of such payment because the distance it runs in the township has been shortened by the fact that other municipalities have been carved out of the township territory through which the trolley ran, nor can the sum be reduced by the fact that other sums have been exacted by these new municipalities for a right to lay an additional track through them.

This trolley road having formed a connection with another road, after which a single fare was charged for a passage over the entire system, the receipts from the business of the former road are to be regarded as such proportion of the entire receipts as the length of the former road bears to the length of the entire system of roads. (*Asbury Park & S. G. R. Co. et al. v. Neptune Tp. et al.*, 74 At. Rep., 998-9.)

New York.—Limitation of Actions—Injuries to Property—Actions—"Operation."

A cause of action against a railroad operating a road in front of premises accrues when every part of the road is adjusted according to its final construction and it begins to carry passengers, for until that time it is not in "operation," defined as active exercise of some specific function of office, or power exercised in producing an effect, though prior to that time construction and experimental trains had been operated. (*Rothman v. Interborough Rapid Transit Co.*, 121 N. Y. Sup., 200.)

New York.—Street Car Passengers—Single Fares—Right of Transfers—"Continuous" Route.

General Railroad Law, Section 104 (Laws 1890, Chapter 565, as amended by Laws 1892, Chapter 676), provides for a single fare in case of a continuous trip by any passenger between any two points on railroads or portions thereof and for a transfer entitling each passenger to a continuous trip to any point or portion of any railroad embraced in the contract with him, substantially as a single railroad with a single rate of fare, and for a penalty for non-compliance. Held, that where a temporary break occurred in the street car line during the construction of a subway under railroad tracks, requiring passengers to walk some 1200 ft. to

get a connecting car, their route over such line was not "continuous" within such section, and a passenger who could be carried by connecting lines in two ways, the one across the break being slightly shorter and more direct, was entitled to a "continuous" trip by car from his starting point to his destination, and the street railroad company could not insist that he take the shorter route, and any rule refusing the right to travel by means of transfers over the longer but continuous route and compelling him to take the shorter route to avoid a double fare was unreasonable under the existing conditions, though it would become reasonable when he was again given a continuous passage by the shorter route through the subway. (*Mannion v. International Ry. Co.*, 121 N. Y. Sup., 263.)

New York.—Passengers—Transportation Contract—Stop-over.

The holder of tickets issued by a street surface railroad company, good for one fare between two points, is only entitled to a continuous passage on each ticket and may not alight from one car on which he begins his journey and afterward board another car and complete the journey on the same ticket. (*Bonasera v. Buffalo & L. E. Traction Co.*, 118 N. Y. Sup., 748.)

Tennessee.—Foreign Corporations—Powers—Public Policy—Right to Purchase Stock in Other Corporations.

The statutes of the State or of the United States and the settled decisions of the highest court of the State are the sources from which public policy must be learned, along with the practice of the executive departments of the State government, and mere silence on a subject of the statutes or decisions as to the power of corporations may be sufficient to indicate that the matter is not against public policy, so that a foreign corporation may act in such matter where it is not against good morals.

In the absence of express power conferred by the charter of a corporation, or authorized by legislation, or by necessary implication, a corporation has no power to buy or subscribe for stock in another corporation.

Where a foreign corporation possessing the power to purchase the stock of other corporations purchased the majority of the stock of another corporation, the court, in the absence of legislation on the subject, could not hold that the purchase was illegal, except in so far as a monopoly might thereby be created in that line of business, or so far as there might be an unlawful restraint of trade or suppression of competition between rival corporations.

The act of a foreign corporation empowered by charter to purchase and hold the stock of other corporations in purchasing and holding a majority of the stock of street railway corporations operating street railways in widely separated cities without any physical connection or common interest does not create a consolidation of the corporations because of the absence of a union of corporate interests and stockholders, but the foreign corporation becomes merely a stockholder and the rights of the several corporations as such remain unchanged.

A corporation authorized to acquire stock of other corporations may acquire the permanent ownership of stock in another corporation, and may issue its own stock therefor, and may vote at all meetings of stockholders and exercise the privileges of a natural person, but its control must not defraud the rights of minority stockholders nor prevent the corporation whose stock is purchased from performing its public duties imposed by its charter. (*Clark et al. v. Memphis St. Ry. Co.*, 130 S. W. Rep., 751-752.)

LIABILITY FOR NEGLIGENCE

Alabama.—Injuries to Animals—Animals Near Track—Care Required.

It is not necessary to stop or check an electric car when an animal is seen near the track, unless the circumstances indicate that the animal is likely to move onto the track, (*Mobile Light & Railroad Co. v. Mackay*, 50 S. Rep., 1035.)

Alabama.—Carriage of Passengers—Personal Injuries—Actions—Pleading.

A plea of contributory negligence of a passenger injured in alighting from an electric car which alleges that she was guilty of negligence proximately contributing to her injuries in that she rode on the platform in violation of a rule published in the car in such a way that she could have seen it is insufficient as failing to show notice of the rule

and causal connection between its violation and the injury

A passenger incumbered with small bundles who steps from an electric car in the dark while it is slowing up to stop and is barely moving is not guilty of contributory negligence as a matter of law.

A charge that a passenger riding on the platform of an electric car without supporting herself with either hand is guilty of contributory negligence is properly refused.

There being evidence that a street car passenger was injured while alighting by a sudden increase in the speed of the car, it was proper to refuse to charge that it was not the conductor's duty to know of the passenger's position of peril at the time the speed of the car was increased. (*Birmingham Ry., Light & Power Co. v. Girod*, 51 So. Rep., 242.)

California.—Injury to Passenger—Starting Car—Signal by Another Passenger—Duty of Conductor.

There was no negligence of a street car company in the starting of a car throwing a passenger who was alighting, the starting signal, two bells, having been given without authority by another passenger, neither the motorman nor conductor having any reason to believe it would be so given, the motorman believing it was given by the conductor, the conductor instantly on hearing the signal calling to the motorman not to start and the motorman then endeavoring to prevent the starting; the company, through its motorman and conductor, not being required to anticipate and take precautions against such an unauthorized signal.

The collection of fares being part of the duty of the conductor of a street car, though it is equally his duty to look after the safety of his passengers, it is not error to instruct that he was in the performance of his duty while collecting fares; it appearing that he was collecting fares when the car stopped, that before giving his starting signal he would have gone to the platform to see whether all passengers so desiring had alighted, and that before he had done so a starting signal was given by a passenger, resulting in injury to another passenger who was alighting. (*Cary et al. v. Los Angeles Ry. Co.*, 108 Pac. Rep., 682.)

Colorado.—Negligence—Contributory Negligence—Last Clear Chance—Right-of-Way Over Tracks—Speed of Car.

A plaintiff may recover for personal injuries notwithstanding that his own negligence exposed him to injury if defendant after becoming aware of his peril, or after he could have become cognizant of it by the exercise of proper watchfulness and precaution, failed in that respect and such failure was the proximate cause of the injury.

By reason of its character as a means of conveyance, a street car has a preferential right over the space occupied by its tracks, but such right must be exercised with due regard to the rights of others.

Where, in an action against a street railroad company for causing the death of a bicyclist, it appeared that decedent was run into from behind by a car, that the motorman had full knowledge that hundreds of wheelmen daily rode along the space between double tracks, that they generally "lay over" to the other side to permit approaching cars to pass, and it further appeared that a car was approaching decedent at a distance of 200 ft. or 300 ft. away, that decedent had given no intimation that he was aware of such approach and was "lying over" to let such approaching car pass, it was negligence for the motorman to fail to slacken the speed of the car or, if need be, to stop the car until he knew that decedent was aware of his danger and would have ample time to protect himself therefrom, and the sounding of the gong or the ringing of a bell was not sufficient under the circumstances.

While perhaps a motorman may rightfully assume that a pedestrian will turn out of the way of the car, he cannot rest on such presumption so long as to reach a point where it will be impossible for him to control his car or give warning in time to avert injury. (*Denver City Tramway Co. v. Wright*, 107 Pac. Rep., 1074.)

Connecticut.—Master and Servant—Injury to Servant—Assumption of Risk—Evidence.

In an action for injuries to an electric railway lineman while at work on a trolley wire, evidence held to justify a finding that he did not assume the risk of a defect in the construction of the trolley wire. (*Arnold v. Connecticut Co.*, 75 At. Rep., 78.)

Connecticut.—Collisions—Contributory Negligence.

A driver of a wagon drove across street car tracks when he saw a car approaching about 100 ft. away. He watched the car until he saw it was getting too close for safety and then he whipped up his horse, but the car struck the rear wheel. When he turned to cross the track he relied on the motorman slowing up. The car was not running fast. Held, that the driver was guilty of contributory negligence as a matter of law. (*McKeon v. Connecticut Co.*, 75 At. Rep. 139.)

Connecticut.—Carriage of Passengers—Personal Injuries—Setting Down Passengers—Contributory Negligence.

Stopping a street car is an implied invitation to passengers to alight and an implied assurance that the place is safe unless notice is given to the contrary.

A street car passenger who had alighted safely passed around the rear of the car, brushed against the fender and fell. Neither she nor the carrier knew the fender was down, but the car was so lighted as to make the fender visible if she had looked. Held, that the direction of a verdict for the carrier was proper, plaintiff at the time of injury being merely a traveler on the highway as to whom defendant owed only ordinary care, of which no want was shown, and plaintiff being guilty of contributory negligence in failing to look before passing so close to the car. (*Powers v. Connecticut Co.*, 74 At. Rep., 931.)

Delaware.—Injuries to Passengers—Negligence.

In an action by a passenger for injuries received while alighting from the car caused by the sudden starting of the car, the plaintiff must show by a preponderance of the evidence that the negligence which caused the injuries was the fault of defendant and was the negligence described in plaintiff's declaration, and such negligence is not to be presumed, but the burden of proving it is on plaintiff. (*Benson v. Wilmington City Ry. Co.*, 75 Atlan. Rep., 793.)

Delaware.—Trolley Wires—Maintenance—Injuries to Travelers.

A street railroad company is not liable for the sagging of its trolley wire in a street from the effect of an unusual storm of wind and rain unless it fails to repair the injury within a reasonable time.

Where, notwithstanding a warning to plaintiff that defendant's trolley wire had sagged as the result of a violent storm, his wagon came in contact with the wire and he was injured, the warning imposed on him the duty to exercise reasonably all his faculties to prevent an accident, and if he failed to do so he was chargeable with contributory negligence. (*Wagner v. People's Ry. Co.*, 75 At. Rep., 610.)

Illinois.—Master and Servant—Fellow Servants—Who Are—Question of Law and Fact.

Whether servants of a common master are fellow servants is a mixed question of law and fact, as the definition of "fellow servants" is a question of law, while the question of the relation of fellow servants is one of fact, unless the undisputed evidence with legitimate inferences is such that all reasonable men must reach the same conclusion, in which case it is a question of law.

To create the relation of fellow servants, the servants must be directly co-operating with each other in the same work, or their duties must be such as to bring them into habitual association so as to afford them the power and opportunity of exercising a mutual influence on each other promotive of proper caution.

A conductor on a cable car operated on a street and a motorman on an electric car operated by the same company on a street crossing the first at right angles are not as a matter of law fellow servants, where the employees on the two lines are under the control of different superintendents in charge of different car houses, and the lines are not operated on a schedule requiring the meeting of the cars at the crossing, though rules of the company require, when cars on the lines meet at the crossing, that cable cars shall have the right-of-way, and though on a signal from the gripman the motorman may cross first. (*Bennett v. Chicago City Ry. Co.*, 90 N. E. Rep., 735.)

Indiana.—Statutory Limitation—Personal Injuries—Injuries to Wife—Excessive Damages.

The limitation in Burns' Ann. St. 1908, Sec. 285, limiting the damages for death by wrongful act, is not applicable to

an action for damages brought by the person wrongfully injured; but where an action is brought by a husband for negligent injury to his wife it cannot be ignored, but must be considered as a declaration of public policy fixing the maximum damages.

A husband 55 years old, with a life expectancy of 18 years, sued for negligent injuries to his wife, 42 years old. Prior to the injury the wife had performed her household duties and had rendered some assistance to the husband in connection with the manufacture and sale of cigars. Her services were worth \$8 to \$10 per week to the husband. She had not been able to perform her usual duties since the accident, and some of the injuries were of a permanent character. The husband incurred an indebtedness of \$620 for medical services. Held, that a verdict for \$10,000 was excessive. (*Indianapolis Traction & Terminal Co. v. Menze* (No. 21,360), 88 N. E. Rep., 929.)

Iowa.—Street Railroads—Operation of Cars—Duty of Motorman—Collisions—Evidence—Instructions.

The duty of a motorman on a street car to keep a lookout for persons within or approaching the zone of danger is different from that of an engineer in charge of an engine operated on a railroad right-of-way where there is no reason to anticipate the approach of persons.

Where, in an action for injuries to a person struck by a street car, the evidence showed that the motorman saw plaintiff working near the track in such a position that he was not likely to observe the approach of the car and apparently not giving attention to such approach, in time to stop the car before the accident, and that it was apparent to the motorman that plaintiff believed that the car was running on the other track according to custom, the court properly submitted the case on the theory that if the motorman saw, or, in the exercise of reasonable care, might have seen, that plaintiff was in a position of danger from the car or was putting himself in a position of danger without noticing the approach of the car, and if he failed to exercise reasonable care to stop the car before the accident, the street railroad was liable, notwithstanding plaintiff's negligence in putting himself in a position of danger. (*Welsh v. Tri-City Ry. Co.*, 126 N. W. Rep., 1118.)

Massachusetts.—Duty to Boarding Passengers.

Even if a street car conductor was not bound to wait until a passenger was seated before giving a signal to start, the motorman was bound to use ordinary care in so starting the car as to avoid injury to the passenger. (*Nolan v. Newton St. Ry. Co.*, 92 N. E. Rep., 505.)

Massachusetts.—Carriage of Passengers—Who Are Passengers.

Where a passenger, in taking a train, knowingly disregards the provisions made for his convenience and safety, and instead of using the platform, chooses a course with which he is not familiar, and which he knows was not intended for his use, he becomes a trespasser, or at most a mere licensee, and the carrier's duty is only to refrain from wanton or reckless conduct that would put the passenger in peril. (*Boden v. Boston Elevated Ry. Co.*, 91 N. E. Rep., 879.)

Massachusetts.—Negligence of Person Intending to Board Car.

Plaintiff attempted to cross a street to board a southbound street car at a place where cars usually stopped. When he reached the northbound track and the car was within 150 ft., he waved his hand to the motorman, who shut off the power and checked the speed. Believing that the car would be stopped as usual, and after again looking, plaintiff walked quickly onto the southbound track, and when about half way over, observing that the car was coming very rapidly, he increased his speed, but could not clear the track, and was struck. Held, that he was not negligent as a matter of law. (*Hunt v. Old Colony St. Ry. Co.*, 91 N. E. Rep., 884.)

Michigan.—Collisions with Animals or Vehicles—Liability.

While plaintiff was driving along a street by the side of defendant's track, and at a sufficient distance from the track to enable a car to pass, a car came up behind him and frightened his horse, which jumped to one side in front of the car and was injured. Held, that defendant was not liable for the injury. (*Bottje v. Grand Rapids, G. H. & M. Ry. Co.*, 122 N. W. Rep., 87.)

News of Electric Railways

Answer Filed to Rental Suit in Detroit

Corporation Counsel Hally, of Detroit, Mich., has filed an answer in the Wayne County Circuit Court to the Detroit United Railway's cross bill in the suit to compel the company to pay \$200 a day additional rental for the occupation of West Fort Street by its tracks, where it is claimed by the city that the franchises have expired. Mr. Hally denies that the earnings do not warrant the tax. In this connection, he states that the earnings are immaterial, as the franchises have expired and the city has control of the streets and the right to charge whatever rental it pleases for their use. Continuing, he urges that the company is not obligated to carry passengers on the streets where its rights have expired and denies that any duty rests upon it to carry passengers.

A meeting of the committee on franchises of the City Council was held on Feb. 15, 1911, to discuss the proposed traffic agreement between the Detroit United Railway and the Michigan United Railway by which the former was to bring the cars of the latter to a terminal in the business portion of the city. Mr. Hally had been asked to give his opinion on the legal phase of the matter, but he was not ready to do this and did not attend the meeting.

At a special meeting of the Michigan League of Municipalities, held at Detroit on Feb. 16, 1911, and attended by 55 officials of 30 of the largest towns in the State, a resolution was adopted which was prepared by Mayor Thompson, of Detroit, asking for amendments in the home rule law by the Legislature to allow cities to amend their charters without making a general revision, as is now required.

Another Subway Proposal in New York

Another proposition for the construction, equipment and operation of a municipally controlled rapid transit subway system in New York has been submitted to the Public Service Commission by Joseph Caccavajo and Marshall W. Brown, engineers. The new proposal covers each of the five boroughs embraced in Greater New York. The proposal includes the triborough route with certain modifications, the Fourth Avenue subway route with its extensions in Brooklyn, the Richmond Borough route under the Narrows from Brooklyn to Staten Island, the Lafayette Avenue route with extension to Jamaica, the new loop and tunnel to Fourteenth Street, Manhattan, through Bushwick Avenue and North Seventh Street; Utica Avenue and other extensions in Brooklyn and extensions over the Queensboro Bridge to Flushing, and the east and west Bronx extension to Lexington Avenue line. In addition, certain routes in Manhattan are provided in the new proposition. These include the Second Avenue line, which the city may take at its option, making a part of the general plan. The company agrees to obtain money as needed for the construction and equipment of the various routes by selling preferred stock at a price which will net its par value to the treasurer of the company, which stock shall obligate the company to pay 5 per cent cumulative dividends for the four years of construction and equipment and the first year of operation, and thereafter 10 per cent cumulative dividend.

Reasons for Segregation of County Traction Lines

The reasons underlying the physical and operating severance of the suburban lines of the County Traction Company from those of the Chicago Railways were recently made public by George B. Blanchard, president of the County Traction Company, in a letter addressed to the residents of seven suburbs which formerly had a 5-cent fare to Chicago. Mr. Blanchard's letter follows, in part:

"Records in the United States Circuit Court show that the lines in your territory did not earn enough to pay operating expenses. Foreclosure was therefore inevitable, and the fact that a 5-cent fare to the loop is impossible does not require further demonstration. It is quite possible that

a 5-cent fare would be practicable in a zone which would include your municipalities and that part of Chicago lying west of Forty-eighth Avenue provided the City of Chicago were convinced that by reason of increased business and the growth of the territory this would not seriously diminish the amount payable to the city under the Chicago Railways ordinance. It goes without saying that prolonged and expensive litigation is unsatisfactory and is not a substitute for street car service or street car earnings. The County Traction Company stands ready to do anything which it consistently can toward providing adequate and up-to-date service for your communities, and this statement is submitted with a view to clarifying the situation.

"In settling with the city the Chicago Railways is obligated to account for full fares for all persons transported. Before dividing the net receipts with the city the Chicago Railways is entitled to receive annually 5 per cent upon the value of its property. The city's share last year was \$800,000, and if the lines of the County Traction Company were in the city limits the Chicago Railways could afford to purchase the same, because any loss in operation would be shared by the city."

Power Contract in Baltimore.—A new 15-year contract for supplying 12,000 hp to the United Railways & Electric Company, Baltimore, Md., has been entered into by the Pennsylvania Water & Power Company. The contract made by the McCall Ferry Power Company with the United Railways & Electric Company in June, 1907, has been canceled on account of the inability of the McCall Ferry Power Company to complete its plant. The present plants of the United Railways & Electric Company in Baltimore will in the future be held for reserve service.

Geleerd Municipal Ownership Measure.—The City Council of Toledo, Ohio, on the evening of Feb. 13, 1911, adopted a resolution indorsing the Geleerd municipal ownership bill and provided for a committee to go to Columbus and urge its passage when the committee to which it was referred arranges for a hearing. The bill was prepared by Cornell Schreiber, city solicitor, under the direction of Mayor Whitlock and Representative Geleerd, and is a part of the machinery to be used in arriving at a settlement of the franchise question with the Toledo Railways & Light Company.

Meeting of Central Electric Accounting Conference.—The next meeting of the Central Electric Accounting Conference will be held on March 11, 1911. Both Springfield, Ohio, and Youngstown, Ohio, have been suggested as the place in which to hold the meeting, and the question has been left over to a vote by mail by the members. Important committee reports will be presented as follows: "Uniform Comparative Statistics" and "Amendments to the Constitution and By-Laws." The committee on membership will also report. The details of the program have not yet been arranged.

Franchise Matters in Des Moines.—The committee of 25 and members of the City Council of Des Moines, Ia., have unofficially rejected the Des Moines City Railway's proposed franchise, and have asked the company to submit a plan whereby the city may purchase and operate the plant. In accordance with this suggestion the company has submitted to the city a proposition to sell \$1,305,000 in stock to the city at 90 cents on the dollar. The city is to pay for this in bonds at 4 per cent. The company will then finance the rehabilitation of the plant in exchange for bonds. In order to further the negotiations, every effort will be made to secure the passage by the Legislature, which is now in session, of the necessary enabling act.

Inquiry into New York Commission.—Governor Dix, of New York, has announced that he has selected John N. Carlisle, Watertown, N. Y., to conduct an inquiry into the working of the Public Service Commission of the First District of New York. Mr. Carlisle is the retiring member of the Public Service Commission of the Second District of New York. He is a Democrat and a lawyer, and was

appointed to the commission a year ago to succeed Thomas M. Osborne, who resigned. Mr. Carlisle will remain in the commission until March, and after a short rest will take up his duties as investigator, under the Governor's commission. He will be succeeded in the Public Service Commission by Winfield A. Huppuch, the Governor's business partner and chairman of the Democratic State Committee. Mr. Huppuch will resign as chairman of the State Committee.

Municipal Ownership Resolution in Providence.—A resolution directing the City Solicitor to apply to the General Assembly at the present session for legislation to enable the City of Providence to acquire the appurtenances of the street railway, electric and gas lighting systems of the city was introduced in the Board of Aldermen on Feb. 6, 1911. The resolution asks authority for the city to obtain by purchase or by right of eminent domain all tracks, rails, poles, wires and all other structures and equipment erected or located in, upon or over the streets of the city. Also for obtaining possession of all tunnels, conduits, pipes, poles or other structures connected with the city's lighting system, either by gas or electricity. The resolution was referred to the special committee on lighting franchises, it being the object of its sponsor to have the matter considered at a joint meeting to be held with the committee on railroads.

Platform of Mayoralty Candidate in Chicago.—John R. Thompson, who is seeking the nomination for Mayor of Chicago on the Republican ticket, has announced his views in regard to public service corporation matters as follows: "The traction, lighting, telephone and all other public utilities to be strictly regulated and controlled by the city, and the cost of the service to be fixed at the lowest price consistent with efficiency and a reasonable return on actual capital invested. The transportation system, surface and elevated, to be put on a basis which will furnish adequate service at all times. This to include universal transfers and increased trunk and cross-line service in all parts of the city; the restoration of one fare to and from the adjacent suburbs; the construction and ownership by the city of a model and adequate subway; the strict enforcement for the benefit of the city and its people of all the traction ordinances in letter and in spirit."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Illinois.—Prof. David Kinley, of the University of Illinois, has completed the work of drafting the administration public utilities bill. Among the salient features of the bill are: The Railroad & Warehouse Commission is given jurisdiction over public utilities; regulation and supervision are provided; a bureau of standards is established and an appropriation is made to carry out provisions of the act; every utility shall file its schedules with the commission, and all rules and regulations affecting rates; no company shall charge or collect more than is specified in the schedules. No permit shall be granted to a second utility in the same municipality until it is ascertained by the commission that the public convenience and interest demand such second public utility.

Indiana.—A bill has been introduced to authorize the fixing of prices to be charged for electricity where such prices are not fixed by ordinance. This measure is believed to be directed against interurban railways which furnish current. A bill to prohibit trespassing on railroad property is urged by the Railroad Commission. Senate bill No. 381 would give the Railroad Commission power to act in the separation of grade crossings of steam railroads and interurban railways. A bill has passed the Senate which provides that foreign corporations operating in Indiana shall have no powers beyond those extended to like corporations organized under the Indiana law, and that they shall exercise no powers in Indiana which they cannot exercise under the laws of the State under which they were organized. An effort is being made to amend the block signal bill so as to limit the power of the commission to order roads to install block systems. A franchise bill introduced by Senator Grube provides for a referendum vote on franchises sought by railways from cities and towns. This bill failed to pass for want of a constitutional majority, but it was revived. The Legislature has adopted the omnibus plan of disposing of bills. Nine railway bills, the majority of which concern electric

railways, have been passed in a group by the Senate. These bills have likewise been reported favorably in the House. Three of the bills are known as the Indiana Railroad Commission bills. The first gives the commission additional authority over both steam and electric railways and provides for immediate report by telegraph of accidents which occasion the loss of life. The second bill greatly increases the commission's authority over witnesses, compelling them to answer all questions under penalty of punishment for contempt and to produce any book, record or report in their charge which the commissioners believe calculated to shed light on the cause of any accident or rate problem. The third prescribes a clearance of 21 ft. for wires and obstructions crossing railroad tracks and prescribes the method of fastening such obstructions. Other bills have been passed regulating the maintenance of telephone and telegraph wires across rights-of-way of steam and interurban railways and prescribing the method of their construction. A bill authorizing railroads to take stock in interurban railways was passed without objection, it being explained that the measure would enable steam railroads and interurban railways to build and maintain joint terminal stations at terminal points. A bill has also been passed requiring steam railroads and interurban railways to maintain crossing signs. The Wider House bill, designed originally to require one year's experience for all persons before being employed as motormen on interurban trains, after being amended so as to provide for such experience as the railroad commission may direct, has been engrossed and recommended for passage. If the commission does not ratify the employment, the man must not be permitted to act as a motorman. The following new bills have been introduced: A Senate bill requiring interurban railways to maintain waiting rooms in cities of 5000 or more population and a House bill to prohibit commissioners from giving railroads the right to use any portion of the public highways.

New Jersey.—A hearing was given by the Senate committee on railroads, canals and turnpikes on Feb. 15 on the question of amending the public utility law so as to confer rate-making powers on the commission and otherwise to change the law. Thomas N. McCarter, president of the Public Service Railway, was the principal speaker in behalf of the electric railways. He had carefully considered all the measures that had been proposed and had concluded that the best plan would be to let the present law stand and include in it a rate-making clause. He laid before the committee an amendment to empower the commission "upon complaint in writing filed with the said board, by the governing body of any municipality the people of which are affected by any rate, fare or charges imposed by any public utility, as herein defined, for service wholly within this State, or upon formal application of any such public utility, to direct any such public utility to make such change or changes in said rate, fare or charges as may be just and reasonable, and in determining what is just and reasonable said board shall consider the fair value of the property devoted to the public use, physical and otherwise, and all the financial, physical and economic circumstances of the business." Four public utility bills have been introduced in the Senate. Senate 5, presented by Senator Gaunt, is the old Robbins rate-making bill of former years. Senate 19 is a renewal by Senator Gebhardt of his last year's bill establishing a public utility commission with authority to make regulations and to procure their enforcement. Senate 14, also by Mr. Gebhardt, is a rate-making bill. The main bill before the Senate is the one drafted by Mr. Osborne, with the assistance of Frank H. Sommers, president of the State Utilities Board. It creates a new board of public utilities and gives it power on its own initiative to investigate and to fix rates. This bill has a companion, Senate 62, which repeals the present law. In the House there are two public utility bills, 20, by Mr. Streitwolf, and 167, by Mr. Egan. The latter is the administration bill.

Massachusetts.—A bill has been introduced in the Senate which provides for the construction of a tunnel under Boston Harbor to bring the Boston, Revere Beach & Lynn Railroad into the heart of Boston and connecting the systems of the Boston & Maine Railroad and the New York, New Haven & Hartford Railroad. The bill authorizes either of the above railroads to undertake the work, sub-

ject to the approval of the Massachusetts Railroad and Boston Transit Commissions as to route and details. With the consent of the double commission and of the Boston Elevated Railway, the tunnel may be connected with the East Boston tunnel or any other tunnel or subways hereafter constructed; and with like consent and approval the Boston, Revere Beach & Lynn Railroad may be connected with the East Boston tunnel and its trains run in it upon such terms as may be agreed upon by the railroads and the double commission. A very important section of the bill provides that within a time to be fixed the New York, New Haven & Hartford Railroad shall equip and operate two of its tracks between the South Station and Readville with electric motive power; the Boston, Revere Beach & Lynn Railroad is also to be electrified, and two tracks of the Boston & Maine Railroad between Lynn and the junction of the Gloucester branch with the main line in Beverly are also to be provided with electric motive power. The bill is understood to voice the plans of the New York, New Haven & Hartford interests in the direction of providing improved connection between the north and south sides of Boston, and in meeting the proposed competition of the Boston & Eastern Electric Railroad, which for several years has been trying to secure a certificate of exigency to build a high-speed interurban electric railway between Boston, Lynn and Salem. A bill has been introduced to provide for an investigation by the Boston Transit Commission of the matter of removing the elevated railway structure between the North Station and Sullivan Square. Another bill provides that the Railroad Commission and the Boston Transit Commission shall report a bill to enlarge the Park Street subway station in Boston along the lines advised in the recent report of the joint commission known as the "Big Four" to the Legislature on metropolitan improvements. A bill has been introduced into the House which provides that by July, 1914, all railroads having terminals in Boston shall operate their service within 10 miles of such terminals by electricity. A bill has been introduced by interests allied with the Boston & Eastern Electric Railroad for legislation to insure the issuing by the Railroad Commission of a certificate of exigency to the above company.

Ohio.—Senator Deaton has introduced a bill to extend the power of the State Railroad Commission materially. It would require schedules of rates to be posted at all railroad and interurban stations, with notice of 30 days instead of 10 days. In case of change of rates the commission could also suspend rates upon its own initiative. All freight and packages would have to be checked. A bill by Representative Kennedy would place city and interurban railways in the same class as steam railroad lines in reference to the grade-crossing law. The steam railroads object to the plan of Representative Winters, in his public utilities bill, to place the duties of the enlarged commission with the State Railroad Commission. They do not want the commission loaded down with other duties. The House committee on elections has recommended for passage the Crosser bill, which provides for the initiative and referendum. Councils may provide for a referendum upon any ordinance creating a right, granting a franchise, expending money or any other delegated power. The people may demand a referendum upon a petition signed by 8 per cent of the electors. Ordinances granting public utility franchises shall not be operative for 60 days after their passage. The Geleerd bill, which would authorize cities to own and operate street railways, has been referred to the House committee on cities, of which Representative Geleerd is a member. It is said that six of the 13 members of the committee are pledged to the bill. The Ohio State Liability Commission filed both a majority and minority report with the Legislature on Feb. 9, and each was accompanied by a bill for the consideration of that body. The bill based on the majority report would provide a State board of compensation awards to consist of five members to be appointed by the Governor, with the approval of the Senate, not more than three of them to be of the same political party. Compensation from a State fund, to be furnished by the employers of labor, would, under this bill, be graded according to the nature of the injury received and the employee would be paid such an amount as was considered justly due him. The bill advanced by the minority would provide a State liabil-

ity board of awards to consist of three members to be appointed by the Governor and approved by the Senate. Their salaries would be \$5,000 per year each, and their duties the same as those defined in the majority bill. The minority bill, however, requires a more definite classification of risks than the other for determining the premium that shall be paid by those who decide to contribute to the fund. The Winters public utility bill was introduced in the House on Feb. 15. This measure was drafted mainly to cover those corporations which have not previously been subject to State supervision. The State Railroad Commission is to be succeeded by "the Public Service Commission of Ohio," with enlarged powers extended to include interurban railways. Street railways are to be exempt from the provisions of the Winters bill because they operate under contracts with local municipalities. One of the provisions regarding railroads is that they shall so connect their tracks, where they are in proximity, as to allow of the prompt transfer of freight to connecting lines. Another provision stipulates that all utilities shall establish a depreciation fund which shall be used only for repairs and improvements, the commission to have authority to order such improvements as it deems just for the convenience of the public. Utility companies may merge, with the consent of the commission, but the capital stock of the consolidated company is not to exceed the combined capital stock of the companies consolidated with such additional sum as was paid in cash. The commission is to supervise all issues of securities. In case a municipality fixes a rate for service on the approach of the expiration of a franchise to hold during the interval before another grant is made the commission may intervene in case of unfairness and fix the rate at such figure as it finds to be just. All contracts with other companies relating to the construction, maintenance or use of their properties and to service are to be filed with the commission; also all schedules of passenger and freight rates. A system of accounts may be established, and annual reports, containing such information as is thought proper, are to be filed with the commission. No company shall be interested in rebates, or other considerations which prefer one patron to another or one locality to another. The bill has also been introduced in the Senate. The Calvey bill, providing that street cars must be provided with closed vestibules at both ends, has passed the House.

Oklahoma.—The House has killed the bill to provide toilets on interurban electric railway cars by postponing action on the measure indefinitely.

Rhode Island.—Senator Sanborn has introduced a bill to amend the charter of the Newport & Providence Street Railroad. This amendment allows the company to lay rails in Warren and Bristol, to connect with the tracks of the suburban company as well as in certain parts of Newport County. The bill has been referred to the committee on corporations. A bill has been introduced in the House to amend the section of the public laws which relates to employers' liability. An act introduced in the House to provide special rates for school children on all railroads has been tabled.

Tennessee.—A bill has been introduced to prohibit the installation of prepayment cars on street railways in Tennessee.

Texas.—The purchase of the Denison & Sherman Interurban Railway's line between Dallas and Sherman, 63 miles, by the Northern Texas Traction Company, and its consolidation with the latter company's line that runs between Ft. Worth and Dallas, is provided for in a bill introduced in the Legislature by J. C. McNealuss, Dallas. Senator McDonald Meachum, Vavasota, has introduced a bill to require all street and interurban railways to provide separate cars for whites and negroes. Under the present law the two races are required to occupy separate parts of street cars. The committee of the Senate on internal improvements has reported unfavorably Senator Collins' street car vestibule bill to forbid the operation of cars not fitted with vestibules, to require the operation of closed cars between Nov. 1 and March 15 and to make it obligatory for street railway companies to supplant open cars with cars without running boards and with center aisles. The bill had been advanced as a substitute for a House measure.

Financial and Corporate

New York Stock and Money Market

Feb. 20, 1911.

After a quiet opening this morning the stock market grew strong in the afternoon when it became apparent that the trust decisions would not be handed down by the Supreme Court. There is no doubt that the stock market is waiting for these decisions and that no decided movement in either direction is likely to occur until the decisions have been rendered.

The money market continues easy and the demand for strictly first class investment bonds is very satisfactory. Rates for money to-day were: Call, 2@2½ per cent; 90 days, 3¼@3½ per cent.

Other Markets

In the Philadelphia market during the past week the traction issues have not been particularly active. There has been little demand and there has been no selling pressure. Prices have been inclined to sag and fractional losses have been recorded.

In Chicago traction shares have been almost entirely out of trading. A few lots of Metropolitan Elevated and of Kansas City Railway & Light have about covered the transactions. Prices have receded slightly.

Small lots of Boston Elevated and Massachusetts Electric were dealt in on the Boston Exchange during the past week, but there was little color to the trading. Prices remained practically unchanged.

There continued to be some buying of United Railways shares at around 17½ in the Baltimore market last week, but the demand was not insistent. The bonds of the same company were also traded in with the usual freedom.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 14.	Feb. 21.
American Light & Traction Company (common).....	a290	a290
American Light & Traction Company (preferred).....	a106	a106
American Railway Company.....	44¾	a45
Aurora, Elgin & Chicago Railroad (common).....	44½	44½
Aurora, Elgin & Chicago Railroad (preferred).....	85	85
Boston Elevated Railway.....	a129	a129
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	a71½	71½
Boston & Worcester Electric Companies (common).....	a9	9
Boston & Worcester Electric Companies (preferred).....	40½	40
Brooklyn Rapid Transit.....	78¾	78¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84	83¾
Capital Traction Company, Washington.....	129¾	129
Chicago City Railway.....	*200	a190
Chicago & Oak Park Elevated Railroad (common).....	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred).....	*7¼	*7¼
Chicago Railways, ptctpg., ctf. 1.....	93	a93
Chicago Railways, ptctpg., ctf. 2.....	25¼	a25
Chicago Railways, ptctpg., ctf. 3.....	9½	a10
Chicago Railways, ptctpg., ctf. 4.....	6¼	a6
Cleveland Railway.....	*91½	91½
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Detroit United Railway.....	72	74
General Electric Company.....	a155¼	a154½
Georgia Railway & Electric Company (common).....	a126	a125½
Georgia Railway & Electric Company (preferred).....	a88	a87½
Interborough Metropolitan Company (common).....	20¼	19
Interborough Metropolitan Company (preferred).....	a54¼	54
Interborough Metropolitan Company (4½s).....	79	78¾
Kansas City Railway & Light Company (common).....	21	a22
Kansas City Railway & Light Company (preferred).....	71	71
Manhattan Railway.....	*137¾	139¾
Massachusetts Electric Company (common).....	a18	17
Massachusetts Electric Companies (preferred).....	a88	a88
Metropolitan West Side, Chicago (common).....	a20¾	a21
Metropolitan West Side, Chicago (preferred).....	*67	a67
Metropolitan Street Railway, New York.....	*19½	15
Milwaukee Electric Railway & Light (preferred).....	*110	110
North American Company.....	72	71¾
Northwestern Elevated Railroad (common).....	a22	a22
Northwestern Elevated Railroad (preferred).....	a62	a62
Philadelphia Company, Pittsburgh (common).....	52¾	53½
Philadelphia Company, Pittsburgh (preferred).....	42¾	43½
Philadelphia Rapid Transit Company.....	a197½	a20
Philadelphia Traction Company.....	a85	85
Public Service Corporation, 5 per cent col. notes.....	a96½	a96½
Public Service Corporation, ctf. 5.....	105½	106
Seattle Electric Company (common).....	a111½	a109½
Seattle Electric Company (preferred).....	a100½	101
South Side Elevated Railroad (Chicago).....	a72	a69
Third Avenue Railroad, New York.....	*11	11
Toledo Railways & Light Company.....	8	8
Twin City Rapid Transit, Minneapolis (common).....	110¾	110¾
Union Traction Company, Philadelphia.....	a47½	a47¾
United Rys. & Electric Company, Baltimore.....	18	17¾
United Rys. Inv. Co. (common).....	46	47¾
United Rys. Inv. Co. (preferred).....	74	74¾
Washington Ry. & Electric Company (common).....	a36	a35
Washington Ry. & Electric Company (preferred).....	a88¾	a88
West End Street Railway, Boston (common).....	a92	92
West End Street Railway, Boston (preferred).....	102½	102½
Westinghouse Elec. & Mfg. Co. (common).....	a71	a70¾
Westinghouse Elec. & Mfg. Company (1st pref.).....	a120	a120

a Asked. * Last Sale.

Annual Report of the South Side Elevated Railroad

The annual report of the South Side Elevated Railroad of Chicago for the year ended Dec. 31, 1910, shows an increase in gross earnings as compared with the previous year of 9.96 per cent, and in net earnings of 13.09 per cent. The sum of \$50,000 has been set aside for depreciation, making a total depreciation reserve of \$340,682. Earnings and expenses for the year were as follows:

EARNINGS.	
Passengers	\$2,343,782
Other earnings.....	90,163
Miscellaneous	23,544
Total earnings.....	\$2,457,489
EXPENSES.	
Maintenance of way and structure.....	\$130,278
Maintenance of equipment.....	161,789
Conducting of transportation.....	818,379
General expenses.....	227,287
Loop rental and expenses.....	315,778
Total operating expenses.....	\$1,653,511
Net earnings.....	\$803,977
Deduct interest on bonds.....	\$360,000
Deduct rental paid Chicago Junction Railroad.....	93,080
	453,080
Available for dividends.....	\$350,897
Dividends paid.....	153,448
Surplus	\$197,449

Charles V. Weston, the president, said in his statement to the stockholders:

"The gross earnings for the year just ended were \$2,457,488, compared with \$2,234,972 for the previous year, an increase of \$222,516, or 9.96 per cent. Expenses were \$1,653,511, as compared with \$1,523,954 for the previous year, an increase of \$129,577, or 8.5 per cent. Net earnings were \$803,977, as compared with \$711,018 for the previous year, an increase of \$92,959, or 13.09 per cent.

"The surplus from earnings for the last fiscal year was \$350,897, equal to 3.43 per cent on the outstanding capital stock of the company, as compared with 2.52 per cent for the previous year.

"The number of passengers transported during the last year was 46,875,642, as compared with 42,722,624 for the previous year, an increase of 4,153,018 passengers, or 9.72 per cent. The daily average traffic was 128,426 passengers.

"The very favorable increase in traffic on the lines of this company during the last year may be traced to several causes. During the months of July and August last year there were several conventions and other public demonstrations which attracted many visitors to the city and increased the traffic, but considered as a whole the business of the company for the year 1910 may be accepted as that which could be reasonably anticipated, taking into consideration the natural increase in density of population within the territory served and the attractiveness of the service afforded by this company.

"One very interesting and gratifying feature brought out by an analysis of the 1910 traffic is represented by increase of business within the short-haul zone on that part of the main line lying between Fortieth Street and Congress Street stations, just south of the loop. During the years 1907, 1908 and 1909 there was a decided falling off in traffic within the short-haul area mentioned. The total gain for the stations between Fortieth Street and Congress Street for the year 1910, compared with the previous year, was 14.43 per cent. The gain on that part of the line between Congress Street and Eighteenth Street stations, both inclusive, was 16.2 per cent, and between Eighteenth Street and Fortieth Street the gain was 12.9 per cent; all losses in traffic have been practically retrieved.

"There has also been a marked improvement in the traffic on the entire system during those hours not included in the rush hour periods.

"During the year there were some unusual operating costs, attributable largely to increased cost of fuel for the generation of power, due to blockades on the coal roads during the severe weather of January and February and to the coal miners' strike in Illinois, which continued over a period from April 1 to October, curtailing the supply of coal and radically advancing prices for that commodity. There was also an advance in the wages of employees in the transportation and shop departments of the service. The ratio of expense to earnings—including loop rental and all other expenses of every character, except the fixed

charges, which are made up of interest on bonds and the rental charges on lines leased from the Chicago Junction Railroad Company—was 67.3 per cent, as compared with 68.2 per cent for the previous year.

"There have been only slight additions to the physical property of the company during the last year. These consist of additional copper feeder cables. The cost of these additions to the feeder system was \$8,433. There were also some changes in the arrangement of Loomis Street station, to improve operating conditions there, at a cost of \$7,770.

"In the second quarter of the last year your directors deemed the financial condition of your company to be such as to warrant resumption of dividend payments to shareholders. Accordingly a dividend was declared for that quarter at the rate of 2 per cent per annum, and dividends have been declared and paid at the same rate for each succeeding quarter to date. You may reasonably expect the continuance of dividend payments at such rates as your directors may from time to time decide to be consistent with conservative and prudent business management.

"Summarizing the conditions of your company, the following may be said:

"The physical property is in first-class condition of repair. The efficiency of the entire plant is high. The company has no floating indebtedness other than current expenses. It had cash on hand amounting to \$805,189 on Dec. 31, 1910, and with a continuance of the safe policy of conducting the company, which has characterized it to the present time, you may confidently look forward to a steady and continuous improvement in its affairs."

Report of Detroit United Railway

The report of the Detroit (Mich.) United Railway for the year ended Dec. 31, 1910, as presented at the annual meeting of the company on Feb. 7, 1911, compares as follows with the report of the company for the year ended Dec. 31, 1909:

	1909	1910
Gross earnings.....	\$8,047,554	\$9,345,219
Operating expenses.....	5,042,724	5,981,065
Net earnings from operation.....	\$3,004,830	\$3,364,154
Income from other sources.....	144,833	152,768
Gross income less operating expenses.....	\$3,149,663	\$3,516,922
DEDUCTIONS		
Interest on funded and floating debt, and taxes:		
Detroit United Railway.....	\$1,325,568	\$1,463,809
Rapid Railway System.....	159,578	160,709
Sandwich, Windsor & Amherstburg Railway....	26,804	34,100
Detroit, Monroe & Toledo Short Line Railway..	147,166	149,104
Detroit, Jackson & Chicago Railway.....	221,013	222,900
	\$1,880,129	\$2,030,622
Credited to depreciation reserve.....	400,000	400,000
Credited to contingent liability reserve.....	100,000	100,000
Total deductions.....	\$2,380,129	\$2,530,622
Surplus income.....	\$769,534	\$986,299

PASSENGER STATISTICS, 1910

Revenue passengers.....	165,920,752
Transfer passengers.....	48,237,720
Employee passengers.....	6,379,538
Total passengers.....	220,538,011
Receipts revenue passenger.....	.0529
Receipts per passenger.....	.0398

MILEAGE STATISTICS, 1910

	Total
Car mileage.....	36,170,644
Earnings car mile.....	.2584
Expenses car mile.....	.1654
Net earnings car mile.....	.0930

The condensed balance sheet as of Dec. 31, 1910, shows:

ASSETS	
Value of entire property.....	\$40,160,230
Treasury securities.....	2,732,459
Accounts current.....	814,834
Current assets, such as cash, accounts receivable, material and supplies.....	623,842
Discount on gold notes and bonds.....	376,852
Total.....	\$44,708,217
LIABILITIES	
Capital stock.....	\$12,500,000
Mortgage bonds.....	23,333,000
Vouchers payable, bills payable, unredeemed tickets, etc.....	2,790,600
Total reserve fund.....	1,854,510
Surplus account and net income.....	4,230,107
Total.....	\$44,708,217

In presenting the report, J. C. Hutchins, president of the company, said:

"Provisions have been made to pay \$140,000 Detroit Sub-

urban Railway bonds at their maturity Jan. 1, 1911. An equal amount of Detroit United Railway 4½ per cent bonds, now held in escrow by the trustees, will be issued in their stead.

"The company, as in previous years, made liberal expenditures during this year in the maintenance of its tracks, rolling stock and other properties. On Jan. 1, 1910, the company's depreciation reserve stood credited with \$1,038,614. Larger expenditures than usual were incurred for extensive renewals of tracks and foundations, involving heavier construction to meet increased traffic conditions on various city lines. One hundred additional motor equipments were purchased during the year, costing \$58,987, which amount has been charged against depreciation reserve. There was added to the credit of the depreciation reserve during the year \$400,000, leaving said fund with a present credit balance of \$1,379,627. At the beginning of the year the company's surplus stood credited with \$3,244,539. There has been credited to the contingent liability reserve the sum of \$100,000 out of the earnings of the year 1910, making \$400,000 in said reserve. This leaves a present surplus of \$4,230,107."

Franchise Assessments in New York

The New York State Board of Tax Commissioners has completed its special franchise tax assessments for New York City. The total for 1911 is \$483,908,300, as compared with \$465,409,600 in 1910 and \$474,001,900 for 1909. The final assessments of the principal street railways for 1910 and the tentative assessments for 1911 follow:

	Final. 1910.	Tentative. 1911.
Bleecker Street & Fulton Ferry Railroad.....	\$730,000	\$730,000
Broadway & Seventh Avenue Railroad.....	7,955,000	7,250,000
Brooklyn Rapid Transit System.....	53,276,300	59,304,800
Bronx Traction Company.....	250,000	260,000
Central Crosstown Railroad.....	660,000	400,000
Central Park, North & East River Railroad.....	2,750,000	1,800,000
Christopher & Tenth Street Railroad.....	1,172,000	1,172,000
Coney Island & Brooklyn Railroad.....	4,036,000	4,036,000
Dry Dock Railroad.....	1,400,000	1,400,000
Eighth Avenue Railroad.....	4,890,000	6,000,000
Fort George Railroad.....	317,000	317,000
Forty-second Street Railroad.....	1,600,000	1,200,000
Manhattanville Railway.....	4,206,000	4,600,000
Fulton Street Railroad.....	20,000	10,000
Hudson & Manhattan Railroad.....	10,900,000	11,500,000
Kingsbridge Railway.....	759,000	759,000
Long Island Electric Railway.....	425,000	425,000
Manhattan Railway.....	78,512,500	81,412,500
Metropolitan Street Railway.....	20,258,000	19,200,000
Nassau Electric Railroad.....	3,056,400	3,056,400
New York & Queens County Railway.....	2,275,000	1,657,000
Ninth Avenue Railroad.....	2,800,000	2,800,000
Pennsylvania Tunnel & Terminal Company.....	15,800,000	16,000,000
Richmond Light & Railroad Company.....	550,000	650,000
Sixth Avenue Railroad.....	4,550,000	4,550,000
Southern Boulevard Railroad.....	196,000	212,000
Third Avenue Railroad.....	7,920,000	8,300,000
Twenty-third Street Railway.....	2,790,000	1,625,000
Thirty-fourth Street Railway.....	1,206,000	700,000
Union Railway.....	4,420,000	4,700,000
Westchester Electric Railroad.....	150,000	150,000

Refinancing in Philadelphia

The Philadelphia (Pa.) Rapid Transit Company has given official notice of the special meeting of the stockholders of the company to be held on Feb. 28, 1911, at which the following matters will be acted upon in accordance with the plan for refinancing advanced by E. T. Stotesbury, of Drexel & Company, Philadelphia:

First—An increase of the indebtedness of the company from \$5,000,000 to \$15,000,000.

Second—The authorization of an issue of \$10,000,000 of 5 per cent gold bonds, and the execution of a deed of trust securing the same, being the increase of indebtedness above mentioned.

Third—The assignment and transfer to the Union Traction Company of Philadelphia, the lessor of Philadelphia Rapid Transit Company, under lease dated July 1, 1902, of all the interest and equity of Philadelphia Rapid Transit Company of every kind in the Market Street Elevated Passenger Railway, the Darby & Yeadon Street Railway, the Doylestown & Willow Grove Railway, and in all other railway properties acquired since July 1, 1902, and the re-transfer to the Philadelphia Rapid Transit Company of said interests and equity under lease without additional rental, the same as if they had been part of the Union Traction Company's system leased to the Philadelphia Rapid Transit Company July 1, 1902; such transfer to be in consideration

of the guarantee by the Union Traction Company of Philadelphia of the payment of the principal and the interest of said bonds from time to time maturing.

Fourth—Assenting to an increase in the capital stock of the Market Street Elevated Passenger Railway.

Fifth—The approval of a new system of keeping the books and accounts of the company.

Sixth—Such other business as may be germane to the above matters.

Prospects for Consolidation of Chicago Elevated Railroads

Henry A. Blair, chairman of the board of directors of the Chicago (Ill.) Railways, who has for some time been at work on a plan to consolidate the elevated railways in Chicago, returned to that city on Feb. 16, 1911, from New York. Questioned about the pending merger, he is reported to have said:

"We have made some progress and that is about all I can say at this time. I expect to return to New York about the end of this week to continue the negotiations. It is a big project, and I do not expect that it can be brought about in a week or a month, possibly not in a year. Every one concerned is agreed that a merger of all transportation lines is desirable, but when some one attempts to bring it about there are always some 'kneockers' who get busy. I do not feel discouraged, however, and I still believe that the plans worked out last July will go through."

Colorado Railway, Light & Power Company, Trinidad, Col.—Application for the appointment of receiver for the Colorado Railway, Light & Power Company has been made in the Federal Court at Denver by W. H. Brown & Brothers, New York, N. Y., who allege that they are creditors of the company to the amount of \$250,000; that the coupons due on Feb. 1, 1911, on the \$1,864,000 of outstanding bonds of the company remain unpaid, and that the liabilities of the company greatly exceed the assets.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—The Coney Island & Brooklyn Railroad has been granted permission by the Public Service Commission of the First District of New York to issue \$91,819 of 4 per cent bonds under the mortgage of Dec. 15, 1904, executed to the Mercantile Trust Company, as trustee. The company must sell the bonds so as to net not less than 80.

Elizabeth & Trenton Railroad, Trenton, N. J.—The stockholders of the Elizabeth & Trenton Railroad have authorized an issue of \$750,000 of bonds to provide funds for constructing an electric railway between New Brunswick and Elizabethport, and have also authorized the directors to lease the property of the company to the Public Service Railway. The incorporation of the Elizabeth & Trenton Railroad as the successor to the Trenton & New Brunswick Railroad and the New Jersey Short Line Railroad was noted in the *ELECTRIC RAILWAY JOURNAL* of May 28, 1910, page 957.

Federal Light & Traction Company, New York, N. Y.—The Federal Light & Traction Company has sold to White, Weld & Company, New York, N. Y., and Spencer Trask & Company, New York, N. Y., its entire authorized issue of \$2,000,000 of 6 per cent two-year notes dated Feb. 15, 1911, and due Feb. 15, 1913, but callable after Aug. 15, 1911, in lots of \$100,000 or over at par and interest upon 60 days' notice. The Columbia Trust Company, New York, N. Y., is trustee of the issue. The securities to be deposited as collateral for the notes represent a cash investment of not less than \$3,300,000. In addition the company will have in its treasury available for corporate purposes approximately \$1,000,000 from the proceeds of these notes.

Fort Smith Light & Traction Company, Fort Smith, Ark.—The authorized capital stock of the Fort Smith Light & Traction Company has been increased from \$1,600,000 to \$6,500,000. Of the previous capital stock of \$1,600,000 there were \$950,000 of common stock authorized and outstanding and \$650,000 of 5 per cent preferred stock authorized and outstanding. Of the new total of \$6,500,000 of authorized new stock, \$1,500,000 is common and \$5,000,000 7 per cent preferred, and of these amounts \$950,000 of common and \$920,000 of preferred are outstanding. Dividends on the preferred stock are payable on Jan. 15, April 15, July 15 and Dec. 30.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.—A new corporation is to be formed to be known as the Ft. Wayne & Northern Indiana Traction Company to take over the Ft. Wayne & Wabash Valley Traction Company. The present company has \$6,000,000 common and \$1,500,000 preferred stock, \$8,900,000 bonds and about \$1,000,000 of floating debt. The Ft. Wayne & Northern Indiana Traction Company will have \$4,000,000 each of common and preferred stock and \$15,000,000 authorized refunding bonds. Subject to all indebtedness, the Ft. Wayne & Wabash Valley Traction Company is to be taken over by the new company, it giving its common stock and \$2,500,000 preferred. Upon payment of \$17.50 a share, the old company preferred shareholders will get \$1,500,000 preferred stock of the new company, and \$2,622,200 of its common stock comes to holders of the present common stock. The \$17.50 per share fund is to be turned over to the new company. A banking syndicate gets \$125,000 of this fund and \$344,300 new common stock for underwriting the sale of \$1,000,000 bonds, \$1,000,000 preferred and \$1,000,000 common stock of the new company so as to yield it \$1,500,000 cash.

Interborough-Metropolitan Company, New York, N. Y.—Notice has been sent to stockholders of the Interborough-Metropolitan Company that the voting trust of that company, which expires March 6, 1911, will be extended until March, 1916. Stockholders are asked to authorize S. R. Guggenheim, R. R. Govin, Edwin Hawley, G. L. Hoyt and M. F. Plant to execute the renewal agreement. In a circular to the stockholders it is stated that this action is necessary in order to complete the subway plans that are under consideration. So far the company has received consent of approximately 75 per cent of both classes of stock. Under the new agreement there will be three new names added to the voting trust. These are Theodore P. Shonts, Andrew Freedman and Cornelius Vanderbilt. The other two are August Belmont and E. J. Berwind, both of whom were in the original voting trust. Regarding the new names the agreement says, in part: "Any vacancies among the voting trustees caused by the death, resignation or inability to act of Andrew Freedman and Cornelius Vanderbilt or any successor appointed to either of them shall be filled by August Belmont & Company as from time to time constituted. Any vacancy among the voting trustees caused by the death, resignation or inability to act of E. J. Berwind or Theodore P. Shonts or any successor appointed to either of them shall be filled by the Guaranty Trust Company, New York. Any vacancy among the voting trustees caused by the death, resignation or inability to act of August Belmont or any successor appointed to him shall be filled as follows: Said August Belmont shall, within 30 days from the date of this agreement, lodge with the Guaranty Trust Company an instrument in writing signed by him designating three persons for that purpose, and any such vacancy shall be filled in the order of their designation."

Ohio Traction Company, Cincinnati, Ohio.—Charles P. Taft, Cincinnati, has been elected a director of the Ohio Traction Company to fill a vacancy in the board of directors caused by Mr. Taft's resignation two years ago, since which time the place has not been filled.

Public Service Corporation of New Jersey, Newark, N. J.—The Public Service Corporation of New Jersey has issued the following notice to the holders of the preferred stock of the New Jersey & Hudson River Railway & Ferry Company: "By the terms of an agreement dated Jan. 9, 1911, the Public Service Corporation of New Jersey has guaranteed a continuance of the annual dividends of 6 per cent, payable semi-annually upon the first days of February and August, upon the outstanding preferred stock of the New Jersey & Hudson River Railway & Ferry Company. The corporation is now prepared to stamp upon such certificates as are outstanding the terms of this agreement, and for this purpose it invites you to send, by registered mail, to J. P. Dusenberry, treasurer, the certificate in your possession. When so indorsed the certificate will be returned."

Public Service Investment Company, Boston, Mass.—Stone & Webster, Boston, Mass., offer for subscription at 98½, yielding 6.10 per cent, \$500,000 of 6 per cent cumulative preferred stock of the Public Service Investment Company. The authorized capital stock of the company is

\$4,000,000, of which \$2,000,000 is preferred and \$2,000,000 common. Of the preferred stock \$1,500,000 is outstanding, while all of the common stock is outstanding. The company has no bonded indebtedness.

Somerset Water, Light & Traction Company, Somerset, Ky.—The United Water, Light & Traction Company has been incorporated with a capital stock of \$100,000 to succeed the Somerset Water, Light & Traction Company, the property of which was sold under foreclosure recently, as noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 28, 1911, page 182.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The property of the Washington, Baltimore & Annapolis Electric Railway will be sold at foreclosure sale on March 20, 1911, at the Naval Academy Junction, under an order of the United States Circuit Court, which followed the filing of a bill by the receivers asking such action. The details of the plan of the committee representing the bondholders for the reorganization of the company were referred to in the *ELECTRIC RAILWAY JOURNAL* of Nov. 19, 1910, page 1044, and Nov. 26, 1910, page 1078.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, $1\frac{1}{2}$ per cent.

Brockton & Plymouth Street Railway, Plymouth, Mass., 3 per cent, preferred.

Brooklyn Rapid Transit, Brooklyn, N. Y., quarterly, $1\frac{1}{4}$ per cent.

Columbus (Ohio) Railway, quarterly, $1\frac{1}{4}$ per cent, common.

Galveston-Houston Electric Company, Galveston, Tex., 3 per cent, preferred; No. 4, $1\frac{1}{2}$ per cent, common.

Grand Rapids (Mich.) Railway, quarterly, 1 per cent, common.

Halifax (N. S.) Electric Tramway, quarterly, 2 per cent.

Kansas City Railway & Light Company, Kansas City, Mo., quarterly, $1\frac{1}{4}$ per cent, preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, $\frac{3}{4}$ per cent.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, $\frac{1}{2}$ per cent, common.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent, preferred.

West Penn Traction, Pittsburgh, Pa., 1 per cent, common.

MONTHLY ELECTRIC RAILWAY EARNINGS

AMERICAN RAILWAYS COMPANY.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Jan. '11	\$314,387	.....	.....	.....	.....
1 " " '10	293,132	.....	.....	.....	.....
7 " " '11	2,389,092	.....	.....	.....	.....
7 " " '10	2,236,617	.....	.....	.....	.....

BROCKTON & PLYMOUTH STREET RAILWAY.

1m., Dec. '10	\$7,672	\$6,561	\$1,111	\$1,575	*\$164
1 " " '09	8,001	6,852	1,149	1,809	*659
12 " " '10	119,626	84,662	34,964	20,160	14,804
12 " " '09	130,786	92,949	37,837	21,668	16,169

EL PASO ELECTRIC COMPANY.

1m., Dec. '10	\$65,168	\$37,022	\$28,146	\$7,505	\$20,641
1 " " '09	59,667	32,628	27,039	9,410	17,629
12 " " '10	640,658	369,057	271,601	99,011	172,590
12 " " '09	600,958	360,103	240,855	98,225	142,630

OKLAHOMA CITY RAILWAY.

1m., Dec. '10	\$55,314	\$37,261	\$18,053	.....	.....
1 " " '09	41,227	29,043	12,184	.....	.....
12 " " '10	648,330	399,830	248,500	.....	.....
12 " " '09	452,569	278,757	173,812	.....	.....

FORT SMITH LIGHT & TRACTION COMPANY.

1m., Dec. '10	\$52,434	\$28,994	\$23,439	.....	.....
1 " " '09	45,611	24,531	21,080	.....	.....
12 " " '10	470,232	266,774	203,458	.....	.....
12 " " '09	395,800	225,187	170,613	.....	.....

OTTUMWA RAILWAY & LIGHT COMPANY.

1m., Dec. '10	\$28,276	\$14,316	\$13,960	.....	.....
1 " " '09	25,745	12,856	12,889	.....	.....
12 " " '10	263,833	149,744	122,089	.....	.....
12 " " '09	236,583	126,103	110,480	.....	.....

PENSACOLA ELECTRIC COMPANY.

1m., Dec. '10	\$25,561	\$13,878	\$11,682	\$5,119	\$6,563
1 " " '09	20,410	11,726	8,684	4,597	4,087
12 " " '10	273,193	159,605	113,498	60,532	52,966
12 " " '09	246,664	141,338	105,327	52,631	52,695

SEATTLE ELECTRIC COMPANY.

1m., Dec. '10	\$493,843	\$260,801	\$233,041	\$107,452	\$125,589
1 " " '09	481,893	289,035	192,858	103,709	89,149
12 " " '10	5,588,189	3,212,789	2,375,400	1,307,330	1,068,070
12 " " '09	5,854,175	3,394,538	2,459,638	1,242,663	1,216,974

Traffic and Transportation

Ticket Sales in the New York Subway

The Public Service Commission of the First District of New York has issued a table of ticket sales by the Interborough Rapid Transit Company on the subway division which shows that between the opening of the subway lines on Oct. 27, 1904, and Jan. 1, 1911, 1,212,771,225 passengers were carried as follows: Two months of 1904, 16,241,869; 1905, 116,209,313; 1906, 149,778,370; 1907, 182,559,990; 1908, 220,991,212; 1909, 256,768,981; 1910, 270,221,490. The number of passengers carried in 1910 was more than double the aggregate carried in 1905—the first full year of operation. Liberal increases are indicated by individual stations during the five years ended Dec. 31, 1910. This is particularly noticeable with respect to the Times Square, Grand Central, Fourteenth Street and Fulton Street stations. At the same time the Lenox Avenue and Broadway branches, as well as the entire business between Ninety-sixth Street and South Ferry, show very large gains. A comparison of the number of tickets sold in the stations and sections of the subway mentioned follows:

	1910.	1905.
Lenox Branch.....	49,781,496	22,303,145
Broadway Branch.....	32,752,668	9,112,575
Ninety-sixth Street to South Ferry.....	154,117,174	84,714,568
Times Square.....	11,354,365	5,396,503
Grand Central.....	13,843,848	7,884,042
Fourteenth Street.....	12,593,253	6,387,271
Brooklyn Bridge.....	16,688,628	16,198,989
Fulton Street.....	13,109,949	5,722,456

There was a falling off in the number of tickets sold at the Brooklyn Bridge station last year from each of the three previous years. The Times Square and Grand Central stations, however, show a gradual improvement from their inception.

The following table shows the yearly ticket sales at the Times Square, Grand Central and Brooklyn Bridge stations since the opening of the subway:

	Times Square.	Grand Central.	Brooklyn Bridge.
1910	11,354,365	13,843,848	16,688,028
1909	10,776,529	13,390,953	16,980,474
1908	9,638,382	11,752,264	16,909,224
1907	8,608,030	11,041,818	23,175,615
1906	6,876,965	9,562,754	19,595,251
1905	5,396,503	7,884,042	16,198,989
1904 (two months).....	868,900	1,177,650	3,092,681

A comparison of the yearly ticket sales on the three divisions of the subway follows:

	66th St. to So. Ferry.	Broadway Branch.	Lenox Branch.
1910	154,117,174	32,752,668	49,781,496
1909	149,888,370	30,152,688	46,295,409
1908	134,415,454	24,877,110	39,877,715
1907	127,563,153	19,554,470	35,312,015
1906	107,183,278	13,002,816	29,473,234
1905	84,714,568	9,112,575	22,303,145
1904 (two months).....	12,699,107	1,688,813	1,853,949

Accident Prevention Campaign of Lehigh Valley Transit Company

At a recent meeting of the School Board of Allentown, Pa., Superintendent Raub, in his report, recommended to the board that the Lehigh Valley Transit Company be given permission to address the pupils in all the schools of Allentown, Pa. In an interview in regard to the plans of the company for its campaign to prevent accidents Edward C. Spring, traffic manager of the company, said:

"It is the policy of the Lehigh Valley Transit Company to do everything within its power to prevent accidents rather than wait for them to happen, and to this end it appears to us in consideration of the large number of accidents which happen to school children that our campaign of education cannot be more pertinently started than with the pupils of the public schools.

"Our plan is to have our claim department, which is under the supervision of R. H. Schoenen, visit the various schools in Allentown and give 15 or 20-minute talks to the children on the safeguards against accidents, impressing upon them the results which follow carelessness and negligence on their part. Afterward these talks will be followed up in all the schools of the various cities and towns along our line.

"We cannot help believe that the parents will appreciate this up-to-date movement, and will follow up the talks at

home by further impressing upon the child the necessity of care and caution while playing in and around the tracks of the company. This is one of the greatest movements that have ever been undertaken by transportation companies, and has been carried out successfully in the Middle West. We shall visit every grade, from the kindergarten to the high schools, both public and parochial. In Cleveland, Ohio, E. F. Schneider, the manager of the Cleveland, Southwestern & Columbus Railway, one of the largest interurban lines operating out of that city, made 360 addresses, speaking to upward of 30,000 pupils last year. These were little talks lasting from 10 to 20 minutes, impressing the children to be careful.

"The Lehigh Valley Transit Company believes that this new departure in our claim department will be sincerely appreciated by not only the parents of the pupils, but by the public in general."

Accidents in Indiana for the Quarter

The Railroad Commissioner of Indiana has issued Bulletin No. 14, which contains a summary of the accidents on the steam railroads and the electric railways operated in Indiana for the three months ended December, 1910, and Circular 71, on the prevention of accidents, which was addressed to the interurban electric railways of Indiana on Jan. 25, 1911, by the commission. This letter was published in the *ELECTRIC RAILWAY JOURNAL* of Nov. 19, 1910, page 1046. The comparative record of casualties on the interurban railways as made public by the commission follows:

PASSENGERS.			
WHERE—		1909.	1910.
On passenger trains.....		32	35
On station grounds.....		3	1
CAUSES—			
Collisions.....	12	11	
Derailments.....	5	0	
Getting on and off moving trains.....	9	5	
Getting on and off trains after stops are made.....	1	4	
Miscellaneous.....	8	16	
RESULTS—			
Deaths.....	3	0	
Fractures and dislocations.....	0	1	
Sprains.....	2	1	
Cuts and bruises.....	27	30	
Miscellaneous.....	3	4	
HIGHWAYS.			
WHERE—			
In vehicles.....	8	7	
On foot.....	2	2	
CAUSES—			
Struck on crossing.....	10	7	
Teams frightened.....	0	2	
Miscellaneous.....	0	0	
RESULTS—			
Deaths.....	0	2	
Sprains.....	0	0	
Cuts and bruises.....	4	3	
Miscellaneous.....	6	4	
EMPLOYEES.			
EMPLOYMENT—			
Conductors.....	4	0	
Motormen.....	3	6	
Laborers.....	3	9	
CAUSES—			
Collisions.....	3	3	
Miscellaneous.....	7	12	
RESULTS—			
Deaths.....	5	2	
Fractures or dislocations.....	0	4	
Sprains.....	0	0	
Cuts and bruises.....	1	7	
Miscellaneous.....	4	2	
TRESPASSERS.			
WHERE—			
On tracks.....	8	7	
Miscellaneous.....	0	3	
RESULTS—			
Deaths.....	7	7	
Fractures or dislocations.....	1	0	
Sprains.....	0	2	
Cuts and bruises.....	0	1	

In commenting on the figures contained in the report the commissioners say:

"No passengers were killed on interurban railways during this quarter, while three were killed during the same quarter in 1909. Following the preceding quarter, when 50 passengers were killed in one quarter, this quarter makes a good showing. It indicates that more care and attention are being given by interurban officials and employees to safe operation. It indicates also that the people of Indiana, through its commission and otherwise, have taken up this most important subject and have given it full consideration. That there may be general information on this subject we publish as a part of this circular the circular letter, No. 71, which shows the action taken by the commission and the interurban railways to prevent

accidents on interurban railways. We note, also, that while in this quarter of 1909 there were five employees killed, there were only two killed in this quarter in 1910, one being killed in collision and one being struck by car."

Fenders and Wheel Guards in New York

Within the last two years the street railways in Greater New York have equipped 6350 cars with wheelguards and about 350 cars with projecting fenders at a cost of between \$250,000 and \$300,000 in compliance with orders issued by the Public Service Commission of the First District of New York. The projecting fenders are attached to the front dash of the car and extend beyond the bumper. The cars equipped with wheelguards carry two each, one on each end. The Metropolitan Street Railway has about 1800 cars equipped with wheelguards; the Third Avenue Railroad and the Union Railway have more than 1000, and the Brooklyn Rapid Transit Company has about 2000. Other companies have installed wheelguards as follows: The New York City Interborough Railway, 45 cars; Second Avenue Railroad, 250 cars; South Shore Traction Company, 10 cars; Westchester Electric Railway, 101 cars; Yonkers Railroad, 56 cars; Coney Island & Brooklyn Railroad, 410 cars; Richmond Light & Railroad Company and Staten Island Midland Railway, 177 cars. Projecting fenders have been installed as follows: New York & Queens County Railway, 239 cars; New York & Long Island Traction Company, 30 cars; Long Island Electric Railway, 37 cars; Van Brunt Street & Erie Basin Railroad, 10 cars.

The commission issued its order for the installation of wheelguards and fenders by all companies in Greater New York in April, 1909, following a series of tests which it conducted in the fall of 1908 at Schenectady and Pittsburgh to determine the relative efficiency of the different types of such devices. The reports of accidents for the fiscal year ended June 30, 1908, showed that 303 persons had been killed by accidents on street surface railways during the year, whereas after the wheelguards and fenders had been installed, namely, for the year ended June 30, 1910, the accident reports for the same companies showed only 152 persons killed during the year. The purchase of new and improved cars by the companies and the complete overhauling of old cars undoubtedly exerted an influence toward lessening the number of fatal accidents.

Accident in Sheboygan.—Several persons were killed at Sheboygan, Wis., on Feb. 9, 1911, when a car of the Sheboygan Railway & Electric Company plunged through an open draw at Sheboygan into the Sheboygan River.

Milwaukee Sprinkling Ordinance Valid.—The Supreme Court of Wisconsin has held that the city ordinance of Milwaukee which requires the Milwaukee Electric Railway & Light Company to sprinkle the pavement between its tracks and 1 ft. on each side is valid.

Toronto & York Radial Railway Desires to Operate on Sunday.—The Toronto & York Radial Railway, Toronto, Ont., Can., has applied to the Ontario Railway & Municipal Board for authority to operate its cars on Sunday on the Metropolitan branch to and from any city of more than 50,000 inhabitants.

New Passenger Tariff of the Los Angeles-Pacific Company.—The Los Angeles-Pacific Company, Los Angeles, Cal., has issued local passenger tariff No. 4-A, which cancels conductors' passenger tariff No. 4 and names one-way and round-trip fares between stations on all the lines of the company. The tariff was issued under date of Dec. 31, 1910, and became effective on Jan. 6, 1911.

Crew in Illinois Traction Wreck Indicted.—The motorman and conductor who were said to have been responsible for the wreck which happened near Staunton on the Illinois Traction System last fall were recently indicted by the grand jury. The State Attorney called the case immediately, but it has been postponed until the next term of court, as the motorman is ill with brain fever.

Traffic Between Louisville and Indianapolis.—Traffic between Louisville and Indianapolis was discussed last week at a meeting of the companies interested held at New Albany, Ind. Representatives of the following companies were present: Louisville & Northern Railway & Lighting

Company, Louisville & Southern Indiana Traction Company, Indianapolis, Columbus & Southern Traction Company and the Indianapolis & Louisville Traction Company.

Record of Thirteen Years Without a Fatal Accident.—In a communication sent to the *Chicago Record-Herald* recently by E. E. Downs, general manager of the Chicago & Milwaukee Electric Railroad, it was set forth that in the 13 years' life of the road not a single fatal accident has resulted from operation. During that period, according to Mr. Downs, between 75,000,000 and 100,000,000 passengers were carried. Mr. Downs said: "I do not think there is another railroad in America, either steam or electric, which has been in operation the same length of time or carried the same number of people that can show a record as clean."

Automatic Trips on Subway Local Tracks.—The Public Service Commission has adopted a final order requiring the Interborough Rapid Transit Company to install automatic trips in connection with all the red or danger signals on its local tracks in the subway by July 1, 1911. The commission decided that the full equipment of the local tracks with the automatic stops would seriously impede local traffic and be an unnecessary precaution. There are 98 places in the subway, however, where the local tracks are equipped with danger signals showing when a red light is displayed the presence of a train in the block immediately ahead, and at these points automatic stops will be provided.

Sentence Passed on Car Bandits.—One of the bandits who held up a car of the Los Angeles-Pacific Railway, Los Angeles, Cal., at Tokio station on the Venice short line on Jan. 26, 1911, has been sentenced to life imprisonment. In passing sentence the judge said: "A man who will hold up a train or a man and relieve him of his property will do anything to accomplish that purpose. He will not stop at murder. A man who possesses the nerve and the cool, collected abilities that you do is not a subject of reformation, in my judgment." Up to Feb. 10, 1911, the other members of the gang implicated in the hold-up had not been apprehended. Several passengers of the car which was held up were injured in the mêlée incident to relieving passengers of their valuables.

Hearing on Transfers in Jersey City.—The Board of Public Utility Commissioners of New Jersey has decided to give a public hearing upon the complaint of the Seventh Ward Improvement Association of Jersey City against the Public Service Railway in regard to the refusal of the company to give transfers on the Montgomery-Greenville-Culver Avenue line, which is a continuous route from the ferry in Jersey City to the car house in Greenville. The line is operated to two terminal stations, Greenville being at the end of the route and Culver Avenue about one-quarter of the distance from the terminal in Greenville. Complaint was made that the company refuses to issue transfers to passengers who may by mistake board a car marked "Culver Avenue" and compels them to pay an extra fare to continue their journey beyond that point. The company contends that the present system tends to prevent unnecessary overcrowding of short-line cars by long-haul passengers.

Handling an Excursion with a Locomotive.—On Feb. 14, 1911, the Illinois Traction System handled a large number of people into and out of Springfield. Trailers were attached to all morning trains from Champaign, Bloomington, Peoria and Clinton. An excursion party of 302 people was also handled from Decatur to Springfield, 40 miles, in six passenger trailer coaches drawn by one of the new 800-hp electric locomotives, which were described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 8, 1910, page 646. The performance of this type of locomotive in freight service has been especially satisfactory, and this excursion gave an opportunity to observe one of the locomotives in passenger train service. The train was handled through city streets in Decatur and Springfield and over the 40-mile interurban division at a schedule speed of 20 m.p.h. From observation of the instruments in the locomotive it required only 350 amp at 500 volts to move the train at 38 m.p.h. The maximum amperage required to start the train was 500 and the full train could be brought to a stop from 38 m.p.h. in a distance of 600 ft. The Sprague-General Electric controllers on locomotives of this type have 18 points; on the first 7 points all four motors are connected in series. This arrangement accounts for the small starting current.

Wisconsin Commission on Fares in Neenah.—In the case of the City of Neenah against the Wisconsin Light, Heat & Traction Company and the Wisconsin Electric Railway the Railroad Commission of Wisconsin has ordered the companies to grant a 5-cent fare with transfer privileges between the two systems within the city limits in substitution for the fare of 5 cents now charged by each road for travel within the corporate limits. Both companies operate inter-urban lines between Neenah and Menasha, but the Wisconsin Electric Railway is the only one whose lines traverse Neenah from one end of the city to the other. The Wisconsin Light, Heat & Traction Company's lines extend but a short distance within the city limits. Passengers have hitherto been compelled to pay a fare of 5 cents on each road, and the city contended that the double fare was inequitable and not conducive to the best interests of the city. The respondents contended that the bulk of their business was between Neenah and Menasha and that the strictly city business within the corporate limits of Neenah did not justify the joint fare; also that their franchises called for fares not lower than 5 cents within the city limits. The commission overruled the franchise objection on the authority of the Supreme Court decision in the Manitowoc-Two Rivers fare case, mention of which is made elsewhere in this department.

Decision in Regard to Transfers on Staten Island.—In November, 1909, the Public Service Commission of the First District of New York, under Section 57 of the Public Service Commissions Laws, applied to the Supreme Court for a writ of mandamus directed to the Richmond Light & Railroad Company and to the Staten Island Midland Railway to compel those companies to exchange transfers at three points where the lines of the two companies intersect within the limits of the former village of New Brighton. At the trial before Justice Clark on Dec. 1, 1909, it was urged by the commission that at all three points transfers should be given because of conditions contained in the franchises which the two companies had obtained from New Brighton before consolidation. As to the two points on Castleton Avenue it was also urged that as the two companies, by virtue of a trackage agreement, operated over one set of tracks on Castleton Avenue, between Broadway and Columbia Street, transfers should be given under the provisions of Section 104 of the Railroad Law. On July 16, 1910, an opinion was filed in favor of the commission, on the ground that the franchises of the companies required transfers at all three points, and an appeal was taken by the company from the order entered. On Nov. 15, 1910, the appeal was argued before the Appellate Division for the Second Department and a decision was rendered on Dec. 30, 1910, sustaining, on the opinion below, the order made at Special Term.

Ruling by Wisconsin Supreme Court on Fare Case.—The Supreme Court of Wisconsin, in the case of the City of Manitowoc against the Manitowoc & Northern Traction Company, has handed down a decision to the effect that no franchise now in operation has the force of a binding contract between the parties thereto, provided the Railroad Commission sees fit to alter any provisions in the franchise. The question came to the Supreme Court on an appeal from the Circuit Court of Manitowoc County where the trial court refused to make permanent a temporary injunction against the Manitowoc & Northern Traction Company to restrain it from raising the rate of fare between Manitowoc and Two Rivers from 10 cents to 15 cents. The franchise states that 10 cents shall be the maximum fare between the two cities. All contracts will remain in force until the rates provided therein have been changed by the commission. If the rate is changed the contract is superseded. As the Manitowoc & Northern Traction Company has failed to bring the matter before the commission for a determination as to the reasonableness of the new rates the old rate must hold until such action has formally been taken and the new rate approved. The increase in fares between Manitowoc and Two Rivers was announced by the company on April 20, 1909, and on June 4, 1910, the injunction obtained by the city to prevent the company from putting the increase into effect was dissolved. As announced in the *ELECTRIC RAILWAY JOURNAL* of July 9, 1910, page 93, the increase was declared in effect on June 15, 1910.

Personal Mention.

Mr. A. J. Glynn has been appointed master mechanic of the Lake View Traction Company, Memphis, Tenn.

Mr. C. P. Taft has been elected a vice-president and a director of the Ohio Traction Company, Cincinnati, Ohio.

Mr. John Roberts has been appointed signal engineer of the New York, Westchester & Boston Railway, New York, N. Y.

Mr. W. F. McKnight, Harrel, Ark., has been appointed a member of the Railroad Commission of Arkansas to succeed Mr. William A. Falconer.

Mr. E. M. Haas, formerly superintendent of bridges and buildings of the Illinois Traction System, Peoria, Ill., has been transferred to another department.

Mr. George W. Bellamy, Mammoth Springs, Ark., has been appointed a member of the Railroad Commission of Arkansas to succeed Mr. John W. Crockett.

Mr. L. B. Martin, engineer maintenance of way, Illinois Traction System, Peoria, Ill., has had his jurisdiction extended to include the department of bridges and buildings.

Mr. Lewis C. Bewsey, who has been connected with the Indiana Union Traction Company, Anderson, Ind., for 15 years, has been appointed superintendent of the company in Indianapolis to succeed Mr. C. L. McMahan, resigned.

Mr. Walter J. Gillner, who has been connected with the claim department of the Indiana Union Traction Company for the last three years, with headquarters in Indianapolis, Ind., has resigned to become connected with the claim department of the Portland Railway, Light & Power Company, Portland, Ore.

Mr. W. Sumner Seibert has been appointed assistant to the secretary of the Railroad Commission of Pennsylvania, a newly created position. Mr. Seibert was acting secretary of the commission previous to the appointment of Mr. Archibald B. Millar as secretary of the commission, as noted in the *ELECTRIC RAILWAY JOURNAL* of Jan 21, 1911.

Mr. W. M. Archibald has been appointed engineer of maintenance of way for Galveston Electric Company, Galveston-Houston Interurban Railway and Houston Electric Company, which include the city lines of Galveston and Houston and the interurban railway between these cities. Mr. Archibald has had about 15 years' experience in Birmingham and other cities in similar capacities.

Mr. Edward Bell, local superintendent of the Illinois Traction Company's street railway and lighting properties in St. Louis, Mo., and Venice, Madison and Granite City, Ill., is en route to the Barbados Islands, off the northeast coast of South America to make an engineering study of the Bridgetown Tramways, which have been purchased by William B. McKinley, Champaign, Ill., and his associates. It is proposed to rebuild and re-equip this narrow-gage street car system, and Mr. Bell will make plans and recommendations for this work.

Mr. C. L. McMahan has resigned as superintendent of the Indiana Union Traction Company at Indianapolis, Ind., to devote his entire attention to the development of a farm which he has purchased between Paoli and French Lick, Ind. Mr. McMahan entered the employ of the company about 14 years ago as a motorman and conductor on the city lines at Muncie, in which capacities he served for more than four years. Subsequently he served in the office of the company at Muncie for two years. He was next appointed superintendent of the company at Indianapolis.

Mr. James P. Kineon, whose appointment as superintendent of the Ocean Electric Railway, Glen Cove Railway, Northport Traction Company, Nassau County Railway, and the Huntington Railway, all controlled by the Long Island Railroad, was announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 18, 1911, was graduated from the electrical engineering department of Yale University in 1905. During 1905 and 1906 Mr. Kineon was connected with the General Electric Company testing meters, small motors and transformers. During 1906 and 1907 he served under the electrical superintendent of the Long Island Railroad, and from 1907 to 1911 he was connected with the New York & Long

Island Traction Company and the Long Island Electric Railroad as superintendent in charge of transportation, maintenance of way, maintenance of equipment and the operation of power houses and substations.

Mr. W. H. DeWitt, who was appointed superintendent of transportation of the Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia., as announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, began his railroad career with the Chicago, Burlington & Quincy Railroad as a switchman. Mr. DeWitt was subsequently made a brakeman and was later appointed a freight conductor. His next position was as passenger conductor. Then he was advanced to assistant trainmaster and from assistant trainmaster was advanced to trainmaster. Mr. DeWitt resigned from the Chicago, Burlington & Quincy Railroad to become superintendent of the Missouri & North Arkansas Railway at Eureka Springs, Ark. He remained with this company at Eureka Springs for two years and then became trainmaster of the Missouri-Pacific Railroad at Hoisington, Kan. He resigned from the Missouri-Pacific Railroad to become superintendent of the Ft. Dodge, Des Moines & Southern Railroad.

Mr. Timothy S. Williams, who was recently elected president of the Brooklyn (N. Y.) Rapid Transit Company to succeed Mr. Edwin Winter, resigned, was born in Ithaca, N. Y., and was graduated



T. S. Williams

from Cornell University in 1884. Immediately after graduating from college Mr. Williams accepted a position with the New York *Commercial Advertiser* as reporter and subsequently served that paper as Albany correspondent, city editor, Washington correspondent and editorial writer. While in Albany Mr. Williams frequently interviewed David Bennett Hill, who later was Governor of New York. Mr. Hill was a particularly difficult man to please in

the matter of an interview, and he is reported to have said that Mr. Williams was the only newspaper correspondent who always reported him correctly. As a result of the acquaintance which sprang up between Mr. Hill and Mr. Williams Mr. Williams while acting as Washington correspondent of the *Commercial Advertiser* was tendered the position of secretary to Mr. Hill and accepted the post. He served under Mr. Hill until Roswell P. Flower became Governor and remained with the latter as his private secretary. The interests of Governor Flower and his associates in the Brooklyn Rapid Transit Company at that time were very large, and Governor Flower induced Mr. Williams to accept the position of secretary of the Long Island Traction Company in 1895 and to become secretary and treasurer of the Brooklyn Heights Railroad a few months later. When the Brooklyn Rapid Transit Company was organized Mr. Williams was elected a director of the company and its secretary and treasurer. In 1900 he was elected first vice-president of the company and its constituents, and he continued in that capacity until recently, when he was elected president.

H. W. Wallace & Company, Chicago, Ill., consulting and operating engineers for the Fort Dodge, Des Moines & Southern Railroad, a 106-mile electrified steam railway, have placed a contract with the General Electric Company, Schenectady, N. Y., for re-insulating the trolley so that 1200-volt equipment may be used. The railway also is extending its transmission line five miles to East Fort Dodge to a new 1200-volt substation which will be located in an industrial district where much switching is necessary. This road has abandoned its steam locomotives and is handling both freight and passengers by electricity. Each of the two regular freight trains operating nightly between Des Moines and Fort Dodge ordinarily handles from 1000 to 1400 tons during a run.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Creston-Winterset Interurban Railway, Creston, Ia.**—Application for a charter has been made in Iowa by this company to build an electric railway from Creston to Des Moines. Capital stock, \$500,000.

***Northern Kentucky Street Railway, Newport, Ky.**—Application for a charter has been made in Kentucky by this company to build an electric railway in Newport. Capital stock, \$10,000. Incorporators: J. M. Dawson, Edward F. Kelly and Gwynne Dennis.

Southwestern Traction & Power Company, New Orleans, La.—Incorporated in Louisiana to build a 75-mile electric railway from New Iberia to Lafayette. Other lines from Morgan City to Jeanerette may also be built. Surveys will begin within a few weeks and it is said that financial arrangements have been made. Capital stock, \$1,500,000. F. W. Crosby, New Orleans, president. [E. R. J., July 23, '10.]

Kent Traction Company, Chestertown, Md.—Incorporated in Maryland to build a 10-mile electric railway to connect Tolchester, Fairlee, Georgetown and Chestertown with a branch to Rock Hall. Rights-of-way have been secured. Capital stock, \$200,000. Incorporators: Frederick G. Usilton, Wilbur W. Hubbard, J. H. Sidds, J. D. Bacchus, H. M. Kleinfelter, W. B. Copper and T. D. Bowers. [E. R. J., Feb. 13, '11.]

***Las Cruces Railway, Las Cruces, N. M.**—Application for a charter has been made in New Mexico by this company to construct and operate electric railways. Capital stock, \$10,000. Directors: Samuel T. Reynolds, El Paso; C. M. Haley, Isidoro Armijo and William P. Lapont, of Las Cruces.

***Niagara Frontier Railway, Niagara Falls, N. Y.**—Application will be made for a charter by this company at the next session of the Ontario Parliament to construct an electric railway from Fort Erie, Ont., to Niagara via Niagara Falls.

FRANCHISES

Los Angeles, Cal.—The Los Angeles-Pacific Railway has received a 45-year franchise from the Board of Supervisors to build its extension to connect Hollywood and Lankershim, via Cahuenga Pass.

Oakland, Cal.—The Oakland Traction Company has received a 30-year franchise from the City Council to extend its line over Hopkins Street in Oakland.

San Rafael, Cal.—George D. Shearer has asked the City Council for a 49-year franchise to build an electric railway over certain streets in San Rafael. [E. R. J., Dec. 10, '10.]

Suisun, Cal.—The Vallejo & Northern Railway will ask the Board of Trustees for a new franchise to build its railway along the deep water at Vallejo and over certain streets in Vallejo.

Waukegan, Ill.—The Waukegan, Rockford & Elgin Traction Company has asked the City Council for a franchise to build an extension in Waukegan. This will be part of an extension from Wilmot to Kenosha.

Winnipeg, Man.—The Winnipeg Electric Railway has received a franchise from the City Council to build several railway extensions in Winnipeg.

Lansing, Mich.—The Lansing & Suburban Traction Company has received a franchise from the City Council to build a double-track extension on Michigan Avenue in Lansing east from the Michigan Central Railroad track to the eastern limits of the city.

***Vicksburg, Miss.**—E. J. Bomer and S. B. Wilson have received a franchise from the Council to build an electric railway between Vicksburg and Walters, via the National Military Cemetery road.

West Caldwell, N. J.—The Pine Brook Electric Railway, Caldwell, has asked the Borough Council for a franchise to build its railway through West Caldwell. This proposed 12-mile electric railway will connect Pine Brook, Caldwell,

Fox Hill and Denville. S. W. Kerris, Pine Brook, is interested. [E. R. J., Jan. 21, '11.]

New York, N. Y.—The Hudson & Manhattan Railroad, New York, has received from the Public Service Commission an extension of time until June 15, 1913, for the construction of the Ninth Street extension of its line from Sixth Avenue to Fourth Avenue in New York.

Mechanicsburg, Pa.—The Valley Traction Company, Le-moyne, will ask the City Council for a new franchise to extend its railway through Mechanicsburg.

Chattanooga, Tenn.—C. E. James and associates have asked the City Council for a 40-year franchise to build five lines covering a large part of Chattanooga. Most of the lines are to be double tracked. [E. R. J., Jan. 28, '11.]

Beaumont, Tex.—The Beaumont Traction Company has filed an acceptance of the franchise recently granted it by the City Council for numerous improvements of its lines in Beaumont.

***Puyallup, Wash.**—R. S. Boyce and associates will ask the City Council for a franchise to build an electric railway in Puyallup. It is expected to extend this line to Tacoma. It is said that financial backing has been secured to build this railway.

Seattle, Wash.—The Seattle Electric Company will ask the Board of Public Works for a franchise to construct a double-track railway on Rainier Avenue in Seattle.

Vancouver, Wash.—The Mount Hood Railway & Power Company, Portland, has asked the City Council for a franchise to build a railway in Vancouver. A similar request will be made for franchises before the Councils of Washougal and Camas by this company.

TRACK AND ROADWAY

Alabama Traction Company, Montgomery, Ala.—This company has begun construction on its 25-mile electric railway in Montgomery. It is expected to extend it eventually to other towns. Charles G. Abercrombie, Montgomery, general manager. [E. R. J., Nov. 26, '10.]

Montgomery (Ala.) Traction Company.—This company expects to extend its railway from Skippack, the present terminus, to Schwenksville, Green Lane and Pennsburg, and other points along the Perkiomen Valley, instead of the North Penn Valley.

Nelson Electric Tramway Company, Ltd., Nelson, B. C.—At a special meeting of the directors of this company a report was presented showing that an additional \$10,000 is required to complete the railway in Nelson.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has secured contracts from the Hudson Counties Construction & Guaranty Trust Company, New York City, N. Y., by which \$1,250,000 has been obtained to build this 35-mile railway from Fresno to Kingsbury with a branch to Sanger. Construction will begin within 30 days. W. D. Mitchell, secretary. [E. R. J., Nov. 26, '10.]

Pacific Electric Railway, Los Angeles, Cal.—This company completed and placed in operation on Feb. 11 the 7-mile extension of its Los Angeles-Covina line to San Dimas.

Oakland & Antioch Railway, Oakland, Cal.—This company completed and placed in operation on Feb. 4 its extension between Concord and Bay Point. This railway will eventually connect Oakland, Concord Bay Point, Walnut Creek, Lafayette and Martinez.

Vallejo, Benicia & Napa Valley Railroad, Napa, Cal.—It is said that this company has let the contract for building an extension from Vallejo to Kellogg to connect there with the Santa Rosa & Clear Lake Railroad.

Grand Junction & Grand River Valley Railway, Grand Junction, Col.—A 13-mile extension from Grand Junction to Palisades will be built by this company during the present year.

***Hartford, Conn.**—Burton D. Potter, Hamden, has made arrangements for the incorporation of a company which contemplates the building of an inclined railway from the base to the top of Sleeping Giant in Mt. Carmel.

***Atlanta, Ga.**—J. D. Little, W. P. Andrews, J. Aldredge, Chas. Glover and others are organizing a company to build

an electric railway from Buckhead to the new Brookhaven Club, via the Peachtree Road, in Atlanta.

Columbus (Ga.) Electric Railway.—This company is extending its lines above Columbus. In addition the company is to erect overhead ground wires from Columbus to Goar Rock. This will require about 11,000 lb. of wiring. Other improvements are being contemplated.

Chicago, Ottawa & Peoria Railway Company, La Salle, Ill.—Construction will shortly be begun on the Joliet extension of this 90-mile road. The new work will include the construction of 22 miles of interurban railway from the eastern terminus of the present line at Morris to Joliet, and will include considerable street track in Joliet. The Joliet city work will cover unoccupied streets on which franchises were granted to the Joliet & Southern Traction Company. These franchises are now the property of the Chicago, Ottawa & Peoria Railway. The new extension of the Chicago, Ottawa & Peoria Railway will connect Princeton, La Salle, Ottawa, Peru, Streator and Morris with Joliet and its many routes of travel to Chicago. Also it will complete another link in the McKinley Syndicate's proposed high-speed electric railway between Chicago and St. Louis.

Taylorville Railway, Light, Heat & Power Company, Taylorville, Ill.—About three miles of new track will be built by this company in Taylorville during the present year.

Evansville, Ind.—It is reported that the Southern Railway is considering plans for electrifying its branch from Evansville to Rockport, Ind., via Jasper and Hamilton. Steam locomotives will be used for freight service as before. It is stated that the company will take over and electrify a small line from Huntingburg to Ferdinand, Ind., and extend it to St. Meinrad.

Gary & Southern Traction Company, Gary, Ind.—A 12-mile extension will be built by this company from Gary to Crown Point during 1911.

Capital Circuit Traction Company, Indianapolis, Ind.—It is announced that contracts are about to be let by this company for the grading work between Danville and Lebanon. This company proposes to construct an electric railway 146 miles long, belting Indianapolis and passing through seven counties and 14 incorporated towns. Hoover Hollon, general manager. [E. R. J., Jan. 29, '10.]

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company has decided to spend \$75,000 for the double tracking of several lines in South Bend. Frank B. Cutshall, South Bend, general manager.

Iola, Kan.—D. H. Siggins, president of the Union Traction Company, Independence, J. J. Jones and associates have projected an interurban railway through Neosho, Allen and adjoining counties and connecting Chanute, Humboldt and Iola.

Wichita Railroad & Light Company, Wichita, Kan.—This company will build an eight-mile extension from Sedwick to Newton during 1911.

Annapolis, Md.—Robert Moss, Annapolis, and associates are interested in a plan to construct a 50-mile electric railway from Annapolis to Drum Point. It is said that 48 miles of this route, from Millersville to Drum Point, have been graded by the old Drum Point Railroad Company and may be sold to a new corporation.

Boston (Mass.) Elevated Railway.—Plans are being made by this company to double-track 32 miles of its line from Fargo Street, South Boston, along Summer Street, connecting the South Station with city points. A. L. Plympton, Boston, chief engineer.

Plymouth & Sandwich Street Railway, Manomet, Mass.—This company has begun the construction of its 14-mile extension to connect Fresh Pond, Cedarville, Sagamore, Sagamore Beach and Sandwich.

Duluth (Minn.) Street Railway.—This company will spend \$100,000 in improving its service during the present year.

Brooklyn (N. Y.) Rapid Transit.—This company will build about three miles of new track in Brooklyn during 1911.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—It is stated that this company is making preparations to extend its tracks easterly from Fredonia to Sheridan early this spring. C. A. Alderman, chief engineer.

Kingston (N. Y.) Consolidated Railroad.—During 1911 this company will construct three miles of new track in Kingston.

Dayton & Troy Electric Railway, Dayton, Ohio.—This company will spend \$150,000 this spring on improvements which will include the installation of a high-tension line and the completion of the double-tracking of its railway.

United Electric Company, Dennison, Ohio.—About two miles of track will be built by this company from Uhrichsville to Dennison during this year.

Enid Interurban Traction Company, North Enid, Okla.—This company will extend its line six miles from Enid to North Enid and East Enid during the year.

Joliette & Lake Colonization Railway, Ottawa, Ont.—This company, which was recently incorporated to build a railway from Joliette, Que., to Montreal, states that the line will be operated by steam. [E. R. J., Feb. 11, '11.]

Peterborough (Ont.) Radial Railway.—This company will build a two-mile extension in Peterborough during the present year.

Philadelphia (Pa.) Rapid Transit.—This company has completed and placed in operation its new line between Philadelphia and Chester via the subway from Jupiter Street and Market Street.

West Penn Railways, Pittsburgh, Pa.—This company has plans now under way for building eight extensions to its lines. Steps looking toward financing the work were taken when the company authorized \$25,000,000 worth of bonds. A network of electric railways is planned to run through Fayette and Westmoreland Counties and extending into Washington and Allegheny Counties.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—About three miles of track will be constructed by this company from Pen Mar to Blue Ridge during the present year. Grading has been completed.

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—This company will begin on May 1 construction work on its proposed 30-mile interurban line between Nashville and Gallatin. Surveyors are now at work mapping out the route from Maplewood to Gallatin. [E. R. J., Jan. 21, '11.]

***Jonesboro, Tenn.**—Plans are being considered in Jonesboro to issue \$50,000 of bonds to provide funds to construct an electric railway from Jonesboro to Johnson City.

***Nashville, Tenn.**—Thomas P. Calhoun, Nashville, who is promoting the construction of a line from Nashville to Nolensville, reports that its construction is now practically assured. It is understood that it will be built by the Tennessee Rapid Transit Company. If the line is built citizens will provide for the construction of extensions.

Northern Texas Traction Company, Dallas, Tex.—It is reported that this company will build two extensions of its railway, one from Dallas to Terrell and the other from Dallas to Waxahachie.

Elkins (W. Va.) Electric Railway.—About six miles of track will be built by this company from Roaring Creek Junction to Bellington during this year.

***Princeton (W. Va.) Power Company.**—This company advises that it has now in operation about one and one-half miles of track between East Princeton and West Princeton. It operates two cars and furnishes power for lighting purposes. Capital stock authorized, \$50,000. Officers: S. J. Evans, president, general manager and purchasing agent; R. W. Reynolds, vice-president; L. H. Perkins, secretary, and M. Gleason, chief engineer, all of Princeton.

Chicago, Howard & Geneva Railway, Walworth, Wis.—This company will build a 10-mile extension from Walworth to Delavan under the name of Marengo, Havard & Northern Railway during 1911.

SHOPS AND BUILDINGS

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This company will build a new paint shop near the car house being erected just west of Ottawa. The structure will be 40 ft. x 100 ft. There will be two repair pits, each 162 ft. in length. The northeast corner of the building will be three stories in height. This part will be 40 ft. x 24 ft. The tool room will be on the first floor; the second will be for drafting and the third for engineering. The build-

ing will be covered by a monitor roof 240 ft. in length. The walls of the building will be on a solid rock foundation. The Joliet Bridge & Iron Company has the sub-contract for the steel work. The cost is estimated to be about \$50,000.

Indiana Union Traction Company, Anderson, Ind.—It is stated that this company will build a new passenger and freight terminal station on West Washington Street in Winchester. The structure will be of brick and stone and will contain a waiting room and offices.

Lexington & Interurban Railway, Lexington, Ky.—This company contemplates the expenditure of nearly \$1,000,000 on improvements during 1911. Among them will be the erection of passenger and freight stations in towns reached by the interurban lines.

Boston & Northern Street Railway, Boston, Mass.—A new car house has been opened by this company in Wakefield on its Wakefield-Reading division. The structure is 240 ft. x 120 ft., and will be entered by 8 tracks from the Boston, Lowell and Lawrence lines. It will accommodate 50 cars and is equipped with a sprinkler system.

Richmond & Henrico Railway, Richmond, Va.—This company will construct a car house near the National Cemetery Road in Richmond. The structure will be of brick and reinforced concrete construction. The cost is estimated to be about \$15,000.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company has placed in operation an additional unit at the steam auxiliary plant in Vancouver. The new unit is a turbo-generator similar to the two units installed some months ago. It is of about 3000 hp and raises the capacity of the steam plant one-third.

Winnipeg (Man.) Electric Railway.—This company has awarded the contract for the equipment of its 17,000-hp power station to the Canadian General Electric Company. The generator will be driven by Curtis turbines and the equipment will be installed in four units of 3000 kw each.

Public Service Railway, Newark, N. J.—E. M. Waldron Company, Newark, has been awarded the contract for mason and other work on the new power house to be erected by the Public Service Railway in Perth Amboy. The iron and steel work will be done by Payne Brothers, Inc. The structure will be 180 ft. x 112 ft. and its highest point will be 100 ft. The exterior of the building will be of terra cotta and faced brick, the interior of vitrified brick. There will be two chimneys and large-capacity coal bunkers.

London (Ont.) Street Railway.—This company has decided to build steam power plant and abandon the proposals for the use of hydroelectric power from Niagara. C. B. King, general manager.

Portland Railway, Light & Power Company, Portland, Ore.—Contracts for the construction of the third and largest of all the power plants on the Clackamas River will be awarded by this company in a few days. The structure will be located on the Clackamas River three miles above the present one in operation and will have a capacity of 40,000 hp.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—This company has purchased from the General Electric Company one complete switchboard for its new power house in Charleston.

Laredo Electric & Railway Company, Laredo, Tex.—This company has purchased one 400-hp Keeler boiler from the Keeler Boiler Company.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—It is reported that this company will enlarge its power plant at Aberdeen. J. S. Thornton, purchasing agent.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company is considering plans for improving its power dam at Cedar Falls.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The power house and terminals of this company at Racine are being enlarged. Two 125-kw (G.E.) low-pressure units and one 1500-hp turbo-generator are being installed.

Manufactures & Supplies

ROLLING STOCK

Wausau (Wis.) Street Railroad is in the market for one passenger car.

City Railway, Dayton, O., has ordered 10 pay-as-you-enter cars from the Cincinnati Car Company.

Philadelphia (Pa.) Rapid Transit Company, it is reported, will purchase from 150 to 250 new pay-within cars.

New York, Westchester & Boston Railway, New York, N. Y., is in the market for 60 all-steel 70-ft. passenger cars.

Springfield (Mass.) Street Railway has ordered 50 type CP-27 air brake compressors from the General Electric Company.

United Railways, San Francisco, Cal., has ordered 80 type CP-27 air brake compressors from the General Electric Company.

Great Falls Electric Properties, Butte, Mont., has placed an order with the American Car Company for eight double-truck cars seating 40 persons each.

Nahant & Lynn Street Railway, Lynn, Mass., has ordered two 30-ft. 8-in. motor car bodies and four Brill 27 G. E.-1 trucks from The J. G. Brill Company.

Long Island Railroad, New York, N. Y., noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, as being in the market for 50 steel motor cars, 30 steel passenger cars, 10 steel parlor cars, 5 steel combination baggage and mail cars and 5 steel passenger and baggage cars, has placed an order for these cars with the American Car & Foundry Company.

Central Pennsylvania Traction Company, Harrisburg, Pa., noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, as having ordered eight cars from The J. G. Brill Company, has specified the following details for the six pay-within cars:

Seating capacity.....	32	Heaters	Consolidated
Length of body.....	25 ft.	Headlights	Wheeler
Over vestibule.....	37 ft.	Journal boxes.....	Brill
Width over sills....	7 ft. 7 in.	Motors	2-G.E.-216
Over posts at belt..	8 ft. 2 in.	Push button signal,	
Body	wood	Consolidated	
Interior trim.....	cherry	Registers.....	Inter. double
Underframe	wood	Roofs	Monitor
Air brakes.....	National	Sanders.....	Natl. Brake & Elec.
Bumpers....	Brill angle iron	Sash fixtures.....	Brill
Car trimmings.....	bronze	Seats	Brill
Couplers	Brill	Seating material.....	cane
Curtain fixtures....	Natl. bal.	Springs	Brill
Curtain material....	Pantasote	Trucks.....	Brill 39-E
Gongs	Dedenda	Ventilators	Brill
Hand brakes.....	A. & W.	Wheels	National

TRADE NOTES

American Bridge Company, New York, N. Y., has appointed R. W. Bailey general manager of sales, to succeed James A. Huston, resigned.

Ideal Concrete Machinery Company, South Bend, Ind., has opened an office in the Old Colony Building, Chicago, Ill., under the management of H. I. Purcell.

Ackley Brake Company, New York, N. Y., has made arrangements for the manufacture in England of the Ackley adjustable brake for sale in the United Kingdom.

The Asbestos Protected Metal Company, Canton, Mass., has established a Western office at 613 Fisher Building, Chicago. Wilmot W. Burritt is in charge of this office and territory as district manager.

American Manufacturers' Export Association, New York, N. Y., has been formed to promote foreign trade. H. T. Wills, secretary of the National Tariff Commission Association, has been elected secretary of the new organization.

Siler-Pettit Manufacturing Company, Ft. Wayne, Ind., has been incorporated by E. E. Siler, B. F. Pettit and George S. Hanford, with a capital stock of \$250,000. This company will manufacture and sell oil pumps, tanks and distributing systems.

Orenstein-Arthur Koppel Company, Pittsburgh, Pa., manufacturer of industrial and portable railways, is planning to double the capacity of its plant at Koppel, Pa. The changes will mean that more than twice the number of men will be employed compared with the present force. Koppel is a few miles from Beaver Falls, Pa., and is in the Pittsburgh district.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received orders from the Isthmian Canal Commission for two 75-kw motor-generator sets, with a switchboard for the control of each, from the Cia Beneficiadora de Pachuca de Mexico for one 915-kva, three-phase, oil-insulated, self-cooling auto-transformer, and through Slowan, Thomas & Company, for the Chinese government, for two 150-kw, direct-current generators and a nine-panel switchboard.

Frank Koester, formerly with the Interborough Rapid Transit (Subway) Construction Company, J. G. White & Company, the Guggenheim Exploration Company and the American Smelting & Refining Company, all of New York, has recently opened an office at 115 Broadway, New York, as consulting engineer. Mr. Koester is author of "Steam Electric Power Plants" and "Hydroelectric Developments and Engineering."

Cincinnati Car Company, Cincinnati, Ohio, has applied to the Secretary of State of Ohio for permission to increase its capital stock from \$100,000 to \$1,500,000. It is intended to erect new shops and storage houses at Mitchell Avenue and the Baltimore & Ohio Railroad, on ground adjoining the present plant. Improvements and extensions will also be made to the present plant. The new stock will be taken by the Cincinnati Traction Company, of which the car company is a subsidiary.

Whipple Supply Company, New York, N. Y., will equip the 41 new cars of the Denver City Tramway with light-weight rolled steel section Hedley anti-climbers. This company also reports that the Terre Haute, Indianapolis & Eastern Traction Company will adopt the Hedley anti-climber in the form of a combination anti-climber and emergency pocket coupler. An order has been received from the Public Service Railway for 15 sets of Hedley anti-climber drawhead steel castings.

Pressed Steel Car Company, Pittsburgh, Pa., has made public its report for the fiscal year ended Dec. 31, 1910. Gross sales for the year amounted to \$27,977,978. The net profits derived from all sources were \$1,568,366. Of this amount the sum of \$1,417,496 was derived from works operation and the balance from dividends on securities, excess receipts, interest and discounts and other sources. During the year the company expended \$304,302 on improvements and betterments, about equally divided between the McKee's Rocks and the Allegheny works. F. N. Hoffstot, president of the company, wrote on Feb. 15, 1911, that the McKee's Rocks plant was still in full operation, but the Allegheny plant was closed down in November, 1910. Advantage was being taken, however, of the shut-down period to make certain changes and improvements necessitated by the abandonment of a lease held for some years on adjoining property at Allegheny. The Pressed Steel Car Company now owns all the capital stock of the Western Steel Car & Foundry Company, having acquired the minority interest during the year. Plans are being made for the installation of an up-to-date plant at the works of the Western Steel Car & Foundry Company capable of building any type of car at the rate of 50 per day. The Central Car Wheel Company, the property of which the Pressed Steel Car Company has leased, will be able, it is expected, fully to meet the demands for cast-iron wheels.

ADVERTISING LITERATURE

Arthur D. Little, Inc., Boston, Mass., chemists and engineers, have published Professional Paper No. 4, on "The Basis of Quality in Paper."

Warren Webster & Company, Camden, N. J., have published a booklet containing a number of views of buildings heated by the Webster system.

Electric Service Supplies Company, Philadelphia, Pa., has issued a booklet describing and containing views of various types of Peerless armature tools and car barn appliances.

Cheatham Electric Switching Device Company, Louisville, Ky., has issued Catalog No. 10 describing the "Cheatham Switch." The pamphlet also contains several testimonials from users of these switches.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has recently issued Circular No. 1165 on Westinghouse "Fan Motors." In this connection two smaller folders, Nos. 4100 and 4101, have been issued, one dealing with d.c. and the other with a.c. fan motors.

Niles Car & Manufacturing Company, Cleveland, Ohio, has published a catalog illustrating and describing cars built for the Twin City Light & Traction Company, the Oklahoma Railway, Cleveland, Painesville & Ashtabula Railroad, Aurora, Elgin & Chicago Railway and a number of others. The catalog also contains specifications and illustrations of the trucks used by this company, which are manufactured by the Baldwin Locomotive Works.

Stone & Webster Engineering Corporation, Boston, Mass., has reprinted in pamphlet form the description of the Seattle-Everett Railway which was printed in the *ELECTRIC RAILWAY JOURNAL* for Aug. 27, 1910, page 320. The pamphlet is a very artistic and handsome example of the printer's art. The cover is decorated with a reproduction of a map of the Puget Sound district, showing the bow formed by the connecting interurban railways in this district. The pamphlet is illustrated by several fine half-tone engravings which are printed on plate paper and loosely fastened on the pages. These illustrations give an excellent idea of the high class construction employed on the line and some of the difficulties encountered in building through virgin timber country.

NEW PUBLICATIONS

Lignes Electriques Aeriennes. By Ph. Girardet. Paris: Gauthier-Villars, 1910. 181 pages, illus. Price, 5 francs.

This book is a recent addition to the engineering library issued by the publishers and contains a clear and detailed discussion of the matters which concern the erecting engineer of an electrical transmission line. Probably the chapters of most interest to the American readers are those relating to the manufacture and erection of concrete poles. These have come into extensive use in Europe because of their durability and low maintenance, compared with wooden and steel poles. They possess considerable elasticity and when built as described will withstand a strain at the top of the pole as high as 3,300 lb., although with a concrete pole line it is usual to use built-up steel towers at sharp turns. Spans of 330 ft. with concrete poles are not uncommon. One principal objection to the pole is its weight. A pole 40 ft. long weighs about 2900 lbs. This makes transportation expensive. Hence concrete poles are usually built on the ground in lots of 150 to 180, that is, so as to supply a pole line for a distance of 6 miles or 3 miles in each direction from the point of manufacture. The volume describes in detail the different methods of constructing these poles and attaching the cross arms. Other chapters cover the subjects of the preliminary survey of a transmission line, staking out the line, franchises, preparation for the work of construction and the work of construction itself. In the appendix a copy of the French law on transmission lines is given.

Lignes Electriques Souterraines. By Ph. Girardet and W. Dubi. Paris: Gauthier-Villars, 1910. 207 pages, illus. Price, 5 francs.

This book is a companion volume to the one just reviewed, and is devoted to the methods of constructing underground transmission lines, testing them and searching for faults. It is given up almost entirely to the method of laying the cables in trenches without conduits, a practice very extensively employed in France and increasing in use. The cables are protected outside of the lead covering with a layer of jute, then with a steel band covering, and finally with an exterior layer of tar or asphalt. They are laid in trenches 20 in. to 40 in. in depth, between two layers of sand, each from 4 in. to 6 in. in thickness. To protect them from the blow of a pick or shovel from a workman in the street, a layer of bricks or tile or strips of galvanized wire netting is laid over them. The volume describes in detail the methods of laying these cables, type of junction boxes employed, methods of testing and repairing, etc.

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CONTENTS.

Consolidation of Prepayment Car Companies.....	359
Cost of Stopping Interurban Cars.....	359
Work of the Block Signal Committee.....	360
The Rate Decision.....	360
The Illinois Electric Railways Association and the Central Electric Railway Association.....	360
Work for the Prevention of Accidents.....	361
London Transit Problems.....	362
Apprenticeship in Electric Railway Shops.....	363
Indianapolis, New Castle & Toledo Electric Railway.....	364
Piece-Work Records in Boston Armature Shop.....	370
Rail Corrugations.....	372
Electric Railway Conditions in France.....	373
Renewals as Defined by the Board of Supervising Engineers, Chicago Traction.....	374
Report of Block Signal Committee to the Indiana Railroad Commission.....	377
Inspection of Railway Material Discussed by New England Street Railway Club.....	378
Talks on Accidents to Employees of the Cleveland, Southwestern & Columbus Railway.....	379
Development of McKinley Lines During 1910.....	381
Single-Phase Railways Abroad.....	382
Atlanta Shop Notes.....	383
Suggested Tieless Roadbed Construction.....	384
Merger of Interests of Pay-As-You-Enter Car Corporation and Pay-Within Car Company.....	384
Pressed Steel Gasoline Track Inspection Car.....	385
Coasting Recorders for Milwaukee.....	385
Recent Turbine Developments and Efficiencies.....	386
Single Truck Pay-As-You-Enter Cars for Quincy, Ill.....	387
Pennsylvania Railroad Orders Nine More Electric Locomotives.....	388
Turn-In Car at Dayton, Ohio.....	388
London Letter.....	389
News of Electric Railways.....	390
Financial and Corporate.....	393
Traffic and Transportation.....	396
Personal Mention.....	398
Construction News.....	400
Manufactures and Supplies.....	403

Consolidation of Prepayment Car Companies

We have already expressed the opinion that the prepayment feature has been the most important improvement which has been introduced in car design since the adoption of electricity for street railway service. For some time after the successful establishment of the pay-as-you-enter plan in Montreal many railway managers in the United States were skeptical as to whether the system would work satisfactorily on their properties. But experience has proved that these fears were unfounded. The consolidation which is being announced this week of the Pay-As-You-Enter and Pay-Within interests unites the two companies which have been the chief, if not the only, commercial exponents of the prepayment feature of car operation in this country. This consolidation was brought about, it is understood, because in developing their systems these companies found that it was impossible for either to make further progress without infringing the patents of the other, and is a natural and logical outcome of the business situation which has faced these companies during the past two years. It should be of benefit to the electric railway industry, because it will combine the strength and experience of both organizations in this important field of car construction.

Cost of Stopping Interurban Cars

The cost of stopping and starting an interurban car is one of the innumerable items of operating expense which are insignificant when isolated but in the aggregate attain large proportions. In a paper on "Automatic Block Signals for Electric Railways," which was printed in a recent issue of the ELECTRIC RAILWAY JOURNAL, W. K. Howe stated that the cost of stopping and starting a 40-ton car from and to 40 m.p.h. was 3 cents. A few years ago a prominent steam railroad signal engineer estimated the cost of stopping and starting a six-car passenger train from and to 45 m.p.h. to be 35 cents, so that the two figures compare very closely when reduced to a common basis. If these costs are correct it is evident that considerable capital expenditure is justifiable on many roads with heavy traffic in order to eliminate unnecessary stops and slow-downs on account of sharp curves or other obstructions. Mr. Howe applies the cost given to a block signal installation and shows that an investment of \$8,750 is warranted by eliminating stops at a single siding for 20 trains in each direction per day. Aside from using the cost as an argument for the expenditure of money to effect a saving, it is worth while to point out that there is no profit in stopping a car twice to pick up and let off a passenger who pays only 5 cents for a short ride when the actual cost of carrying him is 7 cents or more. Most interurban roads have adopted a minimum fare of 10 cents, which is none too much considering the cost of the service given for the shortest ride.

Work of the Block Signal Committee

The data sheet which has been sent out by the joint committee on block signals of the Engineering and Transportation & Traffic Associations gives some indication of the line of investigation which will be pursued during the next few months by this important new committee. The questions to which answers are requested may be divided into two classes: first, those designed to elicit information regarding the operating conditions affecting signal installations, such as speed of cars, braking distance and kind of propulsion current; and, second, those pertaining to existing or contemplated installations of block signals. Three of the members of the joint committee are operating men and three are electrical engineers, but they cannot be expected to supply from their own knowledge of conditions all of the information necessary for drawing up conclusions regarding the signal requirements of electric interurban railways. Data on existing installations of signals should be the best guide for the committee, because many methods and devices which were all right in theory have proved failures in actual practice, and objections which appear paramount on paper often do not materialize. This is more particularly true of the features of signal installations which directly affect the movement of trains, such as the number and location of signals and the method of displaying indications. The electrical details for the most part are comparatively simple to study and judge on their merits. With the co-operation of all member companies which now have block signals of any type in use and with the assistance of manufacturers of signal devices the committee should be able to formulate a code of requisites to be fulfilled by every signal installation, and perhaps in addition a similar code of desirable characteristics covering conditions where the traffic density warrants extra expenditures for more extensive signal protection or greater facility of train movements. If such a code or codes can be drawn up in time for presentation at the convention next October the committee will have accomplished all that can be reasonably expected of it during the first year of its existence. That much will be a long step in advance.

The Rate Decision

Whatever may be the ultimate result of the decisions of the Interstate Commerce Commission in the railroad freight rate cases, interurban roads as a whole are not affected by the attitude of the governmental authorities toward the interstate tariffs. The position of the interurban lines, which furnish what is distinctly a local service, is not comparable with that of the steam railroads. The older established steam properties have had the benefit of many years of successful operation, and their present prosperity appears to have formed the groundwork for the decisions of the commission that they were in no need of additional revenues. Furthermore, no matter what the excesses in capitalization of the steam railroads may have been at the time of their construction and early financing, the great advances in the values of the rights-of-way and terminals are believed in most cases to have made capitalization and value practically equal at the present time. The interurban lines have not yet had the benefit of similar years of development. In many localities they were constructed without large expenditure for roadbed and equipment, and they were built to a large extent by promoters. But they have proved for the localities which they serve very useful

agencies of transportation and they deserve the same public encouragement and support which were extended to the steam railroads in the period of development of those properties. The passenger rates of steam and interurban lines, through advances in interurban rates wherever franchise conditions permit, are becoming more nearly equal than in the past. We believe that the unmistakable tendency is for advances in interurban passenger rates to continue in the future and that the competition between steam and electric roads will be more in service and less in rates. In the freight and express features of their business interurban lines furnish a rapidity of transportation that is not equaled by even the old-line express companies. For this unique and special service they are entitled to much higher rates than those which prevail on steam railroads.

THE ILLINOIS ELECTRIC RAILWAYS ASSOCIATION AND THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The new constitution of the Illinois Electric Railways Association, which was adopted at the first regular meeting of that association, held in Chicago on Feb. 17, provides that active membership shall be confined to electric railway companies in the State of Illinois, but that by a two-thirds vote of all members present at any regular meeting the scope of the association may be extended to include any other State or States. For the present, therefore, the Illinois Association has decided not to consolidate with the Central Electric Railway Association, although that body made a strong effort to bring about such a consolidation and no doubt its members will be greatly disappointed at the failure of their negotiations.

We can see, however, that there are many logical reasons which urge the Illinois roads to have a separate association through which they can advance their own special interests within the State. This statement is made with a full appreciation of the good work done in the past by the Central Electric Railway Association and the promise of even greater accomplishments in the future. The Central Electric Railway Association is an active, energetic and flourishing organization whose membership includes many of the best interurban railway operating and executive officers in the country. It has been a powerful factor in promoting the interchange of traffic between interurban roads in the middle West, in developing profitable long-distance riding and in advancing the art of interurban electric railroading in all its phases. For these reasons membership in the Central Electric Railway Association should be very useful to many, if not most, of the railways in Illinois, in spite of the fact that with but one exception there is no physical connection between the interurban railway companies in Illinois and those belonging to the Central Electric Association. But the question is not whether individual companies in Illinois should join that association, but whether the Illinois roads do not also need an association of their own.

There is certainly enough work to be undertaken to occupy the energies of both organizations, and the field of each need not and should not interfere in any way with that of the other. For instance, matters of purely local interest in Illinois can very properly be taken up by the association representing all of the Illinois street railways, interurban, elevated and city

lines alike, while the broader matters of standardizing the mechanical equipment of interurban cars, block signals and the development of through passenger, express and freight traffic can undoubtedly be taken up more effectively by the larger body. In a sense, the same question has come up in New England, where both the New England Street Railway Club and the Massachusetts Street Railway Association have done excellent work, but it has not been found that the activities of one body have interfered in any way with those of the other. It is true that in that case one organization has a membership of individuals and the other of companies, but both have the cordial support of the electric railway interests in the territory concerned. There is nothing in the constitution or by-laws of the Illinois Electric Railways Association to prevent a member company of that body from also being a member of the Central Electric Railway Association. In fact, one road, the Chicago, Lake Shore & South Bend Railway, which has its Western terminus at Kensington, Ill., has joined both organizations, and we believe that all other large interurban companies in Illinois would well follow its example.

As yet the Central Electric Railway Association has been largely, if not distinctively, an organization of interurban railways. Undoubtedly in thus largely confining its attention to interurban subjects it has accomplished a great deal more good than if it had attempted to take up all subjects connected with electric railway operation. If, however, it should seem wise in the future for the association to expand its scope so as to take up city railway problems as thoroughly as it has those connected with interurban operation and thus attract to its membership the street railway companies in the principal cities of Ohio, Indiana and Michigan, we believe that a proposal to join would appeal to the large city properties in Chicago.

In brief, it is our opinion that there can be hardly too many electric railway associations, provided each receives sufficient support from those interested in its work to allow it to accomplish good results. During the past few years electric railway associations and clubs have grown enormously in number, size and usefulness, and there are now in existence 18 sectional organizations of this character in different parts of the country. None of these has encroached on the work of the American Electric Railway Association or of its affiliated organizations, nor has the increase in size and influence of any hampered the development or field of any other. Association work is educational in its character, and as more of it is undertaken its field of usefulness seems to widen. This is partly because in any branch of learning an ever-increasing number of new problems presented for solution are disclosed as the horizon of actual knowledge broadens. Another reason is that the more one engages in association work the more efficient he becomes in it and the greater is the progress made.

We do not mean to imply from this discussion that the time may not come when certain of these associations can be consolidated, and this will be the natural tendency in Ohio, Indiana and Illinois as connecting links are built between the interurban systems in those States. With these facts in mind we believe that a most cordial welcome should be extended by the electric railway fraternity to the new organization in Illinois. The best wishes which can be extended to it are that it shall serve the electric railway interests in that State as efficiently as has the Central Electric Railway Association those of Ohio, Indiana and Michigan.

WORK FOR THE PREVENTION OF ACCIDENTS

It is axiomatic to say that all efforts that are directed toward the prevention of accidents are humane and deserve the support of officials and employees. General advice to trainmen, however, is as important as specific rules and regulations, and each class of effort should supplement the other. We have published accounts of the work which is being done by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway, in the endeavor to eliminate accidents, and wish to call further attention to the personal nature of the appeal which he directs to the employees. In another part of this issue of the *ELECTRIC RAILWAY JOURNAL* we publish abstracts of two of the interesting papers presented by Mr. Schneider recently before the employees.

The talks which Mr. Schneider makes are strong appeals to the better instincts of the employees. They are given periodically before the men of the different divisions. Each talk is given but once before each gathering. The keynote of the motive with which the talks deal is the complete elimination of accidents on the Southwestern system. In order that this ideal condition may be kept in mind the men are implored to consider the fearful consequences of accident. That is to say, they are urged to consider the effect upon the lives and health of those who may be involved in accidents. They are told frankly that the management wants to end the year without discharging a trainman for any cause.

While there is a wide difference in the methods that prevail with different companies and while a variety of practices have been introduced through the individual attempts of managers, it seems important to emphasize the prime need of continued work in this direction. New men enter upon their duties with a short acquaintance with operating practices, but without the familiarity with danger that is sometimes felt by older employees. If the effort of the company ends when it gives the employee a rule book, the trainman's knowledge will be derived largely by methods of self-teaching and intercourse with fellow-employees. This might start him on a fairly safe course if it was supplemented by a respect for danger that was greater than the average man holds. But with most men some stronger compelling force is necessary.

Such periodical talks as those given by Mr. Schneider have the effect of rousing the men frequently to a sense of the hazards which they control. They are not given so frequently as to risk a loss of interest in the subject. While the subject cannot be varied from "the prevention of accidents," the arguments can be diversified and put forth with new earnestness. This result appears to have been attained successfully by Mr. Schneider. Machine-like regularity of attention to rules of safety is not the sole aim to be accomplished by the managers of railways who undertake campaigns of this character. No matter how efficient and dependable the machinery of the system may have been in the past, its ultimate control lies with the human beings who must be stirred to a realization of their responsible part in the hazards of operation. Rigidity of discipline has its place and it is an important one, but if employment is easy and men are indifferent, disciplinary methods alone will not accomplish the results that should be attained.

A movement that is founded wisely upon the better impulses of the men is an appeal to humane considerations that will not be totally fruitless.

LONDON TRANSIT PROBLEMS

The annual "Blue Book" of the London Traffic Branch of the British Board of Trade always contains matter of interest to the transportation engineer. One reason for this may be that this commission, now in the fourth year of its existence, had its origin as the result of the suggestions of the Royal Commission on London Traffic, whose members, it will be remembered, visited this country in the fall of 1903 and later brought out a monumental report of eight volumes on London traffic conditions. It is also undoubtedly true that by a combination of circumstances the entire London transportation situation is in a somewhat critical condition in which developments of the most far-reaching importance, from a traffic standpoint, may occur at almost any time in the early future.

Of foremost interest is the present status of the steam railroad companies whose lines radiate from London. Fully to understand the problems which confront these roads the reader should realize the great competition from electric surface lines and motor omnibuses which these properties have experienced within the last ten years, so far as their suburban traffic is concerned. The rivalry of the street railways with penny fares, and in some cases with halfpenny fares, has been bad enough, but the tremendous increase in motor buses has made the matter even worse. Nor does this competition show signs of abating. The tramways are constantly extending and the motor bus companies have been able by mechanical improvements to decrease their maintenance charges and by consolidation to reduce their transportation expenses. Hence the motor omnibus service can be considered a permanent addition to the transportation facilities of London and one with which the steam railroads, as well as the tramways, will have to contend.

The reasons which are driving the steam railroads in the London district toward electrification, therefore, are different from those in America. In this country, in many if not most cases, electrification is looked upon in the light either of a necessity to avoid combustion in tunnel operation or of a luxury for which the suburban passenger or the city resident must pay, if the railroad is to make the change. But by the steam railroads in the British metropolis electrification is considered more as a means of salvation from present difficulties, involving sacrifices it is true, but providing perhaps the only way by which these roads can win back the fickle commuter and the short-distance rider and can restore the suburban traffic to its old standards.

Undoubtedly the results of the electrical equipment of the South London division of the London, Brighton & South Coast Railway, now known as the South London Elevated Electric Railway, will go a long way toward encouraging the acceptance of such a viewpoint. This line, which is 9 miles in length and is equipped with the single-phase system, was put into operation on Dec. 1, 1909. The results of operation for the first six months of 1910 show that the passenger traffic increased the enormous amount of over 91 per cent, or from 1,958,129 to 3,743,160. During this time the daily train mileage on week days was increased from 687 to 1465, or approximately 113 per cent. Part of this traffic, in the opinion of the chairman of the board of directors of the company, was that which had previously been enticed away by the tramways, but in all

probability a considerable portion was entirely new business. It is true that with the commencement of electrical operation the company reduced its fares and revised its season-ticket rates, so that the entire gain cannot be stated to be due to the adoption of electricity. But the company is so well satisfied with the service that it is planning immediately to equip two additional sections of its suburban system serving populous districts, most of which are intersected by tramways. It is not surprising that these results should have had a very marked effect in stimulating the other London suburban steam railroads to consider whether the situation can be saved and is worth saving. Practically all of the companies have felt the effects of this competition, the East London probably the most, as its suburban traffic has fallen off 61 per cent during the past eight years. In some cases the railroad companies are now reducing fares, in others they are investigating the merits of electrical operation, and in still others they are showing a disposition to abandon the short distance riding to the tramways.

In the meantime the passenger traffic by all of the other general means of transit in Greater London is advancing by leaps and bounds. It is estimated that, disregarding the traffic on the steam railroads and that in cabs and private carriages, the number of journeys per inhabitant in Greater London in 1881 per annum was 56.6. This had increased in 1891 to 95.4 and in 1901 to 128.7. The growth during the last eight years has been especially rapid, increasing in 1903 to 142.9; in 1905 to 153.2; in 1907 to 169.2, and in 1909 to 189.6. Of this traffic the local underground railways in 1909 carried 29 per cent, the tramways 49 per cent and the omnibus companies 22 per cent. This per capita figure is a large one for a community like Greater London, even with its total population of nearly 7,500,000, because, unlike most American cities, London is made up of a great many local centers of population, each to a large extent having its own individual mercantile industries and even political interests.

What can be done to meet the increasing demands on the transit facilities of London which these figures of constantly growing traffic show? This is the problem which is facing the government authorities and railway managers in that city. There are many courses to follow and each will contribute a part toward a solution of this problem. They include the improvement and consequently more extended patronage of the existing steam railroad systems, which, as shown, have by no means reached the limit of their carrying capacity. An increase in the facilities for the transfer of passengers on the different underground railways will also accomplish much and indeed has already done so, because all of the underground roads now recognize the advantage of this interchange. The greatest relief however, in the opinion of the traffic branch of the Board of Trade, lies in the construction of a comprehensive system of arterial roads, partly for the accommodation of the growing volume of road traffic, but also very largely to admit of a multiplication of tramway tracks. To determine the relative traffic efficiency of different widths of roadways an enumeration was conducted by the board of the vehicles traversing different important streets in London, and a "coefficient of obstruction" was determined upon for each class of vehicle. This coefficient varied from 10, which was assigned to a slow two-horse trade vehicle, to $\frac{1}{2}$, which was the rating assigned to a bicycle. In a similar way, a horse cab received a coefficient of 2, a motor cab a coefficient of

1, and a horse omnibus a co-efficient of 7. Electric cars were credited (or debited) with 10, as a "coefficient of obstruction," or "traffic unit," the term to which the first expression was abbreviated for convenience in the report.

Based on these figures, the commission has recommended a width of at least 100 ft. for its main arterial roads and has expressed its belief that a road of this breadth should accommodate two electric railway lines and three lines of vehicle traffic on each side of the road. Altogether the commission believes that the needs of the city require the construction of practically 100 additional miles of such roads within the Metropolitan area, as well as the widening of many of the existing streets. A program such as that proposed by the commission necessarily will take a long time to carry out, and perhaps it will never be completed in its entirety on account of the expense, but it is at least daring in its conception. There is no doubt, to judge from the report, that something should be done to improve the now overtaxed condition of the streets in London.

APPRENTICESHIP IN ELECTRIC RAILWAY SHOPS

Apprenticeship undoubtedly formed the first way of learning a trade and up to from 40 to 50 years ago was the usual method followed. With the enormous expansion of corporate and railway enterprises, however, and the increasing tendency toward specialization in manufacture, the practice of training apprentices to become skilled workmen fell somewhat into disuse. The reason for this undoubtedly was that the necessity of providing skilled assistants in a shop was felt more strongly by a man who was the owner of a shop and also the employer of the men than by a salaried foreman. It was easier for the foreman and probably, for the time, cheaper for the large corporation by which he was employed to have the shop force recruited from men who had learned their trade in smaller shops than to engage upon a course of apprentice education. A broader view of the situation, however, discloses the short-sightedness of this policy and the falsity of the arguments upon which it is based, and most of the largest and most progressive steam railroad and manufacturing companies now provide means by which young men can enter the employment of the company as apprentices and acquire an expert knowledge of the business in which the company is engaged.

The subject has a direct bearing on electric railway matters because there is a generally acknowledged lack at the present time of skilled men in many departments of shop work, especially in that of car equipment, inspection and repair. In this field the demand far exceeds the supply. In fact, most of the skilled labor now engaged in this work can be said to have been self-taught, and it is to determine the best method of developing such men that President Harvie, of the American Electric Railway Engineering Association, has appointed a committee on apprenticeship courses to report at the next convention.

To those who are unacquainted with the extent to which manufacturing and railroad companies have engaged in the practice of training apprentices the proceedings of the recent convention at Boston of the National Society for the Promotion of Industrial Education will be a revelation. One of the parts or sections of this society is devoted to the subject of apprenticeship and corporation schools, and at the last annual meeting addresses were given by those who had been closely con-

nected with schools of this character conducted by the General Electric Company, the Westinghouse Electric & Manufacturing Company, the Solvay Process Company, the American Locomotive Company and the Atchison, Topeka & Santa Fe Railway. In general, the course given by these companies is about the same and includes real instruction in all of the different branches of the work to which the young man has apprenticed himself and the payment to him, during his course, of a living wage. All of the speakers indicated in their remarks that the apprenticeship system was worth in direct returns all that it cost the company, because it provided a supply of skilled mechanics or other workmen who had been trained to work according to the methods of the company and were better suited and fitted to its needs than those hired outside.

In several of the addresses emphasis was laid upon the success of the apprenticeship system in producing the kind of employee who thinks rather than the kind who displays no intelligence in his work. Of course, the apprentices are required to work like other men in the shop, and experience has shown in these apprentice schools that it is inadvisable to make shop work subservient to school work, but the men are encouraged to think and to ask the reasons of the methods which they are taught to follow.

A regularly organized apprenticeship system possesses two important advantages over the plan by which young men are taken into a shop simply in the capacity of helpers. As such their chances of learning more than one single department of the work are small and they have not the availability for general employment that a broader training would give to them. Again, the effect of work whose purpose and theory a man understands but dimly is to rob him of initiative and he soon forgets to use his reasoning powers. For instance, a man may work constantly at wiring a car and know no more about the connections than that it is necessary to connect a terminal with one tag in one place and a terminal with another tag in another place and then test the circuits with a magneto, but he will not, as a rule, make as good a workman as one who knows the reason for the different connections which he is making.

A special feature brought out in the discussion at the Boston convention was that the value of apprenticeship courses is by no means limited to the large companies. In fact, the smaller companies can employ the system even more satisfactorily than larger ones. The only requirement is the selection of certain skilled workmen to give a part of their time to teaching the young men in regard to the work which they have to do.

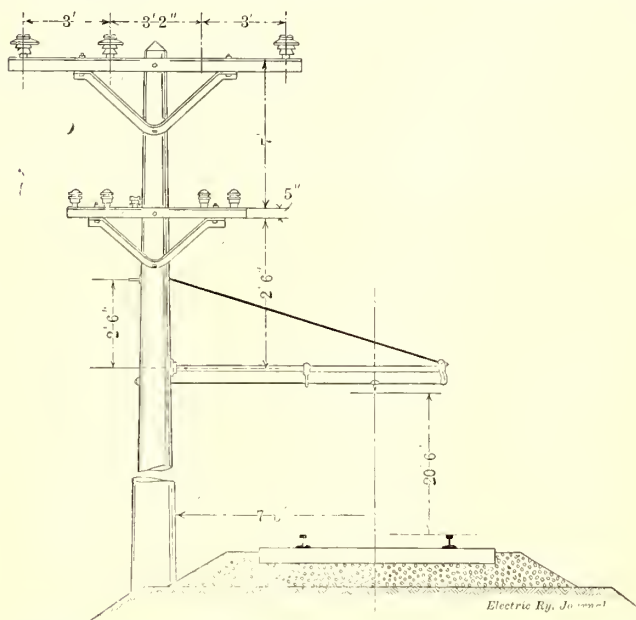
An apprenticeship course, it should be understood, is quite distinct from the courses in force on some railway lines designed especially for graduates of technical schools or colleges. The latter have received their general education and need a technical knowledge of the practice in different departments of a railway company to fit them to fill some position in the transportation, engineering or other department of the company. The apprenticeship course, on the other hand, is intended especially for the development of machinists in the shop department and for car repair and construction men.

In this connection it is worthy of note that the fourth annual conference of the apprentice instructors of the New York Central Lines took place in New York Jan. 27. The course has been in force since March 1, 1906, and has been extended to ten shops of the system. On July 1 of last year 617 apprentices were on the rolls of the company.

INDIANAPOLIS, NEW CASTLE & TOLEDO ELECTRIC RAILWAY

BY PAUL H. WHITE, CONSULTING ELECTRICAL AND MECHANICAL ENGINEER OF THE COMPANY

In June, 1910, the Indianapolis, New Castle & Toledo Electric Railway Company put into operation an electric railway line which is of particular interest because of its excellent roadbed, simplified power equipment and large "sheep-nose" cars. This road owns a private right-of-way from the eastern limits



Indianapolis, New Castle & Toledo—Typical Cross-Section of Line and Track Construction

of the City of Indianapolis, 40.25 miles, to New Castle. Entrance to Indianapolis is had over the tracks of the Indianapolis Traction & Terminal Company. The interurban road has its own tracks and a terminal station in New Castle, which is a manufacturing city of 15,000 inhabitants, located in the center of a rich agricultural district.

HISTORICAL

When the promoters first planned the New Castle project they had just successfully built the Indianapolis & Southern Railroad and sold it to the Illinois Central Railroad. Studies in connection with the construction of that property led them to believe that Indianapolis needed a belt railroad that would encircle the city and derive substantial earnings by transferring freight for both electric and steam roads. This belt line, they thought, should have a big city freight and express terminal, and with that in view they spent about \$300,000 for a private right-of-way, over which trains could be brought to the terminal property at Tenth and Massachusetts Streets, close to the business district. The Indianapolis, New Castle & Toledo interurban line, it was planned, would use this terminal entrance and would be built as a high-grade, electrically operated freight and passenger line, connecting Indianapolis with Toledo and the Great Lakes.

The belt railway and the high-grade interurban road projects were too large to be carried on during the financial depression of 1907, and, although the construction work was well advanced on the New Castle section of the interurban road, receivers were appointed Oct. 10, 1907. No work was done on the project by the receivers until September, 1909, when the courts gave the Union Trust Company of Indiana, the receiver, authority to spend not more than \$460,000 in completing the road between Indianapolis and New Castle. At the time these instructions were issued the subgrade was about 90 per cent completed, 18 out of 45 miles of track were down and 2 miles of track were ballasted and bonded. The power-house building

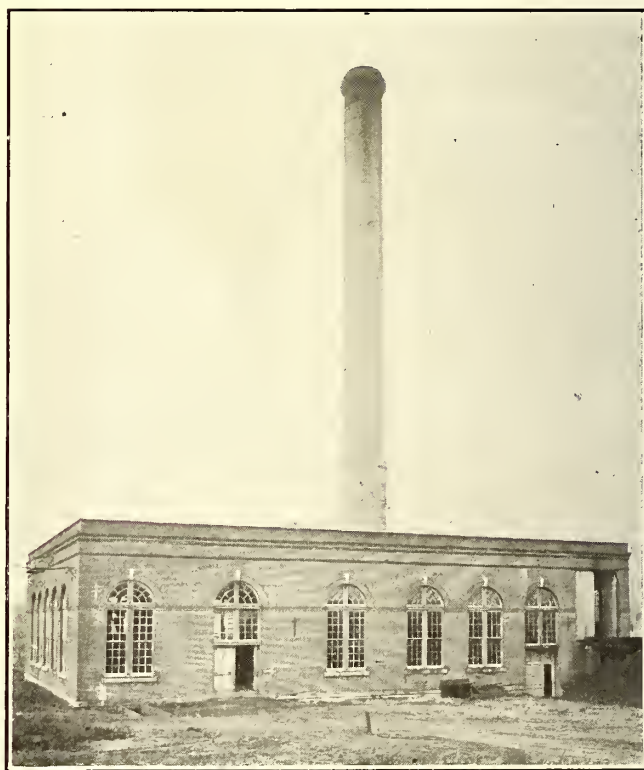
had been erected and the boilers and stokers had been purchased. The pole line was about 75 per cent completed, and substation buildings were under construction. It became advisable later to abandon the substation work that had been done previously and relocate the substations according to more modest designs. All the bridges, which include a number of massive reinforced-concrete structures, were completed at the time of the receivership with the exception of one.

The writer, who was consulting engineer and formerly general manager of the Indianapolis & Martinsville Traction Company, was placed in charge of the completion of the power generation and distribution work and the purchase of cars and all other electrical work. A. R. Holliday, formerly with the Pennsylvania Railroad, was put in charge of the completion of the track and roadbed.

About a year ago the receivers began issuing certificates maturing in three years. After the construction work had been completed to the city limits operation was postponed for three months on account of difference of opinion regarding entrance into Indianapolis between the receivers, the public and the Indianapolis Traction & Terminal Company, whose tracks were to be used. After these differences had been adjusted 5800 ft. of track had to be built to connect with the Indianapolis street railway system leading to the Indianapolis terminal.

TRACK AND ROADWAY

The New Castle line is fortunately situated in not having any grade crossings with steam roads and in reaching the Traction Terminal in Indianapolis over city track, which is said to be shorter and faster than that used by any other interurban line reaching Indianapolis. Between the eastern city limits and New Castle the roadbed of the new interurban line parallels a steam railway for practically the entire distance and



Indianapolis, New Castle & Toledo—New Castle Power Station with Local Converter Equipment

is on a private right-of-way, which at no place is less than 66 ft. wide. A generous amount of earthwork was done, so that between terminal cities the road has grades and curves which compare favorably with those of the parallel steam road. All water crossings are spanned by reinforced-concrete structures with ballasted decks. These are of particularly heavy and substantial construction, as evidenced by several of the accompanying illustrations.

The track construction of the new road conforms to existing interurban standards. The rails weigh 70 lb. per yard, are connected with continuous rail joints and are bonded with No. 0000 American Steel & Wire Crown bonds. Cross bonds are placed approximately 1000 ft. apart. Fifteen sidings have been installed on the 40.25 miles of private right-of-way connecting the city limits of the terminals. All of these are stub-end sidings pointing in the same direction, so that the uniform practice of having all the cars running in one direction head in and back out of the sidings at meeting points may conveniently be followed. The switches are thrown and protected by Buda semaphore-blade switchstands.

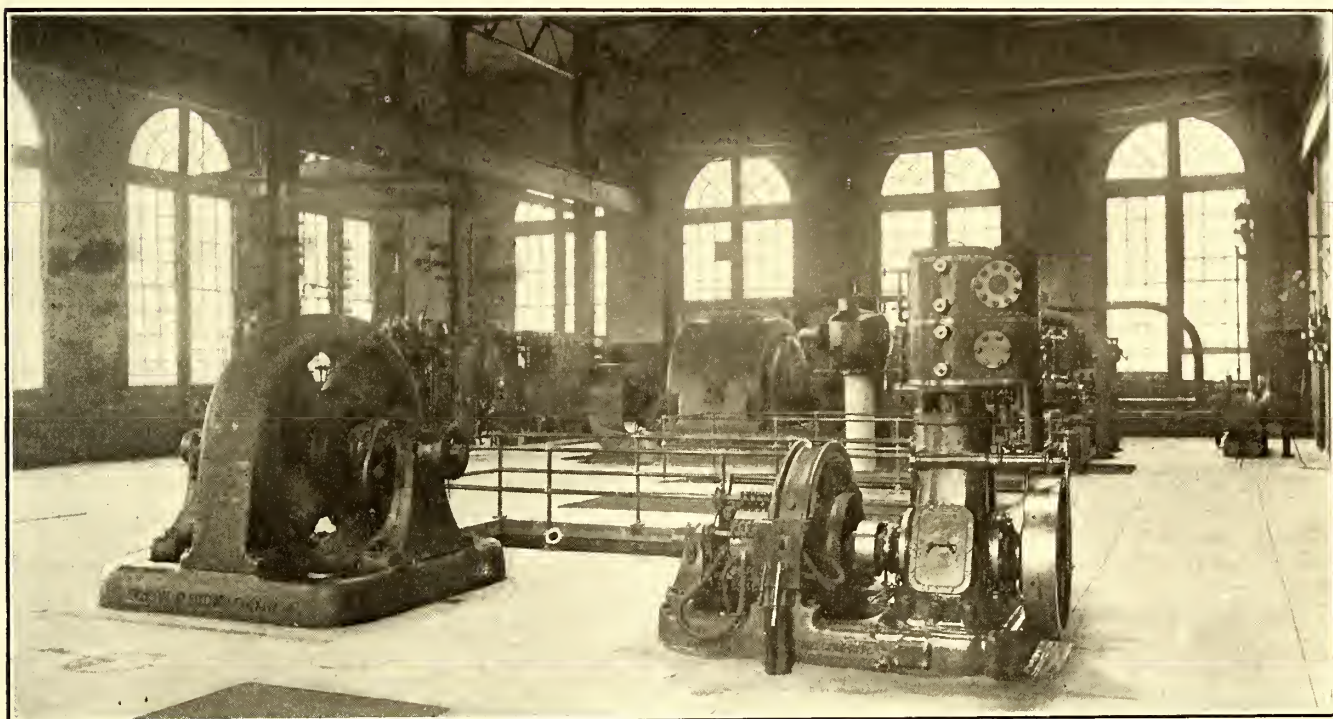
A shelter house has been placed at each highway for the accommodation of waiting passengers. These houses are of frame construction. A lumber concern built all of the shelter houses at its plant and delivered them to the railroad company at a cost of \$55 each.

OVERHEAD CONSTRUCTION

Energy for the operation of the cars is generated in a modern

through trolley wire for a distance of 300 ft. ahead of switch points. This unusually long trolley lead makes it possible for the conductor to change the trolley pole while the car is slowing down and then be ready to run ahead to throw the switch as soon as his car is stopped. Thus some time is saved in taking a siding.

The No. 000 trolley wire is supplemented throughout the entire length of the road by a 650,000-circ. mil stranded copper cable carried on the cross-arms which support the telephone wires. The trolley feeder circuits are protected by Garton-Daniels lightning arresters spaced about 1000 ft. apart. Duplicate telephone circuits of No. 12 copper wire extend the full length of the line. One circuit is reserved for train operation and the other for the general business of the road. The train-handling telephone circuit includes jack boxes spaced one-half mile apart. The Stromberg-Carlson Telephone Manufacturing Company supplied the telephone apparatus, which includes an instrument mounted in the forward compartment of each car. Each of these instruments is provided with a windlass and



Indianapolis, New Castle & Toledo—Interior of New Castle Power House

plant located near New Castle, the eastern terminus of the road. From this plant a 33,000-volt transmission line extends to three intermediate rotary converter substations. The transmission line is looped through each substation, and provision is made for sectionalizing the line at each substation. The locations for the intermediate substations were so chosen that no meeting point is farther than 2 miles away from one. This feature and the generous amount of trolley feeder provide an operating voltage which is notable for its steadiness and is a very important factor in maintaining close schedules.

TRANSMISSION LINE

A view of the pole-top construction is shown. The high-tension circuit consists of 12.4 miles of No. 4 copper and 22 miles of No. 3 copper. The three high-tension wires are carried on Locke No. 312 36,000-volt porcelain insulators mounted on a single 10-ft. cross-arm. It is interesting to note that, while these insulators were installed three years ago and now have been in full service for eight months, not one has been found defective.

TROLLEY CONSTRUCTION

Current is distributed to the cars through a No. 000 grooved trolley wire carried on 9-ft. tubular bracket arms and fitted with Ohio Brass Company's overhead materials. At each siding the trolley wire serving the side track is hung parallel with the

150 ft. of connecting cord which terminates in a jack plug.

POWER STATION

The power station of the new road is located about one-half mile west of New Castle, the eastern terminus of the line. As originally designed it was planned to use this power station for feeding a considerably greater mileage than is now operated. The plant at present has a greater generating capacity than is needed, and there is ample room for the installation of additional equipment. The building is of fireproof design, rectangular in shape and subdivided into turbine and boiler rooms. The turbine room is served by a 20-ton hand-operated crane supplied by the Northern Engineering Works. In addition to two turbo-generators and the electrical control apparatus, this room contains a 40-kw, 125-volt marine-type steam exciter set and a rotary converter equipment, which supplies current to the adjacent section of the interurban line.

BOILER PLANT

The boiler-house equipment includes three 400-hp Edge Moor boilers, with Green chain grate stokers, and three Dean outside-packed pot-valve pumps. Coal for the power plant is delivered directly above a bunker extending the full length of the firing aisle and fronting on it. The fuel is shoveled directly onto the hoppers of the chain-grate stokers. The ashes are collected in pits under the boiler fronts and are carried out of the

buildings on industrial railway cars. A reinforced-concrete steel stack furnishes draft for the boilers. This stack is located about the center of the boiler house and is of the Alphons Custodis type.

The boiler auxiliary pumping equipment and a Cochrane feed-water heater are grouped at the center of the boiler house. Three boiler-feed and house pumps are mounted on concrete foundations, which support them 2 ft. above the boiler-room floor and thus give room in which to adjust and repack the valves. The Cochrane heater is supported by a steel platform at a height of 11 ft. 6 in. above the floor. Either of the three pumps may be used for boiler feeding, boiler washing or low-service pumping.

The high-pressure steam piping, which was supplied by the Best Manufacturing Company, has been laid out on the loop system to give maximum flexibility in event of deranged operating conditions. The main steam header is back of the boiler settings, and the leads to the turbines are taken under the turbine-room floor, so that they may not interfere with the handling of materials by the overhead crane.

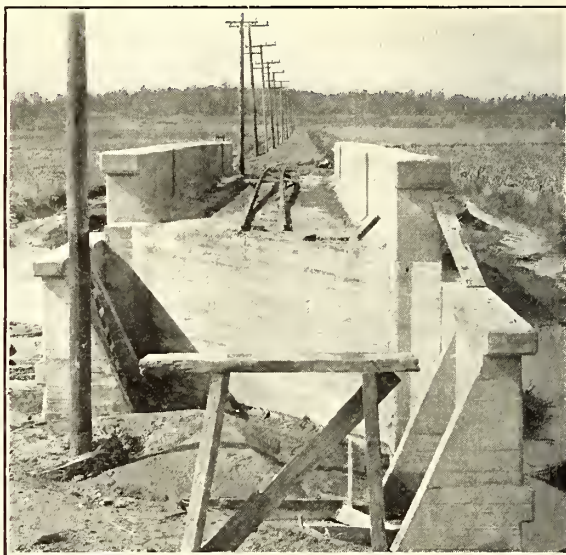
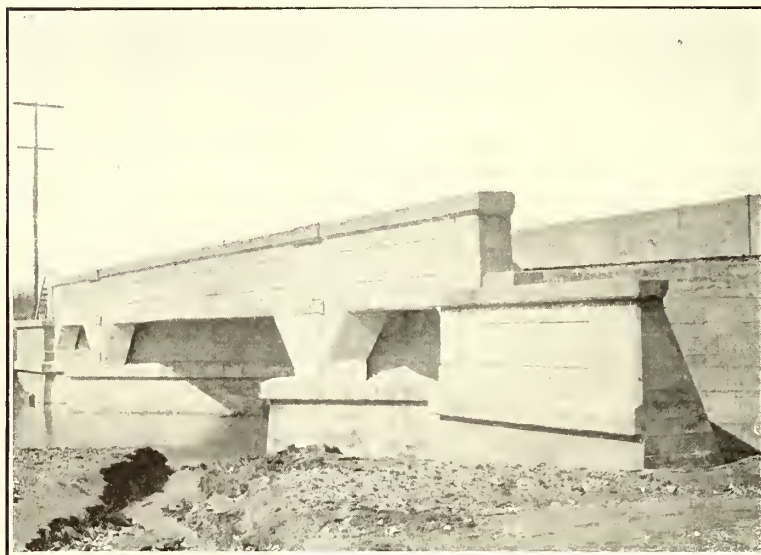
GENERATING UNITS

The main generating units are two General Electric horizontal turbine-driven, 370-volt, 25-cycle, three-phase, 1500-kw sets. The generators of these sets are cooled by air forced

the turbine axes. The exhaust outlets from the turbines pass down through the floor to connect with the opposite ends of a large inverted "T." These connections are made by means of large right-angle bends and include hand-operated valves. The middle upright leg of the "T" connects with the condenser shell. One of the right-angle bends is so designed that it may be swung through 180 deg. and thus assume a position which would make possible direct connection with an additional condenser unit should this be purchased.

The condenser is served by an Alberger dry-air pump installed on the main floor. Circulating water is drawn from a nearby river and forced through the condenser by a 12-in. electrically operated turbine pump. This pump, which has a capacity of 4000 gal. per minute, takes its suction from the river and discharges into a conduit 1500 ft. long, made of 20-in. wood-stave pipe. The discharge water from the condenser is led to a sump outside of the building, from which the boiler-feed supply is drawn.

Exciting current for the turbo-generators is furnished by either of two units. One is a 35-kw, 125-volt induction motor-generator set operating at 750 r.p.m. and the other is a 50-kw General Electric marine engine set, the engine operating at 400 r.p.m. Exhaust steam from this exciter set is piped to the feed-water heater.



Indianapolis, New Castle & Toledo—Typical Concrete Bridges with Floor for Ballast

through them by Sturtevant fans mounted on extensions of the turbine shafts. These fans take air directly from the turbine room, forcing it through the generating windings, and discharging it outside of the building through a duct carried under the turbine-room floor. The turbines operate under steam at 175 lb. initial pressure and 50 deg. superheat. They run at 1500 r.p.m.

CONDENSING EQUIPMENT

As the capacity of each unit is sufficient to meet the overload demands of the entire road, only one condenser unit has been installed. This condenser is of the surface type and Alberger manufacture. It has 3600 sq. ft. of cooling surface. Piping connections are arranged so that either turbine may be coupled to it through a short connection. Each turbine has an independent atmospheric exhaust valve leading to a spiral pipe exhaust main. Cast-iron pipe has been used for the parts of this main which are installed in a horizontal position.

The vacuum connections between the two horizontal turbines and the surface condenser located between them are of interest because the piping has been designed to provide for using the single condenser with either turbine, pending an increase in power demand, and also to provide for the convenient installation of an additional condenser whenever it becomes necessary to operate both turbine units. As stated, the condenser is installed above the turbine-room floor, and its axis is parallel to

ELECTRICAL CONTROL CONNECTIONS

The original plan for this power station included an elaborate arrangement of busbar compartments in the basement, but the construction engineer appointed by the receivers, for reasons of economy, installed the electrical switching and other control apparatus above the turbine-room floor according to a very simple plan which has given very satisfactory results. All wiring, both high and low tension, except the leads between the generators and the machine switches, is installed above the floor level. This makes certain that any disturbance will be noted quickly and facilitates the inspection work.

The electrical equipment provides for switching the output of the generators on the generator side of the transformers. Each phase is controlled by an automatic carbon-break circuit-breaker which may be operated by a solenoid or by hand. These machine switches feed current into a 370-volt, three-phase copper bus erected on a steel framework directly behind the control board. Line switches similar in design to the machine switches connect the busbars with the secondary leads of a bank of oil-insulated transformers, which step up the voltage from the busbar potential of 370 to the line potential of 33,000 volts.

Normally three of these transformers are connected in delta and a fourth transformer is available for emergency. Switches of the knife type are provided so that the spare transformer

may quickly be connected in place of one of the others, or the four transformers may be grouped in two pairs connected in open delta and thrown on the line in multiple to furnish a 1000-kw capacity of transformation from 370 volts to 33,000 volts. The high-tension connections for the four transformers are made with bare copper wire supported on post insulators anchored in the power-station wall. A set of electrolytic lightning

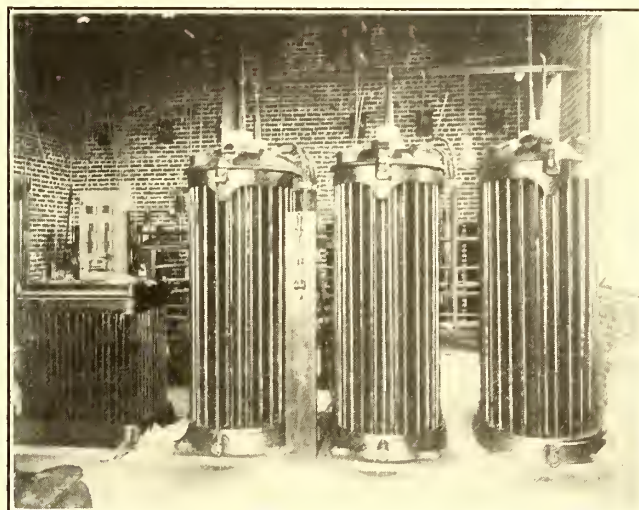
design of these substations has been simplicity, with due regard to continuity of service. The substation buildings are of fire-proof construction, 23 ft. wide and 30 ft. 6 in. long. One of the substations—that at Shirley—was built in connection with a depot which has a waiting room, ticket office and freight room on the ground floor. The second floor contains eight rooms



Indianapolis, New Castle & Toledo—Exterior of Substation at Shirley

arresters is installed on a fireproof gallery close to the outlet of the 33,000-volt line wires. The horn gaps are inside the building.

Direct current for feeding the New Castle end of the trolley wire is obtained from a rotary converter installed in the power house. This 300-kw unit takes its supply of current directly

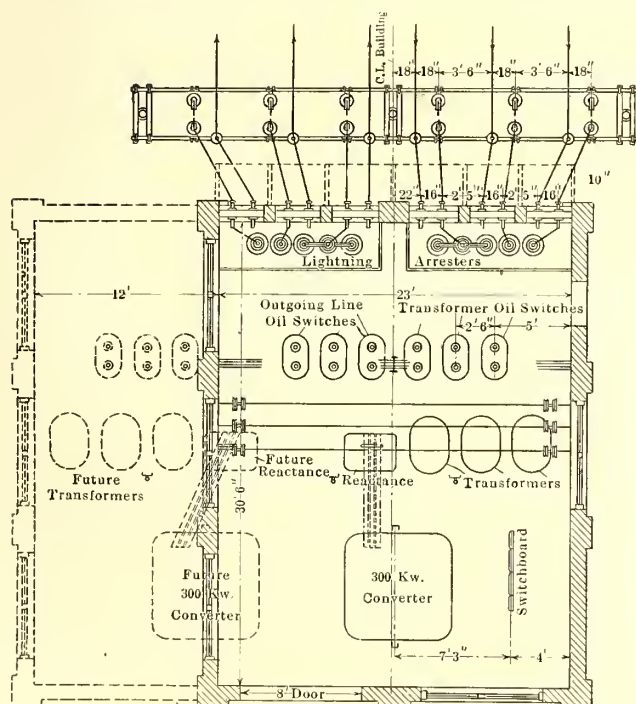


Indianapolis, New Castle & Toledo—Transformers in Substation at Shirley

arranged as a residence for the agent and substation operator. This station is now in charge of a man and his wife. The wife operates the substation and performs the duties of ticket and express agent during the daytime and the husband is on duty at night.

The electrical features of the substations are very simple. Thirty-three-thousand-volt current is led into the building through porcelain wall insulators. Taps for an electrolytic lightning arrester equipment and its horn gaps are just outside of the wire entrances. The electrolytic arresters, of which there are four cells, are mounted on an insulated platform just inside the substation wall.

The high-tension wires are carried on porcelain pedestals secured to the ceiling of the substation. Three bus wires, to which the transmission line is connected through hand-operated knife switches, extend across the width of the substation and are supported on disk strain insulators, as shown in the floor

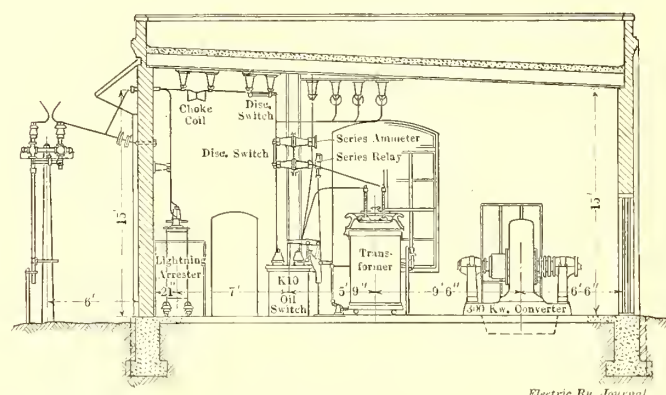


Indianapolis, New Castle & Toledo—Plan and Section of Substation

from the generator bus. The General Electric Company supplied the major part of the electrical apparatus for the New Castle line.

SUBSTATIONS

Three substations feed the trolley at points about 9 miles apart and are similar in design. A plan and sectional elevation of one of the substations is presented. The keynote in the



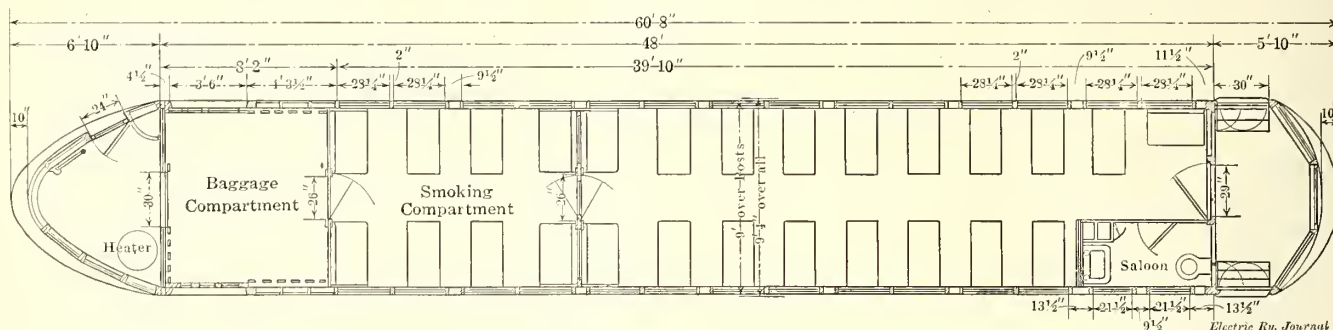
Electric Ry. Journal

plan. Taps from these three buses are led through disconnecting switches down to the tops of three type F, form K-10 oil switches, which serve to connect the incoming transmission line with the step-down transformers feeding the rotary converter. The oil switches are designed to handle 100 amp at 45,000 volts. They stand directly on the substation floor. Each switch has a time-limit relay on it.

The step-down transformers, of which there are three, are 110-kw oil-insulated units. Low-voltage alternating current is fed to the rotary converter through a reactance coil. The low-voltage cables between the reactance coil and the rotary are the only parts of the substation wiring which are below the floor level, and they are incased in iron pipe. Half-voltage trans-

ROLLING STOCK

The rolling stock equipment of this new road includes six large four-compartment passenger cars, two motor express cars and seven freight and miscellaneous trailers. The large passenger cars were built by the Jewett Car Company. A floor plan and half-tone engraving of one of these cars are shown.



Indianapolis, New Castle & Toledo—Plan of Standard Combination Car

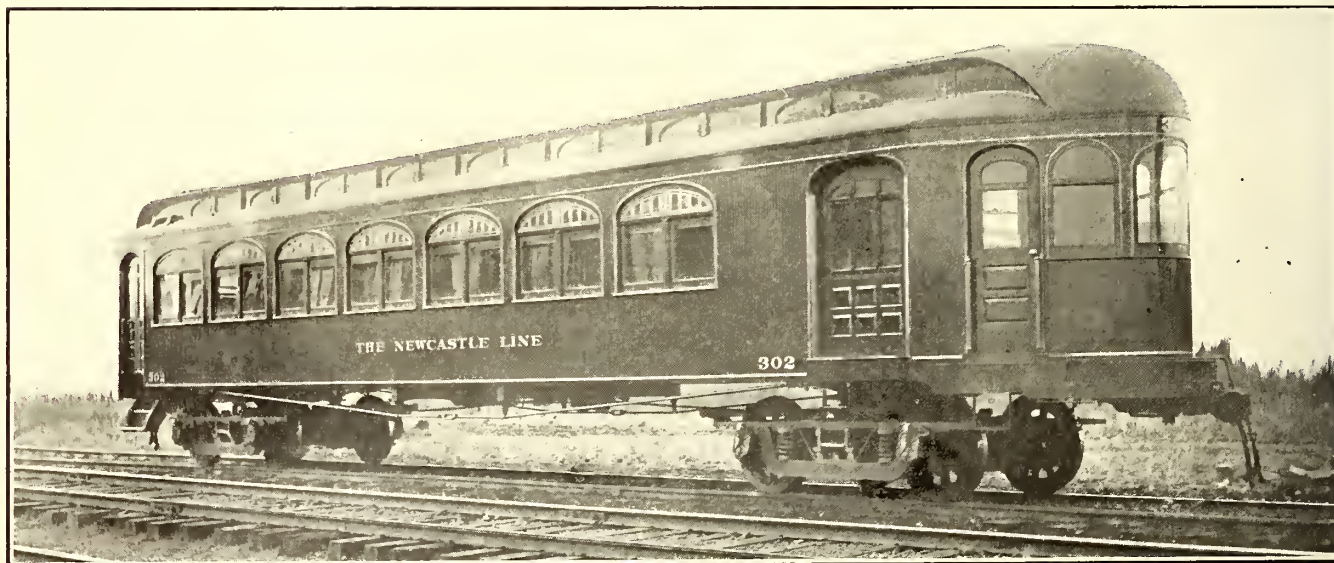
former connections are provided for starting the rotary, the starting switches being mounted on the top of the reactance coil case. This is the only low-tension alternating-current switch in the substation. The rotary converter is a 300-kw unit operating on 370-volt alternating current and delivering 600-volt direct current. The switchboard which controls the output of the rotary has one direct-current machine panel and two direct-current feeder panels. The circuit-breakers on the trolley feeders have low-voltage trips, so that when the alternating-current supply from the power house falls in voltage the substation equipment automatically is cut off from the trolley wire.

The high-tension line is looped through two of the substations. The outgoing lines are controlled by K-10 oil switches similar to those used for cutting off the transformers supplying the rotary converter. The outgoing alternating-current feeders are protected by electrolytic lightning arresters similar to those on the incoming lines.

SALE OF POWER FOR PUMPING

The railway company supplies the village of Shirley with

The photographic view of the exterior was made before the pilot was attached. The over-all length of the car is 60 ft. 8 in., which is made up of a rear platform and bumper, 5 ft. 10 in. long over all; smoking and coach compartments, 39 ft. 10 in. long over all; a baggage compartment, 8 ft. 2 in. long over all, and a motorman's compartment, 6 ft. 10 in. long. The car is arranged for single-end operation and has steps at both sides of the rear platform. The toilet room, which is located at the rear of the car, is 6 ft. long and has been furnished with especially fine fittings, including a Duner flush hopper, a nickel-plated wash bowl and a linen closet. The floor of the toilet room is covered with interlocking rubber tile, and the side walls are finished in white enamel. The main passenger compartment of one of these cars has seats for 36 people. The car is 9 ft. 4 in. wide over all and has a 29-in. aisle. The smoking compartment seats 16 people. The doors at the forward end of the smoking compartment and the rear end of the main compartment swing toward the center of the car, and the door in the intermediate bulkhead swings in either direction.



Indianapolis, New Castle & Toledo—Car with Parabolic Front

power for operating the pumps used to furnish water for fire protection. Water is stored in an elevated tank, and a 25-hp motor is used to drive a pump which keeps this tank filled. The pump motor is fed with three-phase current at 370 volts, taken from the secondary side of the substation transformers. The contract for the sale of this service provides for the delivery of current at 3 cents per kw-hour, with a minimum monthly charge of \$25. When the charge amounts to more than \$50 a month a reduction of 10 per cent is made.

PARABOLIC FRONT END

The motorman's compartment in this type of car has a novel shape because the front end of the car follows the curve of a parabola. This compartment has one exit door at the right-hand side of the car. The center forward window glass is cylindrical in shape and is fixed solidly in position. The windows on either side are arranged to drop and so located that it is easy for the motorman to reach out to throw a switch. The controller is located at the very front of this "sheep nose," the

heater at one corner and the coal bin in the other. This arrangement of the front end of the car gives the motorman ample space to suit his convenience. It is thought that the pointed end decreases the wind resistance to a notable amount when the car is operating at high speeds, and that, with this rounded front end and a steel-sheathed pilot, the car will be able to force its way through practically any snowdrift. The end framing of the car is carried forward to the bumper, and so a very strong structure is formed to resist butting.

The body of one of these cars weighs 35,000 lb. and an entire car weighs 55,000 lb. complete. Each car is mounted on two heavy Baldwin M.C.B.-type trucks, with 37½-in. spoke wheels. The journal bearings are 5 in. x 9 in., the gear fit 7½ in. and the wheel fit 7⅞ in. The car is propelled by four GE-205 motors with K-34 controller. General Electric straight air brakes are used. All of the electrical wiring of the car is inclosed in conduit, which is installed between the center sills. The cars are intended for single-end operation only and each is equipped with Van Dorn couplers.

The special equipment on these cars includes: General Elec-

tains between all other stations on the road, was made on account of steam railroad competition.

AUTOMOBILE FEEDER LINE

One novel source of traffic for this road is an automobile 'bus line operating between Maxwell interurban station and the town of Greenfield, a county seat. Greenfield has service to Indianapolis over another interurban road, but the owners of the 'bus line find it profitable to operate three automobile 'buses over their 6-mile highway route. This 'bus line sells through tickets to Indianapolis from any point on the 'bus route by way of Maxwell and the Indianapolis & New Castle interurban road. Similarly the interurban road sells through tickets to points on the automobile 'bus route.

One freight train is operated for a round trip each day. General merchandise, manufactured products and milk largely make up the freight business. Recently a sterilizing station has been built on the right-of-way near the midpoint of the interurban line. Milk is delivered to this station by the farmers and then it is sterilized for reshipment into Indianapolis. About 55 cans a day are now handled. At another point on the road a special traveling crane has been erected for transferring radiators from wagons to a platform, from which they can be trucked into freight cars for shipment to Indianapolis.

ANNUAL REPORT OF PRAGUE ELECTRIC RAILWAY

The municipal electric railway of Prague, the principal city of Bohemia, has furnished the American consulate some figures indicating the business done in 1910, the thirteenth year of operation. The system has been extended to four additional suburbs during the past year, until it extends over 52 miles. Almost every line has been double-tracked. The rolling stock consists of 347 motor and 202 trailer cars, 8 snow plows, 10 freight cars and 1 sprinkler. During 1910 49,500,000 passengers were carried, an increase of 6,637,542 over the previous year. The receipts were \$1,389,738, or \$201,181 greater than in 1909.

There are 917 conductors and motormen, 42 switchmen and 32 inspectors, aside from the common laborers and higher officials. On paying fare the passenger is given a ticket for the distance to be traveled, the minimum fare being 2½ cents and the maximum 6 cents. All tickets are good for transfers within the zone in which the ticket is valid. The minimum fare is valid within a zone of six stations from the starting point, and the maximum tickets are good anywhere on the line. An inspector enters the service at \$6.09 a week, and has gradual increases until he has served 11 years, at which time he receives \$8.12 a week, or \$422.24 a year. He then receives an increase of 25 per cent, which makes his salary \$527.80, at which amount it remains until he has served the corporation 35 years, when he is pensioned, receiving as a pension his full salary of \$527.80. Conductors and motormen are taken on trial for three months, and for the first year of service receive \$0.53 a day, or \$193.45 a year. They receive gradual increases until they have served 11 years, when their compensation amounts to \$0.69 a day, or \$251.92 a year. Then they receive an increase of 25 per cent, which makes their salary \$314.90 annually, where it remains until they have served 35 years, when they also receive pensions amounting to their full salary, \$314.90. Switchmen and ordinary laborers also begin at \$0.53 a day and receive gradual increases until they have served nine years, when their salaries amount to \$237.10. They then receive an increase, which makes their salaries \$285.82, at which amount they remain until they are pensioned after 35 years of service at \$285.82 per annum. Ordinary laborers work 12 hours a day, motormen 10 hours and conductors 14 hours. Laborers are given one free day in every five and motormen and conductors one in every seven. Aside from the compensation of the conductors they expect and often receive from each passenger a tip of 2 hellers, which amounts to two-fifths of a cent, when they show the passenger any special courtesy on request, such as supplying information about connections, location of points of interest, etc.



Indianapolis, New Castle & Toledo—Interior of Standard Combination Car

tric air brakes; Van Dorn No. 21 couplers; Peter Smith hot-water heating system; General Electric and Crouse-Hinds head-lights; Symington journal boxes; four GE-205 motors; Sherwin-Williams paint; Hale & Kilburn seats; Wilson trolley retrievers; Shelby trolley poles; U. S. No. 13 trolley bases and Kalamazoo trolley wheels.

REPAIR SHOP

The repair shop of the new road is located on a piece of property, 20 acres in extent, close to the power house just west of New Castle. The shop is a brick structure inclosing two pit tracks, each long enough to accommodate two large interurban cars. One section of the shop building has been set off as a shop storeroom, and repair machinery is being installed in a shop bay facing the pit tracks.

OPERATION

The Indianapolis, New Castle & Toledo Electric Railway has the following operating organization: M. E. Graston, general manager; C. F. Witt, auditor; Harry Buskirk, roadmaster; George H. Brannon, traffic agent; R. E. Hollis, chief engineer power plant and substations; E. H. Clark, master mechanic; R. E. Harris, chief dispatcher. Train operation is conducted under the rules approved by the Indiana State Railroad Commission. The dispatcher is located on the New Castle terminal station. Cars are operated on hourly headway, making the run of 45 miles in 90 minutes, which includes 20-minute running time on city tracks in Indianapolis. The fares between Indianapolis and New Castle are 75 cents one way and \$1.40 round trip. This reduction under the 2-cent-per-mile rate, which ob-

PIECE-WORK RECORDS IN BOSTON ARMATURE SHOP

In connection with the gradual introduction of piece work in its repair shops the Boston Elevated Railway Company has for some time recognized the desirability of a simple record system to check time slips, compare the relative costs of day and piece work and permit the establishment of a standard of reference

department includes the repair of all motor and generator armatures and field coils, special insulation and winding of shop appliances, electric track switches and repairs of electrical service equipment of an auxiliary character.

Both piece and day work are employed in the department. The former has proved so attractive to the employees that it is preferred in place of work on the day basis, although at first

PIECE WORK PRICE CARD--BOSTON ELEVATED RAILWAY CO.						
CPS Armature		SHOPS	DATE Oct. 7, 1909	No. 245		
THE FOLLOWING PIECE WORK PRICE ESTABLISHED ON THIS DATE IS SUBMITTED FOR APPROVAL						
PIECE WORK JOB AND OPERATIONS REQUIRED	PRICE ESTAB. On-Plant Per Cnd	Average Previous Cost on Day Wage Basis			Estimated	
		No. Made	Wages of Man on W's per Hr	Average Cost	Lowest Cost	Previous Cost
GE 73 field coil. Strip, insulate, wind, put on terminals leads and connections, re-rivet shell, making coil complete.	3.00		0.23			
Remarks	DATE CANCELLED CAUSE OF CANCELLATION					
NOTE—WHEN THIS PRICE IS ABOLISHED, STAMP THIS CARD CANCELLED AND REPORT IMMEDIATELY TO SUPT. R. S. & S.						
This work is inspected by Responsible Assistant		Time inspected During progress and at completion of work				
Company is guarded against workmen turning work in and receiving payment a second time in the following manner: Receipts are given each day for completed work on Form 6209, and work taken from employee when inspected also checked in office not quantity, shown as 245.						
APPROVED	J.W.G.		Supt. of Shops		APPROVED	J.H.
APPROVED	P.W.		Chief Eng'r M. & R. S.		APPROVED	B.S.S.

Fig. 1—Boston Piece-Work Records—Front of Typical Piece-Work Price Card, Giving Work, Price and Routine Followed by Company in Checking Job

Boston Elevated Ry. Co.—Cost Card	
Order No. 161	Employee No. 94
Date Issued 10/1/10	Piece Work No. 245
ARMATURE SHOP C. P. S.	
Description of Work 4x 70 Field coil	
Day	Started
Sa.	9
Su.	
Mo.	1745
Tu.	
We.	
Th.	
Fr.	
Total Hours	Min.
No. of Pieces 3	Rate \$3.00
Amount \$9.00	Signature of Foreman

Fig. 3—Boston Piece-Work Records—Armature Shop Card

ARMATURE SHOP BOSTON ELEVATED RY. CO.		
Received of Employee No. 94		
Name John Smith	Date 10/1/10	
The Following Piece Work:		
Piece Work No.	Quantity	Price
245	1	\$3.00
		per
		per
		per
I have inspected the above noted piece work, and approve for Number of Pieces and Quality of Work.		
Inspector X.Y.		352
Receipt No. 2		
ORIGINAL TO EMPLOYEE. DUPLICATE TO OFFICE.		

THIS SIDE OUT—PIECE WORK						
No.	Week Ending					
BOSTON ELEVATED RAILWAY CO., TIME CARD						
ARMATURE SHOP C. P. S.						
NAME AND OCCUPATION						
DAY RATE			HOURS			
FLAT TIME	FIRST HALF		SECOND HALF		OVERTIME	
	IN	OUT	IN	OUT	IN	OUT
2	7.00	9.00				
10	7.00	12.00	12.45	17.45	17.45	20.45 4 1/2
WEEKLY WAGE			AMOUNT			
DAY RATE	HOURS	@				
PIECE WORK (Other Side)						
TOTAL FOR WEEK						

No.		THIS SIDE OUT FOR DAY RATE	
Pieces	DESCRIPTION OF PIECE WORK	AMOUNT	
3	245 \$3.00	9.00	
TOTAL WAGES FOR PIECE WORK			
SAT.	9.00/12.00	4-	
SUN.			
MON.	7.00 12.00 12.45 17.45	10-	
TUE.			
WED.			
THU.			
FRI.			
IN	OUT	IN	OUT
TIME RECORD MUST BE STAMPED BY MAN WHOSE NAME APPEARS ON OPPOSITE SIDE			

Fig. 2—Boston Piece-Work Records—Employee's Receipt. Figs. 4 and 5—Front and Back of Total Day and Piece-Work Record for Weekly Basis

in cases of misunderstanding or disagreement. Such a system is now used in the armature department of the Albany Street shops. The work of the department was described in the ELECTRIC RAILWAY JOURNAL of April 9, 1910, shortly after a fire which caused the motor repairing facilities to be transferred to a vacant shop adjoining the old location. The new quarters afford more space with better natural lighting and they have more extended electric telfer equipments than the old premises allowed. In general the work of the armature

considerable opposition was manifested to the introduction of the piece system. The company, on the other hand, has gained in shop economy, since the schedules have been arranged so far as possible to reduce the original cost of labor per job, combined in all instances with the possibility of larger earnings on the part of the individual.

Each sub-department has a posted list giving the price, job number, order number, type of motor or other part, and kind of work for each principal operation required in maintenance.

In the old shop these prices were posted at the department office, but the present practice of subdivision enables them to be consulted with less loss of time and separates the prices for one class of work from those in force for another. An employee who specializes in armature winding is not reasonably concerned with the cost of work outside his own field, and while the posted lists are open to the inspection of all employees their subdivision has proved to be a convenience.

Six hundred and forty principal operations are listed in the tabulation of piece-work prices. Under the heading "Armature Windings" are listed such tasks as: "Strip; disconnect leads; connect leads; change commutator; insulate armature; wind

are arranged to meet the requirements of both piece and day work, on a regular and overtime basis, and are stamped by a clock registering on a 24-hour dial basis. Piece-work cards (Fig. 3) show the times of starting and stopping each job and the day of the week upon which the particular job was handled, the order number, total number of pieces done in the week, and the rate and amount due for this particular job, countersigned by the foreman or assistant in charge of the section when the work was performed. Thus, if John Smith, workman No. 94, worked on the piece basis upon job No. 245 (GE-73 field coil) from 9 a. m. Thursday until 5:45 p. m., or as it is called in the blank, 17:45 o'clock Monday, his total number of pieces

being three, the rate of \$3 would give him a credit of \$9 for his work covering this period. Overtime work is shown upon a red card. A green card is used to record the time spent upon regular day work, with the rates per hour assigned to the employee. Figs. 4 and 5 are reproductions of the front and back

SHOP RECORD OF PIECE WORK NO.													
ESTABLISHED PRICE				PER				PREVIOUS COST				ESTIMATED ACTUAL	
Week Ending	Order Number	No. Pieces	Amount Paid for Piece Work	Hours Worked	Hour Rate	Amount at Hour Rate	Week Ending	Order Number	No. Pieces	Amount Paid for Piece Work	Hours Worked	Hour Rate	Amount at Hour Rate

Fig. 6—Boston Piece-Work Records—Back of Piece-Work Price Card

armature; insulate front head; solder; splice leads; clean; test, etc." Under "Armature Banding" are "soldering heads, bands, etc." Under the heading "Field Coils" are such entries as "strip and clean shell; strip and reinsulate; wind; inspect and scrap; prepare for impregnating, etc." The tabulations also provide for all the various operations. A typical entry in the table is as follows:

FIELD COILS

GE-73

Order No. 161

No. Price.

Strip, insulate, wind complete.... 245 \$3 (large coil)

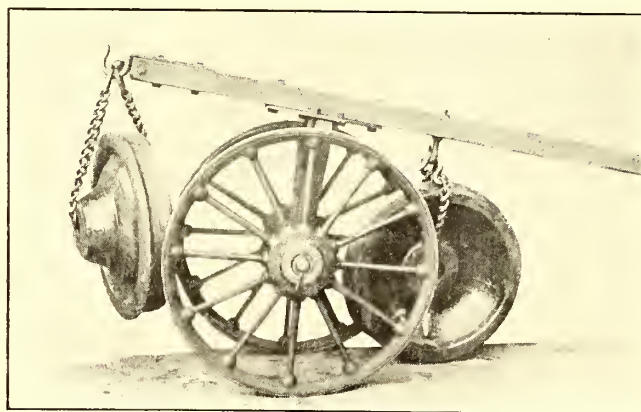
The details of every job are filed at the department office on an index card about 5 in. x 8 in. in dimensions. A sample card (Fig. 1) is shown for the above job, which is numbered 245 in the piece-work record and which falls under the general order number 161. All operations on the GE-73 motor fields are given the above order number, but each principal task for which a price is specifically paid on the piece-work basis has a separate job number. Each card shows in detail the precise character of the work included under each piece-work job. Thus, job No. 245 includes stripping, insulating, winding, putting on terminals, leads and connections, re-riveting shell and completing the coil of the GE-73 motor. The cards show the date at which the quoted price went into effect and the price established, the average previous cost on the day wage basis, the number made under day work and day work wages per hour, the estimated previous cost per job, etc. On the back of the card (Fig. 6) are spaces for the tabulation of data upon which the piece-work price is based, if desired. These spaces include such points as the amount of work done in a given time, various rates, former costs and the gain to the company by piece work. These cards form the company's primary record of piece-work costs and serve as standards of reference. In case any employee questions the amount of work which he is required to do under a given job number he is shown the card and its specific statement of all operations in the job. The date on the card precludes any claim that a certain operation has been in force a less time than it actually has, and the signatures of the responsible shop officers and the vice-president or his representative show that the approval of the higher officials of the company has been given to the duties and price set forth.

The company is protected against work being turned in a second time by the use of receipts (Fig. 2), which are given at the conclusion of each job, after inspection, and by the practice of removing inspected work for succeeding operations or sections of finished material. As the inspector passes upon a given quality of piece work he issues a receipt to the workman and sends a duplicate to the office, thus furnishing a means of checking the time cards turned in to the office. The time cards

of a card showing the total day and piece work performed by a given employee on a weekly basis. These cards after being stamped and examined in the department office and checked with the receipt duplicates are sent to the auditing department and used as the basis of the weekly payroll. A weekly statement is made up by the armature department showing the number of employees working in the shop, the total payrolls and the total wages paid for piece work. A monthly statement is also made up, which includes these data and, in addition, the gain to the employees over the regular pay for the same number of hours, the loss, if any, the gain to the company, the percentage of piece-work wages to the total payrolls, and the percentage of increase in wages of men on piece work over the day rate

CARRIAGE FOR HANDLING CAR WHEELS

The accompanying illustration shows a wheel carriage developed in the shops of the Brooklyn Rapid Transit System for handling wheels. It consists of a pair of spoked wheels and an axle which carries a whiffletree. One hook is attached to the end of this shaft, and a second hook at another point, as shown in the illustration. The wheels to be transported are lifted up



Brooklyn Wheel Handling Carriage

by chain slings which are passed through the hubs and over the hooks. By means of this counterweighting scheme two men can move about a pair of wheels weighing as much as 875 lb. each. Usually one man is at the front end of the shaft and the other at the rear. The company is planning to replace this method in its East New York shops by an electric telfer system, owing to the large number of wheels which are handled there. However, a carriage of this kind commends itself for smaller installations where it would not pay to put up automatic labor-saving apparatus.

RAIL CORRUGATIONS

BY K. SIEBER, ENGINEER, NÜRNBERG, GERMANY

Assume a corrugated rail to be so firmly embedded that it will practically not bend. A wheel moving very slowly would follow the valleys and crests in the rail exactly and, at a point like position "A" in Fig. 1, would exert greater pressure than in position "B," where the convex wheel surface is in contact with a concave rail surface. In several special cases, cal-

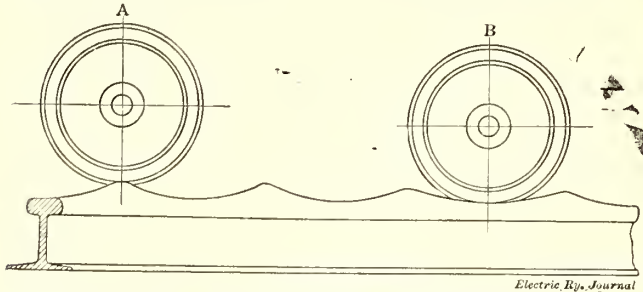


Fig. 1—Car Wheels on Exaggerated Outline of Corrugated Rail to Show Their Positions on Crests and in Depressions

culated by me, the specific pressure of the rail in position "A" was 65 per cent to 100 per cent greater than in position "B." From this fact it is evident that slow-moving vehicles cannot generate concave spots, but that their effect is to smooth down the crests. But when a car is moving rapidly the centrifugal force of the wheels will tend to decrease the pressure at crest "A" and to increase it at depression "B," and there will be a critical speed where the pressure at "A" will exactly equal that at "B."

It is difficult to discover the causes of corrugation by observing the rails themselves, because there is practically no regularity in the origin of rail corrugation. Sometimes it appears in a few days and at other times only after several years. From many years of observation and study of literature on this subject I have concluded that the following statements may be safely accepted as correct:

(1) Corrugations increase in the direction of travel. Sometimes, on account of an extra deep depression, one corrugation will overlap the next and gradually merge into it.

(2) The lengths of adjacent corrugations are not usually equal, but if the average of 50 to 100 in a line is taken, it will be found that the greater the car speeds the greater the average length of the corrugations. This relationship is shown in Fig. 2.

(3) Although the number of rail vibrations per second is not constant at normal car speeds, some definite conclusions are possible. Thus hard and heavy rails have a higher number of vibrations than those which are light and soft. Rails weighing 47 kg per meter (94 lb. per yard) with a tensile stress of 65 kg per square millimeter (41 tons per square inch) had 75 vibrations per second in a foundation of broken stone, while rails in the same foundation weighing 63 kg per meter (126 lb. per yard) with a tensile stress of 80 kg per square millimeter (51 tons per square inch) had vibrations varying from 95 to 120 per second. The number of vibrations was independent of the types of motor or car body suspension and of type of trucks. Even maximum traction trucks exerted no special influence.

(4) Corrugations appear only when the speed exceeds a certain limit. The speed limit is lower for track in rigid foundation than for track in elastic foundation.

(5) Corrugations do not appear on the treads of rails on short-radius curves.

(6) On the rails in curves of large radius there are deep and short corrugations on the outer rail while the inner rail has long and shallow corrugations or none at all.

(7) With the exceptions noted above, corrugations may occur under practically all conditions of track. On tangents they are usually found on the side of the rail against which the wheel flange bears, but they are also found on the opposite side. They occur on up-grades and on down-grades; on

low rails and on high rails; on tight and loose gages; on braking and on coasting sections; on T-rails and on grooved rails. Statements to the contrary would never have been made if those engineers who made them had waited long enough. Some corrugations, for instance, do not appear until after eight or ten years' operation. Excepting for the cases under Nos. 4 and 5, one cannot say that a rail never showed corrugations unless it was prematurely thrown away.

(8) Heavy rails on a rigid foundation always develop corrugations most quickly on the inner rail. The more rigid the foundation, or the better the anchorage, the more quickly the rails corrugate.

The following is a short consideration of the various theories concerning the origin of corrugation which were published in the *ELECTRIC RAILWAY JOURNAL* for Sept. 3, 1910, page 370, in an article by J. H. M. Andrews entitled "Some Notes on Rail Corrugation."

(1) Chattering of car trucks with outside-hung motors.

Corrugation occurs also on rails over which only trail cars are operated. In most cases the chattering is the result, not the cause, of corrugations. Chattering ceases as soon as the corrugations have been removed from a given rail.

(2) Defects existing in the rails before they are put in service.

Defects can accelerate corrugation, but their absence will not prevent it. If there are no initial irregularities on the head of a rail, they will be formed eventually by sand, dirt, movement of the rail material on account of braking, operation on curves, sparking on the wheels due to poor return circuits, etc. The only question is whether the seeds of trouble will fall on fertile ground. The originator of theory No. 2 assumes that the defects are not only in the top of the rail but also exist more or less throughout the general structure. These defects are ascribed by him to the rolling process. On the other hand, numerous observations have failed to show corrugations on sharp curves and on sections where cars are operated slowly. At low speed the corrugations are short, and at high speed they are long. They are longer on the inner side than on the outer side of curves. They always increase in the general direction of travel and not in the opposite direction. If an elastic foundation is replaced by a rigid one, the corrugations increase rapidly. All these phenomena are dynamic effects and have nothing to do with defects in rolling.

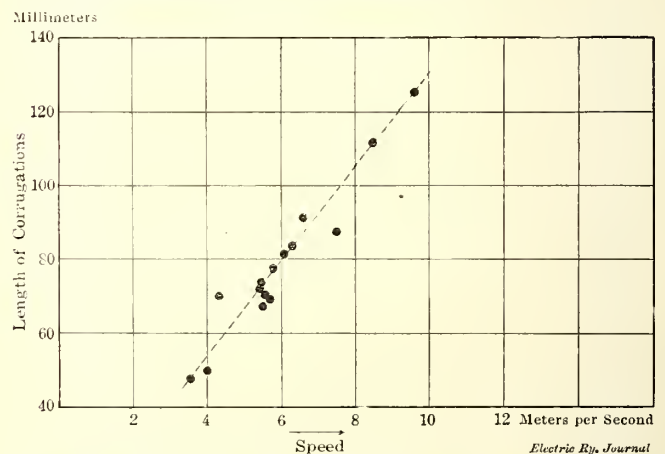


Fig. 2—Relation of the Length of Corrugations to the Speed of Car Operation

(3) Side pressure of the wheel flanges and dirt on the rails. Corrugations appear even where there is no side pressure from the flanges. I have seen some very dirty rails on which there were no corrugations. The flanges always press on the outer side of the curve; even on tangents the car tends to zig-zag over a series of successive curves.

(4) Sliding of the wheels on rails, due to rapid and intense braking.

Corrugations appear on sections where braking never occurs.

(5) Tight track gage.

Corrugations have appeared on normal gage, tight gage and loose gage track.

(6) Flat spots in wheels.

Corrugations have occurred on railway systems where there are few flat wheels, or none at all.

(7) Too rapid acceleration.

Corrugations have appeared on track where acceleration never occurs.

(8) Rolling out and elongation of the upper fibers of the metal.

Corrugations occur not only where the rail material is pushed backward, as on the inner side of curves and on sections where braking occurs, but also where the material is pushed backward, as on the inner side of curves and on acceleration sections. The forward rolling motion accelerates and intensifies the formation of corrugations, whereas the backward rolling delays them. However, this rolling process is not the sole cause, for if it were, sharp curves and steam railroad tracks in particular would have corrugations throughout.

(9) Corrugation is due to vibration either of the rails or of the whole track structure on account of loosening.

In this case the cause probably has been confused with the effect.

The tenth reason given in Mr. Andrews' article, but not numbered therein, is that corrugations arise from the lateral movement or vibration of rails having weak webs which buckle or bend. These vibrations, combined with those of the wheel

contact with the rails. A strip of wood paving or some other elastic structure should be used alongside the rails if noiseless paving is desired.

(4) The rail joints should be as light as is consistent with strength.

The objection may be urged that this construction would result in too frequent changes in track and wheel tires; but even if softer tires and rails are used, the wear will be comparatively small if more care is taken at the car repair shops, for instance, in mating opposite wheels and in keeping the axles in the same truck parallel. Sharp curves may be built up of heavy, hard material, but even in this case a certain degree of caution should be exercised because of the rapid destruction of the upper surface at switches and at crossings.

On railways with heavy traffic, where light rails would have to be removed frequently, despite all precautions, nothing else remains to be done except to install heavy rails and accept corrugation as a matter of course. Its worst difficulties, however, may be avoided by proper maintenance. If the rail corrugations are ground off as fast as they appear, the ultimate expense will be much less than if they are allowed to go unchecked. In Nürnberg corrugations are ground off by hand at intervals of from one to three years according to the frequency of service and the kind of track construction. As shown in the accompanying illustration, Fig. 3, four men move the grinder over the rail head by means of long handles. The average annual cost of removing corrugations is about \$120 per mile. Our well-proved fundamental rule is to undertake no repairs on the track structure without first grinding the rails.



Fig. 3—Grinding Out Corrugations by Hand in Nürnberg, Germany

moving about a horizontal axis, result in the constant rise and fall of the center point of the wheel. The lateral movements of the rail materially encourage the growth of the waves, but they are of consequence only when the other conditions causing corrugations are present. They are not sole causes, since corrugations have occurred even on rails with double webs and on rails with reinforced concrete webs which could not possibly vibrate to a serious extent.

In connection with this discussion of various theories of rail corrugation I should like to recapitulate my own:

Corrugation is possible only when the track structure is too rigid in comparison to the axle load and the wheel diameters. Such a foundation promotes the growth of those irregularities which eventually develop into corrugated rails.

I would recommend the following means as suitable for preventing corrugations:

(1) The track and substructure should be so constituted that under a normal load the rail or tie will give at least 1-16 in. This is attainable with rails weighing 80 lb. to 120 lb. per yard bolted to wooden ties in 7 in. to 10 in. of broken stone, or with the rails laid directly on 12 in. of gravel. The ballast for heavy traffic might be a mixture of gravel and broken stone.

(2) The tensile stress of the rail and ties should not exceed 65 kg per square millimeter (41 tons per square inch).

(3) Concrete should never be permitted to come into direct

ELECTRIC RAILWAY CONDITIONS IN FRANCE

BY A FRENCH CORRESPONDENT

Various causes have combined to stimulate electric railway construction in France to a greater extent than has been the case for the last ten years. One of these is the reduced cost of electric power brought about by an increase in the number of large power stations and the development of hydraulic plants; another is the growing difficulty of handling satisfactorily the constantly increasing loads on the main lines, especially the passenger traffic in the suburban districts near Paris. Owing to the fact that the State guarantees the interest on the securities of many of the steam railroad properties, any large expenditure for new equipment must first be approved by the government, and a company must show a pretty strong case before it secures sanction for electrification. Moreover, several of the French railroad companies which most need electrical equipment have been obliged to call upon the State for provision of their guaranteed interest and can hardly expect an appropriation for additions and improvements unless the earning capacity of such improvements is clearly demonstrated.

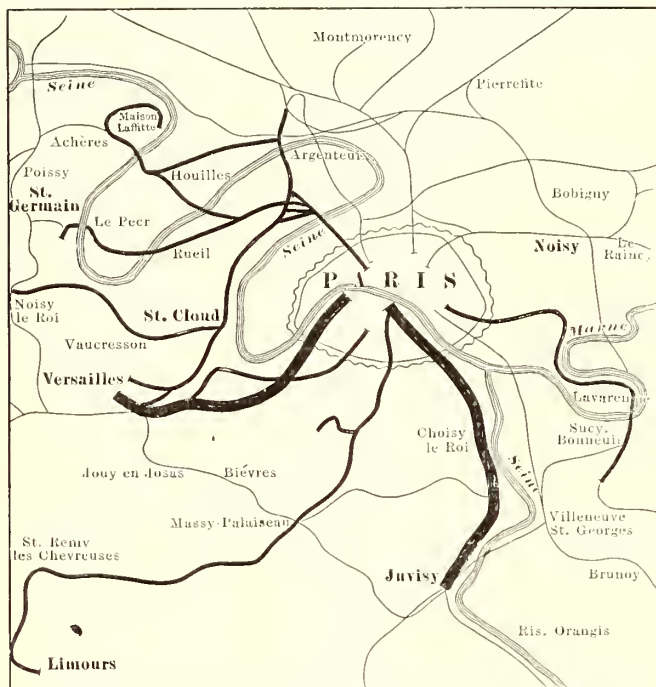
Still a third reason which delays electrification by the steam railroads is the elaboration with which the plans have to be prepared for the approval of the government before they will be considered. For example, in the case of the Western State Railway, the propositions of its commission on electrification made a "dossier" of which only twenty copies were required, but these had to be printed and the cost to the company was \$6,000.

The Western State Railway is among the companies which are considering the subject of electrification most carefully. This road conducts by far the largest suburban traffic in France. On 50 miles of its line the passenger business has increased yearly by one million since 1900. The number of departures from its St. Lazare station is about 80,000,000 per annum and of this number about 60,000,000 is local traffic. During the rush hours some 40,000 passengers per hour are transported from this station. The company also brings into Paris about two-thirds of the food supplies of the city. The electrification plans of this company, if carried out, will involve an expenditure of \$60,000,000. The money is to be raised by a State loan.

On the Eastern Railway the conditions are somewhat different. The suburban system of this road meets severe tramway competition, and electrification is being considered to provide a more frequent and rapid service. The Orléans company, which electrified 12 miles of its local system some years ago, is considering extensions to its system, including the electrification of one of its southern lines.

Outside of Paris there may be 50 miles of single track which have been converted from steam to electricity. In the near future this will be increased to 250 miles. The accompanying map shows the extensions proposed to the local steam railroad lines leading out of Paris. In this map the heaviest lines show the existing electric roads, the lines of medium width the roads about to be electrified. The lightest lines represent other steam railroads near Paris.

In Paris the conditions of urban transportation have been much modified by the extensions of the Metropolitan underground roads and the opening of the Nord-Sud tube. The reorganization of the tramway and omnibus system of the Compagnie Générale des Omnibus, which had its franchise for surface traction inside Paris renewed this year, as described in the



Map of Paris and Suburbs, Showing Present and Proposed Electrified Steam Lines

ELECTRIC RAILWAY JOURNAL for Oct. 1, 1910, was, of course, based upon the new conditions. In other parts of France there is also much activity.

Up to the present time the single-phase system has not been considered with very great favor. However, the Midi Railway in the south of France is equipping some 150 miles of double track on this system and trial equipments of cars and electrical locomotives, ordered from various manufacturers, are now being delivered. A few tramway lines are also making a trial of the single-phase system.

As yet there are no 1200-volt systems in service in France.

Certain of the tramway companies are now suffering from the policy followed 10 years ago of installing inadequate electrical equipment and cheap construction. Owing to their high maintenance charges most of these companies have never been able to pay a dividend, and the rapid deterioration of cheap rolling stock will force upon many of them an entire renewal in the near future of both cars and tracks.

On the other hand, the increase in the use of large turbine units has steadily reduced the cost of power, and several tramway systems have found it more economical to shut down their power stations and purchase power from large central stations.

RENEWALS AS DEFINED BY THE BOARD OF SUPERVISING ENGINEERS, CHICAGO TRACTION

Rules were adopted on Feb. 15 by the Board of Supervising Engineers, Chicago Traction, to govern charges to the renewal funds for which provision is made in the ordinances under which the Chicago City Railway, the Chicago Railways, the Calumet & South Chicago Railway and the Southern Street Railway are operating. The rules in full as they are issued by the board are published below, but "traction valuation commission" has been substituted for "T. V. C.," the abbreviation used by the board. The reports of the traction valuation commission placed original values on the several railway properties as follows: Chicago City Railway, \$21,000,000; Chicago Railways, \$29,000,000; Calumet & South Chicago Railway, \$5,000,000; Southern Street Railway, \$775,000; Chicago Consolidated Traction Company, \$3,930,684.51. The rulings of the board have been accepted by the companies. With an introductory statement published by the board, they are as follows:

RENEWALS

"The traction ordinances of Feb. 11, 1907, refer to the subject of renewals in the following manner:

"Section 7. The cost of renewals shall be paid as provided in Section 16 hereof, but such expenditures (and only such expenditures) as are made for the purpose of extensions of or additions to property shall be thereafter considered as additions to capital; provided, however, that in the replacement of any principal part of the property, either existing or hereafter acquired, there shall be charged to capital the excess amount that the new property cost over the original cost of the property displaced."

"Section 16. The company shall deposit with one or more of the said depositories, in a separate fund, appropriately designated, a sum equal to eight (8) per cent of the gross receipts of said street railways and property for the preceding month, which shall constitute a reserve fund for taking care of renewals and depreciation of said street railways and property. * * * No payments shall be made by said company out of said fund except on the written certificate of the Board of Supervising Engineers for renewals, which are hereby defined to be the replacement of any principal part of said street railways or of their equipment or appurtenances."

"The two main points to be construed by the board under the foregoing provisions of the ordinance are:

"(a) 'Original cost.'

"(b) 'Principal part.'

"These points and other collateral issues, particularly the distinction between renewals and that of maintenance and repairs, were discussed at various times by the board throughout the year 1910, which discussions have led to the following conclusions:

GENERAL RULINGS

"1. The 'original cost' of any property renewed shall be the cost of the property displaced.

"2. Property which has not been rehabilitated.—The traction valuation commission value shall be taken as the 'original cost.'

"3. Property that has been rehabilitated.—The rehabilitated cost, but not the rehabilitated cost plus the traction valuation commission value, shall be taken as the 'original cost.'

"4. Property semi-rehabilitated.—The traction valuation commission value, plus the cost of semi-rehabilitation, less the traction valuation commission value of the part replaced in the process of semi-rehabilitation, shall be taken as the 'original cost.'

"5. Paving which has not been rehabilitated.—25.29 per cent of the traction valuation commission value shall be taken as the 'original cost,' that being the estimated amount included in the allowed valuation of \$50,000,000 for the Chicago City Railway and Chicago Railways companies' properties; 5.08 per cent of the traction valuation commission value shall be taken as the 'original cost' for the Calumet & South Chicago Railway Company. Traction valuation commission values shall be allowed

as shown in the traction valuation commission reports for the Southern Street Railway and Consolidated Traction properties.

"6. The first paragraph of Section 15 of the ordinances shall be construed as referring to repairs only.

"7. The minimum charge to capital or renewals shall be \$200, this rule being adopted for the purpose of simplifying accounting.

"8. In case of a renewal in kind there shall be no addition to capital account, except in special cases, which shall be considered and ruled upon by the board at the time application for work order is submitted by the companies. By renewal in kind is mean the replacement of existing property by new property of similar general character and construction.

"9. Salvage in all cases shall be credited to the renewal fund.

"10. Special cases may arise in connection with all classes of reconstruction work to which these rules cannot be specifically applied. In such cases the board shall give special consideration as to the proper classification of the cost of such work at the time application for work order is submitted by the companies.

DIVISION "D"—TRACK

"1. The principal parts of track construction are as follows: (a) Rails and fastenings; (b) ties; (c) foundations; (d) special work; (e) paving.

"2. Old track rehabilitated with new standard track construction.—The cost of new work shall be divided between renewals and capital, as prescribed in the ordinances.

"3. Replacement of $\frac{1}{4}$ mile continuous distance of single track, or a stretch of track between two special work layouts, shall be considered as a unit representing a principal part for straight or curved track outside of special work.

"4. In case of a renewal of rails and fastenings (standard construction) all other track work occasioned thereby shall be considered as a part of the charge to renewals, but there shall be no charge to capital unless the total cost of the renewal work shall exceed the total cost of an equal length of standard track construction, complete, and then only after special consideration.

"5. Replacement of $\frac{1}{4}$ mile continuous distance of paving 8 ft. wide, or the full width of the pavement in the right-of-way between any two special work layouts, shall be considered as a unit representing a principal part for the renewal of paving.

"6. Special work.—A straight standard single-track crossing, either electric or steam railroad, or its equivalent, shall be considered a principal part for special work renewals, except in the replacement of layouts containing curves, in which cases a decision as to the proper charge to renewals shall be made at the time request for work order is submitted to the board.

"7. In order to simplify accounting and economize work the following computations shall be made to determine the cost of rehabilitated track work and special work for renewal purposes and to establish a proper basis for charge to renewal account:

"(a) The traction valuation commission value of track and paving to be set aside and considered separately:

"(b) An estimate to be made fixing a unit cost on new special work for each type, this estimate to be applied to the various individual layouts of new special work of each of the railway companies. This estimate to include a percentage for overhead. The aggregate cost thus determined of all pieces of special work in track to be deducted from the total track account, as shown on the books of the board, after setting aside traction valuation commission values as above.

"(c) The remainder to be considered as the aggregate cost of straight track or curved tracks rehabilitated to date, not included in special work.

"(d) A computation should then be made estimating the cost of each of the different types of rehabilitated straight track construction (including curved track not in special work), and the cost of each type so determined shall be multiplied by the number of miles of each type of track, respectively.

"(e) The aggregate so found will then be compared with the total charges against track account, excluding special work

and traction valuation commission values as above, but including paving outside of right-of-way, track elevation expense and all other expenses incidental to track construction, including overhead expense.

"(f) The difference between the aggregate of the estimates and the amount shown on the books of the board (excluding special work and certain traction valuation commission values as above) is to be distributed pro rata over the various miles of track of different track construction, and the unit cost thus determined will represent the cost per mile of track for each type, for the purpose of establishing a basis for charges to renewal account.

"(g) Estimates for paving inside right-of-way to be calculated upon the same general plan and carried separately so that a unit cost for the different types of paving may be available in cases where the paving is renewed without any renewal of track being made.

"(h) The totals of traction valuation commission values as above, rehabilitated special work and track values and paving values, should equal the total track and paving accounts on the books of the board.

"These computations shall be made separately for each company.

DIVISION "E"—ELECTRICAL TRANSMISSION AND DISTRIBUTION

"1. The principal parts of the electrical transmission and distribution system are as follows: (a) Poles and fittings; (b) trolley; (c) span wire and fittings; (d) special work overhead; (e) overhead feeder; (f) underground feeder; (g) cross bonds and negative auxiliary return cable; (h) conduits, manholes and vaults; (i) submarine cables; (j) joint bonds and auxiliary cable at special work; (k) dispatching system.

"2. The replacement of $\frac{1}{4}$ mile continuous distance of pole line, either side pole or center pole construction, shall be considered as a unit representing a principal part for a pole line, including all other necessary work occasioned thereby.

"The ordinary replacement of cross-arms and pole fittings from time to time shall be charged to maintenance.

"3. The replacement of trolley wire on 1 mile continuous distance of single track or $\frac{1}{2}$ mile of double track shall be considered as a unit representing a principal part for the renewal of trolley wire; anything less to be charged to maintenance.

"4. The replacement of span wires on 1 mile continuous distance of single track or $\frac{1}{2}$ mile of double track shall be considered as a unit representing a principal part for the renewal of span wire, including all other necessary work occasioned thereby.

"5. Special work overhead.—Replacement of a complete layout of special work overhead, in case the cost is \$200 or more, shall be considered as a unit representing a principal part for the renewal of special work overhead (which includes through work and bridge work), and all necessary work occasioned thereby.

"6. The replacement of 1 mile continuous distance of overhead feeder shall be considered as a unit representing a principal part for the renewal of overhead feeder, including all other necessary work occasioned thereby.

"Where overhead feeder is taken down and placed in stock and subsequently used on outlying lines, the job from which it is claimed shall be credited at the scrap value of the material taken down, and the work on which it is subsequently used shall be charged at the same value.

"7. The replacement of $\frac{1}{4}$ mile continuous distance of underground feeder shall be considered as a unit representing a principal part for the renewal of underground feeder, including all other necessary work occasioned thereby.

"Substitution of underground for overhead feeder not to come under the rule relating to renewals in kind; the excess cost of the work of such substitution and all other necessary work occasioned thereby over the original cost of the work replaced shall be considered a proper charge to capital account.

"8. Replacement of $\frac{1}{4}$ mile or the distance between two track special work layouts for auxiliary negative return cable and

cross-bonds shall be considered as a unit representing a principal part for the renewal of auxiliary negative return cable and cross-bonds, including all other necessary work occasioned thereby.

"9. The replacement of special work, bonding or auxiliary cable will follow the ruling of the board in each specific case in accordance with paragraph 6 for track work.

"10. The renewal of a conduit line is considered a very remote possibility, and such replacements as are occasioned by conduits breaking or excavations at street intersections or at intervals under tracks, made by the city or other public utilities, shall be charged to maintenance. In case for some reason it should be necessary to close up a manhole and vault and build another one at a different location the cost shall be charged to maintenance.

"11. The replacement of the length of submarine cable between the manholes on each land side shall be considered as a unit representing a principal part for the renewal of submarine cable, including all other necessary work occasioned thereby.

"12. A telephone or signal system outside of buildings and used for dispatching or operating cars shall be considered a principal part for renewal. The replacement of the system as a whole would be a proper charge to renewals, but the replacement of individual parts, such as instruments, signal or connecting wires, and general repairs, shall be charged to maintenance.

"13. The same general plan shall be observed in valuing electrical transmission and distribution property for the purpose of determining the proper basis for charge to renewal account as is prescribed in connection with the valuation of track for the same purpose.

DIVISION "K"—CARS

"1. The principal parts of cars are as follows: (a) Body and its component parts; (b) electrical equipment and its component parts; (c) air-brake equipment and its component parts; (d) trucks and their component parts; (e) miscellaneous equipment.

"2. In case any one of these principal parts becomes obsolete or worn out in service and is replaced, rebuilt or reproduced, the cost of such replacement, rebuilding or reproduction shall be charged to renewals.

"3. Car bodies.—In case a car body is replaced in kind and a portion of the equipment replaced by new equipment and another portion of the equipment overhauled and used again, the entire cost of the work shall be charged to renewals.

"4. Electrical equipment.—Same as car bodies. The winding of an armature or the replacement of any part of the electrical equipment in individual cases shall be charged to maintenance, but, for example, in cases where the controllers on a group of cars are replaced by improved controllers, for reasons of economy or otherwise, the cost would be a proper charge to renewals.

"5. Air-brake equipment.—Same as car bodies.

"6. Trucks.—Same as car bodies. Replacement of wheels shall be charged to maintenance.

"7. Miscellaneous equipment, such as headlights, fenders, guards, etc.—Ordinary replacement in individual cases shall be charged to maintenance. In cases, however, where, for example, new headlights are placed upon a group of cars, or upon cars equipping an entire line or division, or the cars running out of a particular car house, the expense shall be charged to renewals. In case seats are replaced on a single car the expense shall be charged to maintenance; but if such changes are made on a group of cars or on cars equipping an entire line or running out of a particular car house the expense shall be charged to renewals.

"8. Ordinary repairs or general overhauling or repainting shall be charged to maintenance.

"9. Where a car is demolished or damaged in whole or in part by a collision or other accident, the cost of repairing the damage or replacing the car shall be charged to maintenance, excepting that when a car is destroyed by fire the provisions of the ordinances governing insurance shall be applied.

visions of the ordinances governing insurance shall be applied.

"10. The same general plan shall be observed in valuing cars for the purpose of determining the proper basis for charge to renewal account as is prescribed in connection with the valuation of track for the same purpose.

DIVISION "G"—BUILDINGS

"1. The principal parts of buildings are as follows: (a) Foundations; (b) walls; (c) coping; (d) roof; (e) cut-stone or terra-cotta trim; (f) mill work—sash, doors and windows, wainscoting, etc.; (g) carpentry; (h) glazing; (i) iron shutters; (j) steel rolling doors; (k) floors—wood, concrete, tile, composition, brick; (l) plumbing, sewerage and water supply; (m) structural steel and iron; (n) sheet metal work—skylights, flashing and down-spouting; (o) heating plant and accessories; (p) lighting system; (q) telephone system—interior; (r) chimneys or stacks; (s) miscellaneous equipment—1, lockers; 2, racks; 3, bins; 4, tables; 5, benches, etc.; (t) painting and decorating; (u) sidewalks, driveways and fences.

"2. The buildings now being used by the companies are of such a character of construction that, with adequate and timely repairs, ordinary wear and tear would not necessitate the complete renewal of any one portion of a building, with such exceptions as are hereinafter noted, until time had brought about a complete disintegration of the entire structure. There may be occasions when, for reasons of expansion, for the purpose of concentrating facilities or for some other extraordinary purpose, it would be necessary to destroy and replace a building, either in whole or in part, with a larger building, or with a different character of building, in which event the rules of renewals would apply as laid down in the ordinances.

"In the case of buildings destroyed by fire and subsequently rebuilt the question of accounting is covered by the sections of the ordinances governing insurance.

"3. The foundations are as near as may be possible impervious to ordinary wear and tear, and should not require replacement under ordinary conditions during the life of the building.

"4. The pointing of walls, cementing of cracks in coping, patching of floors, replacement of broken lights and skylights, new flashing, new down-spouts, painting, plastering, calcimining and decorating are all in the nature of repairs and maintenance and should be so charged.

"In cases where walls and smokestacks crack or chimneys are blown down or destroyed the repairs shall be charged to maintenance.

"5. Defects and individual replacements in lighting systems, plumbing, sewerage and water supply system are taken care of as they develop, and unless some improvement calls for an entire change in the method of lighting, sewerage, plumbing or water supply there would be no occasion for a charge to renewals.

"6. Miscellaneous equipment, as enumerated above, is seldom replaced in whole, and, as a rule, with ordinary repairs should last throughout the life of the building. In a case, however, where a set of wooden racks, lockers or bins is replaced with metal construction it would be proper to apply the rule for renewals as prescribed in the ordinances.

EXCEPTIONS

"7. Fire walls.—In case of a complete renewal of any one or more of fire walls in or about the buildings the expense would be a proper charge to renewals.

"8. Roofs, old style, wood foundation, felt, tar and gravel covering.—In case of an entire replacement of the felt, tar and gravel covering, or of the entire roof, either in kind or with a roof of different construction, the cost would be a proper charge to renewals, except in case the new roof was of a better type and cost more than the old roof; then a proper division of the charge should be made as between renewals and capital.

"9. Concrete roofs not covered.—It is probable that these roofs will remain in good condition for as long a time as the first tar and gravel roof covering would last, the same as though they were covered. When they become cracked or leaky a covering should be placed on the concrete, which covering would be a proper charge to capital account.

"10. Book tile and concrete slab roofs, with tar felt covering. Tile or slate roof.—The replacement of either roofs or roof coverings (weatherproofing), complete, is a proper charge to renewals.

"11. The recoating of a tar and gravel roof is a proper charge to maintenance.

DIVISION "I"—POWER PLANT MACHINERY AND EQUIPMENT

"1. The principal parts of power plant machinery and equipment are as follows: (a) Machinery foundations; (b) engines; (c) generators; (d) economizers; (e) traveling cranes; (f) switchboard; (g) wiring; (h) piping and covering; (i) condensing equipment; (j) heaters and purifiers; (k) boilers; (l) pumps; (m) grates and stokers; (n) coal and ash-handling apparatus; (o) coal and ash-storage bunkers; (p) breeching; (q) miscellaneous equipment.

SUBSTATION MACHINERY AND EQUIPMENT

"2. The principal parts of substation machinery and equipment are as follows: (a) Machinery foundations; (b) rotary converters; (c) transformers; (d) reactances; (e) oil switches; (f) high-tension bus and structure; (g) switchboard; (h) traveling cranes; (i) wiring a.c. and d.c.; (j) air-blast apparatus; (k) storage battery.

SHOP MACHINERY AND TOOLS

"3. The principal parts of shop machinery and tools are as follows: (a) All classes of shop tools and machinery.

"4. The replacement of any one of the foregoing items in paragraphs 1, 2 and 3 complete would constitute a proper charge for renewal account or, in case the replacement was an improvement over the item replaced, the excess cost, if any, would be a proper charge to capital.

"In instances where a machine has received constant repairs over a period of time, the cost of such repairs being charged to maintenance, and eventually some portion of the machine requires complete renewal, the cost of which might represent a large sum of money, such an expense would not be in the nature of ordinary repairs or maintenance, but should be considered as extraordinary maintenance and upon consideration by the board could be construed by it as properly chargeable to renewal account; as illustrations—the replacement complete of tubes in a water-tube boiler; the reconstruction complete of brick settings under a battery of boilers; the complete rearrangement of the piping system; the rewinding of a generator; the replacement of plates or cells in a storage battery.

"5. Machine and tool equipment.—The first installation of machine and tool equipment, such as cutting tools, dies and jigs or other appurtenances and attachments, should be charged in the same manner as the tool or machine itself either to renewals or to capital, but subsequent replacements of such appurtenances or attachments are properly chargeable to repairs.

"Replacement of hand tools is properly chargeable to maintenance.

"6. Furniture and fixtures; office; power plant; substation; shops; car stations.—Any additional items over and above existing furniture or equipment will be a proper charge to capital in case the cost is \$200 or more. Any replacements of existing furniture or equipment complete would be a proper charge to renewals in case the cost was \$200 or more. All replacements or new purchases costing less than \$200 would be properly chargeable to maintenance.

DIVISION "P"—TUNNELS

"1. Tunnels and subways under viaducts.—The tunnels under the Chicago River have been built with the idea that, with proper maintenance under normal conditions, they would last for an indefinite period of time. If, by reason of accident or because of some unforeseen structural weakness, it should become necessary to rebuild the tunnel in whole or in part, the disposition of the cost would be the subject of special consideration.

"2. The renewal of tracks and electrical transmission system in the tunnels is covered by general rules relating thereto.

"3. The replacement of the lighting system, complete, would

be a proper charge to renewals, but the replacement of lamps, globes, individual parts and general repairs should be charged to maintenance.

"4. The replacement of a drainage system complete shall be charged to renewals.

"5. The replacement of a pump shall be charged to renewals.

"6. The replacement of a wooden subway under a viaduct by a cement subway shall be charged to renewals, and the excess cost over the cost of the wooden subway, if there be an excess, shall be charged to capital.

BRIDGES AND VIADUCTS

"As the companies at the present time do not own and have no equity in the bridges and viaducts traversed by their tracks, the question of renewals is confined to the tracks and transmission system. These are covered by the general rules relating to each."

The rules have been approved for the board of supervising engineers by the following: Bion J. Arnold, chairman; Geo. Weston, representing Chicago; Harvey B. Fleming, representing Chicago City Railway and the Southern Street Railway; John Z. Murphy, representing Chicago Railways; A. L. Drum, representing Calumet & South Chicago Railway; F. K. Parke, secretary and auditor; L. H. Davidson, assistant secretary.

REPORT OF BLOCK SIGNAL COMMITTEE TO THE INDIANA RAILROAD COMMISSION

The committee of interurban officials appointed by the Indiana Railroad Commission to consider the subject of block signals made the following report to the commission on Feb. 24:

"The committee appointed by you to investigate the question of block signaling on interurban railroads begs to submit the following further report:

"Through a member of the committee examinations have been made of the following systems:

"1. The system of the National Electrical Manufacturing Company, of Elgin, Ill.

"2. The system of the Hall Signal Company, of New York.

"3. The system of the Nachod Signal Company, of Philadelphia, as in use on the Mahoning Valley line, between Youngstown, Ohio, and Sharon, Pa.

"Additional information has also been received from the United States Electric Company, Chicago, and the Kinsman Block System Company, New York, in relation to their respective systems of short track circuit signaling.

"The committee has also received additional information as to tests with light signals of the continuous track circuit system of the General Railway Signal Company, and is endeavoring to secure additional information with relation to certain other systems of block signaling.

"The committee to-day has had a personal conference with a representative of the Kinsman Block System Company, who advises us that the short track circuit system of that company with the semaphore type of signal will be ready for installation April 1, 1911. The Kinsman company has been asked to submit a proposition for the experimental installation of the first developed signals of that company of the semaphore type, and it is hoped that such an experimental installation may be made early in April.

"The committee desires to have a further meeting in Chicago at the time of the convention of the American Railway Engineering & Maintenance of Way Association on March 21 to 23, when an exhibit of a number of various types of signals for steam and electric roads will be made.

"The committee asks that further time be granted for investigation and report and suggests that the date be fixed April 15, at which time it is hoped that the experimental installation of the Kinsman system may be under way, if not completed."

The report is signed by the committee as follows: A. W. Brady, C. D. Emmons, C. N. Wilcoxon, W. J. Irwin, M. H. Hovey and R. I. Todd.

The report was approved and the time extended as requested.

INSPECTION OF RAILWAY MATERIAL DISCUSSED BY NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on the evening of Feb. 23, with Vice-president Franklin Woodman in the chair. After the usual dinner a paper was read by Henry Gulick, president of the Gulick-Henderson Company, Pittsburgh, Pa., on "The Inspection of Electric Railway Material and Equipment." The author pointed out that inspection of materials and testing are important and closely associated, first to secure greater safety and, second, to increase efficiency by better workmanship. Failures of equipment or material in service can affect every department of an entire organization. Integrity, fidelity, experience, agreeable personality and withal a stiff backbone are the qualifications of a successful inspector. If the inspector is on the ground at the beginning of an order much time can frequently be saved by the prevention of bad workmanship and the use of improper materials.

Mr. Gulick emphasized the point that tests are of value only when they represent something definite. The requirement that one axle for each certain number of a given heat shall be made longer for test is entirely unreliable. A much better plan is to ask the manufacturer to make an extra axle for each lot to be tested. Clearly defined sets of specifications reduce the chances of false interpretation or misunderstanding to a minimum. Where chemical analyses and physical tests are both prescribed the greatest care must be used to avoid conflicts. For this reason a very thorough knowledge of manufacturing processes as well as the service requirements is needed in the drawing of new specifications. No manufacturer ever improves his product until forced to do so by the urgent needs of the service. The author criticised the making of rigid specifications without backing them up by test requirements, and urged the writing of specifications with sufficient leeway for both physical and chemical requirements. For important materials the maximum and minimum limit should be made flat and absolute for acceptance or rejection. As an operating official the railway man can give but limited attention to the selection of materials, and unless some serious failure comes to draw special attention to the fact there is a tendency for the material in question to become a secondary consideration. If it were possible to have measured and recorded every loss due to improper material, including loss of efficiency, loss due to failure, cost of replacements, losses due to poor construction, etc., the aggregate would be amazing. It is not well for heads of departments to become accustomed to small failures which are easily classified under the term replacements. If these avoidable losses were reduced to a minimum they would counterbalance some of the increasing costs which are looming specter-like before the traction operator.

Regarding the inspection of specific equipment parts and details, Mr. Gulick pointed out the importance of examining ties and rails before they are shipped to the railway company, and urged more careful study of wheels of the steel type. Actual trial in service seems necessary with wheels thus far. Open-hearth steel should be used in the manufacture of solid steel wheels, but the railway company cannot readily specify chemical details as yet in this equipment. The mounting on the same axle of two wheels of the same hardness will tend toward more even flange wear and will increase the life of the wheel. In a short time improved records of mileage will be a definite guide as to the proper grade of steel to use, and the time will come when every heat of steel used will be rechecked. The importance of keeping a close record of wheel mileage cannot be exaggerated. Tire thickness is the most important point in the physical examination. Much can be learned regarding wheels by physical inspection and measurement.

In the inspection of axles the utmost care should be used, and the inspection begun where the blooms are made, with a reasonable supervision at each stage of the process. Very close records of axle manufacture and inspection are desirable, but it is important to bear in mind the fact that as the details specified

are increased the possibility of some small error in the treatment is increased. This may result in jeopardizing the element of safety, especially if the manufacturer is not thoroughly experienced in every part of the process. It is entirely possible, however, to prescribe the tests in detail and thus to insure like material within the limits specified. When forgings are permitted to cool after hammering and then reheated together in certain lots and to a given temperature there is every reason to assume that a random test will be representative of the lot. In case axles or shafts are warmed after treatment or cooling, they should not be straightened cold but should be reheated. It is good practice to have the manufacturer machine all over forged axles and shafts for important service.

The best results in truck building are obtained by building the frames in jigs, with the greatest care in assembly. The comfort of passengers is greatly increased by the use of a frictionless side bearing mounted with small clearance. It is improper to mount the first wheel from the collar or end of the axle and to measure from the outside of the wheel hub, for the reason that the height of the hub on the outside of all steel wheels is one dimension which is never accurate, since practically all orders call for the distance from the flange to the back of the hub to be as accurate as possible, and the front height of the hub is the accumulation of necessary variance. Neat fits, close riveting and square frames are important on steel cars.

DISCUSSION

Paul Winsor, chief engineer of motive power and rolling stock, Boston Elevated Railway, said he was a thorough believer in specifications and inspection. The company is constantly improving in its specification work and getting better results. Thus, inspection has bettered the quality of trolley wire purchased, and careful specification has increased the number of bidders. To hold the manufacturer to specifications throws no little light upon his own production conditions and facilitates the fabrication of better material.

G. W. Palmer, Jr., electrical engineer, Boston & Northern Street Railway, also expressed his particular interest in specifications. For some time his company has tried to purchase as much material as possible on this basis. The work covers not only the composition and properties of materials, but conferences with the manufacturers upon what is practicable for them to produce. Manufacturers do not always have knowledge of chemical constituents. In one case the percentage of acetone extract in rubber insulation for wire was extraordinarily high. It was found that the manufacturer had no chemical knowledge and passed out his product with no regard to satisfying the chemical requirements of the purchaser. There is a crying need for the use of inclusive specifications when materials are compared on the basis of competitive bids. After the specification is written it is of equal importance to follow it up in the mill. Proper preparation, systematic inspection, testing and rejection must all come into play to insure the best results.

John Lindall, Boston Elevated Railway, spoke briefly of the value of specification writing as a means of training the railway man to secure equipment more in line with his needs.

C. G. Bacon, Jr., engineer of the Carnegie Steel Company, emphasized the thorough inspection in the mills of his company, there being at least eight inspections of steel wheels in the processes of manufacture. He said that there is little incentive for the manufacturer to go to the purchaser with an improvement unless he knows that it is needed and is prepared for a thorough consideration of the cost question.

M. V. Ayres, electrical engineer, Boston & Worcester Street Railway, said that competition in supplies calls for the use of specifications in order to secure the best results. He felt that the work of the American Electric Railway Engineering Association in connection with standards was along the right line and that more should be done. It would be a great advantage if the companies had several classes of specifications of the association for different kinds of materials and equipment. Inelastic, frozen specifications are harmful, and specifications should be amended from time to time in order to escape this criticism.

A. D. Woods, of Arthur D. Little, Inc., Boston, said that many misunderstandings arise from improper specifications, and that practically all electric railway supplies can be purchased by specifications. He emphasized the importance of testing, and said that tests show that the lowest priced article is sometimes the most expensive. Companies of small size can often save from \$10,000 to \$25,000 a year by purchasing coal on specifications and by proper tests for their conditions.

In closing, Mr. Gulick said that inspection is simply counting the purchaser's money, and that the care with which nickels are counted in the transportation department should be extended to the purchase of supplies.

TALKS ON ACCIDENTS TO EMPLOYEES OF THE CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

Talks to trainmen and other employees of the Cleveland, Southwestern & Columbus Railway, designed to prevent accidents, are given regularly by E. F. Schneider, general manager of that company. Frequent references to the work of Mr. Schneider, which was started when he was the claim agent of the company, have been published in the *ELECTRIC RAILWAY JOURNAL*. Abstracts of two talks given by Mr. Schneider recently are published below. At each of the meetings Mr. Schneider began by reading "The Southwestern Creed," which was published in the *ELECTRIC RAILWAY JOURNAL* for Jan. 14, 1911, page 94. The remarks were illustrated by incidents which had recently occurred on the line.

TALK OF MR. SCHNEIDER AT MEETINGS WITH TRAINMEN ON
FEB. 7, 8 AND 9, 1911

"The new method of trying to appeal to the better nature in man—of asking him as an abstract principle to do right because it is simply right to do, to do things without fear of punishment, without hope of reward—seems to be deficient at the present time. The men who have fallen down within the last few days feel as bad about it as I do. They all wish it hadn't happened. What are we going to do about it? What am I going to do about it? Does it absolutely take that rigid enforcement of the discipline of the old school to get results? I cannot believe it yet. You may force me to do it, but I am going to take one more chance. I am going to give you men the benefit, and ask you to shoulder part of this burden and have a watchful and careful eye, not only upon your own actions, but upon your fellow employees. Will you atone for the faults of the past by being that much better in the future? If you do, well and good. If you do not, you are lacking in that spirit which I had a right to suppose you possessed.

"There is always an element of service from the employee to the employer which is the spirit of the man. You can call it the spirit of honesty or loyalty or conscientiousness or anything you choose, but the employer knows it when you give it to him. It is a big help and has a real and tangible value, and this is the service we are asking of you.

"Heroism, in my estimation, at any rate in the application to our business, is a relative term. Heroism is often an impulsive exercise of the naturally inclined tendency to save human life or human beings from harm, and that can be illustrated in no better way than by the fact that the motorman or conductor or employee of a railroad who is daily engaged in a hazardous business would be one of the first to lend aid, often at the risk of his own life. Suppose a mother and a daughter were out driving, and the horse became frightened and ran away. I can imagine that horse running away in front of one of our stations where a number of our employees often congregate. I can picture in my mind's eye a number of our men who would not hesitate a moment to risk their lives in order to stop that horse in its mad flight. What is it in man that causes him to act so quickly, so impulsively? It is the value of human life, on which he and every one has learned to put an incalculable estimate.

"When we put that same natural, inherent, impulsive tendency to preserve life in actual operation in our daily life, when we

use the same heroism, but modified to fit into our daily life and occupation, when we allow the good and true which we naturally possess to dominate instead of allowing the untoward influences to occupy our mind while on duty, when we are willing to take our run in the morning, or do the duty assigned to us for the day, with a heroic mind, with a true heart and in the true spirit, then we shall see the dawn of a new era.

"You might just as well say that you can't prevent contagious diseases as to say that you can't prevent accidents. You all know of the infectious diseases that have been carried and transmitted by mosquitoes and you know how yellow fever has been practically exterminated by the use of oil which kills the mosquitoes' larvæ. You can prevent disease. You can prevent accident. According to the Rockefeller Institute for Medical Research of New York, many old fallacies have been exploded. It has been said that 75 per cent of the modern doctors are not fit to advise us. Notwithstanding these figures you know that the amount of disease which has been prevented has been very great. Then you must admit that if with 75 per cent of inefficient practitioners you can produce the marvelous results which have been produced during the last 25 years in the prevention of disease, then 100 per cent of good, strong, honest, able-bodied, clear-headed, high-minded trainmen and employees can produce relatively much greater results in the prevention of accidents, and with 100 per cent of efficiency in men we will produce 100 per cent efficiency in results, and we will run the Southwestern without any accidents.

"We are now starting on the fourth year of this system of preventing accidents. To me this is the crucial year. What we have done you all know. I am particularly anxious to make a record this year, for I believe that if we stand the test this year the system will have passed the experimental stage, and we can stand before the world as an example of what can be done.

"The other day at the hotel a man told me that the personnel of the road had changed wonderfully during the last four years; that he could see a marked difference in the attitude and feeling of the men. What does this mean? Have the old men been replaced by better men? No, they are, as far as we have been able to keep them, the same old men. Would there be any benefit in trying to improve our service and lessen accidents by replacing the older men with newer and less expensive men? No, the oldest man is the cheapest from a monetary standpoint. What has caused this marked change? In my estimation this fact has become established among you which makes you more optimistic and which in itself creates a better feeling in the mind of each individual. You all know you will get a square deal. You all know we do not like to change. You all know we try to correct instead of trying to discharge. You all know there is more respect from others for you and your business if you, by your own dignity of bearing, make a respectable business of railroading.

"We are trying to make records in 1911. There is one record above all others I should like to make during this year. I should like to say that we have not discharged a trainman during the whole year. That would mean that you men were so efficient, so careful, so good that not one of you was compelled to leave the employ of this company. In my estimation there is nothing which would establish you and your character in the minds of the public more than to be able to say that the Southwestern had not found it necessary to discharge a trainman or employee for flagrant violation of the rules or for dishonesty.

"I want to ask one favor, and that is when the general manager or superintendent is out on the line do not pass the word along. Let us view things as they are. We, of course, want you on your good behavior all the time, but don't deceive us by doing things differently when we happen to be on your run. We may be able to correct things that need it, and in trying to put on a fictitious appearance you do not benefit yourself, your fellow employee or the company. Some of our best conductors think they are called upon to pass the word along the

line when they discover a 'spotter.' No man has been hurt on this road when he was an honest or efficient man. If you can help make an honest man of a conductor who has not been right, if you can help make an efficient man of a motorman who is not as careful as he ought to be, you have accomplished something.

"The highest standard for our men as to honesty, sobriety, character and efficiency is to be the watchword for 1911.

"I want you all distinctly to understand that the actual fact of your turning in an accident report does not react against you. Our reports are coming in regularly and promptly, and very seldom do we have occasion to find fault with the report or the number of witnesses procured. We never have had accident reports made out for as trivial matters as at the present time, and I wish to commend you upon this part of the work.

"It certainly has been a satisfactory year in this department, and with the feeling there now is among our employees, that personal interest which each one of you have, and in which you are so loyally supporting the company, we will surely make a better record in 1911. I cannot tell you how much I appreciate this great work you are doing, and I know it must be a source of great gratification to you individually to know and to feel that your company is the advance guard in elimination, the actual elimination of accidents."

TALK OF MR. SCHNEIDER AT MEETINGS WITH EMPLOYEES OTHER THAN TRAINMEN ON JAN. 4 AND 6, 1911

"I have told the trainmen, and I now want to tell you, that the methods we have introduced here and which up to this time have been fairly successful are being criticised by other managements as wholly inadequate and impractical. I believe these managers would say that a little education is a dangerous thing. Instead of taking advantage of the advanced position of all laboring men and reasoning with them and appealing to them, they are the fellows who want to rule with a rod of iron. They want to have the old-fashioned military guardhouse methods, and, to my mind, gentlemen, those methods for obtaining the good and true that is in men are things of the past. We must appeal to the good that there is in man. We must appeal to the reason of our employees, for they are reasonable and reasoning men. Our reputation as a road on this great and vital question is, therefore, at stake. We must prove to the world that we are on the right track.

"The primary reason, then, for this meeting is so to understand the conditions which prevail that you men can co-operate with each other, not only in your own department, but with all other departments, to the end that we may run the Southwestern without accidents of any kind. Let me give you a quotation that I saw in a paper the other day: 'When you hear a man remark that accidents will happen you may be pretty sure he has been doing something he shouldn't.'

"According to recent statistics in the city, 60 per cent of the passengers carried on street cars are ladies, and I am sure that the greater number of accidents we have on our cars are accidents to women. This does not show that chivalry to which our women are entitled. The pride of every man should be to shield them from harm.

"The dangers in and around a power plant and substation you well know, and they are many. You have safeguarded yourselves and each other to the extent that we have recently had comparatively few accidents to our employees. It is, however, one of the places where eternal vigilance is especially necessary.

"One becomes accustomed to the dangerous part of this business, and therein lies the trouble. The daily contact with the danger often makes one careless, and an engineer, oiler, substation man or lineman is often so accustomed to the dangers that surround him that he loses respect for them. Always be on the safe side.

"To substation men and those in charge of the power house I would again add a word of caution when linemen are out on the road hunting for trouble. Safeguard them as you would your own life. They are deserving of all the care and caution you can exercise for them.

"This time of the year you linemen are subject to the weather conditions, and it is indeed a hard lot. You are more subject to danger when you are cold and numb than when the weather is more favorable. Have a care not only for yourself, but try also to help think for your fellow lineman and give him all the help you can.

"Injuries, especially those which happen to employees, frequently occur because men do not stop long enough to think. You linemen will laugh at this example. A railroad man wanted to measure the distance from a railroad crossing track to our high-tension line and took a steel tape line and threw it over our high-tension wires. Just think of such a fool-hardy trick!

"We have had six cases of injured eyes in succession, until your superintendent asked me to buy goggles in order to protect the eyes of our employees. I have been through the shop several times recently and have noticed on each occasion that some one went to the emery wheel and used it without putting on the goggles provided.

"This company is anxious to safeguard you in every way possible, and we are constantly thinking of making your work more safe. If you have any ideas as to how to make the tools and machinery you are working with more safe, be sure and let us know.

"This is the most dangerous time of the year for the track. The sudden drops in temperature are especially hard on steel, so that often a piece of steel will break with comparatively a slight blow, or without a jar or blow of any kind. Frogs, crossings and switches are all subject to these climatic conditions, and with the snow and ice to contend with you have a very responsible position. The safety of our passengers depends largely upon your vigilance and your trustworthiness, and I feel sure you will co-operate to the fullest extent, so that your part of this great work will be done in such a manner that no signs of omission or commission can be laid at your door.

"We are all cogs in this great piece of machinery. You and I fit into our respective niches, at least for the time being. Any cog which becomes broken or loose destroys the effectiveness of all the machinery. You are an essential, an integral part of this great system. It seems to me we all ought to be proud to be a part of this great system, the only system that I know of which is putting forth every effort, which is straining every nerve, which is leaving nothing undone in order that its employees may realize and may feel that they are just as necessary and just as essential to the building up of this road as any one else, and that it is a privilege as well as a pleasure to be connected with a road whose motto is first and always 'A road without accidents.'"

LONDON TRAMWAYS REPORT FOR 1910

The annual report of the chairman of the County Council of London, England, states that 30 miles of electric tramway were opened in 1910. On Dec. 31, 1910, there were 136 route miles, of which 119 miles are electrically operated. During the year conciliation boards were adopted to deal with rates of wages and general conditions of labor. No case in which a decision is rendered by a conciliation board can be reopened within 12 months, and the plan of conciliation is to be in force until six months after notice has been given by one side to the other of a desire to terminate it, but no such notice is to be given before Oct. 31, 1912. The average daily number of cars in operation is 953 electric cars and 120 horse cars. During the year 451,439,216 passengers were carried, of whom 210,000,000 passengers paid penny fares. The number of car miles run was 43,160,186. The total capital expenditures on the undertaking up to March 31, 1910, were £10,709,504. The total receipts were more than £2,023,000, and the operating expenses were £1,234,000, so that there was a balance of about £789,000. After allowing for debt and other charges, the surplus carried to appropriation account was £192,109, of which £123,231 was carried to the renewals fund and £59,978 to the general reserve.

DEVELOPMENT OF MCKINLEY LINES DURING 1910

On Feb. 28 the publicity department of the Illinois Traction System, under the guidance of F. G. Buffe, had inserted in numerous daily and weekly newspapers throughout Illinois eight-page supplements containing illustrated descriptions of the last year's progress on the McKinley lines in Illinois. These supplements were circulated to cover every town reached by the System. The publicity department prepared all the reading matter, illustrations, borders, etc., and supplied the matrices or stereotype plates for each paper. The reproductions in some papers were in colors. The arrangement of engravings and reading matter was similar to the magazine section of a Sunday newspaper. Sixty-three half-tone engravings, some of which were 5 in. x 15 in. in size, a number of ornamental border sketches and headings, together with a map of the road, were used in this supplement.

The subjects included the following: McKinley Electric Bridge at St. Louis; Latest Triumph of Illinois Traction System; Shops and Terminals; Equipment and Power; Belt Lines Completed; Illinois Traction Cities; Safety; Stations, Bridges and Buildings; Illinois Traction Officials; Chicago, Ottawa & Peoria, in Northern Illinois; How Big Systems Are Organized; Sleeper Trains; "The Road of Good Service" and Its Executive, Operating and Traffic Officials.

In general these subjects have largely been treated in past issues of the *ELECTRIC RAILWAY JOURNAL*, but a few extracts from the large display supplement follow: The freight and express terminal at St. Louis, which will comprise 24 acres of freight yards, is now almost completed. Belt lines for rapid freight handling have been built at Granite City, Edwardsville, Decatur and Springfield. Among the new freight equipments are six electric locomotives built at the Decatur shops. Reference is made to the sleeping car service between Peoria and St. Louis, to the straightening out of track over several sections and to the extensive installation of dispatchers' and automatic block signals. Announcement is also made of the construction of new substations, the enlargement of the Decatur and Venice shops, and the construction of observation parlor cars. Several large coal storage centers are being

Last year the Illinois Traction System operated over 220,155 passenger trains; over 13,000,000 people were carried on the interurban lines and 60,000,000 people on the different city lines. The freight business amounted to over 500,000 tons. The traffic department has recently added a milk and dairy agent to its organization to assist the farmers in enlarging this profitable source of income. Milk trains are now run on the southern division into St. Louis. This business is rapidly growing.



Typical Passenger Station at Localities Where No Substation Is Required

In the northern part of Illinois the lines of the McKinley system are being extended toward Chicago. The Chicago, Ottawa & Peoria Railway, better known as the Illinois Valley Division, now has 90 miles of road, connecting the manufacturing cities, rich farms and extensive coal mines of the Illinois Valley. Much of the right-of-way between Morris and Joliet has been secured. The franchise for the entrance into Joliet has been obtained, and before another summer the 22 miles from Morris to that city will have been completed. The next extension will be toward Chicago, whence a connection will be made from Streator or some other point for a continuous line to St. Louis. This road is under the same management as the Illinois Traction System, although it is part of the Western Railways & Light Company. W. B. McKinley is president and H. E. Chubbuck is vice-president executive.



Freight and Express Terminal Under Construction in St. Louis

constructed. The one built at Mackinaw Junction will have a storage capacity of 15,000 tons, while the Riverton installation will have a capacity of 10,000 tons. Where coal is not plentiful it will be stored under water in concrete-lined reservoirs. The new combination freight and passenger stations for small towns are of the handsome design shown in an accompanying illustration. These buildings are of red and buff brick with roofs of red tile.

The road was started 11 years ago by Mr. Chubbuck, who left it to assume charge of all the McKinley interests. H. J. Vance is general superintendent directly under Mr. Chubbuck, with headquarters at La Salle. At Marseilles it has bought the water-power rights and is constructing a 4000-hp hydroelectric plant. This line has interchange arrangements with the Chicago & Northwestern and the Rock Island railroads, principally for the transfer of coal and other heavy freight.

SINGLE-PHASE RAILWAYS ABROAD

The *Elektrische Kraftbetriebe und Bahnen* has just published a list of the single-phase railways equipped by the two principal German manufacturing companies, Siemens-Schuckert-Werke and Allgemeine Elektrizitäts Gesellschaft. These lists are printed herewith.

SINGLE-PHASE ROADS WITH A. E. G. EQUIPMENT.

Name of Road.	Voltage.	Frequency.	Number of Motor Cars or Locomotives.	Motors per Car or Locomotive.	Capacity per Motor.	Motor Capacity Total Horse-power.
Royal Prussian Govt. R. R.:						
Spindlersfeld.....	6,000	25	2	2	100	500
Blankenese-Ohlsdorf.	6,000	25	54	3	115	19,550
Blankenese-Ohlsdorf First Order.....	6,000	25	25	2	200	10,600
Blankenese-Ohlsdorf Second Order.....	6,000	25	17	2	200	7,400
Oranienburg Experimental R. R.....	6,000	25	1	3	350	1,400
Oranienburg.....	6,000	25	1	2	300	600
			1	1	1,000	1,000
			1	1	800	800
			1	2	950	1,900
Dessau-Bitterfeld.....	10,000	15				
Stubaital R. R.....	2,500	42	4	4	40	720
Borinage.....	600	40	20	2	40	1,680
Royal Swedish Govt. R. R.:						
London-Brighton R. R.....	6,000	25	2	2	115	575
London-Brighton R. R.....	6,000	25	16	4	115	7,820
London-Brighton R. R.....	6,000	25	30	4	150	20,100
Padua-Fusina.....	6,000	25	10	2	80	1,760
Padua-Fusina.....	6,000	25	3	2	80	480
Menzelschacht (Mine).....	2,300	42	2	3	40	240
Hibernia, Gelsenkirchen (Mine).....	165	50	3	2	15	90
Kirchbichl, Tirol (Mine).....	150	40	1	1	15	15
Lötschberg R. R.....	15,000	15	1	2	800	1,600
Pamplona-Sanguesa.....	6,000	25	5	4	80	1,600
			11	2		
			1	1		
			1	2	800	1,600
			11	4	80	3,520
Karlsruhe-Herrenalb.....	8,000	25			85	2,635
Chemins de fer du Midi.	12,000	16 2-3	1	2	800	1,600
Neapel-Piedimonte.....	11,000	25	11	4	80	3,520
Thamshavn-Lökken.....	11,000	25	2	4	80	960
			3	4		
Rjukan R. R.....	10,000	15			125	2,125
			2	2		
Mittenwald R. R.....	10,000	15	6	1	800	4,800
			3	1	800	
			5	1	600	
Vienna-Pressburg.....	10,000	15				5,400
			245		101	470

Several of the roads included in the list of the Allgemeine company have been carried out through the A. E. G. Union Company of Vienna or the A. E. G. Thomson-Houston Company of Milan, Italy.

Some further information has also been made available with regard to other installations. The Prussian government railroads have decided that the standard electric locomotive for trunk line service should carry single-phase motors having an aggregate one-hour rating of 1800 hp when running at 307 r.p.m. This equipment will give a speed of 120 km per hour (74.4 m.p.h.) to an engine with one leading, one trailing and three driven axles.

The Vienna-Pressburg Railroad, which was originally planned for three-phase operation, is to be operated with single-phase current at 15 cycles, and 10,000 volts. Another Austrian road which will use the same standard is the Mittenwald Railroad, a mountain line which connects with a Bavarian railroad on which the same frequency and voltage are used. A most interesting case is that of the Rhätisch Mountain Railroad in Switzerland which connects directly with the Bernina Railroad. Despite the fact that the latter road is now operated at 800-volt direct current, the new line will have 10,000-volt, 15-cycle, single-phase equipment. The Swiss line is about 74 km (46 miles) long. The current will be taken from a station at Brusio which also supplies the Bernina Railroad. Converter equipment at Bevers or Pontresina will convert three-phase energy at 25,000 volts, 50 cycles, to the single-phase trolley potential frequency mentioned. The Siemens-Schuckert and Oerlikon Company jointly will furnish multiple catenary con-

struction with automatic tension devices for the 47-km (29-mile) section between Zernez and Pontresina. The overhead construction from Zernez to the Schuls terminus will be furnished jointly by the Alioth Company and the Allgemeine Elektrizitäts Gesellschaft. The locomotive equipment will comprise one 600-hp and six 300-hp units from the Allgemeine company and Brown, Boveri & Company; one 600-hp and one 300-hp

SINGLE-PHASE ROADS WITH SIEMENS EQUIPMENT.

Name of Road.	Voltage.	Frequency.	Trolley Length in Miles.	Number of Motor Cars or Locomotives.	Motors per Car or Locomotive.	Capacity in Horse-power per Motor.	Total Horse-power of Motors.
Royal Prussian Govt. R. R.:							
a) Blankenese-Ohlsdorf.....	6,300	25	40.30	6	2	175	2,275
First Order.....			1.86	8	2	180	2,880
Second Order.....							
b) Dessau-Bitterfeld.....	10,000	15	21.70	1	1	1,100	1,100
1. Locomotive.....				1	1	1,800	1,800
2. Express.....				1	1	800	800
3. Locomotive.....				1	2	1,250	2,500
4. Freight.....							
Gran'duke Badish Govt. R. R.....	10,000	15	37.20	10	2	525	12,600
Wiesentalbahn.....							
Royal Swedish Govt. R. R.:							
1. Tomtebodavartan.....	20,000	25		1	3	110	330
2. Kiruna-Riksgransen.....	15,000	15	93.	2	1	1,250	2,500
a) Locomotive.....				13	2	1,250	32,500
b) Freight Locomotive.....							
Murnau-Oberammergau.....	5,500	16	16.12	5	2	100	1,000
				1	2	175	350
Roma-Civita Castellana.....	6000-550	25		4	4	40	800
First Order.....				4	2	40	320
Second Order.....							
Seebach-Wettlingen.....	15,000	15	13.33	1	6	225	1,575
Vienna-Baden.....	550	15	40.30	19	4	60	4,800
				1	2	30	60
Rotterdam-Haagscheveningen.....	10,000	25	47.43	19	2	175	8,750
First Order.....				6	2	175	2,800
Second Order.....							
Midland-Railway.....	6,600	25	20.77	2	2	175	875
Provinzialbahn Parma.....	4000-400	25	37.20	10	2	75	1,800
Spiez-Prutigen.....	15,000	15	12.40	3	2	225	1,800
Waitzen-Budapest-Gödöllö.....	10,000	15	35.96	11	2	150	3,900
				4	2	240	1,920
Haute Vienne.....	10,000	25		35	2 and 4	60	6,960
St. Pölten-Mariazell.....	6,500	25	65.72	14	2	250	7,500
Mülheimer Mining Corporation.....	250	50	4.34	5	2	18	180
Total up to September, 1910.....			487.63	188			104,675

unit from the Siemens-Schuckert and Oerlikon companies; one 600-hp and one 300-hp unit from the Alioth and Allgemeine companies.

WESTINGHOUSE WIRE-TYPE TUNGSTEN LAMPS

In the article on wire-type tungsten lamps in the issue of this paper of Feb. 18 an error was made in transcribing the last paragraph in stating that "the Westinghouse Lamp Company is now prepared to recommend them [the wire-type lamps] for electric railway cars." The statement should have read that the Westinghouse Lamp Company has not tried these lamps in electric car service, but the satisfactory results obtained from their use on steam roads and in industrial plants indicate that a satisfactory tungsten lamp for street railway service may be expected in the not too distant future.

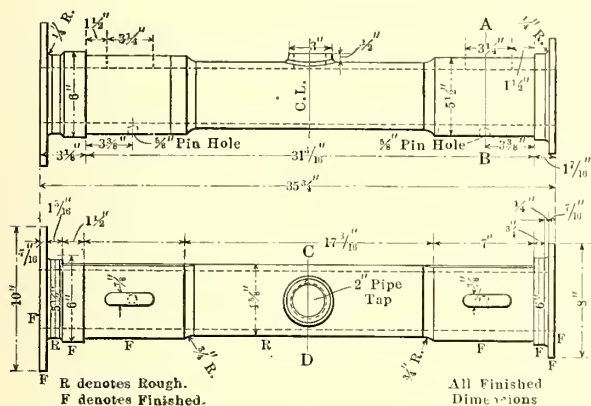
ATLANTA SHOP NOTES

Since 1907 the Georgia Railway & Electric Company has enlarged its shop facilities by the construction of a machine shop 200 ft. x 200 ft. in area, built with brick walls, concrete floors and tar and gravel roofs. The painting and car construction shop, as well as part of the storeroom, are also being rebuilt during the present year in brick and concrete. All of the shops are fully protected with sprinklers and hydrants. The following paragraphs will describe some of the shop practices carried out by W. H. Glenn, vice-president and general manager of railways, and A. M. Moore, master mechanic.

Cars are sent to the shops only when ordered in by an inspector. Once the car enters the shop it is thoroughly overhauled with the exception of paint touch-ups, which are made every 15 months to 18 months. Individual records are kept of all maintenance charges per car to permit comparisons of different classes of equipment in the same service. Approximate mileage records based on trip sheets are also kept on wheels; axles, armatures and other parts.

TROLLEY WHEEL AND FOUNDRY PRACTICE

Trolley wheels made of 89 parts copper, 10 parts tin and 1 part antimony are giving an average life of 5000 miles at a cost of 15.8 cents per 1000 miles. The wheels are oiled nightly at the top of the car. In 1908 the total cost for all current-collection labor and material, namely, wheels, harps, poles, washers, etc.,



Details of Brass Axle Sleeve for GE-67 Motor and Cast-Iron Axle Collar Used with Sleeve

from the base up, was only 19 cents per 1000 miles. The trolley bases are kept at a tension of 15 lb. to 20 lb.

The trolley wheels and many other brass and iron parts are made in the company's own foundry. In 1909 it produced 348,965 lb. of iron castings for 0.0132 cent per pound, against a market cost of 0.0175 cent per pound, and 17,222 lb. of brass at 15 cents per pound against a market cost of 20 cents per pound. The manufacturing price included labor. After allowing \$200 investment charge, the net profit for the year was \$2,188.53. The 1910 output in brass was about 50 per cent greater and the iron 30 per cent greater than in 1909. The company uses Dixon crucibles and Whiting cupolas.

AXLE-BEARING SLEEVES AND ARMATURE BEARINGS

The accompanying drawings show the standard forms and dimensions of the brass axle sleeves and shrunk-on cast-iron axle collars used with the GE-67 motor equipments. Similar sleeves and collars are in use with the Atlanta company's other motors. The use of axle-bearing sleeves involves a somewhat higher first cost than ordinary axle bearings, but this is more than balanced by the reduction in maintenance. The gears and pinions continue to stay in better mesh than when the bearing weight is concentrated at two points. As the sleeved axle penetrates the gear case for 1½ in. there is no trouble from grit or dirt. The sleeves are made of scrap metal with enough new metal to work them properly.

Armature bearings are made of More-Jones armature metal, which is giving an average life of 50,000 miles on oil-lubricated motors.

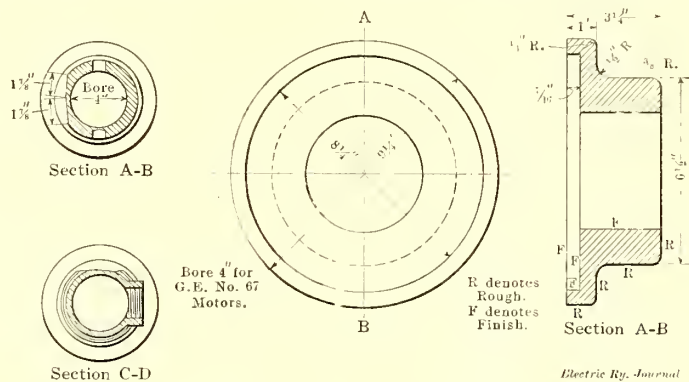
LUBRICATION AND CARBON BRUSHES

All motors are lubricated under a mileage contract with the Galena-Signal Oil Company. The older motors are still lubricated with grease, although different oil cups have been tried. The cost of motor lubrication per 1000 miles for the last three years has decreased as follows: 39 cents in 1907 for 8,267,555 car-miles; 30 cents in 1908 for 8,799,000 car-miles; 22 cents in 1909 for 9,088,298 car-miles.

The Atlanta company used about 14,000 carbon brushes in 1909, but during the following year it did not use more than 4000 brushes because of the extensive adoption of the Speer and Le Carbone types. The former brushes are used on the GE-67 motors and the latter on the Westinghouse Nos. 68 and 101 motors. All commutators are being slotted. With the old brushes in use some commutators had to be turned every three months, but it is confidently expected that the new brushes will lengthen to two years the interval between turnings.

ROLLING STOCK

The Atlanta company operates 222 single-truck cars on Baltimore trucks with motors of the Westinghouse No. 68, Westinghouse No. 101, GE-67 or GE-80 types. These cars weigh about 17,500 lb. complete, including electrical equipment. As the cars seat 28 passengers each, the average weight per passenger is 625 lb. The 60 double trucks are carried on Brill No. 27 F.E-1 trucks equipped with four Westinghouse No. 101 or four GE-80 motors. These cars weigh 38,000 lb. complete.



Electric Ry. Journal

including electrical equipment. The seating capacity is 40, making an average weight of 950 lb. per passenger.

During 1909 and 1910 the company built five double-truck and 12 single-truck cars. It also converted 12 open cars to center-aisle cars with screens. A passage was cut through the inside benches and the platform benches were removed to make vestibuled platforms. The running-board type open car was found dangerous in Atlanta. The company has recently begun to build and operate pav-as-you-enter cars.

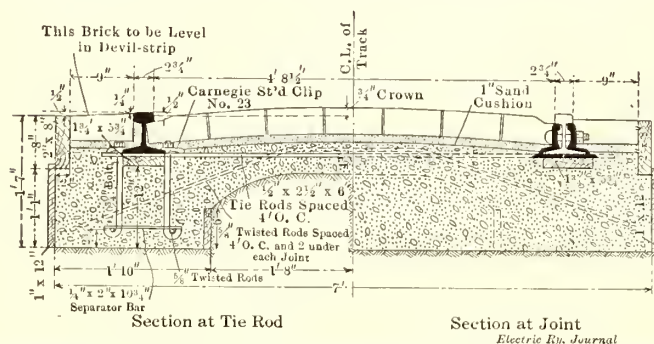
THE CLEVELAND VENTILATOR

The Nichols-Lintern Company, of Cleveland, Ohio, has been conducting tests of its Cleveland ventilator on a number of roads recently and has found that in regular city service the exhaust per ventilator averages about 2500 cu. ft. per hour and for interurban service about 4500 cu. ft. per hour. The ventilator is made entirely of sheet metal and will fit any size of upper deck sash or sash frame. It is weatherproof and draft-proof and very inconspicuous both from the interior and outside of the car. The air from the interior of the car is taken from close to the head lining and the exhaust is close to the upper and lower decks of the car. The weight of the ventilator varies, according to its size, from 3½ lb. to 6 lb. The Nashville Railway & Light Company, Nashville, Tenn., recently made a test of this ventilator extending over about five months and has ordered more than 250 of them.

SUGGESTED TIELESS ROADBED CONSTRUCTION

W. A. Haller, former general manager of the Oklahoma Railway, has devised the construction shown in the accompanying cut as a suggestion for track in which ties are entirely omitted. In this design the rail rests directly on longitudinal creosoted strips embedded in concrete. The base of the rail is secured to the concrete by means of hook bolts which hook over the longitudinal reinforcing rods in the concrete, as shown in the end section. The rails, longitudinal strips, tie rods, etc., are assembled and blocked in position and the concrete is then placed. The tie rods are spaced every 4 ft. and the creosoted wood cushion strips are continuous.

During the past two years Mr. Haller has constructed over 10 miles of steel-tie concrete city track which has so far proved entirely satisfactory. However, it has frequently been asserted that a construction consisting of steel ties attached directly to the rail and bedded on solid concrete is too rigid, too likely to be noisy and even to be injurious to the rolling stock. Therefore, the tieless design incorporating a continuous wood cushion strip has been worked out in order to provide a permanent concrete roadbed with a cushioning medium between the rail and the concrete. The design shown will also permit the replace-



Section of Proposed Tieless Concrete Track Construction

ment of a 100-lb. A. S. C. E. section with either 7-in. T or 7-in. girder rails merely by the substitution of thinner creosoted strips.

INDEX TO UNIT COSTS AND QUANTITIES 100 FT. TIELESS CONCRETE AND PAVED CONSTRUCTION.

Quantities, Per 100 ft.	Per Mile.		Cost. Per 100 ft.	Per Mile.
32.	1,690.	Cu. yds. excavation at 50 cents.....	\$16.00	\$845.00
CONCRETING				
20.27	1,070.	Cu. yds. stone at \$1.55 and 45 cents..	40.54	2,140.00
16.25	540.	Cu. yds. sand at \$1 and 35 cents....	13.83	729.00
22.23	1,174.	Bbls. cement at \$1.60.....	35.57	1,878.00
		Labor.....	21.80	1,151.00
570.	30,096.	Feet form lumber at \$20.....	11.40	601.80
		Equipment and miscellaneous.....	5.83	308.00
21.8	1,151.	Total cu. yd. concrete.....	\$128.97	\$6,807.80
TRACK.				
2.97	157.14	Tons of rail.....	\$110.00	\$5,814.00
3.33	176.	Continuous joints, at \$2.20 and 80 cents.	10.00	528.00
200.	1,056.	Bolts } 1-in. x 4 1/2-in. track bolts at \$6	1.08	55.20
.18	9.2	Kegs } 10-in. x No. 0000 7/8 bonds at 40 cents		
3.3	176.	and 40 cents.....	2.50	130.80
25.	1,320.	1/2-in. x 2 1/2-in. x 6-ft. tie rods at \$0.637.	15.92	840.80
100.	5,280.	Hook bolts at 7.7 cents.....	7.70	406.56
50.	2,640.	Separator plates at 4.6 cents.....	2.30	121.44
100.	5,280.	Rail clips at 2 cents.....	2.00	105.60
200.	10,560.	Lin. ft. 1 3/4-in. x 5 3/4-in. creosoted timber	4.61	243.40
440.	23,232.	Ft. } 5/8-in. twisted bars at \$2.50...	14.62	772.20
585.2	30,898.	Lb. } 1/2-in. twisted bars at \$2.50....	3.95	208.67
186.	9,820.	Ft. track laying at 30 cents.....	30.	1,584.00
158.1	8,347.			
100.	5,280.			
5,280.		Ft. total track.....	\$204.68	\$10,810.67
PAVING.				
4,500.	235,000.	Brick at \$13.00.....	\$58.00	\$3,055.00
	60.	Brick per sq. yd.....		
20.5	1,075.	Sq. yd. border at 40 cents.....	8.20	430.00
52.	2,738.	Sq. yd. center at 30 cents.....	16.60	820.00
4.4	235.	Bbl. cement at \$1.60.....	7.00	376.00
4.45	235.	Yd. sand at \$1.40.....	6.23	329.00
		Supervision and miscellaneous.....	5.00	270.00
			\$100.00	\$5,280.00
			\$449.65	\$23,743.47
		Incidentals, 5 per cent.....	22.48	1,187.15
		Engineering and supt. 5 per cent..	22.48	1,187.15
			\$494.61	\$26,117.77

MERGER OF INTERESTS OF PAY-AS-YOU-ENTER CAR CORPORATION AND PAY-WITHIN CAR COMPANY

An important announcement was issued March 1 by the Pay-As-You-Enter Car Corporation, of New York, and the Pay-Within Car Company, of Chicago, as follows:

"We beg to announce that the interests of the Pay-As-You-Enter Car Corporation and the Pay-Within Car Company have been merged, and a central organization exclusively authorized to issue licenses under the numerous patents owned and controlled by the two companies will be created under the title of Prepayment Car Sales Company, with principal offices at 50 Church Street, New York City, and offices in Chicago and Philadelphia.

"We believe that this consolidation will very materially assist the development of modern street car design on this continent.

"Every successful type of prepayment car and door-inclosing devices on such cars will be controlled from this central organization, whose combined resources and experience will be at the service of the electric railway fraternity."

It is understood that the consolidation has been brought about largely by the fact that in endeavoring to improve their prepayment systems each company found it impossible to progress much further without infringing the patents of the other, the strength of which both companies had ascertained. The new company will be backed by the entire resources of the two other companies and by the financial interests allied with them. Duncan McDonald will be president; A. H. Englund, of the Electric Service Supplies Company, of Philadelphia, will be vice-president and general sales agent; Harold Rowntree, of Chicago, the inventor of most of the door devices which are controlled by the company, will be treasurer, and Thomas W. Casey, who has been responsible for the introduction and great success of the pay-as-you-enter principle in the United States, will be in charge of the company as general manager. The Prepayment Car Sales Company will control a large array of patents, exceeding, it is understood, 100 in number, covering the great variety of designs of prepayment car and door-closing devices owned by the two companies. The extensive work done by both companies warrants a brief statement of their histories.

ORIGIN AND PROGRESS OF THE PAY-AS-YOU-ENTER CAR

The pay-as-you-enter car was invented by W. G. Ross, formerly managing director of the Montreal Street Railway Company, and Duncan McDonald, general manager of the same company. It was first put in operation in Montreal in 1905 and at once proved a complete success, so much so that the Montreal Street Railway Company adopted the plan for its entire railway system. In the following year, in the fall of 1906, a car of the pay-as-you-enter type was exhibited at the Columbus convention of the American Street & Interurban Railway Association and proved to be one of the most interesting features at that convention.

After having an expression of opinion from the prominent railway managers in the United States, the inventors decided to exploit the car, with the result that in the month of November, 1907, the Chicago City Railway Company inaugurated the system on its lines with 300 cars, which proved another success. A little later on the International Railway Company, of Buffalo, commenced with 50 cars. In March, 1908, the Metropolitan Street Railway, of New York City, placed 155 cars in operation, and a month or so later the Public Service Railway of New Jersey followed with 150 cars. The experiment of the pay-as-you-enter feature on street cars proved so successful in Montreal, Chicago, Buffalo and on the Public Service Railway under the most severe conditions possible that it was but a short time before many of the other large electric railways throughout the country adopted the system, and to-day there are said to be over 7000 cars in daily operation on 72 railway systems in the United States and Canada.

After being exploited at first as a private syndicate, the Pay-As-You-Enter Car Corporation was incorporated under the laws of New Jersey in 1908 with a capitalization of

\$1,000,000; Duncan McDonald was elected president and Thomas W. Casey general manager. This company still exists as a subsidiary to a new corporation which was incorporated under the laws of the State of Delaware in May, 1910, with the same title but with a capitalization of \$5,000,000, divided into \$1,500,000 7 per cent preferred stock and \$3,500,000 common stock. Of the latter \$1,000,000 is in the treasury unissued. The Delaware corporation was formed under the auspices of Carlisle & Company, bankers, of New York, for the purpose of materially developing and enlarging the field for the pay-as-you-enter system at home and abroad, and its securities were exchanged for the securities of the New Jersey corporation, which was retained as the operating organization. It is understood that arrangements are on foot for the immediate formation of a separate company to deal with the European patents, and a representative of Carlisle & Company is at present in London organizing such a company.

HISTORY OF THE PAY-WITHIN CAR

The pay-within car had its origin in Philadelphia. In considering fare prepayment the Philadelphia Rapid Transit Company deemed it impracticable to build a car with a very long platform because of the narrow streets and numerous right-angle turns which would make a long platform overlap the sidewalk. Moreover, the reconstruction of any considerable portion of its rolling stock to longer platforms meant a large expense. The company, therefore, decided to remove the bulkheads and create a space on the car-floor level where the conductor could stand, and thus give the entire length of platform over to passengers. This made it possible to rebuild the cars to the prepayment plan and have a platform 50 in. long inside.

The design was worked out by the late F. H. Lincoln, then assistant general manager of the Philadelphia Rapid Transit Company, and Harold Rowntree, of the Burdett-Rowntree Manufacturing Company, Chicago, and important patents were granted to both. The first reconstruction involved 50 cars, which were placed in operation on the Twelfth and Sixteenth Street line, in Philadelphia, on Sept. 28, 1908. These cars were equipped with sliding doors and folding step, both pneumatically operated, the mechanism being supplied by the Burdett-Rowntree Manufacturing Company. The Philadelphia Rapid Transit Company instantly recognized the merit of this type of equipment, since the boarding and alighting accidents were reduced to almost nothing and the receipts were very materially increased. The conversion of additional cars followed rapidly until at the present time there are about 750 pay-within cars in operation in Philadelphia.

The Pay-Within Car Company was then organized for the commercial exploitation of the car, and the Electric Service Supplies Company, Philadelphia, which had been largely instrumental in the organization of the Pay-Within Car Company, was appointed the exclusive selling agent of the car. One of the Philadelphia Rapid Transit converted cars was shown at the street railway convention at Atlantic City, October, 1908, and created a great deal of favorable comment.

The Capital Traction Company, of Washington, D. C., was the first company outside of Philadelphia to recognize the merit of this type of car and placed an order shortly after the convention for 15 cars for operation on its Chevy Chase division, which is a combination city and suburban line. These cars were built new by the Cincinnati Car Company and had platforms 6 ft. 6 in. over all, so that it was possible to divide the platform into separate entrance and exit ways.

It soon became apparent that the field for the pay-within car would be restricted if limited to pneumatically operated doors and steps, partly on account of the expense involved in the pneumatic devices themselves and the reconstruction of old cars to provide pockets for the sliding doors, but also because a great many cars of modern design are not equipped with air compressors. The engineers of the Pay-Within Car Company, therefore, had to devise some way of manually operating doors and steps. The early efforts in this direction were quite discouraging because of the friction involved and of the inertia possessed by sliding doors of considerable size, but

finally a system of folding doors and steps with a manual device and ball bearings was evolved in which the doors and steps could be easily operated with a 6-in. handle. As soon as this apparatus was available the pay-within car became a thoroughly practicable commercial proposition, and it has been adopted by a great many roads during the past year.

PRESSED-STEEL GASOLINE TRACK INSPECTION CAR

Fairbanks, Morse & Company, Chicago, Ill., have placed on the market a new Sheffield motor car, for use where only a small one to three-man car is required. The frame of this car is made of one-piece pressed steel, which is stamped to the proper form while in the flat sheet, and then flanged to form the top, sides and bottom flanges. Pressed-steel stiffeners as well as the pressed-steel front foot rest are then riveted into the frame. The several holes in this frame, which are used for attaching other parts of the car, are all drilled in after the frame is bent, so that the frames are interchangeable. If a frame should be damaged beyond repair, a new frame can be obtained, and the other parts of the car assembled to it. Practically all the woodwork upon the car is included in the seats and tool box. A two-cylinder,



Gasoline Inspection Car in Service

two-cycle, air-cooled motor is used to propel the car, which drives directly on the front axle. The company uses the two-cycle engine as it eliminates the use of valves of any kind which are necessary for the operation of a four-cycle motor. To lubricate the entire engine, the lubricating oil is mixed with gasoline, the tank being filled with the mixture. The oil passes with the gasoline through the carburetor into the crank case of the engine, and from there into the cylinders. The gasoline is, of course, vaporized, and the oil goes through as a spray, which reaches and lubricates all parts of the motor. The car weighs about 400 lb., and it can be operated up to a speed of 30 m.p.h.

COASTING RECORDERS FOR MILWAUKEE

The Milwaukee Electric Railway & Light Company has just concluded an exhaustive test of the Railway Improvement Company's coasting time recorders, and has found that, on the trial cars, it was possible with these machines to reduce the average energy required per car mile 18 per cent or more. At the same time the brakeshoe wear was materially cut down. In consequence, the company has placed an order for 300 coasting recorders for immediate delivery. These coasting recorders are similar to those in use on the elevated and subway lines of the Interborough Rapid Transit Company of New York, and on the Broadway cars of the Third Avenue Railroad Company. The Milwaukee Electric Railway & Light Company is the first prominent Northwestern road to inaugurate this system.

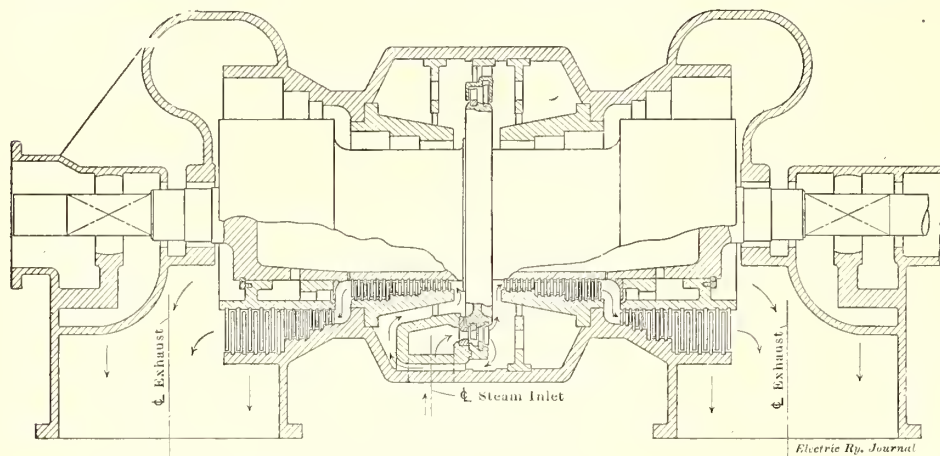
RECENT TURBINE DEVELOPMENTS AND EFFICIENCIES

In a paper read before the Engineers' Society of Pennsylvania on Dec. 12, 1910, E. D. Dreyfus, of the Westinghouse Machine Company, presented some interesting data on steam turbines. Limitations in the electrical art have previously confined the rotative speed of turbines within 1800 r.p.m. for sizes above 500 kw. To-day turbines of 2500 kw are very satisfactorily operating at 3600 r.p.m., and 4000-kw turbines of the same rotative speed are soon expected. In high-speed

encumbered by external ports. Furthermore, independent supports are provided, permitting the exhaust passage to expand and contract freely without disturbing the alignment.

When large capacities are encountered a different problem arises. The size of the exhaust port becomes disproportionately large as compared with the turbine cylinder, necessitating a casting that is difficult to make. Naturally a division of the large volume of steam at the low pressure end suggested itself to the designer. The distance between bearings is another item that the designer of large machines must contend with in dealing with bending moments and stresses. It would be impracticable to place two reaction machines end to end and divide the flow in opposite directions through the two similar elements. One of the solutions, then, was to substitute for the longest and least efficient section of such a combined machine a short impulse wheel of about equal efficiency. In doing this the unit was made 30 per cent shorter than the single-flow design.

Another advantage secured in this arrangement, for large turbines, is the elimination of two of the dummy pistons of the reaction type turbine—the two low-pressure



60-Cycle Double-Flow Turbine

work generator rotors of the through shaft type have been largely superseded by designs having the shaft bolted to the ends of the field disk by means of a non-magnetic coupling in two-pole machines and integral with either half of the rotor in four-pole machines, the whole secured by bolts.

The effect of rotative speed is forcibly brought out in the table, which gives the principal dimensions on two 1000-kw turbines, 1800 r.p.m. and 3600 r.p.m. each.

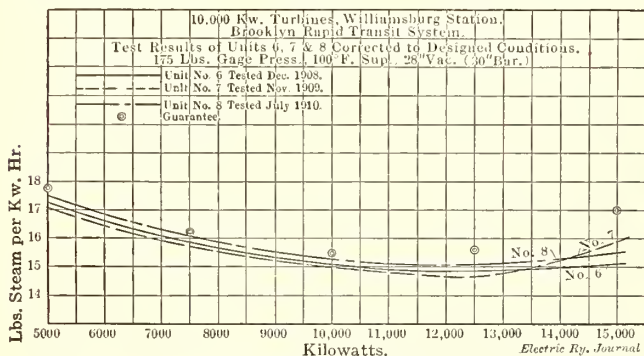
COMPARATIVE DIMENSIONS.			
	Low Speed, 1800 r.p.m.	High Speed, 3600 r.p.m.	
1000-kw Turbine.			
Length between bearings, approximately....	12 ft. 7½ in.	8 ft. 8 in.	
Size of bearings, approximately.....	6 in. x 14 in.	4 in. x 9 in.	
Weight, including blading, approximately....	7,000 lb.	2,000 lb.	
Maximum drum diameter, approximately....	3 ft. 1¼ in.	20 in.	
Minimum drum diameter, approximately....	17¼ in.	10¼ in.	
Number of rows of blading, approximately....	82	49	
Largest blades (nominal height).....	4 in.	4 in.	
Shortest blades (nominal height).....	¾ in.	½ in.	

Coincident with the improvement in mechanical construction a betterment in economy of 3 per cent to 5 per cent has re-

sections equalize their end thrust and the impulse section requires no counterbalancing, as all of the expansion takes place in the nozzles. For low speeds which obtain in 25-cycle work the intermediate stage is retained as a single-flow element in order to provide the best blade lengths.

For such high speeds as are used in 60-cycle work a straight double-flow design lends itself admirably. These improvements have resulted in the exceptionally symmetrical turbine shown in the sectional drawing. Furthermore, a decrease in length of the machine has been brought about, together with greater economy. In the straight double-flow turbine the subdivision of steam after it issues from the impulse wheels is very simply accomplished by a short belt around the nozzle blocks. The specific volume of steam, after issuing from the impulse wheel, being still relatively small, the subdivision is readily taken care of in this way.

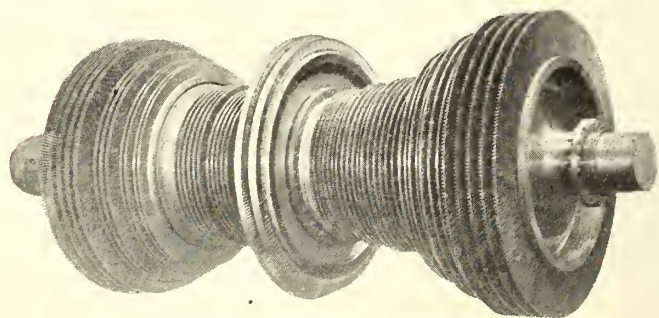
This composite or hybrid design proposes to retain as much of the reaction blading as may be justified from a constructional standpoint. There is a notable difference in efficiency between the nozzle and bucket elements used in turbines. The



Comparison of Guarantee and Test Records of Three Brooklyn Turbines

sulted, both in large and small sizes, due to altered distribution of steam and better blade lengths.

In the early machines the cylinders were made with rib and web reinforcement and with the equalizer passages and turbine supports cast integral. Material of different thickness at certain parts and the varying temperatures occurring in the turbine did not encourage uniformity of cylinder expansion nor facilitate the production of the casting. In the new types the cylinder cover and base are entirely symmetrical and un-



Spindle of Double-Flow Turbine

general results of nozzle and blade experiments indicate that nozzle efficiencies range from 95 per cent to 98 per cent, while single buckets may vary from 70 per cent to 85 per cent. Reaction turbines have a specially constructed blading formation which provides the same results as nozzles, the expansion taking place in both the rotating and stationary elements. In the impulse type the area of the steam passage through the buckets is sensibly constant. Reaction blades establish varying cross-section in precisely the same manner as in nozzle de-

signs. Only when these blades are of relatively short lengths do they become of uneconomical proportion with respect to the leakage annulus, which appears only in the high-pressure stage, and, therefore, the impulse wheel used in this part of the turbine does not detract from the efficiency. Moreover, the use of the impulse section utilizing a high pressure and heat drop removes the wide difference of temperature and pressure with the cylinder.

The turbine, since its introduction within the past decade, has quickly surpassed the economies established by the most efficient reciprocating engines. The most efficient engine has shown itself capable of developing a kw-hour on about 17 lb. of steam with 175 lb. pressure, 80 deg. to 90 deg. superheat and 28-in. vacuum. This engine record has been improved about 20 per cent by the turbine. One of the Westinghouse straight double-flow turbines of 10,000 kw capacity, installed at the City Electric Company, San Francisco, Cal., has developed a kw-hour with 13.88 lb. of steam under the same operating conditions.

The set of curves on page 386 shows the steam consumption results obtained in three tests on successive installations of 10,000-kw turbines in the Williamsburg power station of the Brooklyn Rapid Transit System. In every case the amount of steam required was less than the guarantee, between the limits of 50 per cent load and 50 per cent overload.

SINGLE-TRUCK PAY-AS-YOU-ENTER CARS FOR QUINCY, ILL.

The Illinois Traction System has lately received from the Danville Car Company eight single-truck pay-as-you-enter cars for use in Quincy, Ill. These cars are of a design which has been adopted as standard by this system for single-truck, pay-as-you-enter operation. As shown in the accompanying half-tone and floor plan, the front platform of these cars has a single sliding door for exit only, and the rear platform has two swinging doors and a dividing rail for entrance and exit. The cars are built for double-end operation. The body

yellow pine. The floor in the body of the car and on the platforms is 13/16-in. yellow pine. The platform framing is composed of white oak knees, the side knees being plated inside with 1/2-in. x 9-in. plate, and the center knees with 3/8-in. x 9-in. plate.

As shown in the halftone, the sides of the car are plated with sheet iron. This steel sheathing is of No. 14 gage, 33 1/2 in.

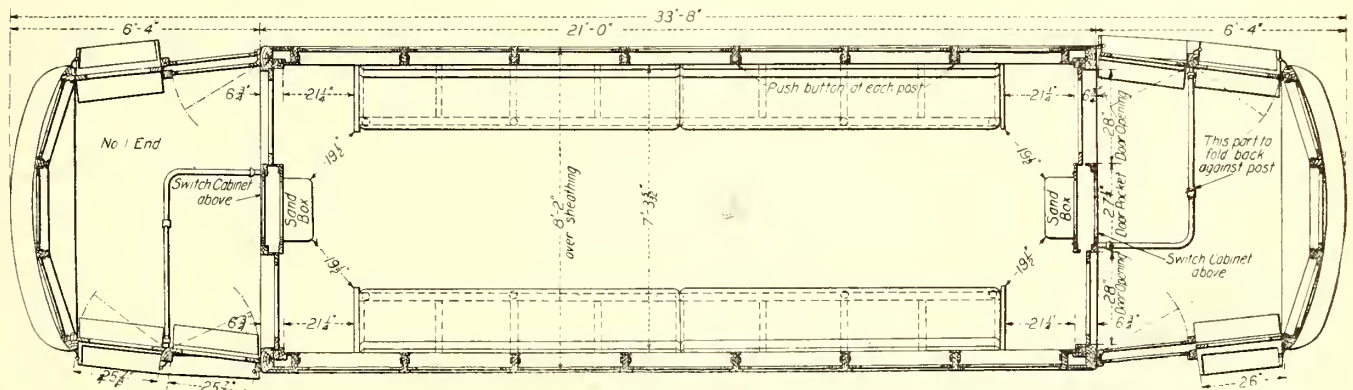


Single-Truck Pay-As-You-Enter Car for Quincy, Ill.

high, and terminates 1/4 in. above the bottom edge of the side sill. The cars were painted in accordance with the Illinois Traction System's standard specifications for steel passenger cars. The switch cabinets on these cars are lined with 3/8-in. transite.

Among the specialties installed on these cars are the standard ball-bearing sheaves of the Illinois Traction System for sliding doors; O. M. Edwards spring rollers for all drop sash; Hunter destination signs; Empire safety treads over the oak steps; Consolidated Car Heating Company's heaters and push-button system; U. S. No. 13 trolley stands, and Earll trolley catchers.

Several bills have been introduced before the New York State Legislature prohibiting the practice of engineering by anyone unless so authorized by a license issued to him by a State board of engineering examiners. Laws to a similar effect have been passed in a few States and others are pending before a number of legislatures. The bill at Albany which is



Plan of Single-Truck Pay-As-You-Enter Car for Illinois Traction System

end-doors are arranged to slide into a center bulkhead. Ample room is provided for rapid passenger movement, as the seating is longitudinal, and, furthermore, there is a free space of 12 1/4 in. opposite each door. Although the car is but 33 ft. 8 in. over all, the platforms are each 6 ft. 4 in. long. The car, which is 8 ft. 2 in. wide over the sheathing, is operated over a track gage of 5 ft.

The side sills, end sills, cross sills and drop-door framing are of yellow pine; the side-sill plates are of 18-in. x 1/4-in. steel. All the cross sills are held in place at the side-sill plate in malleable-iron pockets. The end sills are plated outside with 10-in. x 3/8-in. plate, and inside with 7-in. x 1/2-in. plate, returning on the side sill and securely bolted to the same. The cross sills at the truck supports are reinforced outside with 3 1/2-in. x 3 1/2-in. x 3/8-in. angles, and on the inside with 5-in x 3/8-in. plate.

All side and corner posts are of ash. The top plates are of

being most strongly pressed resembles the law applying to State qualification for the practice of medicine. The American Society of Civil Engineers has passed a resolution stating that it "does not deem it necessary or desirable that civil engineers should be licensed in any State."

A storage-battery plant, said to be the largest single-battery plant of its kind in the world, will be installed by the Consolidated Gas, Electric Light & Power Company, of Baltimore, as soon as a building now being constructed for it is finished. The building will be located adjoining the largest direct-current substation of the company and will cost about \$50,000, while the entire cost of the plant will approximate \$300,000. The storage battery will be of sufficient size to take care of the peak load in the entire business district for nearly half an hour should an accident occur at the time of maximum consumption.

PENNSYLVANIA RAILROAD ORDERS NINE MORE ELECTRIC LOCOMOTIVES.

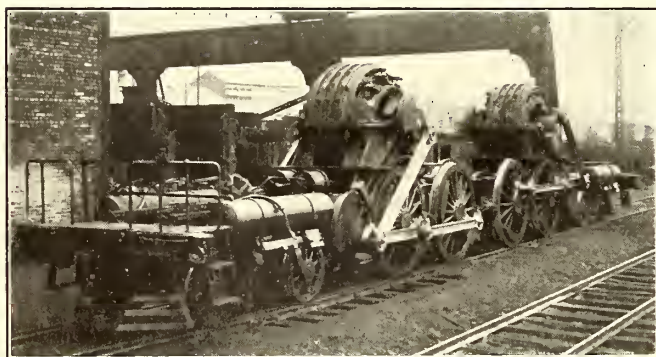
Nine more electric locomotives, aggregating about 40,000 hp, have been ordered by the Pennsylvania Railroad. The new locomotives will be of the same type as those which are now being operated in the Manhattan Terminal, New York City, and will supplement the 24 already in use. The new locomotives are to be completed by July 1, 1911. The cabs, frames, running gear and mechanical parts will be built by the Penn-



Pennsylvania Locomotive Hauling Eight-Car Train

sylvania Railroad at its Juniata shops. The air brakes will be supplied by the Westinghouse Air Brake Company. The electrical equipments will be built and the complete locomotives assembled at the East Pittsburgh works of the Westinghouse Electric & Manufacturing Company.

The Pennsylvania locomotives are by far the most powerful ever built. The locomotive is an articulated machine of double cab design. Each half carries its own motor and complete equipment and the two halves are coupled together at their driving-wheel ends. The frames, driving wheels and trucks of the running gear are similar in general character to those of the "American Type" steam locomotive. The coupled ends are fitted with permanent couplings of twin drawbars and friction draft gears, so arranged that the leading half serves as a leading truck and the other half as a trailer in whichever direction the locomotive may be moving. Each cab is complete with automatic and straight air brake equipment, apparatus for train lighting, electric headlights, pneumatically operated whistle and sanders, as well as its motor, unit switches and master controller. The machines are so arranged that if one motor is cut out the entire machine can be operated from either cab with the remaining motor. The halves are interchangeable.



Motors and Running Gear of Pennsylvania Locomotive

The unit switch field control permits two or more locomotives to be coupled together and all to be operated from either end of any one cab, and affords flexibility of speed regulation. It gives two additional running notches and at the same time economizes power consumption during acceleration.

The following are some of the characteristic features of these direct-current, 600-volt electric locomotives:

Weight of locomotive, complete.....	156 tons.
Weight on drivers.....	200,000 lb.
Weight on each driving axle.....	50,000 lb.
Weight on each bogie truck.....	57,000 lb.
Total length over all, inside knuckles.....	64 ft. 11 in.
Rigid wheel base of each half.....	7 ft. 2 in.

Total wheel base of each half.....	23 ft. 1 in.
Total wheel base of locomotive.....	55 ft. 11 in.
Diameter of drivers.....	72 in.
Contract tractive effort.....	60,000 lb.
Maximum draw-bar pull (recorded on test).....	79,000 lb.
Normal speed with full train.....	60 m.p.h.
550-ton train to be started and accelerated on 2 per cent tunnel grades, maximum contract horse-power.....	4,000
Weight of each interpole motor complete with cranks.....	43,000 lb.
Height of motor frame above cab floor.....	5 ft. 6½ in.
Height of center of shaft above cab floor.....	2 ft. 1½ in.

Since the opening of the Manhattan Terminal on Nov. 27, 1910, the entire through passenger traffic of the Pennsylvania Road in its Newark tunnels has been handled by the electric locomotives of this type with entire satisfaction.

TURN-IN CAR AT DAYTON, OHIO

The People's Railway Company, of Dayton, Ohio, has recently equipped one of its "Pay-Within" cars with the combination turnstile and register, invented by John F. Ohmer, of the Ohmer Fare Register Company. The different features of this invention, which is known as the "Turn-In" prepayment system, were described and illustrated in the *ELECTRIC RAILWAY JOURNAL* for Dec. 17, 1910, on page 1209. The Dayton car is equipped with a turnstile on each platform. The turnstiles have aluminum arms carrying a table upon which the conductor can make change or where the passenger can deposit any package in case his fare is not ready in advance. The turnstiles are attached to an indicating recording and printing register, to which auxiliary dials are connected, showing the same denominations of fares as those mounted in the register. The turnstile and the attached register are controlled by the conductor, who releases the turnstile for entrance by pressing a pedal. The passage of the passenger registers the fare. The only delay possible is that caused by passengers who do not happen to have the proper fare available at once. The arms and tables of the turnstiles are collapsible, so that the front or exit platform is entirely unobstructed.

During February this equipment was inspected by a number of prominent railway men and others, who were the guests of George C. Towle, general manager of the People's Railway. Among those who took the trips were: C. L. S. Tingley, vice-president of the American Railway Company, Philadelphia, Pa., which controls the People's Railway; Harrie P. Clegg, president, and Charles B. Clegg, vice-president, of the Dayton & Troy Electric Railway, Dayton; John A. McMahon, president, E. Wuichet, assistant secretary, V. R. Powell, superintendent, and claim agent, and L. M. Wilson, master mechanic, People's Railway; A. Benham, assistant general manager, Ohio Electric Railway Company, Dayton, Ohio; T. E. Howell, general superintendent, City Railway Company, Dayton; R. A. Crume, general manager, Dayton & Troy Electric Railway; Dennis Dwyer, president, Dayton, Covington & Piqua Traction Company; W. L. Smith, general manager, Dayton Street Railway; Henry Gebhart, chief engineer, Oakwood Street Railway Company, Dayton; B. M. Brown, superintendent, Lebanon & Franklin Traction Company, Dayton, and John F. Ohmer.

During the trip these gentlemen had the opportunity of trying the turnstile register combination as often as they liked and of observing how easily passengers even when encumbered by traveling bags or packages could pass rapidly through the turnstile. The strongest feature asserted for this mechanism is that it secures to the railroad the exact fare for every ride, visibly indicated under its proper denomination, recorded as indicated and printed as recorded.

WEIGHT OF SANITARY CAR FLOOR

Through an error in printing the article entitled a "Sanitary Car Floor," on page 310 of the *ELECTRIC RAILWAY JOURNAL* for Feb. 18, the weight of the "Monolith" floor described was given as 55 lb. per square foot. The correct weight is 55 lb per square yard. This material has been applied by its manufacturers, the American Monolith Company, Milwaukee, Wis., on many classes of high-grade rolling stock where a light, durable and sanitary floor is required.

LONDON LETTER

(From Our Regular Correspondent)

At a recent meeting of the London County Council the chairman of the finance committee stated that the financial condition of the tramways did not justify any profits being diverted toward the relief of rates. The time, of course, might come when the Council would decide that sums should be applied in that way, but the chairman doubted whether such sums should be applied, as many held the view that a tramway should not be worked for profit, but that any balance should be devoted to a reduction of fares and in improving the system.

The returns of the Board of Trade which deal with tramways and light railways in the United Kingdom for the year ended 1910 show that there are 2562 miles open; that the capital expenditure amounts to £73,941,659; that the number of passengers carried was 2,743,000,000, and that the net receipts were £4,945,787. The number of passengers carried during the year was equal to about 62 times the estimated population of the United Kingdom. Out of 2562 miles, 2429 miles are operated electrically. The mileage worked by means other than electricity has thus diminished to 133 miles. Of the 300 tramway undertakings, 176 belong to local authorities and 124 to companies. The net receipts of local authorities who work tramway undertakings belonging to them or leased from other local authorities amounted to £3,600,191, and £1,111,888 was applied toward reducing tramway debt and £346,274 in relief of rates. The sum of £761,646 was carried to the reserve and renewal funds.

The capital necessary to construct an electric tramway from Torquay to Paignton has been subscribed and the work will be commenced immediately. The work of converting the surface contact system to the overhead system on the Torquay Tramways has been commenced.

One of the most interesting reports that have been published recently is the third annual London traffic report, by the Board of Trade. This is a most comprehensive document. It deals not only with the traffic in London, but the suggested making of many miles of new streets and roads in and about London. The report considers that on the completion of the present London tramways further tramway extension and the acceleration and multiplication of existing services will be practically impossible, and it is recommended that 100 miles of new roads and 25 miles of old ones be reconstructed to facilitate tramway traffic. The report is considered editorially in this issue.

The City Council of Coventry has been considering a report of the general purposes committee on the question of acquiring the Coventry Electric Tramways, Ltd., and has decided in favor of acquiring the property so that hereafter the tramways will be operated by the municipality. Coventry has had a tramway system for about 30 years. A large extension was made about seven or eight years ago. A considerable amount of money will have to be spent on the existing lines and in extending the service to new districts.

At the half-yearly meeting of the London Electric Railway, which controls the Metropolitan District Railway and various tubes of the Underground Electric Railways, Lord George Hamilton, chairman of the company, stated that it had carried 46,662,000 passengers during the half year. This is a slight decrease, but is explained by the fact that through tickets are issued now, one passenger passing over three of the railways being counted as one passenger whereas formerly he was counted as three. The earnings for the last half year were £332,000, an increase over the six months of the corresponding period of the preceding year. Certain revisions of fares have been made owing to the amalgamation of the tubes, and the working expenses show a diminution of £4529, due mainly to the lower price paid now for current. It is proposed to replace the arc lamps in the stations by incandescent lamps, which have been found to be more effective and cheaper. The passenger traffic showed very serious competition over the shorter distances. The long-distance traffic was very satisfactory, however, and the policy of the company is to link the distributing centers and to facilitate as far as possible exchange between the company's own lines and connecting lines. Accordingly a bill has been promoted in Parliament to ex-

tend the Bakerloo tube from Edgware Road to Paddington, the busy terminus of the Great Western Railway, which railway, during the earlier stages, would contribute annually toward the cost. A bill is also being promoted to provide a satisfactory physical connection between the various tubes and the District Railway at Charing Cross. It is proposed to extend the Hampstead line with a loop, and to arrange a physical connection between the platforms of the Hampstead line, the Bakerloo line and the District Railway. To do this an escalator will be installed. At present the power house at Lots Road can produce more current than is consumed, and the company is endeavoring to secure power to sell current to companies with which it connects. Authority will also be asked to incur expense in connection with omnibus and other road vehicles, as they have been found convenient in increasing the traffic at isolated stations. A bill has also been deposited in Parliament by the District Railway for power to incorporate a joint committee of the railway and the London Electric Railway to purchase the Lots Road generating station of the Underground Electric Railways from which both railroads take current.

The London United Tramways, Ltd., seems to have turned the corner. The receipts and profits declined for some years, but now that the property has been taken over by the Underground Electric Railways and managed by Mr. Stanley the prospects are brighter. The gross receipts for the year amounted to £333,659, and the working and general expenses, maintenance and repairs to £234,211, leaving with the balance brought forward from last account the sum of £100,398. After payment of interest on debenture stock and loans for the year, and providing for income tax, there remains a balance of £30,814. The directors propose to place £30,000 of this to reserve fund for renewals and contingencies and to carry forward £814. The number of passengers carried during the year was more than 60,000,000, an increase of about 3,250,000, and the directors report a substantial increase in the passenger earnings, although the traffic was adversely affected by the extensive repairs to the permanent way. A new system of fares was inaugurated during the year, each penny stage being divided into three sections and passengers being permitted to travel over any three sections for a penny, four sections for three halfpence and five or six sections for 2d. This new system has resulted in additional traffic. More than 3500 rail joints were cast welded during the year and a number of crossing frogs and points were replaced. Nearly all the rolling stock has passed through the repair shops for complete overhauling and many important changes have been made in the power house, workshops and stores. A bill promoted by the company in the last session of Parliament for an extension of time to construct the tramway along Kew Road, Richmond, received the approval of Parliament, but as the work has not yet been carried out the company has promoted another bill for an extension of time for one year.

The municipalization of the Birmingham tramways, which dates from Jan. 1, 1907, is in two directions still incomplete. The City of Birmingham Tramways still holds the lease of the Bristol Road line, while the Handsworth Cable Tramway, as far as the city boundary at Hockley, though like the Bristol Road line owned by the corporation, is subject to an unexpired lease to the Birmingham & Midland Tramways. Both of these lines, however, will come into the hands of the corporation on June 30, 1912, when the leases expire. The Bristol Road line will be remembered as the subject of the first local experiment in electrical traction, the cars being operated by storage batteries. For a time the experiment seemed promising, but eventually the service degenerated until it became very inefficient.

It is anticipated that at the forthcoming half-yearly meeting of the London & Brighton Railway definite information will be given as to the intentions of the directors in reference to the scheme which has been under consideration for some months for the electrification of the main line between London, Brighton and Eastbourne. Experience gained from the working of the elevated railway between London Bridge and Victoria is said to have confirmed the impression that the electrification of the main line to the coast is not only quite practicable, but necessary, to cope with the growing seaside pleasure and residential traffic.

A. C. S.

News of Electric Railways

State Supreme Court of Pennsylvania Upholds Agreement Between Company and City in Philadelphia

The Supreme Court of Pennsylvania on Feb. 27, 1911, handed down a decision sustaining the validity of the contract entered into in 1907 between the City of Philadelphia, the Philadelphia Rapid Transit Company and the Market Street Elevated Railway. The suit was brought by Elmer E. Brode as a taxpayer of Philadelphia and came before the Supreme Court of Pennsylvania on Jan. 3, 1911, for argument on appeal from the decision of Judge Kinsey in Common Pleas Court No. 1, sustaining the validity of the agreement. The argument before the Supreme Court in Philadelphia on Jan. 3, 1911, was summarized in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 89. In sustaining the decision by Judge Kinsey, the Supreme Court said:

"The act of 1907 is very brief and its provisions are free from all ambiguity. It provides that a municipality may enter into a contract with a street passenger railway or motor power company leasing and operating the franchises and property of such other company within the municipal limits for the purpose of fixing and regulating the franchises, powers, duties and liabilities of such companies, and the rights of the respective contracting parties and by such contract a municipality may, inter alia, agree to accept from the company or companies fixed payments in lieu of the performance of certain duties or of license fees or charges imposed in favor of the municipality by general law or ordinance or by the charters of the respective companies.

"The municipality is further empowered to contract for the appointment of a certain number of persons to act as directors of the company or companies in conjunction with the directors elected by the stockholders thereof and for the ultimate acquisition by it, upon terms mutually satisfactory, of the leaseholds, property and franchises of the contracting company or companies.

"An act of Assembly is to be declared void only when it violates the Constitution clearly, palpably, plainly and in such manner as to leave no doubt or hesitation in the mind of the court passing upon its constitutionality.

"Tested by this rule, how can it be said that the act of 1907 is violative of the section of the Constitution referred to? In its 24 lines there is not to be found a word or clause that can be tortured into the expression of legislative intent that a municipality may become a stockholder in any company, association or corporation or obtain or appropriate money for or loan its credit to any corporation, association, institution or individual.

"The granting of a franchise to a street railway or to a motor power company leasing and operating the franchises and property of the other company necessarily involves a contract or agreement with the municipality granting the franchise for the purpose of fixing and regulating the same and defining the powers, duties and liabilities of the company and the respective rights of each of the contracting parties.

"This is all the first sentence of the act of 1907 provides for. The second empowers the municipality to contract for the payment to it by a street railway or motor power company of fixed sums in lieu of the performance of certain duties or of the payment of license fees or charges imposed in its favor by general law or ordinance or by the charter of the leasing or operating company. This offends against nothing in the Constitution.

"If, then, the Legislature had the clear power to enact these provisions because not forbidden to do so, it follows as a corollary that it had the power to direct that a municipality, in making its contract with a street railway or motor power company, may, for the protection of its rights under the contract, provide that a certain number of persons shall act as directors of the company in conjunction with the directors elected by the stockholders thereof, and the final clause empowering the municipality to contract for the ultimate taking back of the franchises which it granted and for its acquisition of the leaseholds and property necessary to the exercise of the same is not a provision

authorizing it to become a stockholder in a corporation or to appropriate its money for or loan its credit to a corporation."

Reply of Montreal Street Railway to City

The Montreal (Que.) Street Railway, through its president, E. A. Robert, has replied as follows to demands made by the Board of Commissioners of Montreal for the modification of the terms under which the company operates in Montreal:

"Regarding suggestions made verbally to us by you we beg to say as follows:

"1. An increased percentage on the gross earnings of the consolidated lines. We beg to refer you again to our communication of Jan. 11, 1911, wherein it is proposed to you to share the profits of the whole system with the city. We are still of the opinion that this system would be the most advantageous one, and would ask you to adopt it.

"2. Reduce rates for workmen and school children. We beg to point out first that in all cities of similar importance the rates are in most cases higher and in no case lower. Our minimum and average fares are at present the minimum on the continent, and any reduction could not be entertained. We have very carefully considered this question, owing to the fact that the annexations that have taken place and that are likely to take place in the near future will make it necessary to establish some radius from Place d'Armes Square where the present city fares will be maintained, and a basis of fares established for the outside radius, which fares could be reduced to the city fares so soon as justified by the traffic, as outlined in our communication of Jan. 11 and verbally confirmed to you to-day.

"3. Increase the headway from 5 to 3 minutes on all important routes, the question of importance to be decided by the Quebec Public Utilities Commission. This we have always and are still ready to concede as one of the conditions of a new contract.

"4. The company to provide seating accommodation for every passenger. These demands could not be considered by any company on this continent.

"5. The company to remove the snow from curb to curb on all the streets where it runs at its sole expense and under the supervision of the City Surveyor. We believe that a considerable saving in the snow removal expense could be made by carting away the snow in cars. The company would be prepared to undertake this carting at cost, the city to maintain the winter road and the total cost of carting and maintenance to be divided equally between the city and the company.

"6. The company permanently to pave at its sole expense one-third of the streets upon which it runs its lines, the paving to be done where the city decides to permanently pave its streets.

"7. The company to keep at its sole expense in good order the pavement from curb to curb on all streets where it runs its cars. As this involves the permanent paving and maintenance of all the principal streets of the city from curb to curb the company could not entertain this demand.

"8. The company to place in underground conduits within a radius to be decided upon by the Quebec Public Utilities Commission all feeders and return cables. The company will always be willing to be governed by Section 39 of the Statutes of Quebec, 9 Edward VII, Chapter 81.

"9. The company to construct and operate all new lines ordered from time to time by the Quebec Utilities Commission to meet the requirements of the public service. The company has always conceded and still concedes that this demand should be one of the conditions of a new contract.

"10. The company to suggest some methods whereby it will do at its sole expense the street cleaning, street watering and removal of garbage in all streets where it runs its cars. The company cannot suggest any method whereby it will undertake to do what is demanded, at its sole expense."

C. V. Weston Advocates a Traffic Commission

Charles V. Weston, president of the South Side Elevated Railroad, Chicago, Ill., is quoted by the *Chicago Post* as recommending complete public control of surface, elevated and subway lines in Chicago exercised through a commission of three men, one a lawyer, one an engineer and one a business man. Mr. Weston was reported to have said before the Chicago Real Estate Board that Chicago was not ready for "extensive" construction of subways, and to clear up this and other remarks which had been misinterpreted by the daily press he consented to an interview in the *Post*, which follows:

"As the matter appeared I had reversed myself on the subway question. That was not the case. I have thought out a set of principles that must be adopted in Chicago if the transportation situation is to be improved along proper lines, and I never deviate from those principles. Moreover, they are principles that are coming into general acceptance because they are sound business principles."

"Then Mr. Weston enumerated his cardinal points. The principles Mr. Weston vigorously championed are:

"Local transportation should be a monopoly; rival lines should consolidate and single management be established.

"The public should fix the capitalization of the single corporation, making watered securities impossible.

"The public should demand and receive best equipment, best service and the constant maintenance of the property.

"Estimated upon the exact cost of this service, fares should be adjusted on a zone system to provide a fair return on investment.

"Complete public control should be maintained through a commission of three members—an expert engineer, an able corporation lawyer and a high-grade man of affairs.

"At any time the city should have the right to take over the property from the investors by giving back their money.

"When these principles are recognized and adopted the transportation problem will be taken out of politics and placed upon a business basis. The public will have adequate transportation facilities operated as its own representatives shall direct. The investor will have a reasonable return upon his money. What rate should be regarded as reasonable I do not know. That could easily be settled if left to fair-minded business men.

"With the power to take over the property at any time the city, through its commission of three, would be in complete control of the situation. This commission should decide what was needed in the way of equipment, where cars should be operated and how often they should run.

"The South Side Elevated Road, in which \$20,000,000 is invested and which is operated efficiently, has made no profits to speak of in 15 years. It is being run as a charitable institution. But upon the basis I have suggested the investment would be stable and the management would have an incentive to do all in its power to give good service.

"Regarding subways, the transportation companies need more tracks downtown. These additional tracks cannot go on the surface; there is no room for them. I don't care whether the additional tracks are elevated or underground, but since the public seems opposed to more elevated tracks, I have no objection to subways. Subway construction is costly, and it would be criminal to advocate subways where there could be no return on the investment. For that reason a comprehensive system is out of the question now. But in the business center we have got to have more facilities to realize the capacity of the outlying portions of existing lines."

San Francisco's Municipal Railway

The public utilities committee of the San Francisco Board of Supervisors has recommended that an additional \$600,000 of municipal bonds for the reconstruction of the Geary Street, Park & Ocean Railroad as a municipal enterprise should be offered for sale. The action was taken upon notification from the city engineer's office of the Board of Public Works that \$600,000 would be needed so that the work on the municipal project may not be delayed. The proposals for early construction and the amounts to be ex-

pendent are as follows: Special track work, \$60,000; lands for power house and substation, \$140,000; cars, \$300,000; track construction and overhead work, \$300,000; construction of buildings, \$80,000; total, \$880,000. Out of the proceeds of \$500,000 of bonds already sold, \$218,000 has been set aside to cover part of the above estimates, leaving \$660,000 needed for immediate use.

The report of the above action has resulted in the following comment on the Geary street municipal project by the *San Francisco Chronicle*:

"The slowness of the municipal administration in carrying out the plans for the construction of the Geary Street Railroad is causing the people to look for the motive behind the delay. There is a strong suspicion that the plan of the politicians is to delay the actual work of construction until just before the next city election.

"It is true that the next step in the financial plans calls for an issue of \$600,000 bonds, but apparently no steps have been taken to be ready to use this money when it becomes available. It is needed for cars, power house and power equipment, and real estate for the power house, but the Board of Works has not yet reported that the specifications for this part of the work are even '1 per cent complete.'

"Some of the rails are reported ready for delivery, but as the ties, tie rods, fish plates and so on have not yet been ordered, it has been decided to store the rails on their arrival in this city for six months, which, by the way, brings us to just about the critical period of August 1, or three months before the electorate of San Francisco will choose another Mayor. Possibly then the municipal line will be a world beater for activity, bar none. Just at present the expectant patrons are wondering if the plans for the cars are not ready because the bonds are not sold, or if it is that the bonds are not sold because the plans for the cars are not ready.

"The exact status seems to be: Rails ready for delivery; \$230,000 available for ties, bolts, tie rods, fish plates and overhead equipment, and no money nor plans for cars, power house or power equipment."

Municipal Ownership Measure in Detroit

Corporation Counsel Hally, of Detroit, completed the draft of a bill to amend the home rule law of Feb. 23, 1911, and sent copies to members of the Michigan League of Municipalities for consideration. This bill provides that amendments may be made to the charter of a city without a general revision of that instrument, as now required by law. The proposed change will allow the city of Detroit, and other cities as well, to submit the question of municipal ownership of the street railway system to a vote of the people and so place the city in a position to name the terms upon which a new grant will be made. The bill follows the action taken by the Michigan League of Municipalities at a recent meeting held in Detroit. Mayor Thompson, of Detroit, Corporation Counsel Hally and officials of many other cities will be present at a general hearing on the question of amending the home rule law before the committees of the Legislature at Lansing on March 1, 1911. Alderman McCarty submitted a resolution to the Common Council on the evening of Feb. 21, 1911, providing that the question of the election of a charter commission should be submitted to the people, so that in the event of failure of the proposed amendment before the Legislature an election of members of the commission may be held as soon as possible.

Toledo Transit Affairs

The City Council of Toledo on Feb. 20, 1911, adopted a resolution demanding payment by the Toledo Railway & Light Company of its share of the pavement cost on Broadway between Colburn Street and St. James Court, amounting to \$9,979.36, with interest since Oct. 30, 1910. Director of Public Service Cowell had reported to the Council that he was unable to collect the amount.

A resolution has been presented to the Council calling upon every newspaper in the city to present proofs of charges made by the *Toledo Blade* that members of that body were not endeavoring to secure 3-cent fare, and were

not supporting Mayor Whitlock. The *Blade* intimated that the Council was awaiting the result of the veto on the Geleerd bill which would provide for municipal ownership.

Cornell Schreiber, city solicitor of Toledo, appeared before the house committee on cities at Columbus on Feb. 20, 1911, to support the Geleerd bill. Among other things he said: "If Toledo had the right to own its street railway system it could compel the street railway to accept a franchise that we think is fair."

Mr. Schreiber insisted that the City Council of Toledo had indorsed the bill. Representative William Riddle suggested that a vote of two-thirds of the electors of a municipality be required for municipal ownership instead of a majority, and both the author of the bill and Mr. Schreiber agreed to an amendment to this effect. William Kirby, Toledo, opposed the bill. He objected to the clause which makes it unnecessary for the city to secure the consent of owners of abutting property when lines are to be extended. He recalled the failure of the attempt of the city to operate a municipal gas plant, and said that the people are still paying interest upon the debt incurred at that time. Attorney George W. Seiber, Akron, representing the Northern Ohio Traction & Light Company, also opposed the bill.

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., March 8.

Central Electric Accounting Conference—Springfield, Ohio, or Youngstown, Ohio, March 11.

Illinois Electric Railway Association—Bloomington, Ill., March 17.

Street Railway Association of the State of New York—Syracuse, N. Y., March 21 and 22.

American Railway Engineering & Maintenance of Way Association—Chicago, March 21-23.

New England Street Railway Club—Boston, Mass., March 23.

Central Electric Railway Association—Columbus, Ohio, March 23.

Southwestern Electrical & Gas Association—Houston, Tex., April 27, 28 and 29.

Iowa Street & Interurban Railway Association—Davenport, Ia., April.

Missouri Electric, Gas, Street Railway & Water Works Association—St. Louis, Mo., April.

Annual Banquet of New England Street Railway Club.—The eleventh annual banquet of the New England Street Railway Club will be held at Hotel Somerset, Boston, Mass., on the evening of March 23, 1911.

Oakland & Antioch Electric Railway.—The Oakland & Antioch Electric Railway has been completed and placed in operation between Bay Point and Concord, Cal., the first eight miles of the route to Oakland through the Contra Costa Hills.

American Electric Railway Manufacturers' Association.—In accordance with action taken at the last meeting of the executive committee of the American Electric Railway Manufacturers' Association, the association has established headquarters in a new office at room 1002, City Investing Building, 165 Broadway, New York, N. Y.

Power Brakes in Ohio.—Attorney General Hogan, of Ohio, has rendered an opinion to the State Railroad Commission to the effect that it has power to enforce the law passed by the last Legislature which requires that all cars of street and interurban railways shall be equipped with power brakes. The law went into effect on Jan. 1, 1911.

Strike on Pottsville Suburban Line.—Employees of the Schuylkill & Dauphin Traction Company, Pottsville, Pa., went on strike recently to enforce the reinstatement of a motorman who had been discharged by the company for insubordination. The places of the men who struck were filled promptly and the service was not seriously affected.

The Public Side of Street Railroading.—The Portland Railway, Light & Power Company, Portland, Ore., is reprinting in installments in the daily press of Portland the paper, "The Public Side of Street Railroading," presented

by Patrick Calhoun, president of the United Railroad of San Francisco, Cal., at the meeting of the American Electric Railway Association at Atlantic City, N. J., Oct. 10-14, 1910.

Power House Ordinary Realty.—The Appellate Division in New York has decided that the Interborough Rapid Transit Company must pay taxes on its power house and substations on an assessment of \$4,970,000 for 1904 and \$5,969,000 for 1905. Asserting the power houses were part of the railway equipment, the company refused to pay this tax. The court says the power houses are taxable as ordinary realty.

Toledo Situation.—Charles A. Thatcher has asked Mayor Whitlock to appoint a committee to consider his suggestion that a company with a capital stock of \$5,000,000 should be formed to bid for the street railway franchise in Toledo. He favors taking over the property of the Toledo Railways & Light Company, however, if the Geleerd bill to allow the city to purchase and operate the system should be passed.

Brooklyn Rapid Transit Entertainment.—The tenth annual concert, drill and dance of the Brooklyn Rapid Transit Employees' Benefit Association was held recently at Prospect Hall, Brooklyn. About 4000 persons were in attendance, more than 2000 of whom are estimated to have been employees of the Brooklyn Rapid Transit Company. A concert was given by the band composed of employees of the company.

Fender and Wheel Guard Tests in St. Louis.—The Board of Public Improvements of St. Louis, Mo., expects to begin a series of tests of car fenders and wheel guards on March 27, 1911. The board intends to invite those interested to submit fenders for the test. The tests will be in charge of Francis J. Cutts. It was expected that the rules to govern the tests and other general information in regard to them would be ready for distribution by March 1, 1911.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

California.—A slight error in the enrolment of Senate bill 244, giving San Francisco the right to use any tracks belonging to the United Railroads and any streets occupied by that corporation, has invalidated the measure after it has passed through both houses and been signed by the Governor. The first two words, "An act," were omitted, and the title of the measure as enrolled reads: "To amend section 499 of the civil code of the State of California relating to the use of the same street or tracks by two lines of street railway." Senator Burnett, of San Francisco, who introduced the bill, says that he will present it again. The law intended to be enacted by the bill provides that any incorporated city, city and county or town may own and operate street railways within or without the municipal limits and may occupy the same street or tracks occupied or used by any street railway within its limits upon payment to such company of an equal portion of the estimated cost of construction. The city is also permitted to construct tracks of a different gage in conjunction with the company's tracks. Senator Finn's bill which gives to San Francisco the right to build a municipal street railway over East Street, from the Presidio to Hunter's Point, has been passed in the Assembly without a dissenting vote and is now ready to be sent to the Governor. The bill was amended before final passage merely to provide against the possibility of San Francisco transferring the grant. Assemblyman Brown has introduced a bill which requires railways not to permit a car or train to depart from a terminal unless the carrying and seating capacity is 10 per cent greater than the number of passengers.

Indiana.—An agreement concerning the block signal system to be required on interurban railways has been reached in the committee of the Senate on railroads. The bill has been amended so as to require the Railroad Commission to yield its point in holding out for compulsory installation of automatic block signals. Other systems will be permissible under the amended bill reported favorably. The Senate has passed the following bills: To compel electric railways to erect suitable stations in cities; to regular stops; to authorize railroads to acquire stock in traction company terminals. The House has passed the

bill to make it unlawful to employ any person to operate a car on an interurban railway unless he has had one year's experience in steam or interurban service as prescribed in the book of rules adopted by the Railroad Commission, and has also passed the bill to confer on the Railroad Commission power to require the attendance of interurban railway operatives at conferences called by the commission.

Ohio.—The Winters public utilities bill was originally referred to the railroad committee, but Judge Winters, the author of the measure, finally had the bill referred to the House code committee, of which he is chairman. Representative Edwards has introduced a bill which provides that where a street railway follows a route less convenient than the most direct line between terminals it may be shifted to other streets by a resolution of the City Council and without the consent of the owners of abutting property. This measure is designed to allow the Cleveland Railway to build its line on Euclid Avenue instead of on Prospect Avenue.

Pennsylvania.—It will be some time before the administration measure providing for the displacement of the State Railroad Commission by a public utilities commission will be ready for introduction as a new bill is being drawn to meet the desires of Governor Tener and at the same time be constitutional. The following measures affecting electric railways are in committee and will hardly be reported out before March 15: To provide for taxation of real estate owned by corporations; to compel cars to be equipped with inclosed platforms; to prohibit trespassing on rights-of-way, railroads and railways; to repeal State police; to provide for examination and licensing of engineers; to provide that where any public service corporation neglects properly to perform any of its corporate functions, etc., suit may be brought to forfeit right to occupy public streets, etc.; to provide for the payment of wages every two weeks; to provide for the safety of employees by requiring periodical inspection of steam boilers, etc.; to provide for the collection of judgments by attachment execution against ways, etc.; to require suburban and interurban railways to equip their passenger cars with toilets; to govern outside advertising and advertising in common carriers; to require electric railways operating suburban or interurban railways to provide suitable waiting rooms at terminal stations and to equip all cars with toilets or water closets; to require proper appliances for the control of trailers by employees of the motor car; to protect the health and safety of employees of interurban, suburban and street railways; to provide an employer's liability act for injuries to employees; to give the right of eminent domain to electric light companies.

Senator Hunter has introduced a bill in the form of an amendment to the State Railroad Commission act to give the commission full power to enforce its orders and rulings. The commission under the new act would have the power to regulate the management of common carriers, fix rates, change routes, designate where transfers shall be given and fix the proportion of fare to be given each carrier where transfers are made between different corporations. Under the amendment no charter could be granted to a corporation desiring to be a common carrier without the approval of the commission; similarly, the purchase and holding of capital stock of one carrier by another or transfer of stock for purposes of collateral security could not be made without the approval of the commission. In case of accident the commission would have to be notified immediately. The bill also provides for branch offices of the commission in Philadelphia and Pittsburgh. Other bills have been introduced to permit municipal corporations to construct street railways and buy all equipment necessary to operate them and then lease to corporations for periods of years to be fixed by councils; to empower viewers to assess damages for grading streets on railroads and street railways; to provide that cities acquiring property shall take title in fee simple; to authorize municipalities to regulate animal and vehicle traffic by ordinance; to amend laws relative to city debt so that funding bonds shall be paid in annual installments, and creating bureaus of public utilities in departments of public safety and a bureau to have authority over street railways, gas, water and electric lines, telephone and telegraph companies and wire and cables; to authorize second-class cities to tax street railways, telegraph, telephone companies, etc., for general revenue purposes.

Financial and Corporate

New York Stock and Money Market

Feb. 28, 1911.

The fact that the Wall Street market is closely held by strong financial interests was demonstrated last week by the manner in which it withstood the blow administered by the Interstate Commerce Commission's adverse decision on railroad rates. There was of course a sharp break in prices and some liquidation, but at no time did the condition approach demoralization and the rush to sell was only momentary. Important financial interests held the market steady. The public took no part in the trading.

The bond market is hardly as strong as a few weeks ago, but money rates are easy. Quotations to-day were: Call, 2@2¼ per cent; 90 days, 3@3¼ per cent.

Other Markets

Tractions have shown a better tone in the Philadelphia market during the past week, although prices have advanced only fractionally. Sales of Rapid Transit have been fairly large, of the other issues rather light.

In the Boston market there has continued to be some movement in Boston Elevated and in the issues of the Massachusetts Electric Companies.

Kansas City Railway & Light and Series 2 of the Chicago Railways were the only traction issues that were offered in the Chicago market last week, and these only in small lots.

In the Baltimore market during the past week there has been some small trading in the shares of the United Railways Company, at about 17¼, and the usual moderate activities in the bonds of the company.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 21.	Feb. 28.
American Light & Traction Company (common).....	a290	a290
American Light & Traction Company (preferred).....	a106	a106
American Railway Company.....	a45	a44
Aurora, Elgin & Chicago Railroad (common).....	44½	a44
Aurora, Elgin & Chicago Railroad (preferred).....	85	a85¾
Boston Elevated Railway.....	a129	a129
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	71½	71
Boston & Worcester Electric Companies (common).....	9	a10
Boston & Worcester Electric Companies (preferred).....	40	40
Brooklyn Rapid Transit.....	78¾	78¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83½	83¾
Capital Traction Company, Washington.....	129	*129
Chicago City Railway.....	a190	*190
Chicago & Oak Park Elevated Railroad (common).....	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred).....	*7¼	*7¼
Chicago Railways, pteptg., ctf. 1.....	a93	a92½
Chicago Railways, pteptg., ctf. 2.....	a25	a23½
Chicago Railways, pteptg., ctf. 3.....	a10	a8½
Chicago Railways, pteptg., ctf. 4.....	a6	a5
Cleveland Railway.....	91½	a94
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Detroit United Railway.....	74	a71
General Electric Company.....	a154½	a153
Georgia Railway & Electric Company (common).....	a125½	a129¾
Georgia Railway & Electric Company (preferred).....	a87½	87
Interborough Metropolitan Company (common).....	19	19
Interborough Metropolitan Company (preferred).....	54	54
Interborough Metropolitan Company (4½s).....	78½	78½
Kansas City Railway & Light Company (common).....	a25	a25
Kansas City Railway & Light Company (preferred).....	*71	a72
Manhattan Railway.....	130¾	140
Massachusetts Electric Company (common).....	17	a17
Massachusetts Electric Companies (preferred).....	a88	a88
Metropolitan West Side, Chicago (common).....	a21	a20
Metropolitan West Side, Chicago (preferred).....	a67	67
Metropolitan Street Railway, New York.....	15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	71¾	71½
Northwestern Elevated Railroad (common).....	a22	*22
Northwestern Elevated Railroad (preferred).....	a62	*62
Philadelphia Company, Pittsburgh (common).....	53½	a53¾
Philadelphia Company, Pittsburgh (preferred).....	53½	a13½
Philadelphia Rapid Transit Company.....	a20	a20½
Philadelphia Traction Company.....	85	85
Public Service Corporation, 5 per cent col. notes.....	a96½	a96½
Public Service Corporation, ctf.....	106	a105½
Seattle Electric Company (common).....	a109½	a112
Seattle Electric Company (preferred).....	101	101½
South Side Elevated Railroad (Chicago).....	a69	a69
Third Avenue Railroad, New York.....	11	11
Toledo Railways & Light Company.....	8	a10
Twin City Rapid Transit, Minneapolis (common).....	110¾	a110
Union Traction Company, Philadelphia.....	a17½	a18
United Rys. & Electric Company, Baltimore.....	17¾	17¾
United Rys. Inv. Co. (common).....	47¾	47¾
United Rys. Inv. Co. (preferred).....	74¾	74
Washington Ry. & Electric Company (common).....	a35	35
Washington Ry. & Electric Company (preferred).....	a88	88
West End Street Railway, Boston (common).....	92	a92½
West End Street Railway, Boston (preferred).....	102½	a102½
Westinghouse Elec. & Mfg. Co.....	a70¾	69¾
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a120	a120

a Asked. *Last Sale.

Annual Report of Metropolitan West Side Elevated Railway

The Metropolitan West Side Elevated Railway has issued its pamphlet report for the year ended Dec. 31, 1910. The earnings, expenses and income account for the years ended Dec. 31, 1910, and Dec. 31, 1909, follow:

OPERATING EARNINGS.		
	1910	1909
Passenger earnings.....	\$2,936,999	\$2,695,230
Other operating earnings.....	132,946	123,200
Gross earnings.....	\$3,069,945	\$2,818,430
OPERATING EXPENSES.		
Maintenance of way and structures.....	\$141,831	\$134,350
Maintenance of car equipment.....	173,927	165,172
Maintenance and operation of power plant.....	379,483	312,706
Conducting transportation.....	660,313	605,095
General expenses.....	96,323	103,348
Loop operation and maintenance.....	197,138	97,495
Total	\$1,556,015	\$1,418,076
Income from operation.....	\$1,513,929	\$1,400,354
Other income.....	8,770	11,100
Gross income.....	\$1,522,699	\$1,411,514
Interest first mortgage bonds.....	\$399,960	\$399,960
Interest extension mortgage bonds.....	161,320	161,216
Interest collateral loan.....	15,250	20,252
Interest equipment notes.....	.....	601
Other interest.....	.....	601
Miscellaneous rentals.....	37,048	37,048
Loop rentals.....	286,138	262,626
Taxes, car licenses and special assessments.....	180,252	180,893
Total charges.....	\$1,079,968	\$1,062,596
Surplus available for dividends.....	\$442,731	\$348,917
Dividends declared.....	261,237	.....
Balance carried to surplus.....	\$181,494	\$348,917

The statement of surplus for the fiscal year ended Dec. 31, 1910, follows:

Balance as of Jan. 1, 1910.....	\$1,580,624
Balance of surplus for year ended Dec. 31, 1910, as per income account	181,494
Total	\$1,762,118
Charged off for depreciation and losses.....	\$50,000
Surplus as of Dec. 31, 1910.....	1,712,118
Total	\$1,762,118

In presenting the report Britton I. Budd, president of the company, said in part:

"The increase in operating expenses was principally due to the normal increase in cost of carrying a greater number of passengers than the preceding year, to an increase in wage scale as per new agreement made with employees, to increased price paid for power-house fuel from April 1 to Sept. 1, during which time all mines in Illinois were shut down on account of the coal miners' strike. The total increase in operating expenses amounted to \$137,939.

"The proportion of operating expenses to gross earnings increased approximately $\frac{1}{3}$ of 1 per cent.

"The months of November and December show a very considerable falling off in traffic, which is accounted for principally by the widespread strike of men and women employed in the clothing industry. Notwithstanding this condition, traffic exceeded that of any previous year.

"The most gratifying feature of the increase in traffic is the continued development of travel in the reverse direction to the normal current during the rush hours, occasioned by the building up of many industrial plants on the western outskirts of the city adjacent to the lines of your company. On account of this distribution of the traffic, the greatly increased number of passengers were accommodated without an increase in the number of cars or additional capacity in power plant.

"Mileage operated during the year has been increased from 50.5 to 51.5, exclusive of sidetracks. Eighteen passenger coaches were converted to control cars; otherwise no changes or additions have been made to the equipment, there being 225 motor cars, 161 coaches, 101 control coaches and 17 miscellaneous cars.

"Total mileage increased one mile of main line single, and one-half mile of sidetrack, due to the construction of three tracks on the Douglas Park line from Forty-eighth Avenue to Fifty-second Avenue. This greatly improved conditions at the end of the line, furnishing storage room for 60 cars, and providing through service to the industries and residents in this locality.

"A new coal and material yard was constructed at Forty-

sixth Avenue on the Douglas Park line, with connections to the Belt Railway. This allows the storage of 10,000 tons of power-house coal, and provides for the economical handling of same and for the storage of track timber, rail, etc.

"During the year 13,471 ties were renewed, equivalent to $\frac{1}{2}$ miles of single track, complete, with wooden guard rails. Two hundred and forty tons of new 60-foot, 80-lb. rail were laid in tangent track, equivalent to 2 miles of single track. Nineteen thousand and forty-nine feet of steel structure, equivalent to 12,022 tons, were repainted during the year.

"Three hundred and seventy-four axles of the best heat-treated steel were installed under passenger coaches, replacing small axles. Three hundred rolled steel wheels were placed in service. Eighteen passenger coaches have been equipped with cabs and control apparatus on both ends. A large part of the car equipment has been equipped with ventilating devices, in accordance with the city ordinance.

"Dividends to the amount of 3 per cent on the preferred stock were paid during the fiscal year, payment being made quarterly. One hundred thousand dollars were paid on the collateral loan during the year, reducing same from \$300,000 to \$200,000."

The report contains the following traffic summary:

	Total Passengers.	Daily Average.
1907.....	54,280,888	148,715
1908.....	51,587,667	140,950
1909.....	52,519,609	143,889
1910.....	57,229,886	156,794

Philadelphia Refinancing Approved

The plan advanced by E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., some time ago, for refinancing the Philadelphia Rapid Transit Company, was approved at the meetings of the stockholders of the Philadelphia Rapid Transit Company and the Union Traction Company held on Feb. 28, 1911. Briefly the plan provides for an increase in the indebtedness of the company from \$5,000,000 to \$15,000,000, in accordance with the proposal as given in the ELECTRIC RAILWAY JOURNAL of Feb. 25, 1911, page 349. City Councils must approve the loan, which is to be guaranteed by the Union Traction Company, and the stockholders must deposit their stock with the Fidelity Trust Company, Philadelphia, Pa., before March 15, 1911, under an agreement whereby Mr. Stotesbury can create a voting trust.

The results of an audit of the financial condition of the company from July 1, 1902, to Dec. 31, 1910, made by Vol-lum, Fernley, Vollum & Rorer, Philadelphia, Pa., and addressed to Charles O. Kruger, president of the company, were placed in the hands of the stockholders of the company prior to the meeting on Feb. 28. The condensed balance sheet, as of Dec. 31, 1910, contained in this report, showed total assets of \$102,238,188, and liabilities of \$102,238,188. The report also contained a comparison of the passengers carried and the receipts from passengers for the last six months of the calendar years 1909 and 1910. The gain in passengers carried for the last six months of 1910 over the same period in 1909 was 12,486,898, and the gain in passenger receipts for the last six months of 1910 over the same period of 1909 was \$391,571.

Bonds Issued by the Ohio Traction Company to Finance Improvements

Stockholders of the Ohio Traction Company, Cincinnati, Ohio, voted on Feb. 24, 1911, to authorize the issue of \$2,500,000 5 per cent, 25-year gold bonds. Of the total amount authorized \$1,750,000 bonds have been sold to Drexel & Company, Philadelphia, Pa. The bonds are dated March 1, 1911, and interest is payable on March 1 and Sept. 1. The bonds are redeemable as a whole after five years on any interest date at 103. For purposes of the sinking fund the bonds are callable on March 1, 1912, or any interest date thereafter at 103. The sinking fund is designed to retire the entire issue at maturity.

The bonds are secured by mortgage on the traction building, Cincinnati, and on the stock of the Cincinnati Traction Company and the Cincinnati Car Company. The proceeds

of the bonds sold will be used to retire floating debt and to provide capital for betterments.

Among the improvements planned is the completion of the Pendleton power plant. The company will install an additional 6000-kw Westinghouse turbo-generator in this plant. It will abandon the Hunt Street plant as a generating station and will carry the current from the Pendleton plant at 66,000 volts and transform it at the substations. The completion of this improvement will eliminate the hauling of coal. The company will also abandon the Cumminsville power plant as a generating station and locate substation equipment at that point.

The company has acquired 12 acres of ground near the plant of the Cincinnati Car Company, which is located on Spring Grove Avenue, at Chester Park. Ground which it now occupies, adjoining the plant of the car company, will be used by the latter company. The railway company will build on its new land at Spring Grove and Mitchell Avenues a large car house with a capacity of 300 to 400 cars and new shops.

In connection with the issue of the bonds by the Ohio Traction Company the stockholders and directors of the Cincinnati Car Company have voted to increase the authorized stock, which has been \$100,000 to \$1,500,000. The stock of the Cincinnati Car Company is owned by the Ohio Traction Company.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.

It is reported that on Feb. 21, 1911, plans were discussed for the early reorganization of the Chicago & Milwaukee Electric Railroad and that a provisional agreement was made that all questions causing litigation should be decided by Judge Peter Grosscup without appeal from his decision. Attorney Levy Mayer, said to represent holders of \$4,000,000 of bonds of the Wisconsin Division, urged immediate foreclosure in order to end the litigation which is keeping the road in the bankruptcy court. He insisted that the choice of routes by which the road might enter the city should be settled by the owners of the road after the receivership had been closed. Another conference will be called by the court as soon as other security holders can be heard from in regard to the provisional agreement not to appeal from the decision of Judge Grosscup. It has been stated that so long as the road has no entrance for its cars into the heart of Chicago it will be difficult to operate it profitably and most of the bondholders desire an early reorganization so as to obtain terminal facilities.

On Feb. 23, 1911, W. O. Johnson, a director of the Western Trust & Savings Bank, was appointed operating receiver of the Chicago & Milwaukee Electric Railroad by Judge Peter S. Grosscup of the United States Circuit Court. The three former receivers, D. B. Hanna, George G. Moore and W. Irving Osborne, are to be retained by the court in an advisory capacity. In a statement issued by Judge Grosscup he said:

"The appointment of Mr. Johnson has no significance in determining by what route the Chicago & Milwaukee Electric Railroad shall get into the city. That question will be determined when the reorganization has been advanced, and will be largely, if not entirely, determined by the security holders themselves. But in view of this it was thought best not to select an operating receiver who had any personal interest in either of the proposed routes.

"Mr. Johnson was selected as receiver because of his experience in the Freeport Street Railway and the Strawboard and Boxboard receiverships. Mr. Johnson possesses the exact qualities that are now needed to bring the Chicago & Milwaukee Electric Railroad to a place where it can show what there is in it in the way both of earning power and as a public utility."

Central Park, North & East River Railroad, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has signed a decree of foreclosure under the consolidated mortgage of the Central Park, North & East River Railroad for \$1,200,000. The amount found to be due, which includes interest from June, 1908, is \$1,391,800. Isham Harris has been appointed special master to conduct the sale.

Detroit United Railway, Detroit, Mich.—Forster, Hotaling & Klinke, New York, N. Y., attorneys who claim to repre-

sent \$120,000 of the 4½ per cent bonds of the Detroit United Railway, asked the State Railroad Commission to enjoin the company from paying the dividend declared at a recent meeting of the directors. The commission, however, on Feb. 24, 1911, authorized the issue of \$1,078,000 bonds by the company. On the organization of the present company a mortgage was executed authorizing a bond issue of \$25,000,000. Of this amount \$15,880,000 were placed in escrow to retire underlying bonds, the remainder to be used for construction, betterments and extensions. J. C. Hutchins, president of the company, stated that the New York attorneys were mistaken in their conclusions, and that the issue will not affect former issues in the least. Since 1907 the earnings had all been used for betterments, the directors preferring this course to the issue of bonds. In 1910 earnings amounting to \$1,558,000 were used for betterments. This sum, however, was reduced to \$1,440,000 by the sale of the Woodward Avenue car house and one or two other items. The stockholders were entitled to a return on their investment. The stock amounted to \$12,500,000 and had never been increased. The company had outstanding \$1,500,000 in gold notes and the directors did not feel that dividends should be resumed until these were provided for, so it was proposed to have the stockholders subscribe for \$1,880,000 bonds held in the treasury at 82½ and to resume dividends. If a higher price can be secured for the bonds than 82½ they will be placed upon the market. The company under its mortgage can issue bonds to only 75 per cent of the amount spent for betterments. For this reason only \$1,078,000 could be issued in place of the expenditure of \$1,440,000 last year. The company has ordered cars at a cost of more than \$400,000 and has arranged for other improvements that will entail large expenditures.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—The Fidelity Trust Company, Baltimore, Md., as trustee, is offering for subscription at 99¼ and interest to yield 5¼ per cent, 5 per cent 3-year notes of the Fairmont & Clarksburg Traction Company of the issue of \$1,000,000 sold recently to the National City Bank, New York, N. Y. The notes are dated Feb. 1, 1911, and are due Feb. 1, 1914. They are convertible at the option of the holder into common and preferred stock on the basis of 70 per cent of the common stock at par and 30 per cent of the preferred stock at 85 for each \$1,000 note. The notes are secured by the deposit with the trustee of the entire outstanding capital stock of the Fairmont & Northern Railway, the entire outstanding capital stock of the Clarksburg & Western Railway and 76 per cent of the capital stock and \$466,000 of the \$600,000 of first mortgage 5 per cent bonds of the Fairmont & Mannington Railroad.

Kansas City Railway & Light Company, Kansas City, Mo.—The Metropolitan Street Railway, all of the capital stock of which is owned by the Kansas City Railway & Light Company, has sold to Lee, Higginson & Company, Boston, Mass., \$1,400,000 of consolidated mortgage 5 per cent bonds, dated May 12, 1895, and due May 1, 1913. The total authorized issue is \$7,500,000, of which \$7,243,000 is now outstanding, including the bonds now sold. The remaining \$257,000 is reserved to retire underlying division issues. The \$1,400,000 of bonds now issued are to refund the \$1,350,000 5 per cent first mortgage bonds of the Kansas City Cable Railway, which are due on April 1, 1911, and to reimburse the treasury for the \$50,000 paid in making the annual retirement of that amount of the 5 per cent bonds of the Corigan Consolidated Street Railway. The bonds were offered for sale at 99 and accrued interest to yield 5½ per cent.

Lawton & Fort Sill Electric Railway, Lawton, Okla.—On the application of E. E. Shipley, receiver of the Lawton & Fort Sill Electric Railway, J. T. Johnson, district judge, has authorized the receiver to dispose of the property at public sale at a time and place to be fixed.

Montreal (Que.) Street Railway.—A bill has been introduced in the Legislature at Quebec to authorize the incorporation of the Montreal Tramways Company, with a capital stock of \$20,000,000 in \$100 shares to merge the Montreal Street Railway and its subsidiary companies, namely, the Montreal Terminal Railway, the Montreal, Park & Island Railway and the Public Service Corporation, formerly the Suburban Tramway & Power Company, on terms subject to the consent of the Quebec Public Utilities Corporation.

Northern Ohio Traction & Light Company, Akron, Ohio.—At a meeting of the directors of the Northern Ohio Traction & Light Company, on Feb. 24, 1911, the proposal of W. E. Hutton & Company, New York, N. Y., and Cincinnati, Ohio, to purchase \$1,000,000 of the proposed issue of \$3,000,000 of 6 per cent cumulative preferred stock of the company was accepted. A stockholders' meeting has been called for April 15, 1911, to authorize the financing and approve the sale. The funds will be used to finance the development of its power stations and to improve the company's lines.

Rock Hill Water Supply, Electric Light & Street Railway Company, Rock Hill, S. C.—The city of Rock Hill has arranged to take over and operate the property of the Rock Hill Water Supply, Electric Light & Street Railway Company, which includes 1.5 miles of horse railway.

Sea View Railroad, Wickford, R. I.—D. F. Sherman, president of the Providence & Danielson Railway, Providence, R. I., on behalf of himself and his associates, is said to have secured control of the Sea View Railroad through the purchase of the majority interest in that company held by Andrew Radel, Bridgeport, Conn.

Somerset Water, Light & Traction Company, Somerset, Ky.—The sale of the property of the Somerset Water, Light & Traction Company under foreclosure on Jan. 16, 1911, to J. H. Gibson, Somerset, has been confirmed by the court. As announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 25, 1911, page 351, the United Water, Light & Traction Company has been incorporated as the successor to the Somerset Water, Light & Traction Company.

Toledo Railways & Light Company, Toledo, Ohio.—The annual report of the Toledo Railways & Light Company, Toledo, Ohio, shows that the gross income for 1910 was \$2,985,382 and the operating expenses, including maintenance, renewals and depreciation, \$1,868,600, leaving a net income of \$1,116,782. Deductions from the income were \$111,953.72 for taxes and \$814,427 for interest on bonds, or a total of \$926,380, leaving the net surplus \$190,401. A comparison with the figures of 1909 shows increases as follows: Gross earnings, \$252,204; operating expenses, \$241,262; net income, \$10,942; interest charges, \$36,140; surplus, \$327,553. All the directors except Jay K. Secor were present at the meeting on Feb. 23, 1911. The election of a chairman of the board was postponed indefinitely.

Dividends Declared

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent, common.

Louisville (Ky.) Traction Company, quarterly, 2½ per cent, preferred; quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

EAST ST. LOUIS SUBURBAN COMPANY.

Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Jan.	'11	\$188,724	\$103,010	\$85,714	\$45,236	\$40,478
1 " "	'10	188,193	103,039	85,154	45,153	40,011

ILLINOIS TRACTION SYSTEM.

1m., Dec.	'10	\$618,469	\$364,326	\$254,143	.....	.....
1 " "	'09	503,206	*289,044	214,162	.....	.....
12 " "	'10	6,216,104	*3,665,628	2,550,476	.....	.....
12 " "	'09	5,363,384	*3,063,491	2,299,892	.....	.....

HOUGHTON COUNTY TRACTION COMPANY.

1m., Dec.	'10	\$25,032	\$14,187	\$10,845	\$6,560	\$4,285
1 " "	'09	26,083	14,234	11,849	7,106	4,743
12 " "	'10	311,475	165,593	145,881	77,697	68,184
12 " "	'09	319,966	172,551	147,415	73,325	74,090

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1m., Jan.	'11	\$186,271	\$106,904	\$79,367	\$44,429	\$34,938
1 " "	'10	164,994	94,500	70,444	43,292	27,152

PORTLAND RAILWAY, LIGHT & POWER COMPANY

1m., Jan.	'11	\$511,624	*\$270,613	\$241,011	\$123,509	\$117,502
1 " "	'10	431,011	*201,888	229,123	109,152	119,971

UNION RAILWAY GAS & ELECTRIC COMPANY.

1m., Dec.	'10	\$294,154	*\$166,834	\$127,320	\$59,653	\$67,667
1 " "	'09	266,012	*174,397	111,615	57,090	53,925
12 " "	'10	2,981,711	*1,729,057	1,252,654	791,154	551,500
12 " "	'09	2,820,349	*1,550,889	1,269,460	691,190	578,270

WHATCOM COUNTY RAILWAY & LIGHT COMPANY.

1m., Dec.	'10	\$39,084	\$17,777	\$21,307	\$10,777	\$10,529
1 " "	'09	39,149	21,034	18,114	8,522	9,592
12 " "	'10	411,160	233,694	177,466	109,446	68,021
12 " "	'09	406,867	228,093	178,775	99,799	78,975

Traffic and Transportation

Strike of Employees of Connecticut Valley Street Railway

Seventeen employees of the Connecticut Valley Street Railway, Greenfield, Mass., resorted to the device of not reporting for duty on Feb. 16, 1911, as a means to force the company to reinstate five employees discharged for cause earlier in the month. The men discharged were told individually the reasons for which they were discharged.

Soon after the discharge of these men the company was waited on by a so-called committee of employees representing only a small portion of the men, who asked the company to reinstate the five men discharged. The plea was politely but firmly refused. Thereafter endeavors were made by the employees who visited the office and by outsiders to arouse public sympathy through mass meetings held in cities and towns through which the company operates. Committees purporting to represent these meetings afterward requested the officers of the company to submit the difficulty to arbitration. To all of these committees the answer was given that there was nothing to arbitrate; that the questions at issue were between the men discharged and the company; that the men had been discharged for cause, and that the evidence upon which their discharge was based was ample.

On the morning of Feb. 16 the places of the 17 employees of the company out of 105 who failed to report for their respective runs without any notice of their intentions were filled at once by men on the extra list, and barring two missed trips cars on all of the divisions have continued to run on schedule time. The company has suffered slightly from the malicious and unlawful destruction of property. The 17 men who did not report for duty on Feb. 16 have been discharged for insubordination and will not again be employed by the company.

Service in Atlanta

P. S. Arkwright, president of the Georgia Railway & Electric Company, Atlanta, Ga., has filed an answer with the Railroad Commission of Georgia in regard to the order of the commission to show cause why the service should not be improved and all-night service installed. Each line was taken up in turn by Mr. Arkwright, and the conditions which govern its operation are referred to in detail. The answer was concluded as follows:

"Respondent shows that it has been for a number of years and is now operating a limited all-night service. It operates one car, making a trip from the Southern Railway shops on Cooper Street along Cooper Street to Whitehall Street, from Whitehall Street to Alabama Street, to Broad Street, to Marietta Street, along Marietta Street to the Inman yards. This service was put on in order particularly to meet the needs of the railway trainmen who were required to report for duty or who left their duty between the hours of midnight and 5 o'clock in the morning. On this line a fare of 10 cents is charged. It is the route where the greatest need for such service exists. The receipts from this service have not been sufficient to pay the cost of furnishing it.

"The regular service on the lines of this company ends at approximately 12 o'clock midnight and begins at approximately 5 o'clock in the morning. On quite a number of the lines of the company an additional car is operated, leaving the center of town after midnight and in some cases as late as 1 a. m., and on a number of lines an early car is operated, leaving the center of town before 5 a. m. and in some cases as early as 4 a. m. These very late and very early extra cars serve practically the entire general territory of the City of Atlanta.

"After the hours when the car service stops practically all places of residence, business and amusement have closed. Of the few persons who are compelled to work after midnight nearly all continue at work until the car service is resumed in the morning. Any all-night service would necessarily have to be at infrequent intervals and for the persons who occasionally have to travel about at night, such as doctors, etc., this character of service would be of practically no use. Respondent says that there is no general need

for any additional all-night service in Atlanta and no general useful purpose to be served thereby.

"Respondent shows that there is no reason why lines should not be double tracked wherever needful to facilitate increased service provided such increase of service is reasonably necessary and upon condition that the right to double track such lines can be secured and that the streets are wide enough to permit double tracks and that the company has the funds with which to do it. There are, however, a number of instances where, although traffic justifies the double track, the street is too narrow to permit it. There are also other cases where the right to construct double tracks cannot be secured. It has been the policy of this respondent to double track its lines just as fast as the travel justifies it. The great bulk of the track construction work which the respondent has done has been in double tracking its lines and other work necessary for the furnishing of increased service."

A Bill to Standardize Pay-As-You-Enter Cars in Toronto

On Feb. 20, 1911, W. K. McNaught introduced a bill in the Ontario Legislature defining standard pay-as-you-enter cars and imposing a fine of \$100 a day for each car operated on what is known as the pay-as-you-enter system unless it conformed to the bill's provisions. The bill applies only to Toronto, as it is limited to cities of 100,000 population or more. According to the bill the car must have a rear platform at least 72 in. deep, with a folding step not less than 54 in. long. The rear platform must be inclosed and properly heated and provided with a door or doors having an aggregate width of at least 54 in., so arranged as to permit of the entrance and the exit of passengers at one and the same time. If there is a partition between the rear platform and the body of the car, such partition must have doors or openings so as to permit of the entrance and exit of passengers at one and the same time. The front platform must be inclosed and properly heated. It shall be provided with an exit door at least 30 in. wide and a folding step of the same width. If there is a partition between this and the body of the car it must be provided with an exit door or opening not less than 30 in. wide.

In the meantime the chairman of the Ontario Railway Board has rescinded the approval of the bylaw of the company allowing it to use prepayment cars. The solicitor of the company has said that it would appeal from the decision.

Lower Car Steps

E. C. Buckland, vice-president of the Connecticut Company, New Haven, Conn., recited as follows the conditions which govern the question of the height of electric car steps in a letter which he addressed recently to Mrs. John T. Sterling, Bridgeport, Conn., vice-president general of the National Daughters of the American Revolution:

"It is the desire of the management to make the steps satisfactory to patrons if it is possible to do so, but we find ourselves confronted with some conditions not of our making, but brought about by the development of the traffic. Among them are the following:

"During the last 10 years the public have demanded a larger, more easy-riding car than the small single truck cars which previously were the standard horse car; in fact, this demand has become so insistent that the single-truck cars are now an embarrassment to the company. Whenever they are used people complain on account of their size and their uncomfortable riding qualities. The large double-truck car, then, must be regarded as the present standard, with the tendency to increase still further the size and weight. With those large cars must, of course, come larger motors, which are geared directly on the axles. These motors must have sufficient space between the floor of the car and the ground to clear the surface of the pavement. Therefore, with the larger cars the floors have to be raised higher and consequently the passengers must climb a higher step in order to get into the car.

"I think you will see that we cannot lower the height of the floors. The question then becomes, can we not use two steps by which to get into the car? I suppose that no mat-

ter of car equipment has received more careful attention or more extensive experiment than the providing of two steps where one is now used. The experiments have been along two lines. One is to construct an additional step extending further out from the side of the car. That, in cities where the streets are broad and there is plenty of room between the curb and the track, answers admirably, but where the streets are narrow and wagons drawn up alongside the curb barely clear the cars, it is impossible to build steps which will project still further than do the present steps.

"The other plan is to cut a notch into the floor, and so let the second step in flush with the car. This avoids the trouble of providing a clearance, but it makes a pitfall for passengers who are getting off the car and is not recommended as good operation.

"This question of car steps is one which is receiving our very careful attention. We will apply a remedy as soon as we can find a practicable one, and our omission to do so at the present time has been due to our inability to find a solution, rather than to our indifference to the conditions.

"There should also be borne in mind the large expense attendant upon the alteration of all of the cars operated by the Connecticut Company, and the doubtful value of any such alteration when it shall have been completed."

Collision in Cleveland.—Twelve persons were injured on Feb. 14, 1911, in a collision between the Chicago and New York express of the Nickel Plate Railroad and a car of the Cleveland Railway at the crossing at Kinsman Road and East Sixty-fourth Street.

Whistle at Crossings.—The Public Service Commission of Maryland has ordered the Washington, Baltimore & Annapolis Electric Railway and the Maryland Electric Railways to instruct their motormen to whistle when approaching public and private crossings in the country.

Service Between Welland and Port Colborne.—On Feb. 18, 1911, the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., inaugurated a passenger and freight service between Welland and Port Colborne. The opening of the line was delayed until the company received permission to cross an intersecting steam railroad.

Service in Albany.—The Public Service Commission of the Second District of New York has set March 9, 1911, for a further hearing on the subject of service on the Pine Hills and West Albany lines of the United Traction Company, Albany, N. Y., to which reference has been made previously in the *ELECTRIC RAILWAY JOURNAL*. The company has been directed by the commission to present evidence at the hearing on March 9, 1911, concerning the financial relations of the company with other companies.

Complaint Against Buffalo & Lake Erie Traction Company.—The Trustees of Silver Creek have complained to the Public Service Commission of the Second District of New York against the Buffalo & Lake Erie Traction Company, alleging that under a schedule adopted Dec. 1, 1910, the service is irregular and at less frequent intervals than theretofore and that under the franchise granted the company it is required to operate cars daily each way at intervals of not more than 60 minutes, from 6 a. m. to 11 p. m., and that this service is of great importance to the business interests of the village.

Reduction in Fare by the New York & Long Island Traction Company.—The New York & Long Island Traction Company has notified the Public Service Commission of the Second District of New York that beginning March 1, 1911, it will reduce from 15 cents to 10 cents the fare charged on its line between Fulton Street, Brooklyn, and the Jericho Turnpike, Queens Borough, and Front and Main Streets in Hempstead. The lower rate was that fixed in the company's franchise and complaint of the higher rate being charged had been made by the West Hempstead, Hempstead Gardens & Lake View Association.

Ordinance to Limit Car Capacity in Pittsburgh.—Judges Marshall Brown, James R. Macfarlane and Thomas J. Ford, of the Allegheny County Court, have granted an injunction to prevent the City of Pittsburgh from enforcing the ordinance which it passed recently to limit the number of passengers to be carried on a car. The injunction was asked

by the company after the City Solicitor had notified the company that the city intended to enter 100 suits for violation of the overcrowding ordinance to recover the \$100 fine for each violation prescribed by the ordinance. The company declared the ordinance "unconstitutional, unreasonable, illegal and void." In granting the plea of the company the court said that no such law has ever been successfully enforced in this country, and that all attempts that had been made to enforce such regulation have failed.

Park Business at Allentown.—R. P. Stevens, president of the Lehigh Valley Transit Company, Allentown, Pa., refers as follows in the recent pamphlet report of the company for the year ended Nov. 30, 1910, to the amusement business of the company: "Your company controls an amusement and recreation park midway between Allentown and Bethlehem and the development of this enterprise has been the cause of a part of the increased passenger receipts. The park caters to an estimated population of 100,000 people with a 5-cent fare zone, and also benefits by many picnic parties from points between High Bridge, N. J.; Mauch Chunk, Portland and Philadelphia. The establishment of a good comic opera company in the park the past season proved a great success, and the present policy of providing high-grade entertainments and amusements and of affording frequent service assures continued success in this department."

New Schedule in Trenton.—Beginning Feb. 20, 1911, the Trenton & Mercer County Traction Company, Trenton, N. J., adopted a schedule that provides a one-hour headway to Princeton, a 15-minute headway to Lawrenceville, a 40-minute headway to Trenton Junction and a 30-minute headway to Yardville, with the same service as at present to Hamilton Square, Pennington and Hopewell. On West State Street, South Clinton and Hamilton Avenues there are six cars an hour, instead of seven, with nine cars in the morning and evening rush hours. Prospect Street cars continue on the old schedule of seven cars per hour through the day, with an increase to 10 during rush hours. On the Center and South Broad Street lines six cars are in service in the non-rush hours, with an increase of nine in the morning and evening, and on North Broad Street there are eight cars through the day, as against six formerly, with an increase to 11 in the rush hours.

Results with Prepayment Cars and Gates in Memphis.—T. H. Tutwiler, president of the Memphis (Tenn.) Street Railway, issued a statement recently in regard to the prepayment cars in use on the lines of that city and to the car gates in which he said in part: "The gates and the prepayment plan of collecting fares were inaugurated here after a careful study of systems elsewhere and, since their inauguration, they have accomplished the results hoped for. Chief among these is the prevention of accidents. In December, 1909, the falls from our cars amounted to 134, while in December, 1910, with the gates in service, they amounted to only 19, 17 of which were from the East End open trailers, which did not have the safety gates. So it may be said that as against 134 falls in December, 1909, the falls in 1910 on gate cars were reduced to two. The figures for January have not yet been tabulated. An annual comparison would show the prevention of more than 1000 accidents per year, many of which would be serious and some fatal. It would seem that the prevention of accidents should be of paramount consideration in the operation of street cars, and if the gates accomplish this result certainly the public is served. The prepayment plan of collecting fares enables the conductor to remain on the platform, which is certainly the station he should occupy looking to the safe operation of the car, in which position he is at all times in a position to see when passengers are safely on or off the car. It may be said that some of our cars which now have the gates are not such as we would design in case of new cars, and all future cars will have more commodious platforms to facilitate the present gate and prepayment plan system. Considering the results accomplished, there can be no doubt that the present method is a step in the right direction and that it is annually preventing hundreds of accidents and saving several lives, which is of paramount importance in the operation of every first-class street railway service."

Personal Mention.

Mr. G. R. G. Conway has been appointed chief engineer of the British Columbia Electric Railway, Vancouver, B. C.

Mr. William A. Koch, vice-president of the Owensboro (Ky.) City Railroad, has been elected president of the company to succeed Mr. John G. Delker.

Mr. W. O. Johnson, a director of the Western Trust & Savings Bank, Chicago, Ill., has been appointed operating receiver of the Chicago & Milwaukee Electric Railroad, Chicago, Ill.

Mr. Harry Flynn, who has been connected with the Georgia Railway & Electric Company, Atlanta, Ga., for some time, has been appointed auditor of the company, a newly created position.

Mr. Frank Mitchell, assistant cashier of the Georgia Railway & Electric Company, Atlanta, Ga., has been appointed cashier of the company to succeed Mr. I. S. Mitchell, who has been elected treasurer of the company.

Mr. J. W. McCrosky, manager of the operating department of J. G. White & Company, Limited, London, Eng., left London on Feb. 15, 1910, to go to Venezuela and Brazil on a business trip in connection with properties in those countries which are managed by J. G. White & Company, Limited.

Mr. W. R. Putnam has been appointed electrical engineer of the Dakota Power Company, Rapid City, S. D., in charge of the construction of the hydroelectric plants of the company on the Rapid River. Mr. Putnam was formerly superintendent of the Menominee & Marinette Light & Traction Company, Marinette, Wis.

Mr. I. S. Mitchell, Jr., has been elected treasurer of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed Mr. G. W. Brine, resigned, who continues as vice-president and secretary of the company. Mr. Mitchell's entire business career has been with the Georgia Railway & Electric Company, mainly in the capacity of cashier.

Mr. W. F. Towne, formerly general freight agent of the Pacific Electric Railway, Los Angeles, Cal., has been appointed general freight agent of the Pacific Electric Railway, Los Angeles-Pacific Company, and the Los Angeles & Redondo Railway in charge of the freight terminal business of the companies in Los Angeles. Mr. Towne has been connected with the Pacific Electric Railway four years, and before that was foreign freight agent of the Southern Pacific Company, with headquarters at San Francisco.

Mr. M. E. McCaskey, vice-president of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has resigned, effective March 1, 1911. Mr. McCaskey's connection with the company commenced at the time of the consolidation in 1906 when he was promoted from the vice-presidency of the Pennsylvania & Mahoning Valley Railway to the vice-presidency of the consolidated companies which formed the Mahoning & Shenango Railway & Light Company. No appointment of a vice-president was made by the company upon receipt of Mr. McCaskey's resignation.

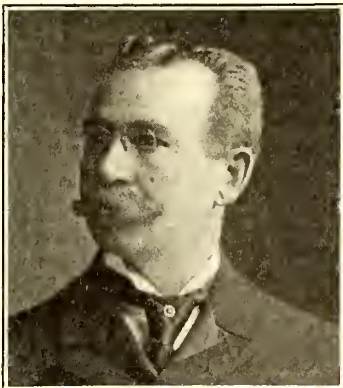
Mr. George E. Moffat, formerly general superintendent and consulting engineer of the British Columbia Electric Railway Company, Limited, of Vancouver, B. C., was appointed general manager and operating manager of the Richmond & Henrico Railway, Richmond, Va., on Feb. 1, 1911. This line is about 10 miles long and connects Church Hill, Richmond, with the business section of the city by a viaduct half a mile long, 96 ft. high and 42 ft. wide. The company is preparing to build some long extensions. Mr. Moffat has had a long experience in electric railway operation in this country and abroad and a biography of him was published in the *ELECTRIC RAILWAY JOURNAL* for Sept. 24, 1910, just subsequent to his resignation from the British Columbia Electric Railway.

Mr. F. W. Taylor has been appointed general purchasing agent of the Pacific Electric Railway, Los Angeles, Cal., with jurisdiction over the stores for the Pacific Electric Railway, Los Angeles-Pacific Company, Los Angeles & Redondo Railway, San Bernardino Valley Traction Company, Redland Central Railway, Riverside & Arlington Railway, Peninsula Railway, Fresno Traction Company, Stockton Electric Railroad and the Visalia Electric Rail-

road, all controlled by the Southern Pacific Company. Mr. Taylor has been connected with the Harriman interests for the last 22 years as supply agent and storekeeper; also as general storekeeper of the Oregon Short Line at Pocatello, Idaho, and for the last eight years he has also been general storekeeper of the lines of the Southern Pacific Company east of Sparks, Nev.

Mr. John I. Beggs, president of the Milwaukee Electric Railway & Light Company, of Milwaukee, Wis., announced his retirement from the presidency of that company last week. Mr. Beggs will remove about April 1 to St. Louis, where, as stated in the *ELECTRIC RAILWAY JOURNAL* for Feb. 18, he will take charge of the St. Louis Car Company, of which he has just been elected president and general manager. No successor to his position at Milwaukee has yet been appointed. Mr. Beggs has been identified with the management of public service corporations for many years, and is recognized as one of the leading and most forceful men in the electric railway and electric lighting industries. He is no stranger to manufacturing and selling enterprises, for twenty years ago he was Western manager for the old Edison General Electric Company. Since then he has been connected with electric lighting or electric railway companies in Cincinnati, St. Louis and Milwaukee. He took full charge of the predecessor of the present Milwaukee Electric Railway & Light Company in 1897. The property had then just emerged from bankruptcy, but Mr. Beggs has built it up until it is now recognized as one of the most prominent and successful of the combined central-station and electric railway companies of the country. Mr. Beggs was president of the American Electric Railway Association in 1906-07, and is a man of varied and extensive interests, as well as of remarkable versatility and of unshrinking courage. President James Campbell, of the North American Company, of New York, which is interested in the Milwaukee Electric Railway & Light Company, says that Mr. Beggs retires from the management of the Milwaukee company against the wishes of every one interested. He paid this tribute to the retiring president: "Mr. Beggs is an ideal executive of a great company. He is a wonderful executive; he has vision; he not only can tell others how to do things, he can do them himself. I never have known a man who combined so many qualities of leadership. He is an engineer, an administrator, an accountant and a financier. The Milwaukee Electric Railway & Light Company is a monument to his ability as a manager and his devotion to duty as a man." The Milwaukee papers unite in paying editorial tribute to Mr. Beggs' resourcefulness and ability as a man and as a railway manager and to the loss which Milwaukee will experience by the change. Even the *Daily News*, which in the past has been antagonistic to the company, said, in part: "In the resignation of John I. Beggs from the head of the Milwaukee street railway and lighting system, this city will lose probably the most dominant character of her history. Constructive, forceful, magnetic, of remarkable physical and mental energy, a driver and at the same time a leader, Mr. John I. Beggs is a man among men and one whom Milwaukee will miss, nor soon forget. In many ways Milwaukee is better for having Mr. Beggs as the head of its great public service corporation. His constructive force, his business imagination, as he called it, his tenacity and his great administrative ability have given Milwaukee a system that equals the best in construction quality and an operative service generally speaking of a highly satisfactory character."

Mr. Beggs became connected with the electrical industry in its early days, being manager of an electric lighting plant in Harrisburg, Pa., in 1884. After that he became connected with the Edison company, as stated. While retiring from the management of the Milwaukee property, Mr.



John I. Beggs

Beggs will retain his financial interest in the company and remain as one of the directors. He will also keep his interests in the Milwaukee financial and other institutions which he has acquired during his long residence in that city. Although expecting to make St. Louis his home, Mr. Beggs is also evidently planning to spend considerable time in Wisconsin, because he has just purchased a handsome country residence on an island located in Lac La Belle in the immediate vicinity of Oconomowoc, Wis.

Mr. E. W. Olds, superintendent of rolling stock Milwaukee Electric Railway & Light Company, has tendered his resignation, to take effect April 1, and will move to California, where he will live in the future. It is understood that Mr. Olds was anxious to retire from active service a year or more ago, but has remained in Milwaukee at the earnest wish of the company with which he has been connected, pending the completion of an order for 100 new pay-as-you-enter cars which are being built for that company by the St. Louis Car Company. These cars are now being delivered. Mr. Olds entered the service of the Milwaukee Electric Railway & Light Company in 1896. He was one of the organizers of the American Electric Railway Engineering Association and has always been prominent in the councils of that body. He served as president of the association in 1903-4.

Mr. W. H. Glenn, general manager of the street railway department of the Georgia Railway & Electric Company, Atlanta, Ga., has in addition been elected vice-president of the company. Mr. Glenn became connected with the engineering department of one of the constituent companies of the Georgia Railway & Electric Company after he was graduated from the Georgia School of Technology. Subsequently he served for several years in the shops. He next served as purchasing agent of the company. Later he was appointed superintendent of track and roadway, and in that capacity he had charge of most of the reconstruction work which followed the formation of the Georgia Railway & Electric Company and worked out many of the problems incident to the changes in the physical property which followed the consolidation. Mr. Glenn was appointed general manager of the railway department of the company in January, 1908.

Mr. A. E. Peters, who was elected secretary of the Detroit (Mich.) United Railway on Feb. 7, 1911, as announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 18, 1911, began his business career with the Michigan Central Railroad at Detroit, which he served for 10 years in the local freight, general freight and auditor's office. He resigned from the Michigan Central Railroad to accept a position with Winston & Meagher, Chicago, Ill., corporation lawyers, who at that time acted as counsel for the Michigan Central Railroad. Mr. Peters returned to Detroit in 1892. He was connected with the Detroit Gas Company for a year and entered the service of the Detroit Citizens' Street Railway in 1893 as stenographer and clerk. He was elected secretary of that company on March 28, 1895, and upon the organization of the Detroit United Railway on Dec. 31, 1900, he was elected assistant secretary of that company. He was also purchasing agent of the Detroit Citizens' Street Railway and the Detroit United Railway for about seven years.

OBITUARY

Frank S. Layng, a director of the Railway Steel Spring Company, New York, N. Y., and formerly a vice-president of the company, is dead. Mr. Layng was also president of the Illinois Zinc Company, Peru, Ill.

Joseph Wetzler, who was joint editor with Mr. T. C. Martin of the *Electrical World* in the later eighties and later of the *Electrical Engineer*, of New York, died in London on Feb. 22. He had been a resident of England for the past 12 years. He was 47 years of age.

R. H. Carpenter, formerly auditor and traffic manager of the Western Ohio Railway Company, Lima, Ohio, died at a sanitarium at Dayton, Ohio, on Feb. 23, 1911, after an illness of more than a year. Mr. Carpenter was a son of Mr. F. D. Carpenter, general manager of the company.

Robert Stewart, a division superintendent for the Chicago (Ill.) City Railway, is dead. Mr. Stewart was born in County Down, Ireland, in 1851, and came to the United States when 20 years old. He entered the service of the Chicago City Railway in 1873 as the driver of a horse car and became chief supervisor of the system in 1893.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Belleville & Western Railway, Belleville, Ill.**—Application for a charter has been made in Illinois by this company to build an electric railway in Belleville. Capital stock, \$2,500. Incorporators: V. J. Adams, Coulterville; John D. Vogt, T. W. Hofsemmer, Peter J. Gundlach and B. A. Gundlach, Belleville.

***St. Louis, Peoria & Northwestern Railway, Peoria, Ill.**—Incorporated in Illinois to build an electric railway from a point in or near Peoria through the counties of Peoria, Tazewell, Mason, Menard, Sangamon and Macoupin to a connection with the Macoupin County Railway, at a point about 2½ miles south of Girard. Capital stock, \$25,000. Directors: Marvin Hughitt, Chauncey Keep, Byron L. Smith and Baret Conway, Chicago; John V. Farwell, Lake Forest; William A. Gardner, Evanston, and John D. Caldwell, Oak Park.

***Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.**—Application for a charter has been made in Indiana by this company to take over the Fort Wayne & Wabash Valley Traction Company's property. Capital stock, \$8,000,000, half of which is common and half preferred stock. Officers: Henry J. Bowerfind, president; James Haberley, vice-president; Arthur H. Mohr, secretary, and Henry E. Vordemark, treasurer, all of Fort Wayne.

***United Water, Light & Traction Company, Somerset, Ky.**—Incorporated in Kentucky to take over the Somerset Water, Light & Traction Company. Capital stock, \$100,000. Incorporators: William Waddle, C. F. Smith, B. L. Waddle, A. A. Tuttle and M. O. Curd, all of Louisville.

Niagara Falls, Welland & Lake Erie Railway, Niagara Falls, Ont.—The Canadian Parliament has granted a charter to this company to build an electric railway to connect Niagara Falls, Welland and Port Colborne, with branches to Port Dover on Lake Erie, and to Fort Erie on the Niagara River opposite Buffalo. It is expected to begin construction in the spring. C. J. McLaughlin, Toronto, Ont., is interested. [E. R. J., Oct. 1, '10.]

***Woodlawn & Southern Street Railway, Woodlawn, Pa.**—Application for a charter will be made by this company in Pennsylvania to build a 7½-mile electric railway to connect Woodlawn, Aliquippa, Hopewell and South Heights. Incorporators: Alexander B. Sheppard, John L. Moore, Ralph E. Reymer, John W. Adams and Walter L. Copeland.

***Memphis & Rugby Railway, Memphis, Tenn.**—Application for a charter has been made by this company in Tennessee to build an electric railway between Chelsea Avenue, Memphis, and the new suburb, Rugby. Capital stock, \$50,000. Incorporators: E. H. Coapman, vice-president and general manager of the Southern Railway, Washington, D. C.; Charles T. Doerr, purchasing agent Birmingham Street Railway; Henry Wetter, Luke Seawell, Charlotte, N. C.; James H. Malone and W. J. Francis.

Dallas (Tex.) Street Railway.—Incorporated in Texas to build an electric railway in Dallas to connect at Garrett Avenue and Ross Avenue with the Dallas Consolidated Electric Street Railway and extend eastward 900 ft. over Ross Avenue to Henderson Avenue and north to the city limits. Capital stock, \$20,000. Incorporators George W. Works, W. Leslie Williams and A. C. Moser. [E. R. J., Sept. 3, '11.]

FRANCHISES

Burbank, Cal.—F. A. Halburg, representing the Pacific Electric Railway, has received a franchise from the Board of Supervisors to build its railway on Fourth Street in Burbank. This is part of the plan to build a 5-mile extension of its Glendale line to Burbank.

Los Angeles, Cal.—The Los Angeles Railway will ask the City Council for a franchise to operate a line on Fifty-third Street in Los Angeles.

Martinez, Cal.—The Oakland & Antioch Railway, Oak-

land, has asked the supervisors for a franchise along Ygnacio Valley Road to a point known as Castle Rock Gate.

East St. Louis, Ill.—The Southern Traction Company, East St. Louis, has received a franchise from the House of Delegates to use the upper roadway of the Municipal Bridge for a double-track railway and to operate its railway over certain streets in the downtown section of St. Louis.

Paris, Ill.—The Illinois Traction System, Champaign, has received a 50-year franchise from the Board of Aldermen to build an extension from Charleston to Paris. The Illinois Central Pacific Railway will build north from Paris to Chrisman and the Illinois Traction System is to build south from Danville to Chrisman. By use of the Illinois Traction System there will be through service from St. Louis to Buffalo.

***Veedersburg, Ind.**—Joseph Wamsley has asked the City Council for a franchise to build an electric railway over certain streets in Veedersburg.

Iola, Kan.—D. H. Siggins, J. J. Jones and associates have asked the City Council for a franchise to build an electric railway in Iola. This proposed railway will connect Chanute, Humboldt and Iola. A franchise has been received in Chanute. [E. R. J., Feb. 25, '11.]

Frederick, Md.—The Frederick Railroad has received a franchise from the Board of Aldermen to extend its railway in the southern section of Frederick.

***St. Louis, Mo.**—The St. Louis, Arcadia & Jefferson Railway has asked the City Council for a franchise to build a 2-mile electric railway in St. Louis to Carondelet Park and to connect Arloe, Gratiot and Lindenwood.

Trenton, N. J.—The Morris County Traction Company, Morristown, has received approval of the State Board of Public Utility Commissioners authorizing it to double-track its railway upon certain streets in Madison.

Amsterdam, N. Y.—The Fonda, Johnstown & Gloversville Railroad, Gloversville, has received a franchise from the City Council for an extension of its line in Amsterdam. The Public Service Commission, Second District, has approved of this franchise and authorizes this company to issue for construction purposes the balance of its 50-year first general consolidated refunding bonds for \$83,000, making a total with the amount previously authorized of \$463,000, all of which are to be sold at a price to be approved by the commission.

Buffalo, N. Y.—The International Traction Company has asked the Public Service Commission, Second District, for a certificate of convenience and a necessity for the construction of an extension on the Abbott road in Buffalo between Cazenovia Street and the city line of Buffalo, a distance of 1½ miles. This extension will connect with the Buffalo Southern Railway, and connect Buffalo with Hamburg, Orchard and that vicinity.

Lima, Ohio.—The Ohio Traction Company has received a 99-year franchise from the County Commissioners to extend its railway to the locomotive works, steel foundry and Gramm motor works in Lima and for the portion of the route lying outside of the city.

Youngstown, Ohio.—The Lake Erie & Youngstown Railway has received a franchise from the City Council to build its railway on Covington Street, Federal Street and West Front Street to Market Street in Youngstown. This projected railway will extend from Conneaut to Youngstown via Ashtabula, Trumbull and Mahoning counties. John H. Ruhlman, Youngstown, promoter. [E. R. J., Feb. 4, '11.]

Oregon City, Ore.—The Mount Hood Railway & Power Company, Portland, has asked the City Council for a franchise to build its railway through Oregon City.

***Burgettstown, Pa.**—W. G. Cramer, representing a company which proposes to build an electric railway to connect Burgettstown and McDonald, has asked the Borough Council for a franchise in Burgettstown.

Quakertown, Pa.—The Lehigh Valley Traction Company, Allentown, has received a franchise from the City Council to build its new short line in the vicinity of Quakertown, by which twenty minutes is to be saved in the trip from Philadelphia to Allentown. Plans for this work are about complete.

Chattanooga, Tenn.—The Chattanooga Railway & Light Company has asked the General Council for three franchises to build extensions in Chattanooga. One franchise provides for the principal streets of the west side of Chattanooga, another known as the Duncan ordinance provides for franchises over all the principal streets and another known as the James ordinance provides for lines over streets, most of which are at present without street railway facilities.

***Delavan, Wis.**—The Lake Geneva & Lake Delavan Electric Company has received a franchise from the City Council to build an electric railway in Delavan.

TRACK AND ROADWAY

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—This company has asked for bids on 5 miles of continuous circuit automatic signal blocking. The bids are returnable Feb. 25 at the office of H. U. Wallace & Company, Marquette Building, Chicago.

Central Illinois Public Service Company, Mattoon, Ill.—A 30-mile extension between Charleston and Paris will be built by this company during the present year.

Woodstock & Sycamore Traction Company, Sycamore, Ill.—Plans are being made by this company to build an extension to Marengo.

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—During 1911 this company will build about 21 miles of new line from Geneva, Ind., to Celina, Ohio, via New London, Ind., and Sheels Corner and Dearborn, Ohio.

Capital Circuit Traction Company, Indianapolis, Ind.—It is said that this company which is now surveying between Lebanon and Danville will use gasoline motor engines instead of electricity. It is expected eventually to extend the line to connect Danville, Martinsville, Franklin, Shelbyville, Greenfield, Noblesville and Lebanon. [E. R. J., Feb. 25, '11.]

***Ladoga, Ind.**—H. Kessler, Ladoga, and associates, are considering plans for the construction of a 10-mile electric railway between Ladoga and Jamestown.

Owensboro (Ky.) City Railway.—This company will extend its railway about a mile in Owensboro during the year.

***Winnipeg, Man.**—Messrs. Macdonald, Sullivan, Haggart and Tarr are said to be making plans and will soon apply for a charter to build an electric railway in Manitoba.

Washington, Frederick & Gettysburg Railway, Frederick, Md.—An application has been filed by this company with the Maryland Public Service Commission for the right to build an electric railway from Brentwood, Md., via Prince George's, Montgomery, Howard, Frederick and Carroll counties to the Pennsylvania line and then to Gettysburg. The company also asks the approval of the commission to issue \$100,000 of stock and, in addition, \$35,000 of bonds and \$6,000 of preferred stock at 6 per cent for each mile constructed.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—This company will build about 3½ miles of track during 1911 from the city limits to the cement plant.

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—This company has awarded the contract to the L. C. Smith Construction Company to build 28 miles of the proposed railway between Kansas City and St. Louis. Work will begin in the spring. D. C. Nevin, Kansas City, president. [E. R. J., Dec. 17, '10.]

North Carolina Public Service Company, Greensboro, N. C.—During 1911 this company expects to construct about 15 miles of track from Greensboro to High Point.

Pine Brook Electric Railway, Caldwell, N. J.—Construction will soon be begun by this company on its proposed 12-mile railway which will extend from the present terminus of the Public Service Railway's line in Caldwell, to Denville, where it will connect with the Morristown Traction Company's line, via West Caldwell, Pine Brook, Parsippany and Denville. S. William Kerris, Pine Brook, is interested. [E. R. J., Jan. 21, '11.]

Morris County Traction Company, Morristown, N. J.—About 12 miles of track will be built by this company during 1911. It will extend from Morristown eastwardly through Convent, Madison, Chatham and Summit, which will com-

plete connections with Elizabeth and the Public Service Railway, Newark.

Elmira Water, Light & Railway Company, Elmira, N. Y.—This company will build about a mile of new track in Elmira during the present year.

Jamestown (N. Y.) Street Railway.—This company has ordered steel rails for double-tracking its railway on Main Street and the building of the new line on Willard Street. Construction will be begun early in the Spring.

Lancaster-Buckeye Lake Traction Company, Lancaster, Ohio.—This company is making preliminary arrangements for building its proposed 20-mile electric railway to connect Lancaster and Buckeye Lake. John H. Littrell, Lancaster, is interested. [E. R. J., Feb. 18, '11.]

Columbus, Marion, Upper Sandusky & Toledo Traction Company, Marion, Ohio.—This company will begin the construction of its line from Upper Sandusky to Toledo in the near future. The people of Sycamore have been asked to take \$15,000 in mortgage bonds of this company. It will connect Marion, Tiffin, Upper Sandusky, Fostoria, Columbus and Toledo. Frank M. Ohl, Toledo, promoter. [E. R. J., Jan. 28, '11.]

Toledo, Port Clinton & Lakeside Railway, Toledo, Ohio.—Plans have been completed for the extension of the line owned by this company from its terminus at Marblehead to the sandbar on the south side of the peninsula, where a dock and waiting station will be built for the accommodation of boats between Marblehead, Cedar Point and Sandusky. The change will necessitate a bay ferry route.

Shawnee (Okla.) Electric Railways.—This company will build 40 miles of track to connect Oklahoma, McLoud, Harrah, Choctaw City, Spencer Muskogee and Spencer during 1911.

Sand Springs Interurban Railway, Tulsa, Okla.—Contracts will soon be awarded by this company for building its proposed 6-mile electric railway to connect Tulsa and Sand Springs. W. H. Henderson, First National Bank Building, Tulsa, chief engineer. [E. R. J., Feb. 18, '10.]

People's Railway, Berlin, Ont.—This company is applying for a Dominion charter on the ground that several of its proposed terminals are located at ports on international waters, such as Owen Sound, Collingwood, on the Georgian Bay; Port Dover and Port Stanley, on Lake Erie; Hamilton, at the head of Lake Ontario, and Goodrich, on Lake Huron. The company also seeks power to increase its capital to \$5,000,000 and to develop water powers for its own undertaking.

Grand Valley Railway, Brantford, Ont.—About 10 miles of track will be built during 1911 in Brantford by this company.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—The Port Colborne division of this company has been opened for traffic with a two-hour service until midnight. The railway is now in operation from Port Dalhousie to Welland.

Toronto & York Radial Railway, Toronto, Ont.—This company is considering plans for building a 14-mile extension to connect Richmond Hill and Stouffville.

Lane County Asset Company, Eugene, Ore.—The contract has been awarded by this company to the Roberts Engineering Company, Kansas City, Mo., for the construction of the 130-mile railway to connect Eugene, Florence and Coos Bay. It is said that the company has secured financial backing. John Baird, Eugene, secretary. [E. R. J., May 14, '10.]

Oregon Electric Railway, Portland, Ore.—It is said that this company will soon build an extension from Eugene to Salem.

Hummelstown & Campbellstown Street Railway, Hershey, Pa.—About 12 miles of track will be built by this company from Hershey, to Lebanon during the present year.

Johnstown (Pa.) Traction Company.—About 11 miles of new track will be built by this company between Mineral Point and Ebensburg during the present year.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—It is said that this company will double-track about a mile of its railway extending from Drogie Station, and will later double-track the entire section between Pittsburgh and Evans City.

Lake View Traction Company, Memphis, Tenn.—This company will extend its line from Lake View, Tenn., to Walls, Miss. The work will begin within 60 days. The directors of the company plan gradual extensions to connect with the principal towns of Northern Mississippi.

Cleburne (Tex.) Street Railway.—This company advises that it has completed and placed in operation its 7-mile electric railway in Cleburne. It expects to soon build a 3-mile extension to the park. Daniel Hewitt, Cleburne, president. [E. R. J., Jan. 14, '11.]

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—This company will place contracts for overhead material, 45-lb. rails and two-O round trolley wire, to be used in the construction of a mile extension. There will also be installed a switch about 100 ft. in length. V. S. Heinly, Corpus Christi, secretary.

San Antonio (Tex.) Traction Company.—This company will spend about \$250,000 in improvements on its railway during the year. It will extend and double-track some of its lines and enlarge its power plant. W. B. Tuttle, San Antonio, general manager.

Nooksack Valley Traction Company, Bellingham, Wash.—This company is having surveys made on the Guide-Meredian Road for its railway to Lynden. Th's proposed 20-mile electric railway will extend through the Nooksack Valley and connect Bellingham, Sumas, Ferndale, Lynden and Blaine. Samuel Alsop, Bellingham, is interested. [E. R. J., Dec. 17, '10.]

***Chamokane Contracting Company, Springdale, Wash.**—This company is being organized to build an electric railway between Springdale to a point on the Spokane River, where the Washington Water Power Company will erect a power plant.

Gogebic & Iron Counties Railway & Light Company, Ashland, Wis.—This company is making preliminary arrangements for building its interurban railway to connect Ironwood and Bessemer. The company has ordered 16,500 cross-ties and 2500 30-ft. cedar poles to be delivered before April 1. The company has opened an office in the Bank of Ironwood Building. F. D. Sullivan, Ashland, is in charge of the affairs of the company. [E. R. J., Dec. 24, '10.]

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company expects to build during the year one mile of single track for local lines and 4 miles of interurban railway between Eau Claire and Altoona.

SHOPS AND BUILDINGS

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has moved its offices to the third floor of the Fiske Building in Fresno. This new office will be permanent until the company's new building is erected in I Street.

Southern Pacific Railroad, Los Angeles, Cal.—Preliminary work has been started by this company on its new car house at Fourteenth Street and Franklin Street extending through to Webster Street in Los Angeles. It will be a four-story stone and steel structure. Awnings composed of a network of metals and supported by steel columns will serve as a protection to passengers. The cost is estimated to be about \$100,000. The company, it is said, will build a car house on Alhambra Avenue, in Los Angeles. The structure will be 160 x 200 ft. The cost is estimated to be about \$100,000.

Shore Line Electric Railway, New Haven, Conn.—This company has purchased a tract of land 500 ft. square on Middletown Avenue in New Haven for a terminal building which will soon be constructed. This is near the junction with the lines of the Connecticut Company at State Street and Ferry Street.

Mason City & Clear Lake Railway, Mason City, Ia.—A fire in this company's car house at Mason City recently destroyed five motor cars. The loss is estimated to be about \$10,000.

Aurora, Elgin & Chicago Railway, Chicago, Ill.—This company is considering plans for building a three-story and basement building to be used for its railway offices in Wheaton.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—The Board of Public Works has con-

firmed the action of the City Council to vacate Cherry Street between Eighth Street and Ninth Street, thus granting the Terre Haute, Indianapolis & Eastern Traction Company a site on which to build a new terminal station.

Springfield (Mo.) Traction Company.—This company will build a new car house on Boonville Street, in Springfield. The structure will cost about \$50,000 and will necessitate the total razing of the building now occupied by this company. W. A. Bixby, general manager.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—Work will be begun at once by this company on a new terminal at Coney Island. The structure will be two stories high, of steel framework and brick construction. The improvements will include a restaurant 50 ft. x 200 ft. on the second floor and back of that a car shed 150 ft. x 150 ft. On the rear will be an automobile garage 170 ft. x 200 ft., facing Fifth Street. A feature of the building will be the utilization of the entire roof space for amusement enterprises.

Ohio Traction Company, Cincinnati, Ohio.—The stockholders of this company at a recent meeting ratified the action of the directors in authorizing a bond issue of \$2,500,000, the proceeds of which will be used for the construction of new houses at Winton Place and other improvements.

Portland Railway, Light & Power Company, Portland, Ore.—Plans are being formulated by this company for building a new car house on a tract of land bounded by Holgate, Milwaukee and Rhone Streets, and the Southern Pacific shops on the East Side in Portland. The cost is estimated to be about \$300,000.

Wheeling (W. Va.) Traction Company.—A frame structure to be used as a waiting room is being built by this company at First Street in Benwood.

POWER HOUSES AND SUBSTATIONS

Public Service Corporation, Newark, N. J.—This company has ordered station and substation apparatus from the General Electric Company as follows: For the City Dock station, a switchboard and regulators; for the Coal Street station, a switchboard; for the Paterson station, transformers and switchboard; for the Passaic substation, transformers, regulators and switchboard; for the Marion station, a switchboard; for the Metuchen station, a switchboard; for the Garfield Avenue substation, oil switches and switchboard apparatus; for the Hudson River substations, constant current transformers, high voltage lightning arrester equipment; for the Trenton station, induction regulators and switchboard apparatus; for the Rutherford substation, a constant current transformer and switchboard; for the Englewood substation, constant current transformers and switchboard; for the New Brunswick substation, high voltage lightning arrester equipment and switchboard apparatus; for the Rahway station, high voltage lightning arrester equipment and switchboard apparatus; for the Lincoln substation, switchboard apparatus; for the Plainfield station, switchboard apparatus; for the Montclair substation, switchboard apparatus, and for the Plank Road substation, feeder regulator and switchboard apparatus.

Third Avenue Railroad, New York, N. Y.—This company has issued specifications for one 1500-kw rotary converter and three 550-kw transformers.

Dayton & Troy Electric Railway, Dayton, Ohio.—It is reported that this company will reconstruct its power plant at Tippecanoe City and build a new substation near Dayton and another near Piqua, in the near future. R. A. Crume, Tippecanoe City, purchasing agent.

Toledo & Western Railroad, Toledo, Ohio.—This company is preparing to spend about \$75,000 in improving the property and making additions to the power facilities this year. The company is controlled by the Toledo Railways & Light Company.

Dominion Power & Traction Company, Hamilton, Ont.—This company will add to its plant during 1911 the following: At its power house in Hamilton a 6400 kw a.c., 2400-volt generator and 7100-hp turbine; at its Hamilton substation an 8000-kw capacity Westinghouse rotary, and at its Brantford substation a 3000-kw capacity Westinghouse rotary. W. C. Hawkins, Hamilton, general manager.

Manufactures & Supplies

ROLLING STOCK

Public Service Railway, Newark, N. J., is building 15 passenger cars in its own shops.

Du Bois Electric & Traction Company, Du Bois, Pa., is in the market for one freight and express car.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex., is in the market for one 32-ft. motor car.

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah, has ordered 10 56-ft. interurban trailer cars from the Niles Car & Manufacturing Company.

Eastern Pennsylvania Railway, Pottsville, Pa., has ordered through the J. G. White Company from the General Electric Company three complete G.E.-90 four-motor equipments.

Oakland (Cal.) Traction Company has ordered 60 passenger cars, with Brill single-motor forged frame trucks and GE-210 motors and air-brake equipment, from the St. Louis Car Company.

Interstate Traction Company, Duluth, Minn., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, as being in the market for two double-truck motor passenger cars, has ordered these cars from the Danville Car Company.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont., has placed an order with the Canadian Car & Foundry Company for six "Simplex" self-clearing cars equipped with M.B.C. draft rigging and Westinghouse air brakes.

Wilkes-Barre (Pa.) Railway, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, as being in the market for 20 additional passenger cars, has ordered these cars from The J. G. Brill Company. The cars are to be 48 ft. long and will be mounted on Brill 27-E-1½ trucks.

Quebec Railway, Light, Heat & Power Company, Quebec, Que., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, as being in the market for 10 single-truck car bodies, has ordered these car bodies from The J. G. Brill Company. This company also reports that it is in the market for 75 coal cars.

Washington Water Power Company, Spokane, Wash., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, as having ordered 25 pay-as-you-enter cars from The J. G. Brill Company, has specified the following details for these cars:

Type of car,	Fare boxes	Brill
single-end pay-as-you-enter	Gears and pinions..	G. E. Co.
Seating capacity.....	Gongs	Dedenda
57	Hand brakes.....	vertical
Bolster centers, length..	Heating system	Cons.
26 ft.	Headlights	A. & W.
Length of body.....	Journal boxes	Symington
38 ft.	Push button signal....	Brill
Over vestibule.....	Sanders.	O. B.
51 ft.	Sash fixtures	Edwards
Width over sills..	Seats	Brill
8 ft. 2½ in.	Seating material	cane
Over posts at belt... 8 ft. 6 in.	Side bearings	Brill
Body	Springs	Brill
wood	Step treads	Mason
Interior trim	Trolley base....	U. S., No. 13
ash	Trucks	Brill 27E-1
Underframe	Ventilators	Brill
wood	Wheels..	Midvale rolled steel
Air brakes... Gen. Elec. Co.		
Bumpers....		
Brill angle iron		
Car trimmings		
bronze		
Center bearings ..		
Symington		
Couplers		
Brill		
Curtain fixtures ...		
Forsythe		
Curtain material... Pantasote		
Destination signs		
Hunter		

TRADE NOTES

Rail Joint Company, New York, N. Y., has moved its Chicago office to Room 215, Railway Exchange Building.

Allis-Chalmers Company, Milwaukee, Wis., has appointed F. C. Bryan general traffic manager of the Milwaukee office.

F. W. Miller Heating Company, Chicago, Ill., has moved its Chicago office from the Railway Exchange Building to the McCormick Building.

John R. Cole Company, Los Angeles, Cal., agent for W. N. Matthews & Brother, has moved its offices to 551 South Los Angeles Street.

Buckeye Jack Manufacturing Company, Alliance, Ohio,

on account of its large increase in business, has increased its capital stock from \$30,000 to \$50,000.

Frank J. Walsh has accepted a position with the Chicago Pneumatic Tool Company. Mr. Walsh has been general foreman of the Chesapeake & Ohio Railroad.

John S. Leake has recently accepted a position with the Pneumatic Jack Company. Mr. Leake was formerly connected with the Manual Training School, Louisville, Ky.

National Car Coupler Company, Attica, Ind., has opened offices in the McCormick Building, Chicago, Ill. W. A. Ruth, sales manager of the company, will be in charge of this office.

McKeen Motor Car Company, Omaha, Neb., has received an order from the Oregon Short Line for four 70-ft. motor cars and an order from the Oregon Railroad & Navigation Company for one 70-ft. car.

Railway Steel-Spring Company, Chicago, Ill., has elected H. K. Devereux, George B. Motheral and Charles Scott, Jr., directors of the company to succeed Julius E. French, Philo N. French and George G. McMurtry.

H. A. Strauss, vice-president and chief engineer of the Falkenau Electrical Construction Company, Chicago, Ill., has been appointed consulting engineer of the Merchants' Light & Power Company, Ogden, Utah.

Valentine-Clark Company, Chicago, Ill., announces that on March 15, 1911, the general offices of the company will be moved from 1001 McCormick Building, Chicago, to 932 Security Bank Building, Minneapolis, Minn.

George A. Johnson, Los Angeles, Cal., has moved his office to 551 South Los Angeles Street, where he will continue to act as sub-agent for Wagner alternating-current motors, generators, transformers and instruments.

Ackley Brake Company, New York, N. Y., has appointed Ing. S. Bellotti & Company, Milan, Italy, agents for the Ackley adjustable brake in Italy. Bellotti & Company are well known throughout Europe as a leading supply house for tramway material.

Hicks Locomotive & Car Works, Chicago, Ill., the property of which was offered for sale under foreclosure on Feb. 21, 1911, was bid in at the receivers' sale by Col. William Barbour, president of the Linen Thread Company, New York, N. Y., for \$470,000.

Alberger Condenser Company, New York, N. Y., has elected George Q. Palmer president of the Alberger Condenser Company and the Alberger Pump Company. Mr. Palmer is succeeded as vice-president of the Alberger Condenser Company by D. H. Chester and in the Alberger Pump Company by W. S. Doran.

Louis A. Shepard, who recently resigned the position with the Titan Steel Casting Company which he had held for several years, has established himself in the timber business with an office at room 517, 30 Church Street, New York. Mr. Shepard will handle a full line of ties, cross arms, poles, piling and timber for railway purposes.

J. F. Hodgkins Company, Gardiner, Me., announce that the business of J. F. Newell & Company was incorporated Feb. 8, 1911, under the name of the above company. The new company will continue the manufacture of trolley wheels, bearings for electric railway motors, journal brasses, "Sampson" lifting jacks and iron and brass castings.

Barney & Smith Car Company, Dayton, Ohio, has declared a dividend of 2 per cent on the \$2,500,000 of 8 per cent cumulative preferred stock, payable March 15, 1911, to holders of record on Feb. 28, 1911. This is the first distribution on the issue since June, 1908. No payment has been made on the common stock of the company since December, 1907.

Garwood Electric Company, Garwood, N. J., has appointed Henry Widmer, 731 Union Street, New Orleans, La., as agent for the sale of its product in Louisiana, southern half of Mississippi, City of Mobile, Ala., and all territory within a radius of 50 miles of that city. Milton S. Nettleton, 29 College Street, New Haven, Conn., has also been appointed as its agent for New Haven and surrounding territory.

Henry Floy, New York, N. Y., consulting engineer, has purchased from the estate of the late William H. Bryan, of St. Louis, the complete collection of data on depreciation ac-

cumulated by Mr. Bryan during his lifetime. The collection includes duplicates of all cards collected by the American Water Works Association committee on depreciation, in addition to similar data on electric light, railway, water power plants, telephone systems, etc.

Mead-Morrison Manufacturing Company, Cambridge, Mass., has closed contracts with the Boston Elevated Railway for installing a complete new coal-unloading and storage plant for its new power house at South Boston, including unloading cars of the latest design, cable road and re-handling and pick-up bridge, and with the Edison Electric Illuminating Company, of Boston, for equipping its plant at South Boston with coal-handling machinery.

Western Electric Company, New York, N. Y., reports that its earnings during January, 1911, were slightly in excess of those of a year ago. The *Wall Street Journal* considers this a remarkable showing in view of the fact that other electrical manufacturing companies report a decrease for the same period. The Western Electric Company's gross business for the twelve months ended last November totaled \$61,000,000, and for the thirteen months ended December, 1910, approximately \$68,000,000.

Lackawanna Steel Company, New York, N. Y., has issued its annual report for the year ended Dec. 31, 1910, which shows gross sales and earnings of \$31,302,760, as compared with \$25,296,661 in 1909. This is \$1,708,650 below the earnings in 1907, the best previous year of the company. Manufacturing cost and operating expenses increased by \$4,385,451 over those of the previous year to \$24,972,289, leaving an income from operation of \$6,330,470, which compares with \$4,709,823 in the previous year, and \$6,623,397 in 1907.

J. W. Paxson Company, Philadelphia, Pa., reports an unusual amount of interest expressed in the steel wire frog and switch brooms which it manufactures for cleaning snow and ice from the frogs and curves of street railway tracks. In consequence the company has received a number of orders in quantity as well as trial orders. The design of the broom is original with the J. W. Paxson Company, and it is useful for cleaning the grooves of rails in both summer and winter. When desired the brooms are furnished with chisel-shaped points.

Charles C. Moore & Company, San Francisco, Cal., engineers, report that the Southern California Edison Company is installing the Moore fuel-oil regulating system in its power station. This is the system used by the Pacific Light & Power Company at its Redondo plant near Los Angeles, where 18 604-hp Babcock & Wilcox boilers are operated with fuel oil with three burners per boiler. The power from that station is used largely for railway work, but in spite of a very fluctuating load a practically uniform steam pressure has been maintained.

General Electric Company, Schenectady, N. Y., has just completed its new warehouse, Greenwich Street and Morton Street, New York City. There are nine floors in the new building aggregating 9000 sq. ft. of floor space, which more than doubles the size of the present warehouse of the company and provides ample space for storing electrical appliances. Two elevators will be used to handle the freight and express and another elevator will be used for the transportation of passengers. The new warehouse with its increased floor space and improved shipping facilities will enable the company to carry a much larger stock to meet the current demands.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., received at its New York office on Feb. 23, 1911, the following cablegram from R. D. McCarter, managing director of the Russian Westinghouse Company, which explains the report which appeared in the daily press the day previous in which the statement was made that the books of the company had been seized by the local authorities at St. Petersburg, where the company is under contract to electrify the city railways: "Our position satisfactory. All companies having large contracts with municipalities have had books and papers taken for investigation by a special committee appointed by the government."

Paul Stewart Company, Cincinnati, Ohio, has been chartered with a capital stock of \$50,000 for the purpose of dealing with electric lighting, traction and manufacturing

corporations throughout America in buying and selling power equipment and machinery, such as engines, generators, motors, etc. The company has purchased a site in Redbank, Ohio, on the Pennsylvania Lines West, and has already erected one steel and concrete building, 100 ft. x 54 ft., to be used as a shop and warehouse, equipped with traveling cranes and other appliances. The office of the company will be located in the First National Bank Building, Cincinnati, Ohio. Paul Stewart, formerly with the John A. Stewart Electrical Company, is president.

Union Switch & Signal Company, Swissvale, Pa., has issued a report for the year 1910 showing a net profit of \$1,250,000. It is said that the net earnings for January largely exceeded those of the corresponding month last year. New orders are being received in greater quantities than was anticipated at the present time, as it is generally the rule that the winter months are very dull. The present outlook, based upon January business, indicates that the company's gross and net earnings in 1911 will be largely in excess of those in 1910, which was the best year's business the company ever had. The improvements in the processes of manufacture will permit of the production of double the output of 1910, and the factory cost is being constantly decreased.

ADVERTISING LITERATURE

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued a folder illustrating and describing the magneto telephone.

Electric Service Supplies Company, Philadelphia, Pa., has recently issued a catalog illustrating and describing Garton-Daniels lightning arresters.

Ohmer Fare Register Company, Dayton, Ohio, has issued two folders pointing out the advantages of registering and recording the face value of all tickets collected.

McQuay-Norris Manufacturing Company, St. Louis, Mo., has issued a folder on "Leak Proof" piston head packing rings. The folder contains several testimonials from users of the rings.

General Railway Signal Company, Rochester, N. Y., describes its universal switch box, Model 5, Form A, in Bulletin No. 121, issued under date of Feb. 19, 1911. This box can be used for shunting or breaking track circuits, for opening line circuits or for selecting circuits.

Joseph Dixon Crucible Company, Jersey City, N. J., has published "Graphite" for March, 1911. It contains articles on "A Monopoly in Zinc Dust," "Increased Use of Dixon's Flake Graphite," "Machine Molding vs. Hand Molding," "Lubricants Used When Machining Various Materials," and "Lubricating Piston Packing."

Green Engineering Company, Chicago, Ill., has issued Catalog No. 8, emphasizing the salient features of the company's pneumatic ash-handling systems. These are adaptable to almost any arrangement of building structures, and may be installed irrespective of the angles of direction or the difference of elevation between points of accumulation and final disposal of ashes.

Canton Culvert Company, Canton, Ohio, has issued a small booklet entitled "No-Co-Ro Metal." This booklet contains articles on "Causes of Corrosion," "Rust Resisting Metal," "Rust and Corrosion Defined," "How Corrosion Is Obviated," and also gives tables showing comparative chemical analyses and twelve-hour corrosion tests of different samples of iron and steel.

Schutte & Koerting Company, Philadelphia, Pa., has issued catalog sheets illustrating and describing the following subjects: "Special Types of Schutte Free Exhaust and Back-Pressure Valves," "Vacuum Breaker Valves," "Automatic Engine Lubricator," "Blast Governors for Corliss Engines," "Air-Jet Chimney Ventilators" and "Koerting Grease Extractor and Feed Water Filter."

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued booklets Nos. 804-X and 805-X, together with folder No. 4781, on standard insulating material products, which have recently been placed on the market by this company. This includes both treated and untreated fabrics and papers, a complete line of friction tapes and rubber splicing compounds, together with various types of insulating glues, cements and gums.

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Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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CONTENTS.

One Way to Fix a Piece Work Rate.....	405
Newspaper Criticisms.....	405
Movable Storage Bins and Shelves.....	406
Accurate Judgment of Running Speeds.....	406
Financial Changes in Philadelphia.....	406
The Peak Load.....	407
The Galveston-Houston Interurban Railway.....	408
Notes of the Lackawanna & Wyoming Valley Railroad.....	415
Pay-As-You-Enter Cars, Atlanta, Ga.....	416
Illinois Traction Shop at Ottawa, Ill.....	418
Work of Laying Power Cable Under the Connecticut River.....	418
Joint Committee on Convention Location.....	419
Simple Directions for First Aid to the Injured.....	419
International Electrical Congress at Turin, Italy.....	420
Report on Reconstruction of Accounts of Philadelphia Rapid Transit Company.....	420
Hearing Before Railroad Securities Commission.....	422
Electrical Improvements of the Detroit United Railway.....	422
Block Signals for Single Track Lines.....	423
Report of the Wisconsin Railroad Commission.....	423
Automatic Block Signal Arrangement for Stub-End Sidings.....	425
New Fare Recorder System Used in Chicago.....	426
Interurban Local Ticket.....	428
Dispatchers' Signals on Stark Electric Railroad.....	428
Expansion Boring Tool in New York and Vicinity.....	429
Combined Accelerometer and Gradient Meter.....	429
Universal Switch Box.....	429
News of Electric Railways.....	430
Financial and Corporate.....	434
Traffic and Transportation.....	437
Personal Mention.....	439
Construction News.....	440
Materials and Supplies.....	443

One Way to Fix a Piece-Work Rate

It is the common experience of shop managements that the substitution of the piece-work system for day wages has the twofold merit of lowering the cost of production and raising the earnings of the men in proportion to their skill. Nevertheless, it is not easy to determine in advance a satisfactory rate for the possible increased output when the shops are to be handled on an incentive basis. One master mechanic solved this problem in a very effective manner. He wanted to place car-window cleaning on the piece-work system, but was in doubt as to what would be a fair unit price. He therefore undertook the task of cleaning car windows himself, so that after an experiment lasting a little over a week he had ascertained just how much time an industrious and fairly skilful man would need to clean a certain number of car windows. With this knowledge it was a simple matter for him to fix a rate which would prove mutually beneficial to the men and the company. The very fact that the employees had seen their chief trying out the new scheme in person prevented the dissatisfaction which probably would have been experienced had the rate been chosen arbitrarily or based on the work of some exceptionally fast man

Newspaper Criticisms

It is an interesting commentary upon newspaper criticism that all of the Milwaukee journals published on the day following the announcement of the resignation of Mr. Beggs as president of the Milwaukee Electric Railway & Light Company spoke in the highest terms editorially of his ability as an organizer and operator and of the service which his company is now rendering the city. This must be very gratifying to Mr. Beggs, because some of these same papers have been very antagonistic to him during his 14-year administration in Milwaukee; but the incident has a broader significance than that which concerns the Milwaukee situation. Public service corporations in other cities are constantly the subject of newspaper attacks. Some of these criticisms may be just and some may not, but in very few cases are they based upon any very exact knowledge of the actual conditions. But public service corporations, like public officials, afford a shining mark, and general charges against their motives or their efficiency give an impression among the uninformed of a constant zeal in the public welfare. In some respects the public service corporation is even more exposed to attack than the public official because of its impersonal and continuous corporate character. It is unpracticable at this time and in this place to print some of the past newspaper criticisms in Milwaukee and in a parallel column the tributes of last week, but such an exhibit would be instructive. It would encourage the officials of other public

service corporations which are doing their best to serve the communities in which their properties are located, and would make them realize that the criticisms directed against them are not really so severe or so sincere as they might otherwise think.

Movable Storage Bins and Shelves

It is remarkable how little thought is given in the planning of storerooms toward the attainment of some degree of elasticity in the arrangement of shelves and partitions. The customary fittings are of wood and usually they are nailed so hard and fast that adjustments for changed conditions can be made only at considerable expense for labor and material. In one storeroom recently erected many of the bins proved so small when the material was to be distributed that they were really worse than useless. For example, the bins for the controller spindles were just large enough to obtain a skin-tight fit. The consequence was that rather than use these small bins the storekeeper preferred to keep a lot of supplies on the floor, with little semblance of order. Trouble of this sort would be avoided if the shelves had movable partitions so that the width of the bins could be altered at pleasure and if the shelf brackets were designed to permit their insertion at any desired intervals on the wall beams. Preferably such an installation should consist of iron brackets and sheet-metal fittings, but the same principle can easily be applied to wooden construction. Flexible shelving has long proved very advantageous in bookcases and there is no reason why it should not be equally desirable in storerooms. It might cost a little more than the ordinary rigid system, but its superior convenience would be worth the extra outlay.

Accurate Judgment of Running Speeds

It is common for witnesses in electric railway accident litigation to testify that the car under discussion was moving at a "high," "moderate" or "low" rate of speed as the case may be. But when subjected to the strong light of a shrewd lawyer's questions these nebulous terms evaporate to such a degree that little of such testimony can be resolved into material evidence. Of course it is perfectly natural that a layman should have only a hazy notion as to how fast a car is traveling. Certainly he cannot tell whether it is or is not going faster than the local ordinances permit. Reasonably exact judgment, however, should be expected from the motormen who travel over the same route many times a day. If the motorman concerned in an accident could swear that his car with the controller on a given notch could not exceed, say, 20 m.p.h. over a certain section, his demonstrable assertion would surely outweigh the intangible guesses of any number of inimical witnesses. It is therefore very desirable that the car operators should know the running speeds in addition to the schedule speeds. The man who is taught the physical characteristics of the route over which he operates and the speed possibilities which they safely permit is likely to become a more careful operator in every way. Something has already been done toward educating motormen in this respect on lines where sharp curves, inclines, crossings, etc., demand the operation of cars at specified lower speeds, but such instructions should be carried out with greater scientific exactness than is now the fashion. There is no valid reason why a motorman should not be as familiar with his equipment as the steam locomotive engineer who knows exactly what can be done to make up time between any two points on his run.

FINANCIAL CHANGES IN PHILADELPHIA

Stockholders of the Philadelphia Rapid Transit Company have voted formally to approve broad plans which have for their purpose the financial reconstruction of the company. These plans are given in detail elsewhere in this issue and include the approval of a new system of accounting, an increase in the bonded debt, and the transfer of the equity and lease in the Market Street Elevated Passenger Railway to an underlying company, by which the elevated road is again leased to the parent corporation. Through a reaudit the balance sheet of the company shows a surplus, as of Dec. 31, 1910, of \$607,100, although the last official report, covering the fiscal year ended June 30, 1910, showed an accumulated deficit on that date of \$1,118,609.

Reference may be made here to the statement of the principles upon which the public accountants acted in making their reaudit of the accounts, although the details of the entries in the profit and loss account which produced this great change are published in full in another part of this issue. The process by which deficit gave way to surplus involved a complete audit of the accounts for the entire period of existence of the company: that is to say, from July 1, 1902, to Dec. 31, 1910. In brief, the readjustment involves the inclusion of all expenses of organization in the property account, the adoption of a policy of amortizing the items of bond commission and losses due to the strike of 1909, and the treatment as capital expenditures of all charges made to bring the plant taken over by the operating company "to a normal operating condition." The theory on which the last-named principle is based is presumably that the charges of this nature, although probably made in whole or in part for the betterment of underlying properties, are capital expenditures of the new corporation.

Without discussion of the statement of principles advanced by the accountants as the basis for their changes it may be shown that through the readjustment thereby effected the total amount of \$2,842,405, previously charged to profit and loss directly or to operating expenses, is made available. Other adjustments go to swell the amount which finally provides in the reconstructed profit and loss account as of Dec. 31, 1910, not only the surplus mentioned, but also a reserve for accrued accident claims of \$1,250,000.

Of the principal items in the condensed balance sheet as of Dec. 31, 1910, in which the new surplus is incorporated, those to which attention should be drawn are the reserve of \$1,433,603 for accident claims and that of \$1,500,000 for accrued renewals. No discussion regarding the reserve for renewals appears in the report of the accountants, but presumably it has been provided in accordance with conditions named by E. T. Stotesbury in connection with his entrance into the affairs of the company. The largest item in the balance sheet is that of leases, franchise, construction, equipment, advances to leased lines, sinking fund, etc., a total of \$99,107,715. Of this amount \$577,820 is carried as "franchise account" and is stated to represent the "cost of organization and expenses incident thereto." Leases, etc., amount to \$12,673,006, and this item is stated to represent the value of equities acquired by the company under its leases not heretofore appearing on the books of the company. The value of leases "covered by bonded indebtedness" is placed at \$10,853,761 and a value of \$1,500,000 is set upon the lease of the Market Street Elevated Passenger Railway.

Statements of the total number of passengers carried and earnings and expenses for the six months ended Dec. 31, 1910, are given. It appears from these figures that the net increase in passenger receipts in that period, as compared with the corresponding period of the previous year, was 4 per cent. In the number of passengers carried the increase was 5.2 per cent. Of the total revenue of \$10,279,031 from passenger and chartered-car traffic there was required for operating expenses \$5,346,426, or 52 per cent. For maintenance of power plant there was expended \$740,344, or 7.2 per cent of the total revenue. The expenditure for maintenance of way and buildings was \$475,103, or 4.6 per cent of the revenue. The outlay for maintenance of equipment was \$530,316, or 5.2 per cent. Thus the aggregate maintenance expenditures reached a total of 17 per cent of the income from operation as stated in the report. Transportation expenses were 25.2 per cent and general expenses 9.8 per cent. The operating revenues from other sources were equal to \$286,972, and the company also derived a return of \$159,898 from the dividends on stocks owned. After provision for taxes and interest a net profit on operations for six months was left of \$200,745. This result is an improvement over the outcome of operations for the fiscal years from 1907 to 1910, inclusive, in each of which a deficit was shown.

THE PEAK LOAD

An interesting recent development in the subject of central station work is the use of direct-connected gasoline engine sets for the purpose of helping over the peak load. Of course, since the beginning of central station practice the peak has been the manager's pet abomination, and almost every possible scheme for supplying extra power economically has been at one time or another tried out. Many large lighting stations, like many railway plants, have, in a measure, met the difficulty by the installation of storage batteries. Looking at this device from the standpoint of economical power supply, it is fairly evident that, counting in the losses in the battery and the cost of upkeep and depreciation, the actual cost per kw-hour delivered via the batteries is considerably higher than the cost per unit delivered straight from the generators. Obviously, therefore, schemes like the auxiliary generating set have a reasonable excuse for existence and the question is merely as to what form of auxiliary power is, on the whole, most economical and available, particularly for railway plants. The devices most generally recommended, aside from the storage battery, are gas engines and superheated water storage in connection with either special turbines or turbines worked at high pressure during the peak. To these should be added the oil and the gasoline engines, which are in effect really varieties of the gas engine.

The peak load falls both upon the generator plant and the boiler plant, so that both need the relief which is furnished by any one of the plans noted. In railway practice, however, the peak in amount and character differs considerably from the peak found in the ordinary lighting station, and it does not by any means follow that the remedial measures which apply well to the latter are equally well suited to the former. The peak of a railway load begins a little later and continues considerably longer than the ordinary lighting peak. It is due in general to the rapid homeward movement of passengers immediately after the close of business hours, at which time the lighting load is beginning to fall off. The railway peak also endures longer, since the time of transit homeward of the

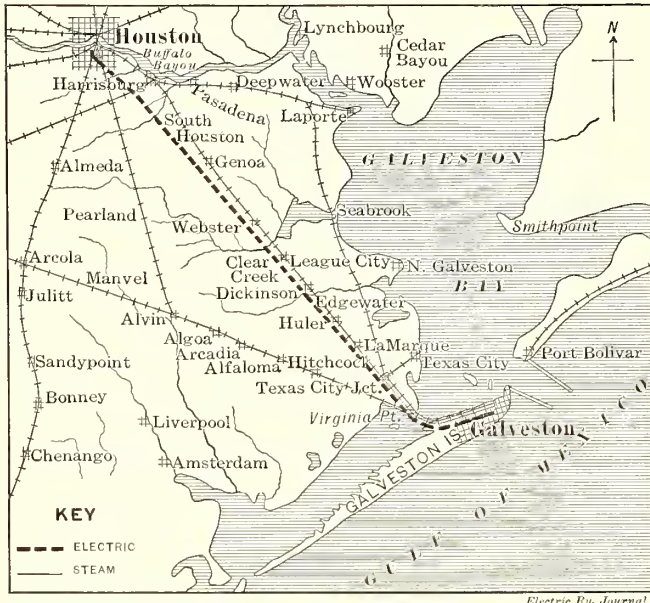
moving crowd is on the whole much longer than the time that elapses between the coming of darkness and the close of business hours.

A railway power station, therefore, must furnish peak power for a longer period than a lighting station, and hence cannot afford to take such large chances with the efficiency of power generation. It cannot put overload on its machine quite so safely, nor can it store power in batteries to quite so good advantage. A still more radical difference between railway and lighting practice is with respect to the wandering of the load. In electric lighting this wandering is a familiar phenomenon, but it does not take place so conspicuously during the peak as at the period when the peak is rapidly falling. The lights in the business district, upon the whole, go out before the residential element of the peak has reached anything like its maximum, so that while the center of load shifts noticeably the extreme peak which causes trouble is produced by a fairly definite territory. In railway practice the load which actually produces the evening peak is a far more wandering load, which shifts and spreads out over a considerable territory. It, therefore, is less desirable in railway work to meet the peak by added installation at the main generating station than in the case of a lighting plant. If batteries are installed, they should be where they will do the most good to the shifting load, and if auxiliary gas, oil or gasoline engines are employed, they can most advantageously be placed in a similar independent situation. The storage of power by superheated water is, therefore, less applicable to railway plants than in general distribution.

As regards plants driven by explosion engines, the choice between one kind and another is merely a question of cost and convenience. Producer gas plants have been used with fair results in several instances. The employment of oil and gasoline engines in a similar way is comparatively new in this country. The engine using comparatively heavy oils has a very considerable advantage in cost of fuel, but has to be of a somewhat different character from other explosion engines. Gasoline is a more expensive fuel used in a more familiar type of engine. Any form of engine using petroleum has, in the matter of convenience, a great advantage over the engine using producer gas, in that it takes considerably less space and attention and is a much less objectionable neighbor than a producer plant, particularly if the latter is to be equipped, as it for convenience should be, with a gas holder. There are electric railway systems on which gas or oil-driven auxiliaries might be used to considerable advantage. We should like to see a careful analysis of costs as between such auxiliaries and batteries similarly located and supplied with power from a central station. We should judge the economic question between these to be rather close, closer than it would be in electric lighting distributions, and it certainly is not a question that can be settled off-hand. In analyzing the economic aspects of the question, much would depend on the actual character of the peak load, both with respect to time and place. It will be found, we think, that in not a few cases the simplest solution of the peak difficulty is the installation of one or more steam-driven auxiliary stations able at once to supply peak power and to deliver it conveniently at points well suited to meet the wandering load. Difficulties due to this wandering and to exaggerated peaks are most severely felt in single stations which supply power over a somewhat too wide area of distribution.

THE GALVESTON-HOUSTON INTERURBAN RAILWAY

One of the latest additions to the transportation facilities of Southern Texas is the Galveston & Houston Interurban Railway, which is rapidly approaching completion under the designer and builder, the Stone & Webster Engineering Corporation, of Boston, Mass. Galveston has a population of about 40,000, and is the principal port on the Gulf of Mexico, being second only to New York in the value of its yearly exports. Included



Galveston-Houston Railway—Route of Electric Lines and Steam Railroads Centering at Houston

among its shipping facilities are 220 miles of steam railroad terminal trackage, 5 miles of docks and 95 acres of warehouses. From Galveston three steamship lines are in service to Liverpool, three to New York and one each to Bremen, Cuba, Vera Cruz and Tampico. Houston, 45 miles northwest, has a population of about 90,000. It is the greatest cotton market in the world, the center of the oil and lumber regions of the State, and is served by 18 railroad connections.

GENERAL FEATURES

The new line is to be of single-track construction, with a right-of-way permitting a second track eventually. Its total

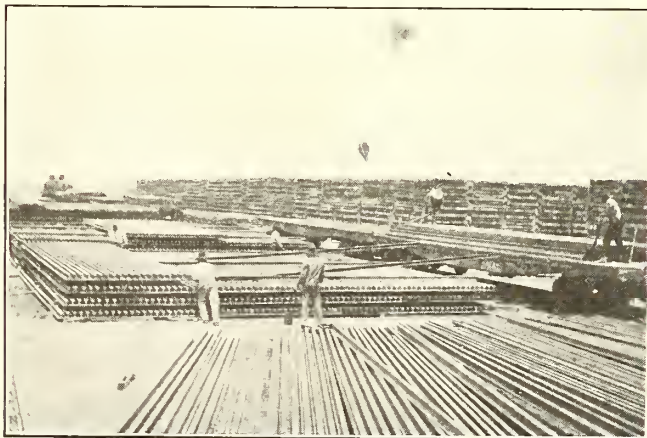
the supply of power from a central plant to substations with motor-generator sets to supply direct current to the rolling stock, and the use of a type of interurban car which has substantially become a standard for the interurban service of the Stone & Webster organization.

ROUTE AND TRACK

Beginning at a point on the southerly side of Houston the line follows a southeasterly direction, traversing Harris and Galveston Counties to the westerly municipal limits of Galveston. The territory is practically all open prairie, as there are only 2 miles of clearing on the entire route. There are but six curves on the interurban section, none of which exceed 2.1 deg. For 36 miles the line runs at a tangent. The maximum grade of 3 per cent occurs on a viaduct built over the Santa Fé tracks outside the Houston city limits. With this exception the maximum grade on the entire line will be 0.5 per cent. The interurban section follows a private right-of-way throughout, the width of the latter being about 100 ft. The poles carrying the transmission, feeder, trolley and telephone circuits are being set in the middle of the right-of-way, so that they will occupy a space between the double tracks when the latter are installed.

Outside the Houston city limits a reinforced concrete trestle 2000 ft. long is built over the steam railroad tracks. In entering Galveston, which is located on an island, the railway will occupy a portion of the new Galveston causeway, now nearing completion. This causeway has a total length of 10,642 ft., and will cost \$1,500,000. It will connect the mainland with Galveston Island, and will be used jointly by Galveston County, five steam railroads and the interurban line. The causeway is a combination of earth-filled approaches, from the mainland and the island ends, and a reinforced-concrete arch viaduct with a steel lift bridge at the center. The length of the filled portion of the causeway is 8184 ft.; of the concrete viaduct, 2358 ft., and of the lift bridge, 100 ft. On the filled portion of the causeway there is sufficient room for a double-track interurban line, but only a single track can be maintained on the concrete viaduct and Scherzer 100-ft. clear span steel lift bridge.

The interurban track will consist of 80-lb T-rail laid on 6-in. x 8-in. x 8-ft. cypress ties, spaced 2 ft. centers in gravel or shell ballast. Six-bolt Bonzano rail joints will be used, together with welded bonds of No. 0000 copper, supplied by the Electric Railway Improvement Company, of Cleveland, Ohio. About 100,000 cypress ties are used. The company is also experimenting with 20,000 hard pine ties, seasoned and dipped in carbolineum, and with 10,000 creosoted ties. The roadbed is nearly



Galveston-Houston Line—Stacking Steel in the Material Yard

trackage covers 45.45 miles, consisting of a main line of 44.23 miles; five passing tracks with a total length of 1 mile, and three substation sidings, 0.22 mile long. The inclusion of short connections inside the limits of the terminal cities brings the total of trolley on the line to 50.5 miles. The overhead work is of catenary construction. Other distinguishing engineering features of the road are an unusual absence of grades and curves,



Galveston-Houston Line—Decking on Bridge Across Clear Creek

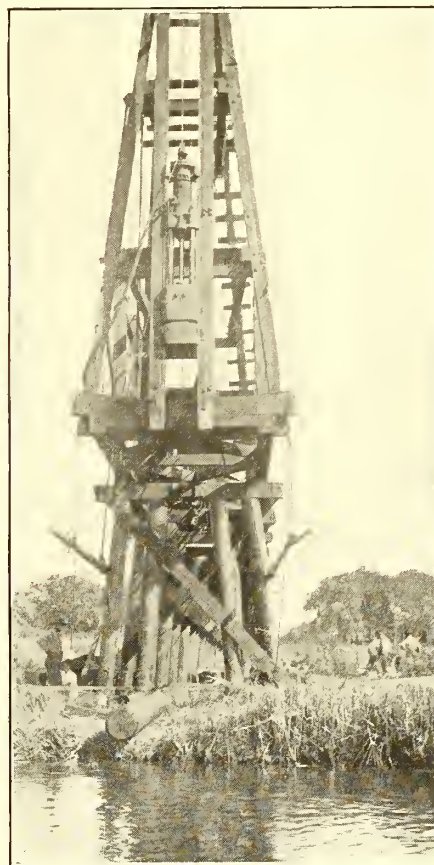
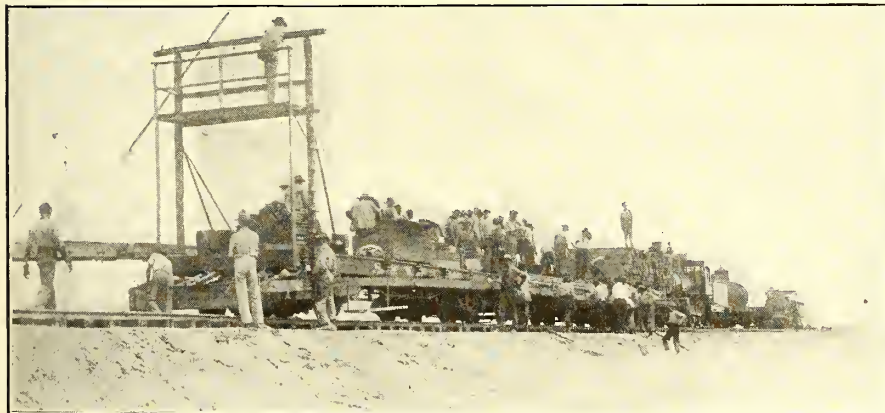
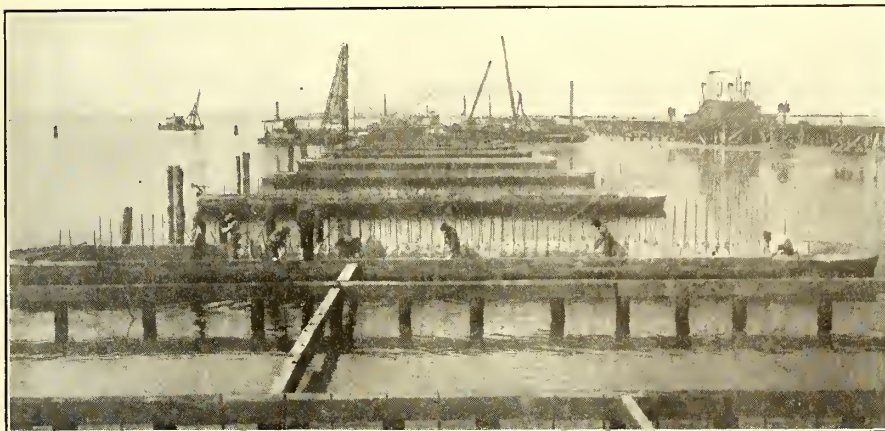
all embankment work, 18 ft. wide at the top. The cuts are very few and light. There will be about 27 open-deck pile trestles on the line, crossing creeks, bayous and natural drainage ways. These will vary in length from 24 ft. to 700 ft. Culverts of cypress timber are to be provided at various points to insure good drainage. The minimum depth of ballast below the bottom of the tie is to be 6 in., and the ballast is to be crowned

to shed water throughout the entire line. Cattle guards are to be installed at all road crossings, and the entire right-of-way will be fenced in, except where the line crosses highways.

CATENARY TROLLEY AND OTHER CIRCUITS

Direct current for car operation will be supplied by a single catenary trolley of No. 0000 B. & S. section, carried on three-fourths of the line by a 7/16-in. steel messenger cable. About 10 miles of the line near the Galveston end are equipped with a 3/8-in. copper-clad steel messenger cable. The trolley is carried 19 ft. above the top of the rail. The brackets which carry the insulators supporting the messenger cable are of T-iron construction, and are 9 ft. in length. The trolley is carried about 7 ft. 6 in. from the side of the pole, but this distance is adjustable by the use of a clamped base which supports the messenger insulator. The trolley is hung 23 in. below the messenger cable, to which it is connected by hangers spaced 15 ft. The brackets are attached to the poles by sockets at their bases and by 5/8-in. tie rods which run diagonally into the pole above the level of the messenger insulator. Anchor-

Current is transmitted from Webster to substations at a potential of 33,000 volts, there being a three-phase circuit of No. 2 copper carried in a right triangle of 48-in. spacing on the sides. The line is transposed every 3.5 miles, the details of the pole and cross-arm arrangement being practically the same as in the regular pole installation, except for the provision of two insulators on the bottom arm of the high-tension service and the omission of one insulator on the top arm. The insulators were supplied by the Ohio Brass Company. The insulators are carried 7.5 in. above the cross-arms on 2-in. iron pipe pins, 12 1/2 in. long over all. The insulator is cemented into the upper part of the pin, the lower portion of the pin being bolted through the cross-arm and set into a 2-in. hole in the latter. About 1700 poles are required for the interurban section. Each pole is equipped with a lightning protective top, consisting of a 2-in. galvanized iron pipe, 90 in. long, with a flat top, 18 in. long. A 5/16-in. galvanized iron cable is attached to the shoulder between the round and the flat portion of the protector and run from pole to pole above the transmission line. There is a clear-



Galveston-Houston Line—Views Taken During Construction of the Line

ages are provided with wood break-strain insulators, in addition to the usual clamps, thimbles, turnbuckles, anchors, hangers and clips. The messenger cable is supported 10 in. above the bracket. The poles, which are spaced 150 ft., are of creosoted pine, 40 ft. long, with 8-in. tops and 18-in. butts. They are set in the earth 8 ft. below the top of the rail.

About 10 in. above the bracket a 7-ft. cross-arm is placed for telephone and feeder circuits, the former being carried on one side of the pole and the latter on the other. At present a 650,000-circ. mil bare copper feeder is installed throughout the entire interurban section between city limits. Within the limits of Galveston the cars will be handled on the tracks of the Galveston Electric Company and in Houston on the lines of the Houston Electric Company, both of which are Stone & Webster properties. The high-tension service of the road is carried on three-piece cemented porcelain insulators mounted on two 5-ft. cross-arms near the top of the pole. The upper arm is carried 9 in. below the top of the pole, and the lower arm is 4 ft. below the upper, or 6 ft. 4 in. above the feeder arm.

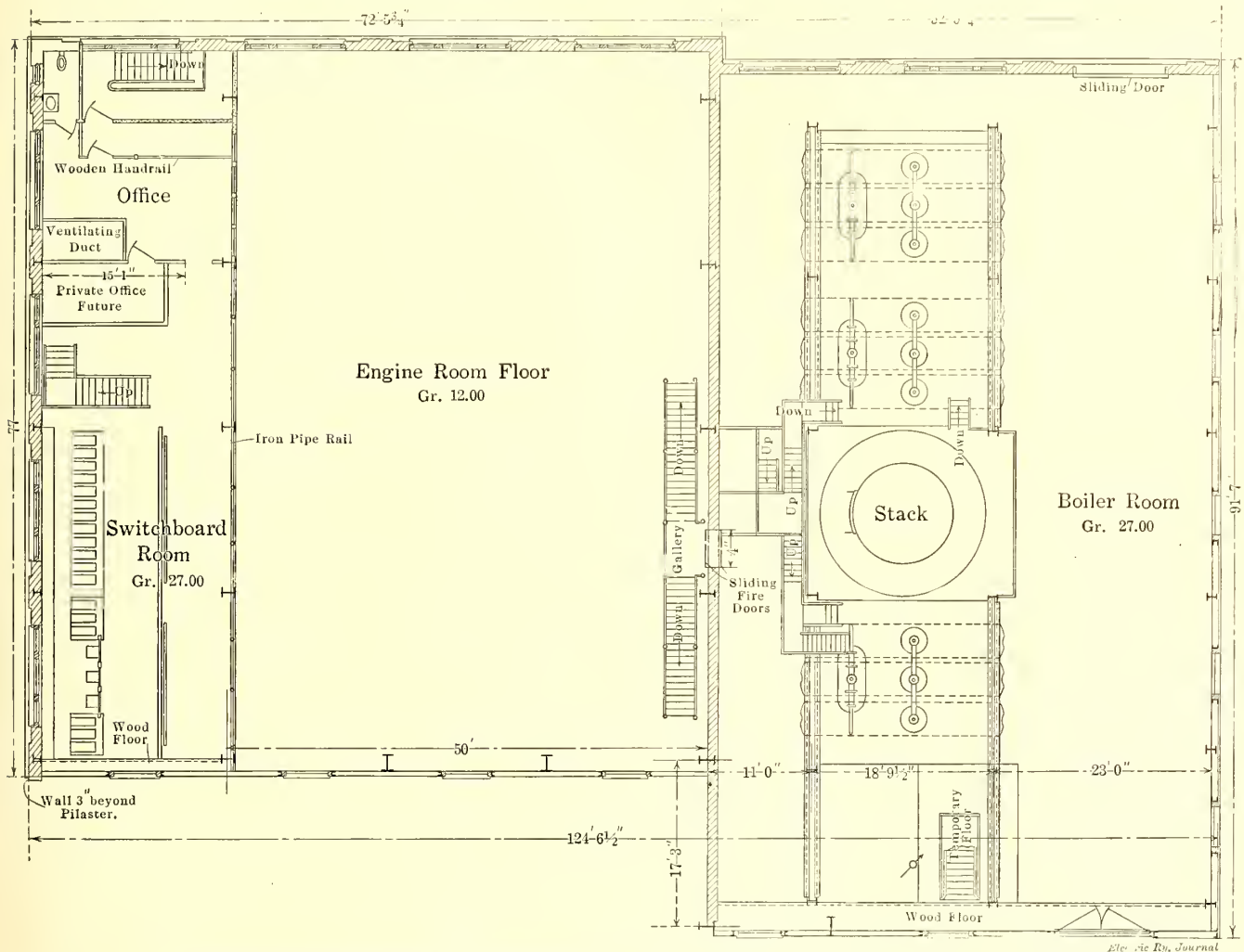
ance of about 4 ft. between the guard wire and the nearest wire of the high-tension service. Electrolytic lightning arresters are installed in the line outside the power house and at each substation.

POWER PLANT

The power house at Webster will contain an initial installation of three 600-hp B. & W. water-tube boilers and two 1500-kw, 2300-volt, 60-cycle G. E. three-phase alternators, each direct-driven by a horizontal Curtis turbine. The power house is a brick and steel building about 70 ft. x 100 ft. in dimensions, on concrete foundations. An ample supply of water for condensing is provided from a nearby stream. An emergency supply of water is obtained from a 650-ft. artesian well, which is equipped with an air lift. This well provides water for a 50,000-gal. overhead tank, from which water is drawn for boiler feed make-up and for emergency fire protection. The normal supply of condensing water from the creek is drawn through two service tunnels carried beneath the turbine room. A central discharge tunnel for heated circulating water is

installation will maintain a constant supply pressure with reducing valve and damper regulating control installation to govern the supply of oil and the draft in accordance with the steam pressure. The oil is taken by the fuel pumps which are in a fireproof room below the stack and passed through an exhaust heater in the same compartment. The heater is provided with a drip pocket, so that any water that separates from the oil after heating may be seen and drawn off readily. A large air chamber is also provided so that the pressure in the oil lines does not fluctuate. The steam and oil at constant pressure are delivered to a balanced valve controlled by a damper regulator. Each boiler has its individual damper. The oil supply to the burners of the furnaces and the steam for atomizing the oil are thus controlled automatically with the load. Space has

The main operating switchboard is located on a gallery at the side of the turbine room and 15 ft. above the floor of the latter, to give the operator a clear view of the machinery. For the same reason a chief engineer's office has been located on the gallery. Above this is the high-tension switch room containing the high-potential oil switches and selectors connected with the 33,000-volt busbars. Either turbine can be run on either 2300-volt bus. There are three exciters in the Webster station, two being steam-driven and one motor-driven. The main switchboard on the operating gallery contains 10 panels; three are for exciter service, two for alternators, two for outgoing lines, one for transformer and one each for station lighting and power and substation feeder service. The transformers are located beneath the main switchboard in a bay off the turbine



Galveston-Houston Railway—Floor Plan and Grade Levels of Webster Power Station

been provided for two future coal conveyors in case oil is superseded by coal. In this connection an ash-handling system, with gravity delivery from hoppers into cars on a narrow-gage track, can readily be provided. The turbine room is served by a 25-ton Case electrically operated crane of 48 ft. 5½ in. span.

ELECTRICAL FEATURES

The output of the turbo-alternators passes through 2300-volt oil switches to one of two sets of busbars via selector knife switches which permit the units to be operated on the same or separate buses as desired. Three 500-kw, 2300/33,000-volt, water-cooled, oil-insulated transformers are installed in the station, and connected with each set of 2300-volt busbars through oil and selector switches. The high-tension side of the transformers is connected directly to the 33,000-volt bus through connecting switches. There is a single 33,000-volt bus, with provision for future duplication. Two 33,000-volt lines are taken out of the station and each is protected by an automatic oil switch.

room. General Electric electrolytic lightning arresters are installed out of doors beside the station.

LABOR

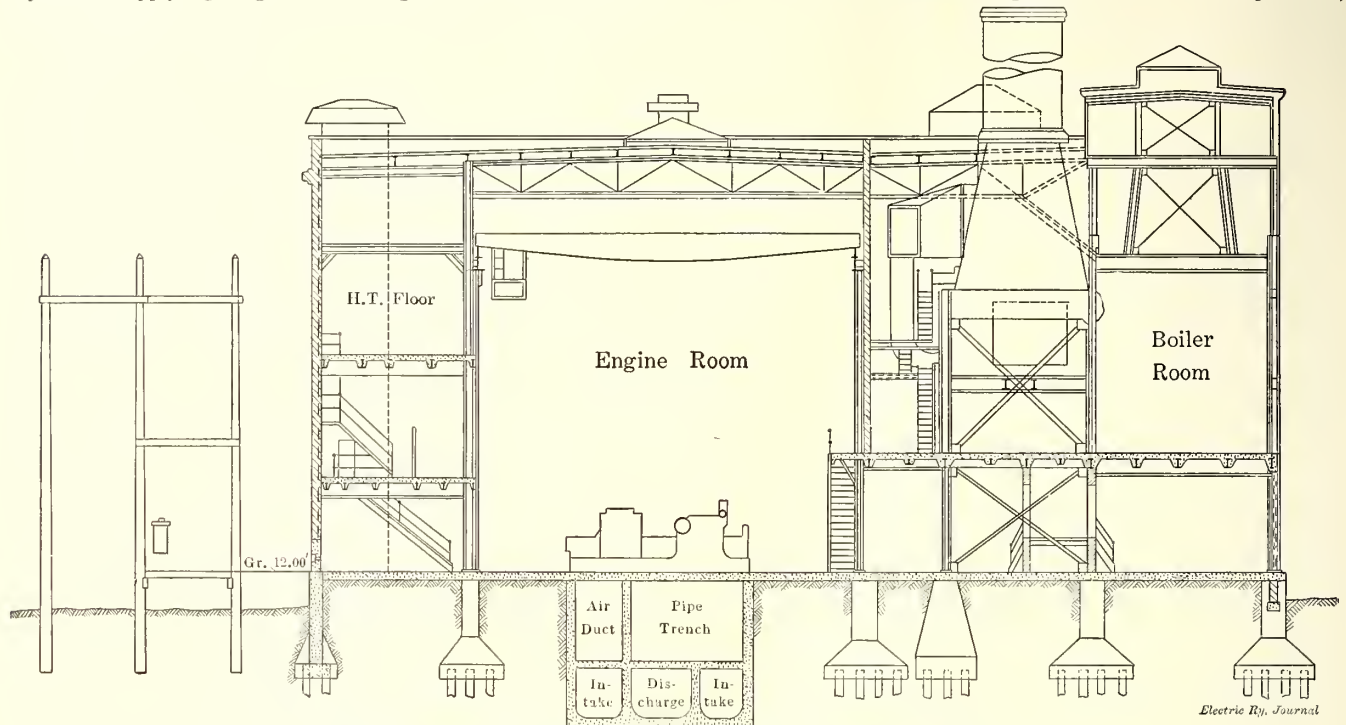
The station has been specially designed to secure a low labor cost in its operation. Three points tending to insure this are the grouping of the auxiliaries in the turbine room, and all upon one floor; the use of an automatic fuel oil system, and the absence of numerous compartments in the arrangement of the station building. The cross duct under the station carries a few pipes and is used at present largely as a means of ventilation for the turbine room. It is carried to the outer walls of the building and terminates in a riser which discharges into the outer air at the roof level.

SUBSTATIONS

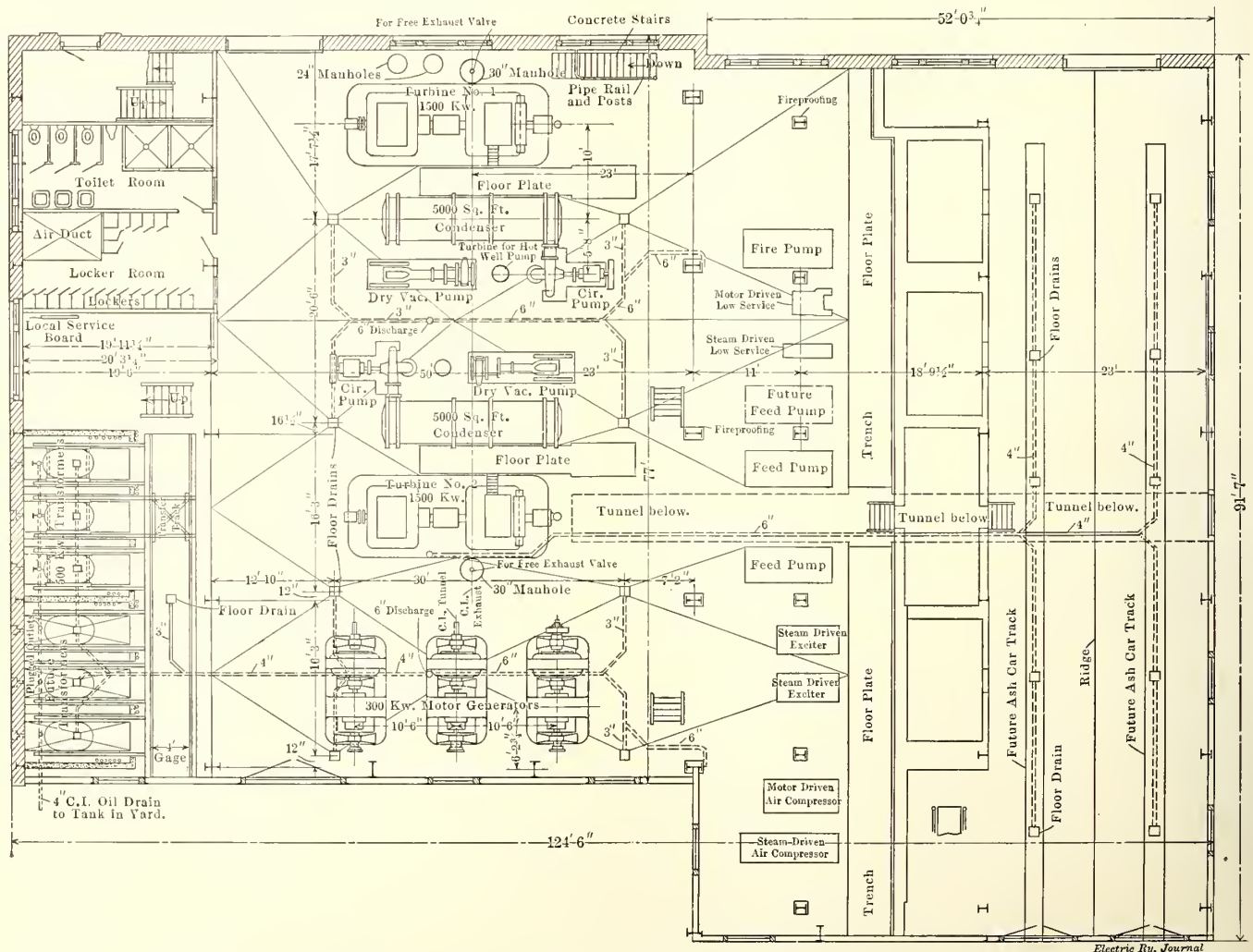
Substations are located in the Webster power house, and at South Houston, 14 miles north, and at LaMarque, 13.5 miles south of the plant. Each substation contains two 300-kw synchronous G. E. motor-generator sets, with transformers and

switching equipment for each installation. A spare 300-kw motor-generator has been temporarily set up in the Webster station and can be transferred to either substation if needed. A frequency of 60 cycles was adopted because the company expects to supply lighting service along the line at a later date.

The motors are operated at 2300 volts, and current is delivered to the feeder and trolley lines at 600 volts. At each substation a section insulator is provided in the trolley and the feeder line is cut in two to facilitate flexibility of operation in case of trouble on any section. The generators are flat-compounded,



Galveston-Houston Railway—Cross-Section of Power Station

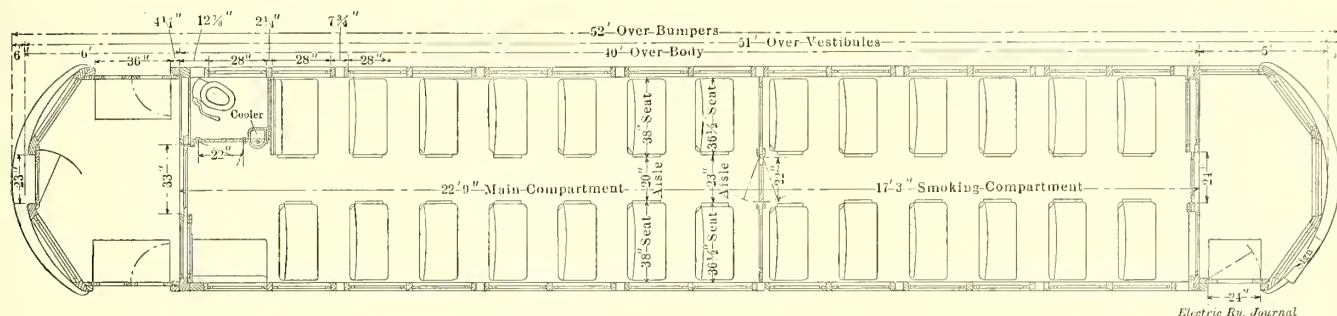


Galveston-Houston Railway—Basement Plan of Webster Power Station

and in the substations the exciters for the synchronous motors are mounted on the motor shafts.

An interesting feature of the Webster substation wiring is the use of a six-wire busbar connected with a compensator for starting the synchronous sets. In the other substations 33⅓ per cent taps are taken off the transformers and five-wire bus connections are provided, so that by the use of double-throw starting switches the motor-generators can be started without the use of compensators. The connections also provide for direct-current starting when desired. Three 250-kw oil-insulated transformers are provided for each substation, with the

24:51. The maximum speed is from 55 m.p.h. to 60 m.p.h. General Electric automatic relay type multiple unit control is provided, and the air-brake equipment is the Westinghouse type, "AMM." Each pair of motors is mounted on a Baldwin M.C.-B truck, with 6-ft. wheelbase and Symington ball-bearing center plates. Steel wheels, 37 in. in diameter, are used. The wheels have a 3-in. tread and a ⅞-in. flange depth, the flange thickness being 1⅜ in. The principal dimensions and other data of these cars are given in the following table. The express cars are operated for double-end operation, and are not included in these dimensions:



Galveston-Houston Railway—Plan of Standard Interurban Car

addition of a spare transformer for emergency service. The substations are of brick, and that at South Houston will be combined with a waiting room and baggage division.

STATION LIGHTING

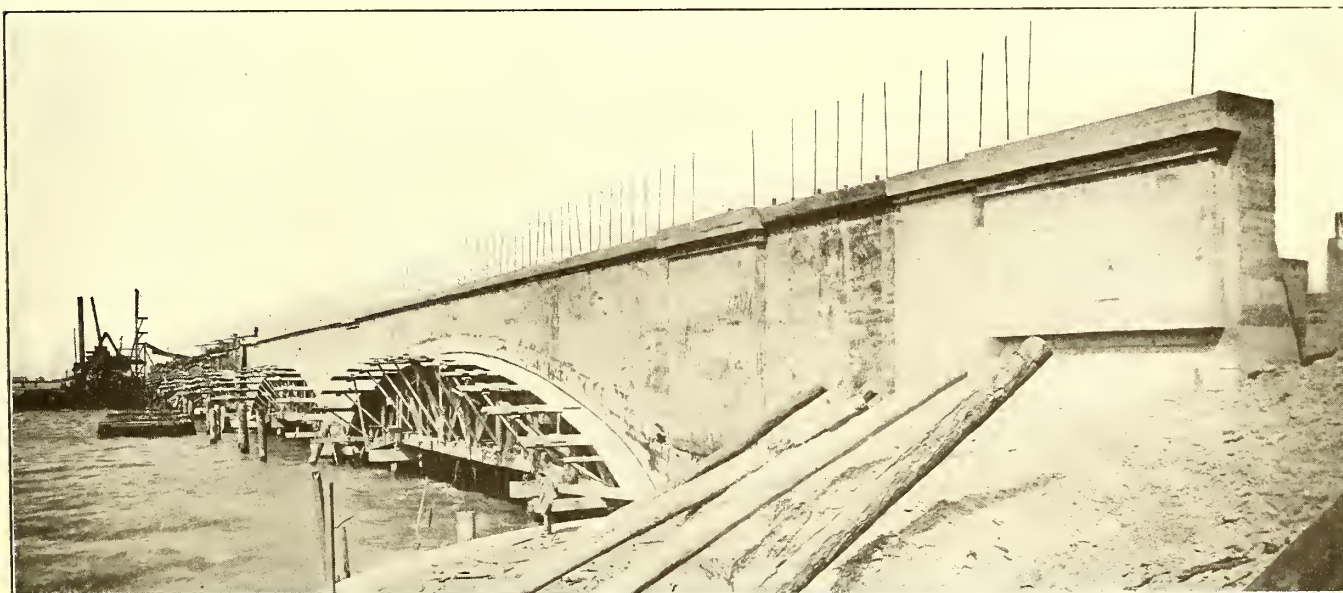
The power station and substations are lighted throughout with tungsten lamps and holophane reflectors. The engine room is lighted by 100-watt tungsten lamps with concentrating reflectors which are suspended from the roof trusses about 50 ft. from the floor. They thus clear the crane and give an even distribution light without glare.

ROLLING STOCK

Ten motor passenger cars and two express cars have been

Length of car body over end panels at sills.....	40 ft.
Length of front platform over dashers.....	5 ft.
Length of rear platform over dashers.....	6 ft.
Length of car over bumpers.....	51 ft.
Extreme width, not to exceed.....	9 ft.
Height, under side of sills to top of monitor.....	9 ft. 5 in.
Height inside top of floor to under side head lining.....	8 ft. 6 in.
Height of window sills above floor.....	28 in.
Distance, center to center of windows.....	33 in.
Distance, top of rails to under side of sills.....	43 in.
Wheelbase of trucks.....	6 ft. 6 in.
Wheel diameters.....	37 in.
Width of tread.....	3 in.
Depth of flange.....	7/8 in.
Thickness of flange.....	1 3/8 in.
Seating capacity smoking compartment.....	24
Seating capacity coach proper.....	30

All the seats are of the stationary cross type except one rear seat for two opposite salons.



Galveston-Houston Railway—Concrete Causeway, View Taken During Construction

purchased from the Cincinnati Car Company. In general these cars closely resemble those in service on the lines of the Northern Texas Traction Company, between Dallas and Fort Worth, and on the Puget Sound lines of Stone & Webster. The cars are single-ended, with vestibules, and a smoking compartment is provided in front. The total seating capacity is 54, of which 24 passengers are carried in the smoking compartment. Each car is 52 ft. long over bumpers, and weighs complete about 36 tons, without passengers. The electrical equipment consists principally of four GE-73 motors, rated at 75 hp each, geared

The car has six longitudinal sills, running the entire length without splices. The two side sills are of 3½-in. x 7¾-in. long-leaf yellow pine, reinforced by 6-in., 13-lb. channels, the inside filler being 2¼-in. x 6-in. yellow pine. The two intermediate sills are of 4½-in. x 6-in. pine, reinforced by ¾-in. x 6-in. plate; the two center sills are of 6-in. I-beam construction, with 2¼-in. x 6-in. pine filler on each side. The cross framing is of 2-in. x 5-in. oak, tenoned into the side sill fillers, intermediate sills and center side sill fillers. The cross framing in contact with the plates is fastened by angle

NOTES ON THE LACKAWANNA AND WYOMING VALLEY RAILROAD

The Lackawanna & Wyoming Valley Railroad is notable as the first heavy electric and high-speed interurban railway constructed in the East. The system now comprises 23 miles of third-rail double track, connecting Wilkes-Barre, Pittston and Scranton. The operation of the line was begun May 16, 1903, by the contractor, but was formally taken over by the railroad company on Feb. 1, 1904, under Charles F. Conn, vice-president and general manager.

The business of the company has steadily increased from year to year, but, owing to the fact that there are three steam railroads between Scranton and Wilkes-Barre and two other electric railways in part of the territory between these cities, both the passenger and freight traffic are far below the available capacity of the line. The passenger earnings for the year ended June 30, 1910, were \$501,488.14, an increase of \$11,000 over the preceding fiscal year. An excess-baggage item of \$3,300 is not included in the foregoing total, although the company carries free 150 lb. of baggage per passenger. The electric railway charges 1½ cents per mile, or 30 cents for the 20 miles between Scranton and Wilkes-Barre, whereas the steam fare is 25 cents. On the other hand the electric service is much better, as limited trains are run every hour, in addition to a local service every 20 minutes. The company owns one

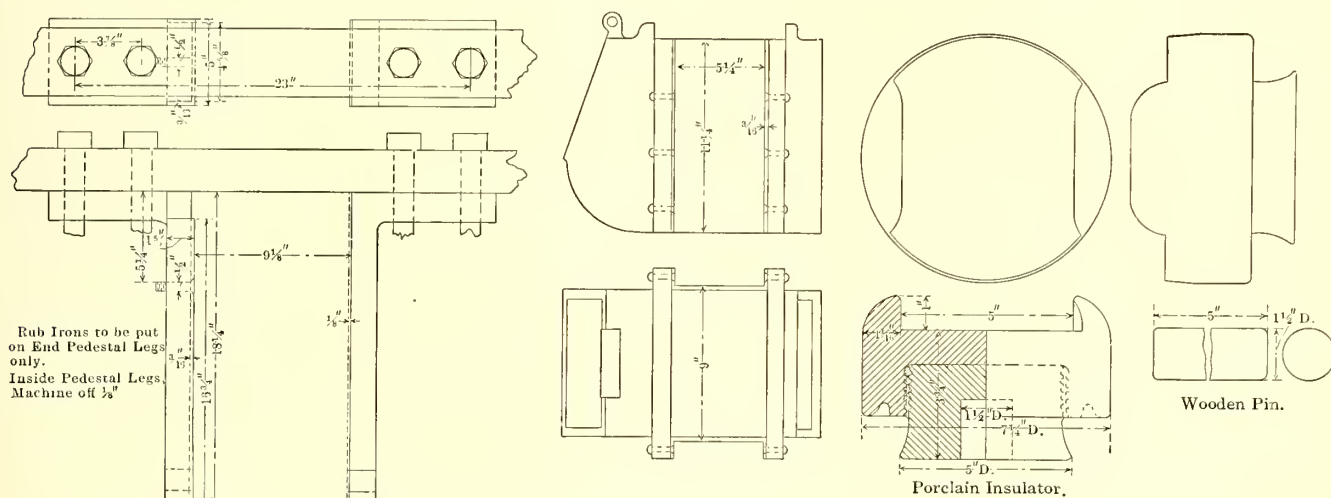
the haul is comparatively short, its pro rata necessarily is small.

THIRD-RAIL OPERATION

This road uses an exposed third rail, but has never had any maintenance charges on its account aside from insulator changes, bonding and jumpers at crossings. During the last two years the company began to replace the original insulators, and at this time some 6000 new ones have been installed. The new insulator, of which details are presented in the accompanying drawing, was invented by George W. Esslinger, the company's line foreman, and the patent is now owned by the Westinghouse Electric & Manufacturing Company. The body of the insulator consists of two pieces of porcelain cemented as shown and mounted on a wooden pin. The construction consequently has the merit of having no metal in any part. The insulators have been made by different potteries at a cost of 31½ cents each.

ROLLING STOCK CHANGES AND IMPROVEMENTS

The company began with 14 cars, but it now has 30 coaches in service, all motor cars. The original equipments, which were single-ended, have since been rebuilt for double-end operation and supplied with Westinghouse multiple-unit control. There are two 150-hp motors per car. The attractiveness of the cars for night service has been greatly enhanced by increasing the number of lamps from 18 to 36. All lights are 16 cp each. In view of the fact that there are tunnels and



Rub Irons for Journal Boxes and Pedestal Legs; Detail of Third-Rail Porcelain Insulator.

park and reaches two others on its lines, but the business from this source is not an important factor.

For the past four years the company has had a contract with the Adams Express Company for carrying express matter, most of which is through line traffic. For the year ended June 30, 1910, the revenue from this source was \$5,991.81, an increase of \$700 over the preceding fiscal year. The freight business for the latter period was \$60,000, an increase of \$8,000 over the year before. The local freight is not as large as one would expect, for, while there is a good deal of truck farming in this territory, many of the farmers still haul their produce to the nearest town, where they usually find ready customers without the intervention of commission men. Furthermore, there is little market freight movement or shopping traffic between the cities served. One man, whose headquarters are in Scranton, spends all of his time soliciting freight business. There is also a commercial agent in Wilkes-Barre who devotes three days a week to the same purpose.

The freight and express handling equipment consists of two electric locomotives, which can easily haul 15 standard freight cars; four motor cars, each of which can haul three loaded standard trailers if necessary; 10 box cars, 20 coal cars, two ballast cars and five gondola cars. The railroad interchanges freight with the connecting steam railroads, but, as

interrupted circuits at grade crossings, an auxiliary storage battery lamp circuit is provided.

F. J. Stevens, master mechanic of the company, has invented a method for throwing up automatically the pin of the old type Van Dorn couplers with which this company's cars are equipped. This object is accomplished by means of an auxiliary motorman's valve, whereby compressed air is led to a piston which is integral with the coupling pin. The operation of the piston therefore pushes the pin out of the coupling.

Mr. Stevens has also made an important improvement in journal boxes by furnishing them as well as the pedestals with wearing shoes or rub-irons, to prevent the excessive play of the brake rigging which had been caused by the wear of the pedestals and boxes. Instead of buying new boxes the old ones were planed and wearing shoes were riveted to them as shown in an engraving on this page. This engraving also shows the application of the shoes to a pedestal. As the brakes are inside-hung, the wearing shoes are put on the outer or end pedestal legs only. There is a bushed tie bolt in the bottom hole of the pedestal to hold the bottom, while the upper end is held by a ½-in. countersunk bolt which brings the head flush with the shoe. All wearing shoes are 3/16 in. thick. The first installation was made in the spring of 1909 and is still in use.

SHOP NOTES

Originally the company had considerable motor trouble from overheating. It was thought at first that the only remedy would be to replace the 150-hp motors by 200-hp motors. It has been found, however, that the difficulties with the motors are greatly reduced by giving the cars a lay-over period of 20 to 40 minutes every round trip. Another cause which has contributed greatly to increasing the reliability of the motor equipments has been the inauguration of commutator slotting combined with the use of high-grade brushes. The original hard brushes were not found suitable on slotted commutators, because they wore off the copper too rapidly.

Flash-over troubles have been cut down in the ratio of 1 to 25 and flatted commutators have been entirely eliminated. The first commutators were slotted 1/16 in., but experience has shown that it is necessary only to cut to a depth which brings the mica just below the copper. This reduction in depth is due to the fact that the new brushes do not seem to wear the commutator at all. The brushes are of the Le Carbone and National types. Their average life is about 12,000 miles as compared with 600 miles from the old brushes. Commutators are slotted in 30 minutes to 45 minutes each by a Westinghouse pneumatic slotter which the operator holds in his hand while undercutting.

All of the wheels are of the steel-tired type, 36 in. in diameter for the motor axles and 33 in. in diameter for the trailer axles. These wheels have 10 spokes and cast-steel centers. The original motor wheels had nine spokes. These steel tires average four turnings and vary in life from 125,000 miles to 225,000 miles. All wheel work except the key-seating is done in the company's shops.

At first the company used two styles of brake shoes; one plain gray iron and the other the steel-back shoe with chilled ends made by the American Brake Shoe & Foundry Company. The steel-back shoe has now been made standard, as the gray-iron shoe wore out too fast. Another reason for giving up the softer shoe was that the iron dust thrown off sometimes was responsible for short circuits besides discoloring the sides of the car.

Hitherto the company has been inspecting and lubricating its equipments on the time basis, but it has now adopted a 900-mile period. Packing which is pulled out from journals is placed in one of the turbine type reclaiming machines made by the Oil & Waste Saving Machine Company. This machine is installed in the power house, where live steam is available for its operation. The oil thus reclaimed is filtered through excelsior and placed in a tank which is heated by steam coils and is so constructed that clean oil may be drawn off at one level, while water containing the sediment from the oil is tapped at another level and led directly to the sewer.

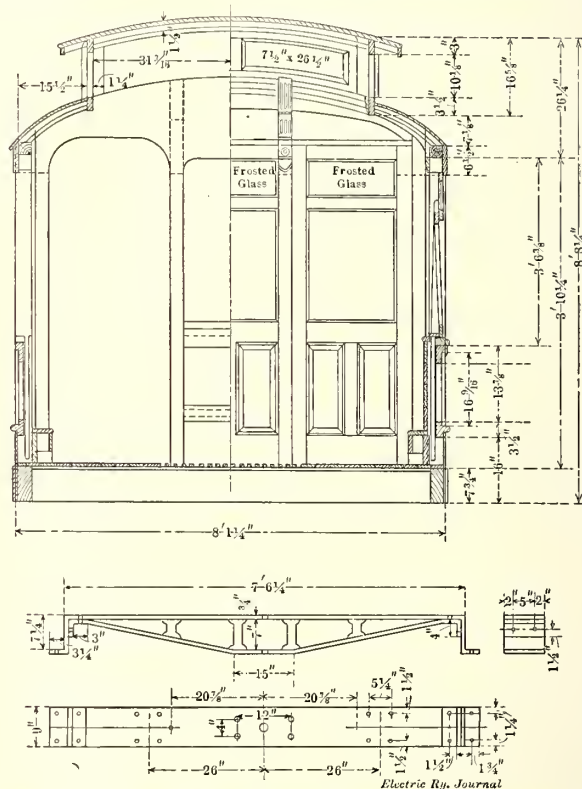
The shop is furnished with a pipe line which carries air at 50 lb. to 80 lb. pressure from six old railway motor compressors. The compressed air is used for various purposes. One application is for the commutator slotter. Another is for the brake-testing outfit which duplicates exactly the piping layout on a car, so that when equipment is tested all of the operating conditions with regard to length of piping, line pressure, etc., are faithfully imitated. A third application is in connection with the gas-pneumatic babbitt melters and soldering furnaces made by the American Gas Furnace Company. The combination of gas and compressed air is especially valuable for soldering work. It now requires only three hours to solder the leads on an armature, whereas with gasoline torches six hours were required. The combination of gas and compressed air is also used for burning paint off cars.

The cars are cleaned with Imperial car cleaner emulsion, which is applied as follows: Smear sides of car with emulsion; follow with paint shop scrubbing brush; wash off with clean water; apply oil cleaner and rub off with dry clean waste. The waste thus impregnated with oil cleaner is afterward used in ordinary car cleaning. It has been found that by cleaning cars in this manner every two months the life of the varnish has been increased about 50 per cent.

PAY-AS-YOU-ENTER CARS, ATLANTA, GA.

On Dec. 7, 1910, the Georgia Railway & Electric Company, Atlanta, Ga., began pay-as-you-enter service with four specially built cars under license of the Pay-As-You-Enter Car Corporation. Since Dec. 7 the company has constructed 26 more cars. It is the company's intention that all the new cars for strictly city use shall be of this type, provided that the pioneer cars do as well as expected. The company will not undertake to reconstruct any of its old cars, as this would be a very costly process in view of the operating conditions which prevail in Atlanta.

The new cars are of pleasing and substantial design, as shown in the accompanying half-tone, cross-sections, framing layout and seating plan. They are 40 ft. 8 1/4 in. over all, with 27-ft. 8 1/4-in. bodies, thus giving platforms 6 1/2 ft. long over all. The bottom framing is heavily reinforced by steel plates; there is also a steel truss in the window pockets running from end to end of the car upon each side. The platforms are carried on angle irons 1/8 in. x 4/8 in. x 6 in. The lower side panels of the car are formed of 1/4-in. plate, 16 in. high. The rest of each side up to the window-sills is of



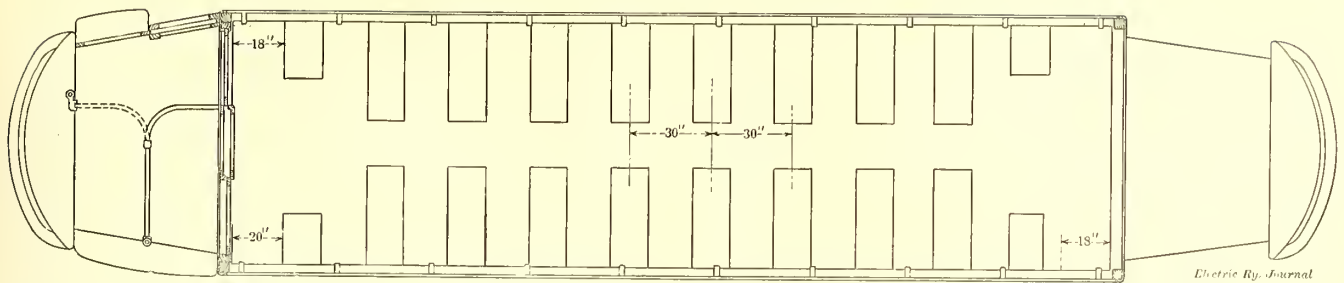
Atlanta Car—Half Cross Section, Showing Bulkhead and Finish, Bolster, etc.

poplar. Other members of the car framing are shown in the half elevation and half section.

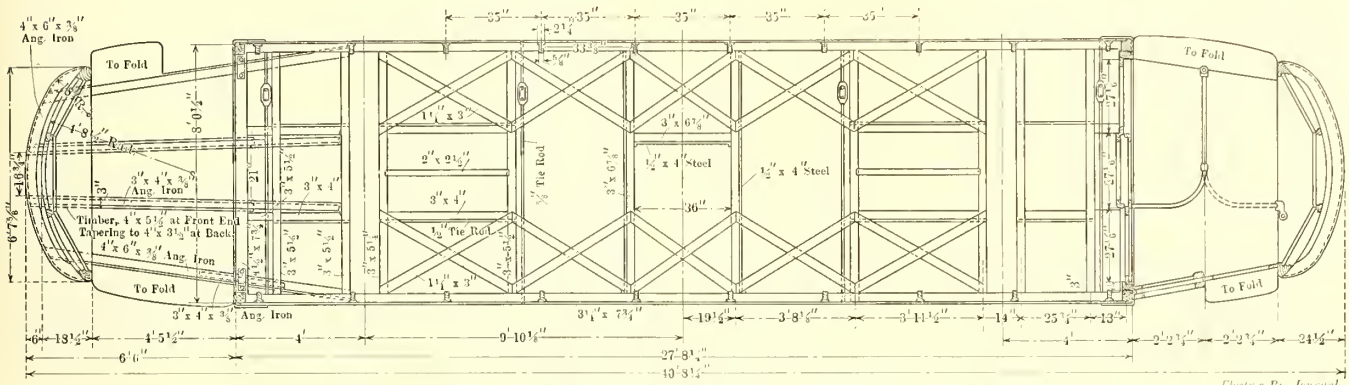
The seating arrangement consists of double reversible cross-seats, but opposite the body end doors a shorter single seat is installed which is exactly the same in construction, finish and operation as the other seats—that is, it is a reversible seat which can be moved away from the opposite door whenever maximum clearance is desired. This seating plan permits considerable freedom in entering or leaving the car body.

The cars are made for double-end operation, the forward end having the usual sliding-door to cover the exit whereas the rear platform has both an entrance and an exit aisle. When the car is in motion all gates and doors are closed except that which would close the entrance. By means of a lever the motorman controls the front exit door and the folding step operated in connection therewith. A fixed step is used on the side of the platform.

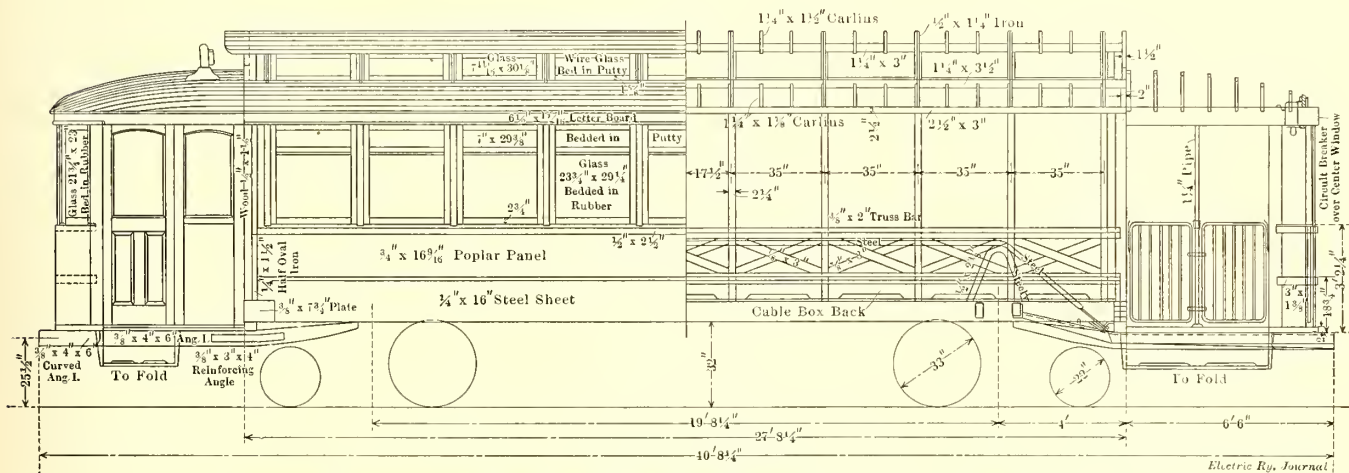
Perhaps the most interesting feature in connection with the



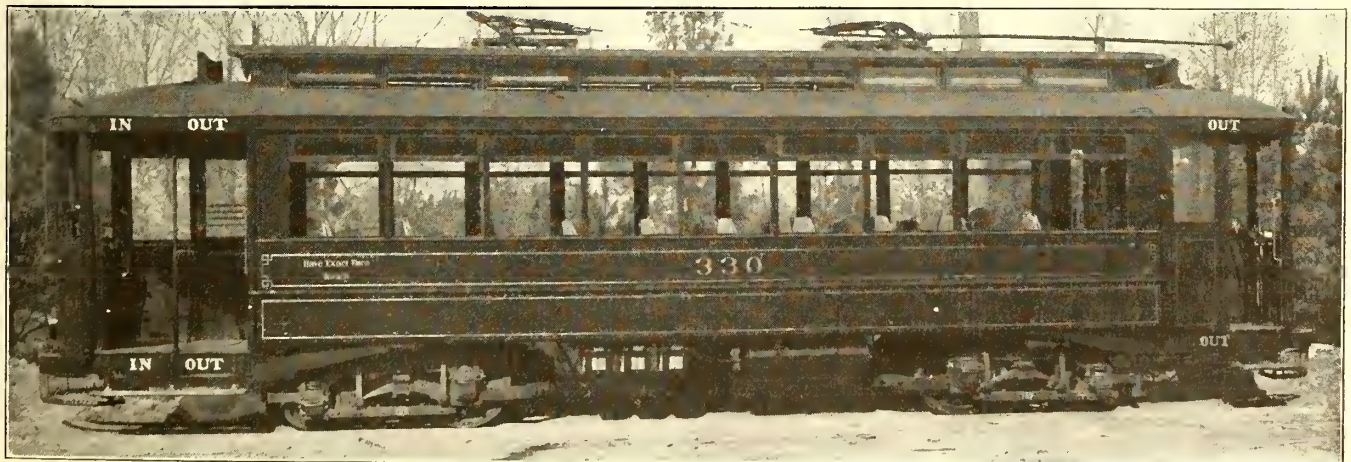
Atlanta Pay-As-You-Enter Car—Platform and Seating Plan. Showing the Reversible Single-Passenger Seats at the Corners



Atlanta Pay-As-You-Enter Car—Floor and Platform Framing



Atlanta Pay-As-You-Enter Car—Half Side Elevation and Half Side Section



Atlanta Pay-As-You-Enter Car—General View of Completed Car as Built and Equipped by the Georgia Railway and Electric Company

availability of these cars for pay-as-you-enter service is the truck. The company felt for a long time that it could not take advantage of the prepayment system because longer platforms seemed impossible in the narrow streets of Atlanta, as this condition would give clearance trouble from the proximity of curves at certain street corners. The problem was solved by the application of the Brill 39-E maximum traction truck, which permits the use of a longer platform and at the same time allows the necessary clearance. It will be noted from the accompanying half-tone and the side elevation that the pony wheels are placed nearest to the ends of the car so that they can swing under the platforms if necessary. The weight of this car completely equipped is about 33,500 lb. As it seats 36 passengers, the weight per seat is 930 lb. This weight is considered very satisfactory in view of the large platform space, the substantial construction and the character of the equipment on this car.

Each car carries two Westinghouse 112 B-2 (75-hp) motors and the National Brake & Electric Company's A-4 air brakes. The cars were built and equipped in the shops of the company under the direction of W. H. Glenn, vice-president and general manager of railways, and A. M. Moore, master mechanic.

About two weeks prior to the inauguration of the pay-as-you-enter service the trainmen on the routes over which the cars were to run were taken to the shops, where every detail of operation was explained to them. They were then allowed to take the cars out of the shops and run them over different lines in the city in order to familiarize themselves with the behavior of the car in passenger operation. For the education of the public several advertisements were placed in the Atlanta papers giving the date when the first cars would be placed in service and explaining the superiority of the new design over the old type. The public was also urged to co-operate in making the new cars prove a benefit to the service. These cars have no fare boxes, but are equipped with the ordinary hand register. The register cord is immediately over the conductor's shoulder as he stands on the platform at the dividing rail.

ILLINOIS TRACTION SHOP AT OTTAWA, ILL.

The new shop which the Chicago, Ottawa & Peoria Railway is erecting at Ottawa, Ill., is to be built of structural steel, brick in cement mortar, with concrete foundations set on solid rock. It will be 301 ft. 2 in. x 62 ft. 2 in. in ground dimensions. The height inside from the top of the floor to the lower chord of the trusses will be 34 ft. The roof will have a pitch of 1 in 5 and will be surmounted by a monitor roof 260 ft. long. The building will inclose three repair tracks, two of which will have repair pits 162 ft. long, which will have concrete walls and floors with the side walls paneled and pocketed for the reception of steam pipes and lights for illuminating the pits. The entire building is to have a concrete floor arranged with suitable floor drains. Sanders Brothers, Ottawa are the general contractors.

In the northeast corner of the building will be located a three-story office structure, the lower floor to be used as a tool and store room, the second floor for an office and the third floor for a drafting room. There will also be a space 36 ft. x 120 ft. inclosed by a galvanized iron partition and one wall of the office, to be used as a paint shop. A suitable craneway for supporting a 15-ton traveling crane will be installed. Structural steel brackets will be mounted upon the steel columns for the reception of line shafts and countershafts. The steel in the building will be strong enough to sustain a future addition on the south side which will consist of a saw-tooth structure 48 ft. wide, extending the entire length of the building. The shop will be equipped with a wheel press, lathes and other machinery for an up-to-date electric railway repair shop, all this machinery to be motor-driven. A freight repair yard will be constructed in connection with the shop. This yard will have seven tracks and a turning "Y" and loop. The foregoing information has been supplied by J. M. Bosenbury, superintendent of motive power and equipment, Illinois Traction System, Peoria.

WORK OF LAYING POWER CABLE UNDER THE CONNECTICUT RIVER

The Ætna Construction Company, of New Haven, Conn., has just completed the installation of a 11,000-volt submarine cable across the Connecticut River for the New London & East Lyme Street Railway Company. This cable is now used in supplying power to the Flanders substation of the latter company from the Shore Line Electric Railway Company's power house on the Connecticut River.

The cable crosses the river about 100 ft. below the piers for the new county bridge, which may be seen in one of the photo-

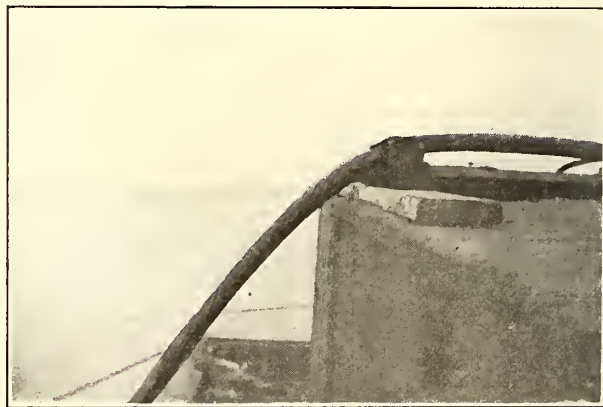


Reel of Wire on Scow.

engravings. The river at this point is about a half-mile wide, and the tide is said to exceed 6 m.p.h. This strong tide, combined with the great amount of ice always drifting down at this season of the year, greatly increased the engineering difficulties. The cable after crossing the river mounts a terminal pole on each shore, where connection is made to the transmission line through potheads.

A trench was dug about 8 ft. wide and 5 ft. deep from bank to bank to conform with the requirements of the United States Engineer's Office of this district. The material taken from the trench in the navigable portion of the stream was loaded upon scows and carried away.

The first engraving shows the reel of cable, which weighed from 6 tons to 7 tons, mounted on a cradle of old timbers. This reel revolved on the shaft as shown, a piece of timber



End of Scow, Showing Cable Passing Into River

under the side of the reel being used for braking purposes, and owing to the strong tide, it was in constant use. The cable passed from the under side of the reel to the top of the stern deckhouse and then over the end, as shown in the second illustration.

Owing to the steep embankment on the east side, the cable was started from this end, where it was run up to the terminal poles. Then the scow upon which the cable was mounted was started out into the stream. Alongside of the scow, and made

fast to it, was the dredge used in excavating the trench, the dredge being used to pull the scow across by means of lines made fast to the nearby piers. Owing to the comparatively narrow trench, a diver followed the cable across to see that it was laid properly in the trench. The scow was kept in line by means of ranges placed between the terminal poles on shore. The engineer in charge, by using binoculars, could always see the ranges and thereby keep the scow in line. After the scow reached the west shore enough slack was let out so that the cable could be pulled up to the poles without too sharp a bend. The cable was pulled up on each shore by the engines on the dredge, care being taken to distribute the pulling strain along about 25 ft. of the cable.

After pulling the cable off the reel it was dropped over the side of the scow into the trench. Trees were encountered which had rolled down the bank after the trench had been dug and had to be sawed apart by the diver to allow the cable to fall in place. If these trees had not been encountered the cable might have been laid in a somewhat shorter time. The cable was laid and ready to be connected up in a day. Only eight men, including the diver, his tender and the man at the pump, were used on the scow and dredge. The engraving below shows a field of ice which came down just after the boats got across. This gives some idea of the condition of the river at the time.

The cable was composed of three-wire, seven-strand No. 4 B. & S. copper conductors, each surrounded by 8/32-in., 30 per cent rubber compound, taped and jute filling. All was then



Connecticut River at Point Where Cable was Laid.

surrounded by tape and two layers of jute serving, protected by No. 8 B. & W. gage wire armor. The test voltage was 27,500 volts between conductors and conductors to ground. The American Steel & Wire Company was the manufacturer. E. S. Glines, of the Aetna Construction Company, was the engineer in charge of the work, acting under John Sanders, electrical engineer of the same company.

JOINT COMMITTEE ON CONVENTION LOCATION

The following joint committee on convention location to investigate the subject of the selection of a place for the next convention of the American Electric Railway Association and report to the executive committee of the association has been announced.

Representing the American Electric Railway Association: James F. Shaw (chairman), New York; John I. Beggs, Milwaukee, Wis., and J. H. Pardee, New York.

Representing the American Electric Railway Manufacturers' Association: Charles C. Castle (chairman), W. L. Conwell, K. D. Hequembourg and George Keegan, all of New York.

The following have also been appointed as alternates by the Manufacturers' Association: Joseph R. Ellicott and Henry C. Evans.

It is expected that this committee will hold a meeting at an early date.

SIMPLE DIRECTIONS FOR FIRST AID TO THE INJURED

Dr. J. J. Moorhead, chief surgeon of the Interborough Rapid Transit Company, New York, has contributed an article on "How to Give First Aid to the Injured" to the February number of the *Interborough Bulletin*. The methods call for no special equipment and are explained in such simple language that it has been considered worth while to republish them substantially in full as follows:

GENERAL

"Prompt action in the case of an accident to a passenger or a fellow employee may often save life or shorten the period of disability. It is not intended that employees should administer more than emergency treatment, nor should any employee undertake to advise or treat the injured. The services of an ambulance surgeon or other physician should be obtained, but pending his arrival much valuable time may be lost. This is especially true in injuries attended by bleeding. The following suggestions are such as can be put into practice readily by any employee while awaiting the arrival of the doctor.

WOUNDS AND BLEEDING

"The body is supplied with elastic pipes (called arteries and veins) through which the blood flows. The arteries flow *from* and the veins *toward* the heart. When the skin is torn or cut to any extent, the pipes carrying the blood are opened and the blood flows out; if a big pipe is cut this flow may be large in amount and rapidly fatal. When arteries are opened the blood usually spurts and is generally bright red; when the veins are affected, the flow is slower and darker. If the wound is big the flow is too great and sudden to clot at once, and help is needed to stop the flow.

"There are only two ways to stop excessive bleeding: To plug the hole in the pipe; to cut off the supply through the pipe. Both of these means, fortunately, can be used instantly and no special apparatus or skill is needed. The commonest wounds are those received on the head, the arms and the legs.

WOUNDS OF THE HEAD

"Practically all of these can be stopped or checked by the use of pressure on the wound—plugging the hole in the pipe. To do this, fold your handkerchief up into a hard square and place it over the wound and hold it there *firmly* with your fingers or the palm of your hand. A piece of *clean* cotton waste or any piece of *clean* cloth will answer. If there is any very hot or very cold water at hand, soak the cloth in it first, as heat and cold also aid in the clotting. If no cloth is at hand, use the tip of your thumb, your fingers or the ball of your palm. Press firmly; if the blood oozes through, don't worry about that so long as you keep up the pressure. Another way to stop bleeding from the head (if it is in the scalp) is to tie a handkerchief, a cord or a rubber band around the head on a level with the eyebrows and the two bony bumps just back of the ears; in other words, you encircle the head tightly a little lower down than the place where your hatband rests.

WOUNDS OF THE ARMS

"The main pipe that supplies the arm runs from the chest to the arm in the armpit; you can feel it throb by pressing your fingers deeply into your own armpit. Any reasonably small amount of bleeding can be stopped in this part of the body by the same means as given above for bleeding of the head or scalp—that is, by pressure. If the bleeding is of large amount (as where a finger or part of the arm is crushed or cut off) don't try to stop it by pressure, but immediately cut off the supply of blood by tying a handkerchief, a strap, a piece of cord, shoelace, suspender, belt, or necktie around the arm *above* the place that bleeds. You can always stop bleeding from the end of a finger by tying the bleeding finger close to the palm; but in any other part of the arm put the cord (or whatever you use) around the arm *above the elbow*—always remember that you must cut off the flow above the wounded place. You can make your cord as tight as you please by putting a piece

of stick under it and twisting until you have made a ridge in the flesh as the cord tightens. Raise the arm so that it points straight up after you have applied the cord around it. If you put such a cord (doctors call such an appliance a tourniquet) just below the armpit and set it tight, not a drop of blood will flow below your cord.

WOUNDS OF THE LEGS

"The main pipe that supplies the leg comes out of the abdomen on the inner side of the groin and then runs down the limb. The same suggestions as given above for the arms will answer for bleeding in this section of the body. If the wound is small and does not spurt or bleed much you can stop it by the pressure of a piece of cloth; if that doesn't answer, or if the wound is large, gaping or spurting, then tie a cord or strap, or your belt or suspender, around the leg *above* the place from which the bleeding comes. Any such cord tied around the leg *close* to the body will prevent even a drop of blood going down into the limb. Raise the leg up as high as you can after you have put a cord around it.

GENERAL HINTS

"Stop the bleeding before you move the injured person; any additional moving may make the bleeding worse. Make him as comfortable as possible by placing him on his back, elevating the injured part. When much blood is lost fainting often occurs and the injured person then becomes unconscious. It is wisest to let the doctor arouse such a person. Stimulants are best given by the doctor; whiskey and brandy are among the best of these.

"Don't get rattled; know what you are going to do and then do it deliberately. Don't be rough or clumsy. Don't use any liquid, powder or anything else on a wound—you may cause blood poisoning. Beware of carbolic solutions.

"What has been said above is intended to apply only to emergency cases in which there is free bleeding. Do not touch the *ordinary* wound with your fingers under any circumstances, because you may have some germs on your hands that will cause blood poisoning even from a small cut. A perfectly clean cloth is the only safe thing to put over an ordinary wound. You can make a safe dressing of any cloth if you will heat it to the point of charring over a flame and then put it on the wound while it is still warm.

"Think of a bleeding blood vessel in the same way as you would think of a leaking pipe of any other sort, and that will enable you to carry out the foregoing successfully and in a way that may save your own or another's life."

INTERNATIONAL ELECTRICAL CONGRESS AT TURIN, ITALY

An international electrical congress is to be held at Turin, Italy, from Sept. 9 to 20, 1911, inclusive, under the auspices of the Italian Electrotechnical Association and the Italian Electrotechnical Committee during the period of the International Exhibition of Industry and Labor. The several committees include the most prominent men in the Italian electrical field and also many important government and university officials. The honorary committee is under the patronage of the Duke of Abruzzi. From Sept. 11 to 16, inclusive, the international committee on electrotechnical standardization will convene at Turin. Invitations to attend this and other meetings have been sent to electrical engineering societies throughout the world. The organizing committee has prepared an official list of the subjects for which it will appoint lecturers, but besides this feature numerous original papers are to be presented by attendants at the congress. The opening ceremonies will take place about Sept. 9. The subscription for membership has been fixed at 25 lire (about \$5). Membership carries with it the right to attend all meetings, to vote and to receive a copy of the printed transactions. On payment of an additional fee of 10 lire (\$2) friends of the members may attend the meetings, but will not have the privilege of voting. The official subjects for discussion are 31 in number. Among them

are the following of electric railway interest: Present State of Technical Progress in the Manufacture of Stationary and Traction Batteries; Underground High-Tension Networks in Metallic Connection with Overhead Lines; Methods of Cooling Transformers of Moderate Size; Converters, Rectifiers and Motor Generators; Single-Phase Traction Versus Three-Phase Traction on Main Lines; High-Tension Direct-Current Traction Versus Single-Phase Traction on Suburban Lines, and Overhead Line Construction for Electric Railways. The papers may be submitted in French, English, German or Italian, when accompanied by a translation or, at any rate, by a summary in French. All of the languages mentioned will be admitted in the discussions. Papers should be forwarded under registered cover not later than June 30, 1911, to the secretary of the organizing committee, G. Semenza, 10 via San Paolo, Milan, Italy.

REPORT ON RECONSTRUCTION OF ACCOUNTS OF PHILADELPHIA RAPID TRANSIT COMPANY

A short reference to the report made by Vollum, Fernley, Vollum & Rorer, public accountants, upon the Philadelphia Rapid Transit Company was published in last week's issue. The full report, which is now available, is based on a thorough examination of the transactions covering the period from July 1, 1902, to Dec. 31, 1910. It states that when the books were opened as of July 1, 1902, no entry was made of the stocks delivered to the company or of the bond obligations assumed by the company as lessee. These were incorporated in the books as a matter of record. Table I, published herewith, shows the condensed balance sheet as of Dec. 31, 1910.

TABLE I.—CONDENSED BALANCE SHEET AS AT CLOSE OF BUSINESS, DEC. 31, 1910.

ASSETS.	
Leases, franchise, construction, equipment, advances to leased lines, sinking fund, etc.....	\$99,107,715
Cash in bank and with agents.....	\$861,403
Securities from fire insurance fund.....	1,200,000
Supplies, materials, prepaid items and accounts receivable	2,061,403
	1,069,071
Total assets.....	\$102,238,189
LIABILITIES.	
Bonds, mortgages, ground rents, etc.....	\$67,064,008
Accounts payable, accrued payroll, accrued tax on capital stock and loans, etc.....	507,125
Accrued taxes, fixed charges, etc.....	1,149,233
Accrued accident reserves.....	1,433,603
Accrued renewals	1,500,000
Total liabilities	\$71,653,969
Capital stock Philadelphia Rapid Transit Company paid in	29,977,120
Surplus as at Dec. 31, 1910.....	607,100
	\$102,238,189

Following the balance sheet are schedules which give details regarding the principal accounts. The report says in reference to the amplified statement of the entry of \$99,107,715:

"Franchise account, represents the cost of organization and expenses incident thereto, \$577,820.

"Leases, etc., \$12,673,066. This account represents the value of equities acquired by the Philadelphia Rapid Transit Company under its leases, not heretofore appearing on the books of the company, as follows: Value of leases covered by bonded indebtedness, \$10,853,761; value of stock acquired to protect operations of leased lines, \$319,305; lease value of Market Street Elevated Passenger Railway Company, \$1,500,000; total, \$12,673,066.

"The balance of this schedule is in itemized detail and requires no explanation with the exception of:

"Unamortized debt discount and expense commission on sale of bonds, \$147,467. This is the remaining value as an asset which is deducted annually until the maturity of the bonds sold.

"Strike account, \$934,346. This account will be reduced annually until extinguished."

In reference to the profit and loss account, which is published herewith, Table II, the report says:

"This account starts with the deficit shown by your published report of June 30, 1910, and has been readjusted upon the following recognized principles, from July 1, 1902, to Dec. 31, 1910:

"1. That all costs of organization are capital expenditures and not operating expenses.

"2. That upon an operating company taking over a plant all expenditures made to bring said plant to a normal operating condition are expenditures of capital and should not be charged to operating expenses.

"3. That the cost of selling bonds should be spread over the life of the bonds, and should not be charged to an expense of a single year.

"4. That any extraordinary outlays, such as expenditures for strikes, etc., should not be charged against the year in which such outlays occurred, but should be distributed over a number of years.

"The accounts affected by these principles are as follows, all of which had been charged to operating expenses or directly to profit and loss: Strike account, \$934,347; franchise account, \$412,495; reconstruction account, \$1,348,096; commission on bonds, \$147,467; total, \$2,842,405.

"The balance of the items in this schedule are bookkeeping adjustments made on audit of the accounts, with the exception of a charge of \$1,250,000 as a reserve for accrued accident claims.

"An examination of the claims docket showed a large number of claims in suit and the reserve above mentioned was created as being a very fair valuation of the liability of the company on this account.

"The result of this readjustment shows that the company has a surplus as of Dec. 31, 1910, of \$607,100."

TABLE II.—PROFIT AND LOSS ACCOUNT.

Deficit June 30, 1910.....	\$1,118,609	.....
Loss on fire insurance fund securities.....	108,854	.....
Depreciation insurance fund securities.....	134,553	.....
Taxes on capital stock, Real Estate Holding Company.....	72	.....
Strike account.....	1,674	.....
Commission on Philadelphia Rapid Transit bonds...	30,000	.....
Reserve for accrued accident claims.....	1,250,000	.....
To reinstate amount charged June 30, 1910, account of sinking fund Philadelphia & Willow Grove Railway bonds.....		\$10,000
Net profit from operating, six months ending Dec. 31, 1910.....		200,745
Income from fire insurance fund securities.....		43,408
Adjustment of excess in comptroller's account prior to 1907.....		49,883
Adjustment of payment Union Traction Company advance account, Fairmount Park & Delaware River bonds.....		12,083
Adjustment of accrued accounts.....		80,509
Adjustment maintenance power.....		11,829
Adjustment strike account.....		934,347
Adjustment franchise account.....		412,495
Adjustment reconstruction account.....		1,348,096
Adjustment commission on bonds.....		147,467
	\$2,643,762	\$3,250,862
Surplus Dec. 31, 1910.....	607,100	
	\$3,250,862	\$3,250,862

A statement of operations for the six months ended Dec. 31, 1910, shows passenger receipts of \$10,272,381 and chartered ear receipts of \$6,650. Operating expenses were as follows: Maintenance of ways and buildings, \$475,103; maintenance of power plant, \$740,344; maintenance of equipment, \$530,316; transportation, \$2,594,838; general expenses, \$1,005,824; total operating expenses, \$5,346,426. The gross profit from operating was \$4,932,606 and income from other sources amounted to \$286,973. From dividends on stock the company received \$159,898. Total income was \$5,379,476. Taxes, interest and rentals aggregated \$5,178,731, leaving a net surplus on operation of \$200,745.

In the six months ended Dec. 31, 1910, the passenger receipts of \$10,272,381 compared with \$9,880,809 for the corresponding period of 1909, an increase of \$391,572. The number of passengers carried was 251,398,989, as compared with 238,912,091, an increase of 12,486,898.

Stockholders of the Philadelphia Rapid Transit Company voted upon five matters at the special meeting of Feb. 28, as follows:

1. An increase of the indebtedness of the company from \$5,000,000 to \$15,000,000.

2. The authorization of an issue of \$10,000,000 of 5 per cent gold bonds and the execution of a deed of trust securing the same, being the increase of indebtedness above mentioned.

3. The assignment and transfer to the Union Traction Company, of Philadelphia, the lessor of this company, under lease dated July 1, 1902, of all the interest and equity of this company of every kind in the Market Street Elevated Passenger Railway, the Darby & Yeadon Street Railway, the Doylestown & Willow Grove Railway Company, and in all other railway properties acquired since July 1, 1902, and the transfer to this company of said interests and equity under lease without additional rental, the same as if they had been part of the Union Traction system leased to this company July 1, 1902; such transfer to be in consideration of the guarantee by the Union Traction Company, of Philadelphia, of the payment of the principal and the interest of said bonds from time to time maturing; a provision relating to said guarantee being that the proceeds of said bonds shall only be expended on property leased to this company under the lease dated July 1, 1902, or, if expended on other property, such other property shall become subject to the conditions of said lease and as though a part of the property covered by it, until the payment by this company of all of said bonds, when such other property shall be retransferred to this company.

4. Assent to an increase in the capital stock of the Market Street Elevated Passenger Railway.

5. The approval of a new system of keeping the books and accounts of the company.

The directors of the Philadelphia Rapid Transit Company were also authorized to execute an agreement covering the formation of a voting trust for five years. Rudolph Ellis, A. E. Newbold and George H. McFadden have been appointed voting trustees.

Stockholders of the Union Traction Company of Philadelphia voted on Feb. 28 to approve the general plan, as follows:

1. An increase of the indebtedness of the company from \$3,000,000 to \$13,000,000.

2. The guarantee of the principal and interest of an issue of \$10,000,000 5 per cent bonds of the Philadelphia Rapid Transit Company, said guarantee representing the \$10,000,000 increase in indebtedness above mentioned.

3. The acceptance of transfers of interests in street railway properties from the Philadelphia Rapid Transit Company and the vesting in said company of the full rights of a lessee in the properties so transferred without additional return to this company.

4. The pledging with the trustee for the said \$10,000,000 bond issue of all the interests of this company, heretofore or hereafter acquired, in the Market Street Elevated Passenger Railway.

5. Assent to an increase in the capital stock of the Market Street Elevated Passenger Railway.

In a reply to Frederick G. De Witt, district attorney of Queens County, in relation to a resolution of the Grand Jury, of Queens County in reference to the service furnished by the New York & Queens County Railway, Long Island City, Travis H. Whitney, secretary of the Public Service Commission of the First District, said in part: "The increased traffic has exceeded expectation so that the new equipment has not relieved the situation to the extent expected. The reason that open cars were operated so late last fall was that the number of closed cars was not sufficient to keep up a satisfactory schedule. Our recent inspection covering all lines shows that the service now furnished is about as good as the average street car service in the greater city. Overloads are carried during certain hours, but overloads are inevitable throughout the city during the same hours. So far as we have been able to ascertain by frequent temperature tests the provisions of the heating order are being complied with."

HEARING BEFORE RAILROAD SECURITIES COMMISSION

The Railroad Securities Commission held its final public hearings in New York on March 6 and 7. All the members of the commission were present at the hearings, which were held at the office of J. & W. Seligman & Company, 1 William Street.

F. J. Lisman testified before the commission with particular reference to the subject of branch lines. He stated that if existing lines of railroad were 30 miles apart in good territory there was room for another line. The business of constructing branch lines was almost a business by itself. Many such lines had been built for the transportation of lumber and had been torn up after the lumber had been moved. They would never be reconstructed for permanent operation if an attempt was made to require the payment of stock issued by the owning companies at par. If the roads were torn up the countries through which they ran went to seed.

One of the commissioners asked about the equity behind the bonds on the property. Mr. Lisman said that the small branch lines would not earn very much at the beginning. They were given land for right-of-way free and often received for nothing all the timber they needed. Local men who were interested would frequently give their time and service without charge.

Nobody would think of taking up an enterprise of this nature without getting some benefits therefrom. The incentive had to be capitalized. He would let the common law regulate the issue of securities. The subject of the mortgage in most cases was from 60 per cent to 80 per cent of the fair cash cost of the property. Small lines could be built for less and operated for less under independent direction than by a large railroad system. He had found that promoters had often spent \$25,000 per mile in construction and had not secured as good results as he could get for half of that amount. It would not be fair to say in such cases that each would be entitled to simply the cost of the property. When the public wanted a railroad it was not interested in the cost; it wanted the facilities.

In the construction of branch lines in the South local labor was secured at the rate of 90 cents or \$1 a day.

In answer to a question regarding rates, Mr. Lisman stated that a small line had to get 1 cent or 2 cents per 100 lb. more on freight than an established system in order to live. Any railroad was a benefit to the people located on the line. There was a property equity if not a cash equity behind the bonds of such companies. Persons could not afford to build such properties for merely the bond dealer's profit. It was not possible to measure out all the risk involved in the construction of new properties by doling out a little stock as compensation for the promoter.

Louis D. Brandeis, who represented shippers in the cases tried before the Interstate Commerce Commission recently, presented a written statement to the commission which he amplified when he appeared at the public hearing. Mr. Brandeis insisted that improvements in railroad service would come only with increased efficiency of management and the application of economies. He stated that the regulation of interstate street railways and of lighting corporations in Massachusetts was very effective. It was all that any one could ask. The amount of water that had been permitted in the capitalization of such properties was almost negligible. The Massachusetts law was not an undue hindrance to the development of enterprises. On the other hand, the law of Massachusetts had broken down absolutely with respect to the control of interstate railroads. A striking example of this was afforded by the New York, New Haven & Hartford system.

The Boston & Albany and Boston & Maine railroads, which had fallen into the hands of persons and corporations not subject to the laws of Massachusetts, had been unprogressive, Mr. Brandeis said. The curb to ambition arising from the fact that rates of dividends on the stocks were limited had had its influence in the policy of these companies. To limit dividends would be the one most serious evil that would be absolutely fatal to success. While capital as capital was entitled to a

very low return, capital so far as it was a potent force, involving judgment and ability, should receive returns commensurate therewith. Capital invested in public service corporations should receive a return commensurate with the degree of good service rendered, not with the degree of risk involved. Mr. Brandeis could imagine companies where practically no risk was involved, but where the service rendered would warrant a large return. He referred to the sliding scale system of rates and dividends which prevails in the organization known as the Massachusetts Gas Companies of Boston.

Mr. Brandeis suggested the establishment of a governmental bureau to act as a clearing house for the purpose of determining what railroad costs and service should be, and of receiving, analyzing and disseminating information regarding economical railroad operation.

Prof. Henry C. Adams, statistician for the Interstate Commerce Commission, supplemented on March 7 the testimony he gave at the Chicago hearing of the commission. He believed there should be a supervisory body to regulate the issue of new securities, but that it should not have to follow arbitrary laws which, in his opinion, would be less reliable than the free exercise of wide discretionary powers.

ELECTRICAL IMPROVEMENTS OF THE DETROIT UNITED RAILWAY

The Detroit United Railway will construct a chemical laboratory near its main power house at Riopelle and Atwater Streets, Detroit. A separate building to contain the laboratory is now under construction. It will be 22 ft. x 40 ft. in size and will be well equipped. It is expected that the laboratory will be completed by June or July.

Included in the work which will be done at the laboratory is the testing of coal. All devices necessary for coal testing will be provided and the company hopes to purchase its coal by specification later. The practice of the company has been to have its coal tested at intervals at an outside laboratory, but it is desired now to know what can be saved or lost by the purchase of coal on specification. A chemist has been employed by the company and has been engaged for the last year in making furnace analyses. He has made general flue analyses showing the temperature, amount of air draft, etc. The company will also analyze its building materials and other classes of materials which enter into power house construction, such as pipe covering. Oil is being purchased on specification.

The Detroit United Railway has installed recently a 3000-kw Westinghouse-Parsons 25-cycle, 6600-volt turbine together with eight 500-kw synchronous motor-generator sets. In the purchase and arrangement of this apparatus it was necessary to construct underground lines in the street in which three conductor cables of proper capacity were installed. This is the beginning of a series of substations which will be constructed around the City of Detroit to be connected by the belt-line method, feeding back into the general system and thereby equalizing with the main power house.

The company has used electric light switch stands independently lighted for three years on one interurban division and has now extended this improvement to all divisions of the interurban system. A separate circuit is run from each substation so that it covers all switches between the substations.

The information regarding these improvements has been received through the courtesy of E. J. Burdick, superintendent of power, Detroit United Railway.

METROPOLITAN STREET RAILWAY REORGANIZATION

The hearing by the New York Public Service Commission, First District, in relation to the plan for reorganization of the Metropolitan Street Railway was adjourned from Feb. 28, the last date fixed, to March 22, in order to give representatives of the company and of the commission sufficient time to go over some of the details which are to be considered.

COMMUNICATION

BLOCK SIGNALS FOR SINGLE-TRACK LINES

OREGON ELECTRIC RAILWAY COMPANY

PORTLAND, Ore., Feb. 28, 1911.

To the Editors:

I have read with interest the article on "Automatic Block Signals for Electric Railways" by W. K. Howe, of the General Railway Signal Company, published in your issue of Feb. 11, and agree with the writer as to the system of signaling to be used, but I do not agree with him in his proposed method of attempting to cheapen the cost of installation by using "call on" signals or permissive blocking in single-track operation. This indication, when used, is primarily for following movements on double track and should never be used in single-track operation, as it becomes a menace instead of a safeguard. To illustrate: A train inferior by direction enters a block, thereby setting the semaphore at stop and displaying a yellow light which allows an extra following to enter the same block "under control." Both the above trains are to meet an opposing train of superior rights by direction, the first named train by time card rights and the extra by authority of a train order. The regular train may be delayed, and finds that it cannot make the meeting point, drops a flagman and starts to back to the station. This may result in a rear end collision if the train backing is not preceded by a flagman, or the following train may not be "under control" and may strike the first train before a flagman can get back.

The omission of intermediate signals is not justified on account of serious delays which will result without their use. In order to obtain proper protection "overlaps" must be used

and finances of the property will justify the expenditure necessary to obtain this protection.

The daily passenger train movement over the district of this division of the Oregon Electric Railway, which is to be equipped with automatic signals, is at present 36 trains per day and will shortly be increased to 48 or 50 trains per day. There are also several freight and work train movements. The character of the trains operated, which in case of passenger trains consist of from two to four cars each, and freight trains from 15 to 40 cars each, requires similar protection to that provided on standard steam lines. Therefore, the cost of about \$3,000 per mile seems to be justified in this particular case.

C. A. COOLIDGE,
General Manager.

REPORT OF THE WISCONSIN RAILROAD COMMISSION

The report of the Railroad Commission of Wisconsin for the year ended June 30, 1910, shows that the total number of electric railways operating in the State was 26. The Grand Rapids Street Railroad was added during the year.

The miles of road, exclusive of road operated under trackage rights, on which these companies operated increased from 586.25 miles on June 30, 1909, to 608.23 miles on June 30, 1910, an increase of 21.98 miles. Operating revenues for the 1910 fiscal year were \$6,788,101, an increase of \$770,181, or 11½ per cent. Operating expenses were \$4,678,363, an increase of \$609,809, or 13 per cent. Net operating revenues increased \$160,372, or about 8 per cent.

A section of the report is devoted to a discussion of the subject of the time required for the disposition of cases. In all cases in which the situation with respect to service was acute

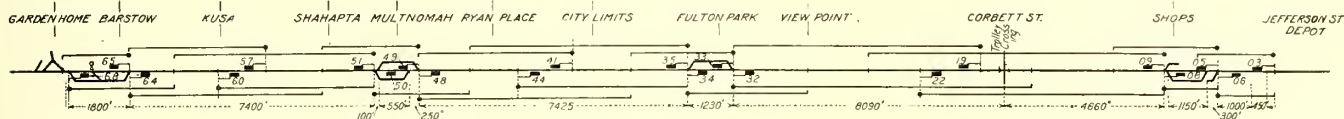


Diagram Showing Proposed Block Signal System on Oregon Electric Railway

and with a train occupying the main line at one station an opposing train is blocked one station away. This method has been tried on comparatively short blocks and has been discontinued for the above reason, and also for the reason that a train switching at one station, or a switch being left open, prevents any movement from the station beyond.

The writer has designed a layout, shown in the accompanying engraving, for automatic signals between Portland and Garden Home, on the Oregon Electric Railway, a distance of 7 miles. This installation calls for 22 three-position upper left-hand quadrant signals, 14 of which are for station protection. There are two preliminary and six intermediate signals. The control of these signals is so arranged that they are virtually "distant" as well as "home" signals, a 45-deg. indication by day and a yellow light by night indicating that the block ahead is "clear," but that the second block ahead is occupied. This allows a train to enter a block at full speed, provided the indication is "clear," or "caution," and if at "caution" the motorman expects to find the next signal at "stop." All signals are located so they can be plainly seen at distances varying from 1500 ft. to 3000 ft., and it is not necessary therefore to provide a distant signal at station approaches. If permanent obstructions to the view make it necessary a distant signal may be installed at the overlap point with only the additional cost of the signal, as the track is already cut at this point.

The writer is strongly inclined to the use of four signals for the protection of all through sidings, as this system allows movements up to the signals at either end and allows switching movements to be made at such sidings with maximum protection. This is the prime requisite in all signaling, and unless such protection is provided the installation of automatic signals should be deferred until such time as the density of traffic

the commission issued temporary orders compelling immediate relief from the conditions complained of justly, or brought about the desired result through informal action, reserving other matters involved for future consideration. The commission refrained from making orders on data which it knew to be less complete than could be made. Clamor for immediate action, the report says, has never tempted the commission to swerve from such a deliberate course as the necessities of the case require. The commission has found that only a certain number of men can prudently be assigned to a certain piece of work. The assignment of additional men to the same work, even when not inexperienced, would result in a relatively large expenditure on the part of the State and a relatively small return of service therefor.

In several cases which have been before the commission for a considerable period of time the utilities and municipalities concerned have been in controversy with one another for many years without reaching a settlement or establishing a truce. The commission, therefore, remarks: "After years of conflict without determining effect with respect to rates and service, it should perhaps not be unreasonable to grant to the commission whatever time is necessary to determine such service and rate questions in a manner which it deems best adapted to carry out the letter and spirit of the public utilities law. In practically no instance during the 50 years since the State of Wisconsin was founded has there been made a record, public or private, which would suffice even tolerably for the establishment of rates and service rules."

Of the issue of new securities authorized during the year \$6,007,000 were to electric railway, light and power companies.

Since the passage of the public utilities law 28 applications for increases of rate have been acted upon by the commission.

In the section of the report relating to the accounting feature of the work the commission states in reference to the subject of depreciation: "The provision of the law relating to a depreciation account has been widely misunderstood and variously interpreted and much additional attention and personal supervision will be necessary before it can be said that this important provision of the law has been complied with."

In discussing recommendations for legislation with reference to the stock and bond law, the commission refers as follows to the construction of the law given by the Supreme Court in a case affecting the Minneapolis, St. Paul & Sault Ste. Marie Railway:

"The law as it now stands, by virtue of such instruction of the Supreme Court, is of little value as a means of ascertaining many important facts relative to past issues of securities of public service corporations which should be matters of record in connection with any new issues of securities. The financial history of such corporations is vital to investors and, if made a matter of record, will accomplish much in preventing overcapitalization of such companies. The law should be so amended as to give the commission the power of investigation which it assumed to possess prior to the decision of the court in the above-mentioned case. It might be well to strengthen the law in other respects. At present the corporation determines the character of securities it wishes to issue, also the purposes for and the terms upon which the same are to be issued. The Legislature could prescribe the purposes for which such securities could be issued, determine the character and limit the amount of the same to that which would be reasonably required for such purposes and leave it to the commission to ascertain whether the purposes are within the terms of the statute and whether the character and amount proposed to be issued are reasonably required for such purposes.

"The broadest powers possible of investigation should be vested in the commission. This, in our judgment, is absolutely essential to effect that which seemed to us to be the manifest purpose of the Legislature in employing the language to which the court has given a different interpretation."

In reference to the engineering staff it is stated that important steps have been taken in the work of the newly established department relating to signaling and interlocking, and to safety of railway travel in general. Considerable further work has been done in the movement toward the revision of certain features of the valuation work performed by the staff. These changes involve special studies as to unit cost, the life of structures and related aspects of this work. There has also been a critical review of the classification scheme governing the valuation work in general. The printed blanks used in gathering from railway companies the inventory and other data required in valuing new roads and in making the annual revisions in the valuation of old lines have been completely overhauled. A revision of forms and classification schemes for electric roads and for the various types of public utilities properties is now in progress and will probably be completed during the coming year.

Informal observations of railroad service are taken by members of the staff while en route in the discharge of their regular duties. These observations relate to such matters of practice as flying switches with passenger trains, failure to test air brakes, lack of protection to trains, unsafety of track and structures, etc.

The more important reports are taken up immediately with the proper officials of the railroad companies, while the less important reports are sent to the general managers of the companies affected at the end of each month.

A systematic inspection and investigation of block signal systems in the State is being made.

Investigations of railway accidents are made as far as possible by those members of the engineering staff who are qualified by previous training to investigate the practical features.

On the subject of the valuation of electric railway properties the commission says: "In the initial steps in the valuation of the electric railway properties of the State originated the

first use of a joint valuation staff serving the Railroad and Tax Commissions. Such joint relationship was provided for in effect in the enactment of the railroad commission law of 1905, which prescribed that data in the office of the State Board of Assessment should be available for the use of the Railroad Commission.

"During the past year the work of the staff, although following substantially the same general lines as in previous years, has been the subject of continued study and criticism with a view of effecting improvements wherever practicable. Following along the lines already mentioned with respect to the steam railroads, there is also under way at present a systematic revision of the valuations of electric railway properties of the State. During the past year the schemes of classification used in these valuations have been recast to conform as closely as practicable with the prescribed classifications of accounts adopted by the Railroad Commission for such properties. Considerable progress has also been made in connection with the revision of unit prices and related details of the work."

Regarding investigations of street railway service the report says:

"Investigations in Milwaukee.—In addition to the special investigations of street railway service in the City of Milwaukee described in a previous report, the staff has been called upon during the past year to make further studies of the data gathered in those investigations for the purpose of supplementing the recommendations previously submitted as to the modifications of the street car routing and extensions of the trackage systems. Certain memoranda were prepared showing the time spent unnecessarily on cars by residents of certain portions of the city due to detouring through the heart of the city instead of using a direct route across the Sixteenth Street viaduct. It was found, for example, that in this one case such direct routing would result in an annual saving of 1,000,000 passenger hours, in round numbers; in other words, that residents in certain sections of the city, for the most part laboring people, would be able to spend these 1,000,000 hours in their own homes instead of in unnecessarily lengthy trips in the street cars operated by way of the present defective routing through the congested downtown district."

"A peculiar feature of the original investigation was the facility with which there could be measured certain traffic requirements which have heretofore been regarded as being more or less intangible in character. A study of the habits or tendencies of the individual classes of passengers by an analysis of the data along special lines showed the resulting trend to travel automatically established by the people. These investigations made it possible to point out accurately the direction of this trend of traffic, thereby furnishing a basis for determining with certainty the natural or established demand for car service on certain streets and in certain districts. The process gave a means of studying the present locations of the various lines with reference to the location of the general trend of traffic, from which it was possible to determine the streets along which franchises would be most valuable to the public as well as to the company. The further fact was brought out, as already indicated for a particular section of the city, that cars were operated over certain sections of track at a decided disadvantage to the public, since it involved a routing of cars neither convenient nor comfortable for the patrons of the company.

"Other Street Car Service Investigations.—Similar street railway service investigations are under way in other cities in the State. It is the object of such investigations to determine the classification of territory served, the amount of traffic, the peak conditions of travel, vacant seats furnished by the company, amount of distortion of headway, and related features of service. It has been the aim to determine the adequacy and convenience of the service provided for the traveling public and to suggest remedies where faulty conditions were found for the information of the commission in rendering its decisions."

AUTOMATIC BLOCK SIGNAL ARRANGEMENT FOR STUB-END SIDINGS

The application of automatic block signals of the trolley contact type to stub-end sidings on single track roads so as to provide complete advance and rear protection involves a number of complications not met with in applying this type of signals to through sidings where the cars pass under the trolley contacts always in the same direction. The Nachod Signal Company has devised an arrangement of its type CD signals to suit the conditions of stub-end siding protection which is simple and effective. Such an arrangement is shown

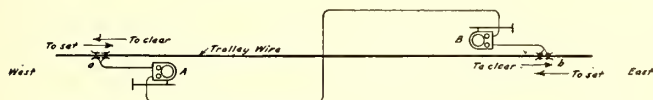


Fig. 1—Pair of Signals Applied to a Single Block

in Fig. 2. Fig. 1 shows a pair of Nachod type CD automatic signals applied to a section of single track, as for curve protection in both directions. Since this forms the signaling unit used the operation will be described before entering into a description of the combination, shown in Fig. 2.

When there is no car on the track ab the signals A and B are neutral, that is, they display neither lights nor disks. This indication authorizes, for example, an east-bound car about to enter the block to run under trolley contactor a , but no further, unless the signal then changes to a caution indication, which is a yellow light and a yellow disk. The caution indication is an assurance that at the same time the signal at B has changed from neutral to stop, and shows a red light and a red disk. The change to the yellow caution signal authorizes the car to proceed through the block. The distance aA , between the contactor and signal, termed the advance distance, is provided for the observance of this change. When the car passes out of the block under contactor b , both signals are restored to normal.

Should another or several cars follow into the block before the first has left, as for permissive signaling, each will receive an indication, by the temporary extinguishing of the yellow light, that it is recorded on the relay counter. As the cars leave the block successively, the signals are not restored to neutral until all the cars have passed under the contactor and left the block.

The contactors are without moving parts, but they operate according to the direction of movement of the cars passing under them. Thus a car moving eastward under a when the block is clear sets a caution signal at A and a stop signal at B , but in backing out at a it will restore both signals to nor-

are maintained permissive at one end and stop at the other, instead of stop at both ends. Moreover, the signal line wire may be lead through the standard switch boxes, so that an open switch in the block will prevent the display of any proceed signals. In this case the signals will remain neutral, and a neutral signal persisting after the contactor is passed is regarded as a stop signal. Power to operate the signals is taken from the trolley, no batteries or insulated rails being used. The contactors control the signals at speeds of 55 m.p.h.

Fig. 2 shows the same type of signals applied to single track interurban operation in both directions with single-end sidings as passing points. When passing in opposite directions one car heads into a siding and backs out again. It is made up of units as in Fig. 1, arranged with an overlap.

Three conditions may be considered: First, a single car passing from west to east through the diagram, the signal protection ahead and to the rear being described. Second, two cars scheduled to pass at siding Y , starting from opposite ends of the diagram and going with equal speed. Third, the same starting conditions, but the west-bound car delayed and the east-bound car continuing to the next siding.

First, an east-bound car in the block to the left, on arriving at c sets caution at C , and stop at F , D being already set at stop. The car passing e will clear D , and at switch point Y or before, signal E will be seen neutral. At g the car will change E to caution and H to stop. Thus it will be seen that while the car is between g and h there will be two caution signals, C and E , for rear protection, and two stop signals, F and H , for facing protection. At h the car will clear C and F ; at j it will set a caution signal at G , and at k it will clear the signals at E and H , etc.

Second, suppose that two cars run under c and k toward each other at the same or nearly the same time. The car at c sets signal C at caution and signal F at stop, signal D being already at stop. The car at k sets signal H at caution and signal E at stop, signal G being already at stop. When the east-bound car gets within sight of E at stop, which must be before it reaches Y , the motorman prepares to head into siding f . At the same time the other car, coming within sight of F at stop, is prepared to stop and wait behind h until F is cleared by the east-bound car passing beyond f in the siding. Thus, under favorable conditions for viewing the signals from a distance, the least combined stopping distance from full speed must equal the overlap EF between signals, plus the visible range of both signals. Under the worst condition, as in fog, the overlap is the least stopping distance, but at such times the speeds would be limited in approaching sidings. Contactor f is located so that after the trolley of the car heading into the siding has passed it the car is in the clear. The distance Yg , from switch point to the contactor, is there-

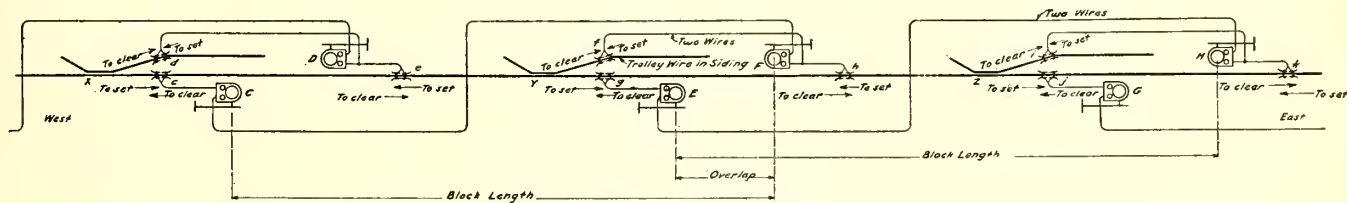


Fig. 2—Block Signal System Applied to Single-Track Line with Stub-End Sidings

mal. While this car is in the block, another car, entering under the contactor b against stop signals, will not change the indications, but will be counted in on the relay; and in backing out again this effect will be canceled.

In general, the relay counter controls the display of signals, setting them for the direction of traffic of the first car in the block, counting in every subsequent car entering under either contactor without change of signals, and restoring them to normal only when as many cars have passed out of the block as entered into it. Thus a car entering the block and setting the signals would hold them, even though other cars switched in and out of the block under the contactors at either end.

The operation is as universal as with track circuit signals, with the advantage that, with a car or cars in the block, signals

fore suggested as 100 ft., and the advance distance gE , 200 ft. The distance Yh may thus be approximately constant, but hZ , the major distance, is dependent on the distance between successive switch points YZ .

After F is cleared, the east-bound car being at the end of the siding, the west-bound car, running under h , sets F at caution and C at stop. At g it clears E and H and passes beyond Y . The other car then backing out of the siding at f counts in another car on F , without changing the signals there, and going east again on the main track at g , sets E at caution and H at stop. At h it counts out on F , which will go to clear provided the west-bound car has passed c .

Third, with the west-bound car in the right-hand block and delayed, the east-bound car on reaching Y , the specified meeting

point, finds signal *E* neutral, and after waiting the required time goes forward. At *g* it sets *E* at caution and *H* at stop, at *h* it clears *C* and *F*, and before reaching *Z*, finding *G* at stop, it takes the siding. This clears *E* and *H* at *i* and it then waits for the west-bound car to pass out of the right-hand block.

NEW FARE RECORDER SYSTEM USED IN CHICAGO

During 1910 the Dayton Fare Recorder Company, Dayton, Ohio, began a series of demonstrations on the lines of the Chicago Railways Company with a new multiple fare recorder



Fare Recorder for Inside of Car

and computer. These trials have proved so satisfactory that the company has ordered more machines of this type. This recorder has so many distinctive features that the following description should prove of general interest to all who are concerned in the vital problems which are connected with fare collection.

The recorders are of the multiple-recording type. They indicate, register and compute each kind of fare separately and record the result of the registration in printed records that require no computations whatever by conductors or receivers to determine the amount of the day's collections. The results are worked out in detailed and classified totals by the recorders, and are fully computed in the printed records when they are removed from the machines.

The recorders are adaptable to all types of cars. As used on the pay-as-you-enter cars in Chicago each register occupies a maximum wall space of 10½ in. x 15¼ in. over one end door of the car. In addition to the indication of the denomination of fare paid, which is given by the register itself, additional indicators are placed on each platform and all operate in unison. Thus if the conductor receives a 3-cent fare the indicators on the front and rear platforms and within the car body are set simultaneously to indicate 3 cents before the register is rung. The indicators on the platforms are mounted at about the level of the conductor's eyes and between the two doors in the end bulkhead. They are set by a small handle within easy reach of the conductor and close to the bulkhead. This handle moves all indicators simultaneously through the medium of gearing and a ¼-in. steel shaft extending from end to end of the car. Provision is made to prevent passengers on the rear platform

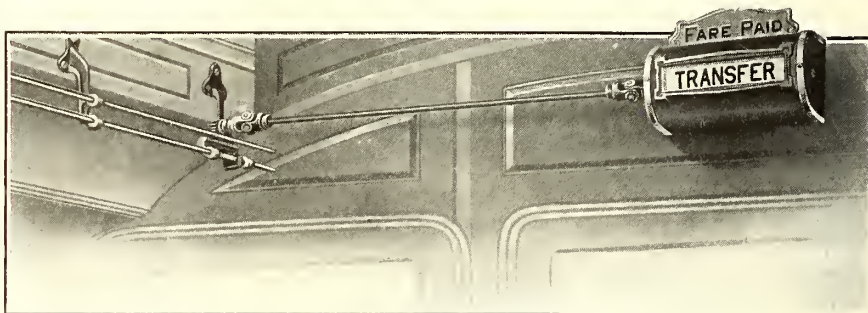
from interfering with the operation of the register or indicator, the handle being removed when not in use.

The register is operated by the conductor by means of a treadle on the rear platform. This treadle can quickly be detached and taken by the conductor to the other end of the car when the direction of operation is reversed.

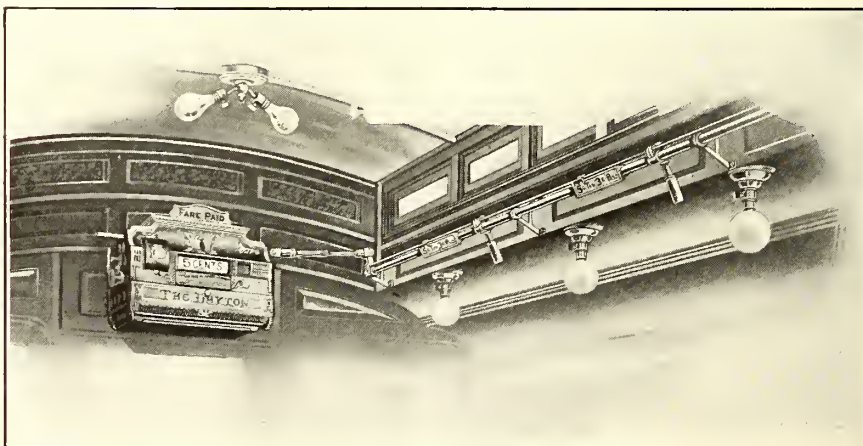
These registers do not show the count of the fares to the passenger, but only the denomination paid and, as earlier stated, this is indicated in three places on the car. For a 5-cent cash fare the register bell gives a clear ring; for other denominations the bell is muffled.

The operating mechanism for regular type cars enables conductors to indicate and register the fares without releasing the operating handle. No ropes or cords are used. The fare indicators are located on the operating rod, a sufficient number being used so that the indications of the fares may be observed from any part of the car. The recorders are at all times locked against unauthorized registrations. When a conductor takes charge of a car at the beginning of his run he first unlocks the recorder, then uses his "conductor's number key" to record his badge number on the printed record, thereby identifying himself with the record of his work. These keys are cut of steel similar to a Yale lock key and are about 3 in. long. Each recorder has a capacity for identifying 9999 conductors and 99 inspectors; the keys are interchangeable.

At the end of the trip the time of arrival is set on the time mechanism, the record of the trip is printed by operating the printing knob (shown on right side of recorder) a quarter turn, and the counters are reset to zero in the usual way. No other operations are required to produce the trip records. At the end of his run the conductor operates the printing mechanism to obtain the total record of the fares collected on all the trips. The total record may be made in duplicate if desired by repeating the printing operation. The conductor then removes the combined trip and total record from the recorder and makes settlement according to the amounts shown therein.



Inside Indicator for Prepayment Cars to Be Used When Desired. It Is at the End of Car Opposite That Occupied by Recorder



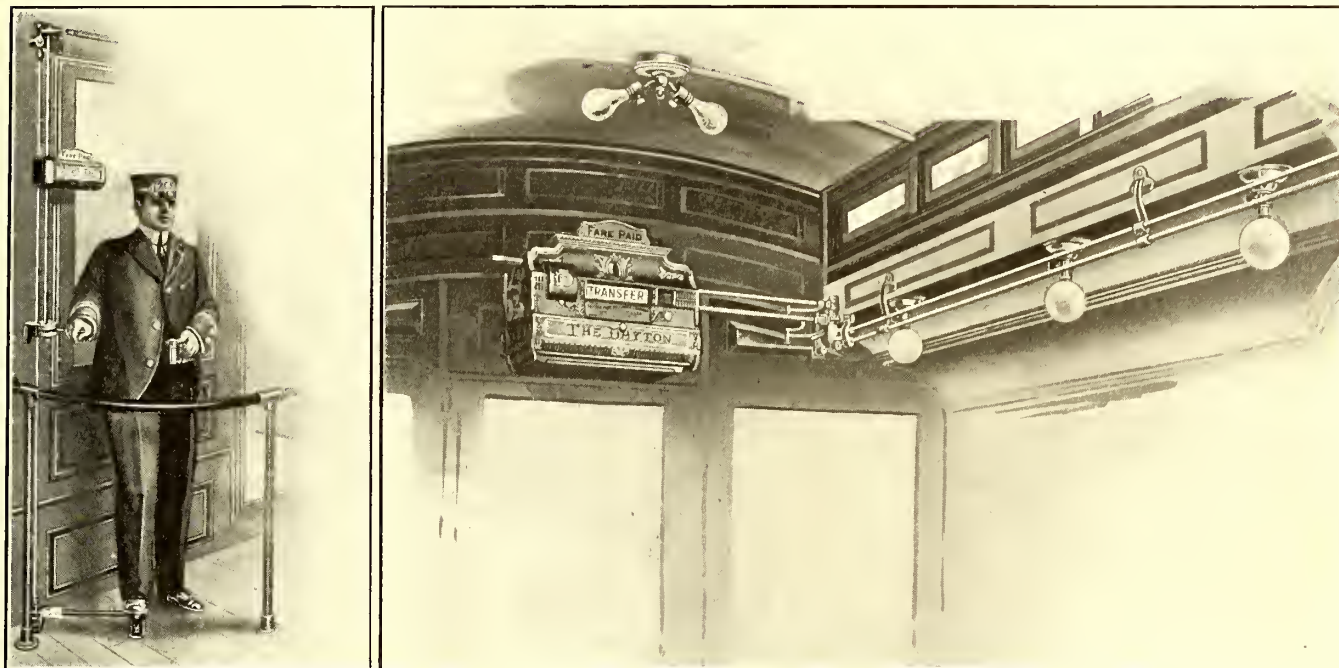
Fare Recorder in Interior of Ordinary Type of Car

When the car is returned to the car house at the end of the day's work an inspector, or register clerk, obtains access to the accumulating mechanism by means of a key, operates the printing mechanism of the recorder and obtains a "total rec-

ord" of the earnings and traffic of the car for the entire day, regardless of the number of conductors that operated the car during the day or the number of trips made. These daily "total records" are described as "auditor's total records," as they are sent by the inspector direct to the accounting depart-

operation, so that duplicate records showing the earnings and traffic of each car can be furnished direct from the recorders at the end of a day's work to any departments or officials desiring them.

The completeness with which the recorders compute and record



Views of Platform and Interior of Regular Prepayment Car Showing Setting and Operating Mechanism and Fare Indicator on Platform and Recorder Inside the Car

THE INTERNATIONAL RAILWAY COMPANY										
TOTAL RECORD										
LINE	TRIPS	CASH	5c. FARES	TRANSFERS	3c. FARES	PASSES	TOTAL PASSENGERS	RECORDER TOTAL	INSPECTOR	
52	17	4 2 2 4	7 6 2	2 5 1	1 1 9	0 7 3	2 2 4	4 0 2 2 5	0 3 9	

TIME TRIP RECORD CAR No. 5143

THE INTERNATIONAL RAILWAY COMPANY										
TOTAL RECORD										
LINE	TRIPS	CASH	5c. FARES	TRANSFERS	3c. FARES	PASSES	TOTAL PASSENGERS	RECORDER TOTAL	INSPECTOR	
52	5	0 9 7 5	1 8 3	0 7 0	0 2 0	0 1 7	2 9 0	4 0 2 2 5	0 0 9	

TIME	TRIP RECORD	CAR No.
131 AM	0 0 9 0 1 8 0 8 0 0 0 2 0 2 8	COND 1940
1215 AM	0 1 3 6 2 6 1 2 0 2 0 4 0 4 4	COND 1940
1101 PM	0 2 0 6 4 0 1 2 0 2 0 4 0 5 8	COND 1940
945 PM	0 3 4 4 6 4 2 0 0 8 0 2 0 9 4	COND 1940
852 PM	0 1 9 3 3 5 1 8 0 8 0 5 0 6 6	COND 1940

THE INTERNATIONAL RAILWAY COMPANY										
TOTAL RECORD										
LINE	TRIPS	CASH	5c. FARES	TRANSFERS	3c. FARES	PASSES	TOTAL PASSENGERS	RECORDER TOTAL	INSPECTOR	
52	6	1 8 5 6	3 3 1	0 9 7	0 6 7	0 2 4	5 1 9	3 9 9 3 5	0 0 0	

TIME	TRIP RECORD	CAR No.
715 PM	0 2 9 9 5 5 1 0 0 8 0 6 0 7 9	COND 2378
602 PM	0 3 5 3 6 4 2 0 1 1 0 5 1 0 0	COND 2378
445 PM	0 2 0 3 4 3 1 4 1 6 0 2 0 7 5	COND 2378
331 PM	0 3 3 1 5 9 1 5 1 2 0 5 0 9 1	COND 2378
215 PM	0 2 4 9 4 5 1 7 0 8 0 2 0 7 2	COND 2378
102 PM	0 3 6 1 6 5 2 1 1 2 0 4 1 0 2	COND 2378

THE INTERNATIONAL RAILWAY COMPANY										
TOTAL RECORD										
LINE	TRIPS	CASH	5c. FARES	TRANSFERS	3c. FARES	PASSES	TOTAL PASSENGERS	RECORDER TOTAL	INSPECTOR	
52	6	1 3 9 3	2 4 0	0 8 4	0 5 1	0 3 2	4 1 5	3 9 4 1 6	0 0 0	

TIME	TRIP RECORD	CAR No.
1145 AM	0 3 5 0 0 1 1 0 1 5 0 6 0 9 2	COND 259
1030 AM	0 2 2 1 3 7 1 5 1 2 0 4 0 6 8	COND 259
915 AM	0 2 5 4 4 6 2 5 0 8 0 4 0 8 3	COND 259
801 AM	0 2 3 8 4 4 1 2 0 6 0 8 0 7 0	COND 259
645 AM	0 1 8 4 3 2 1 2 0 8 0 4 0 5 6	COND 259
530 AM	0 1 4 6 2 8 3 0 0 2 0 6 0 4 6	COND 259

Sample Record Made by Recorder

ment, where the day's earnings and traffic are determined from them. Any number of these daily "total records" can be obtained from the recorders merely by repeating the printing

the earnings and traffic of cars is remarkable. The printed records as they come from the machines are analyzed statements of the day's operations which are as absolutely correct and as legible as typewritten letters. Errors in trip-sheet footings, extensions and classification of fares are positively eliminated.

The recorder produces two separate and distinct records, namely, the conductor's record and the auditor's record.

The conductor's record shows the results of each trip in detail as follows: Arrival time, amount of "cash" collected, number of each kind of fare collected, number of passengers carried and number of conductor. The trip records are totaled for each conductor, showing the following information: Line number, number of trips made, total amount of "cash" collected, total number of each kind of fares collected, total number of passengers carried, register total, date, number of car, number of recorder and name of company.

The auditor's record shows a summarized total of the earnings and traffic of the car for the day classified under the same headings as the conductor's record.

A closer analysis of the facsimile record herewith produced shows the following specific data for car No. 5143, operated Jan. 9 on line No. 52 of the International Railway Company, Buffalo, N. Y. The record for the day begins at the bottom of the sheet, showing the first trip completed at 5:30 a. m., \$1.46 cash, 28 5-cent fares, 10 transfers, two 3-cent fares, six passes, 46 passengers, conductor No. 259.

Similar results are shown for each trip made during the day. Conductor No. 259 made six trips, being relieved at 11:45 a. m. by conductor No. 2378. The "total record" for conductor No. 259 shows that he operated on line No. 52, made six trips, with the following result in fare collections: \$13.93 cash, 248 5-cent fares, 84 transfers, 51 3-cent fares, 32 passes, 415 passengers, the register total showing 39,416 at the end of his run.

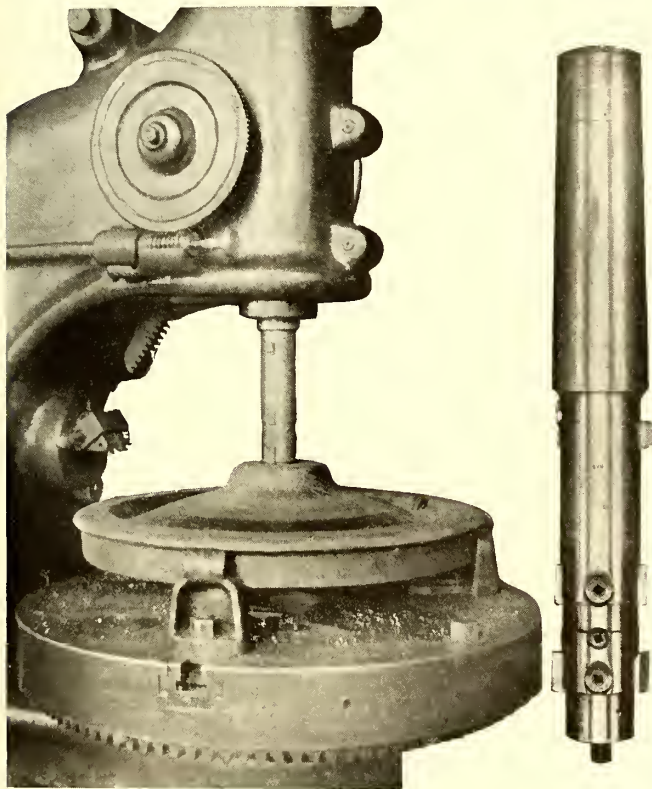
Conductor No. 2378 made six trips, and was relieved at 7:15 p. m. by conductor No. 1940, who made five trips, being in charge of the car until 1:31 a. m., when the car was housed. Each conductor on leaving the car obtained a record of earn-

lease the signal arm. The crew of the first car to arrive reports to the dispatcher by telephone and is warned to wait for the opposing car, and as soon as the first car is on the siding the signal arm is restored to "clear" on orders from the dispatcher by one of the crew, who pulls the arm down and resets the trip. When the arm is set to "danger" by releasing the trip through the selector relay a series of impulses is sent back to the dispatcher's office and is recorded on a tape of paper, in the form of perforations. Each signal gives a different number of impulses so that the "answer back" indication for each is distinctive. It is not possible to receive the "answer-back" signal unless the semaphore arm has moved to the full "stop" position. The record tape affords an accurate and convenient check on the dispatcher's train order sheet.

EXPANSION BORING TOOL IN NEW YORK AND VICINITY

Several of the electric railways in and about New York have installed Davis expansion car wheel boring tools. The accompanying cut shows the application of this tool in one of these shops to a Putnam lathe for borers ranging from 3 in. to $4\frac{1}{2}$ in. in diameter. One of the companies which have been using this tool for some time states that it greatly increases the output of the boring mill. The same company also uses the expansion boring bar for boring bearings $2\frac{1}{2}$ -in. x $3\frac{3}{4}$ -in. bore.

Not more than 20 seconds are required to adjust the tool to bore the wheels for the axles. A perfect hydraulic fit is attained by means of a micrometer caliper. The expansion boring tool shown in the accompanying illustration is intended for use on steel wheels. It carries two sets of cut-



Expansion Boring Tool for Steel Wheels

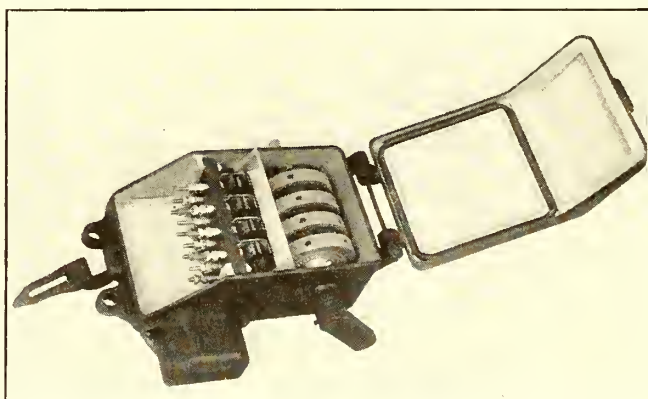
ters at the bottom and a single cutter at the top. The lower set is for rough boring, the upper set for finished boring and the single top cutter for chamfering. The top cutter, which chamfers the hole immediately after the roughing cutters have passed through the wheel, prevents the wheel from cutting the axle when being pressed through. The chamfering cutter is removed from the tool while the finishing cutters are passing through the wheel. These tools are made by the Matthews-Davis Tool Company, St. Louis, Mo.

COMBINED ACCELEROMETER AND GRADIENT METER

A brief description of the Trotter accelerometer and gradient meter was published in the *ELECTRIC RAILWAY JOURNAL* for Nov. 5, 1910, page 962. The American rights to this device have recently been acquired by Wonham, Sanger & Bates, New York. The Trotter accelerometer consists of a curved glass tube completely filled with a special liquid except for a small air bubble which bears a definite relation to the diameter of the tube. A graduated scale is marked on the tube and by the position assumed by the air bubble the acceleration or retardation of the vehicle on which the device is mounted may be read directly in terms of feet per second or any other convenient unit of measurement. The tube is inclosed in a small metal case which can be carried in the pocket, and a special adjustable bracket for mounting the tube on the dashboard of a car is supplied. It is only necessary to adjust the tube so that it is parallel with the center line of the car and so that the air bubble rests under the zero graduation when the car is at rest on level track. As soon as the car accelerates the bubble moves to one side just as a pendulum would swing and the distance through which it moves as indicated by the scale is proportional to the rate of change of velocity of the car. The retardation due to braking also may be read directly. Some of the other tests which may be made with reasonable accuracy with this simple device are measurement of retardation due to wind or rail resistance, measurement of brake horse-power of motors at various speeds under actual running conditions and measurement of grades on which the car may be running.

UNIVERSAL SWITCH BOX

The General Railway Signal Company, Rochester, N. Y., has designed a type of mechanical circuit-breaker, or switch box, which can be adapted to a wide variety of uses in railway signal installations, including shunting or breaking track circuits, opening line circuits or selecting circuits in interlockings. It consists of a connection board, four normal and four reverse contacts and four adjustable cams mounted on a shaft. When the shaft is revolved the cams bear against the contacts and force them open or closed. All of these parts are mounted in a weatherproof iron case which has a gasketed cover, held in place with a cam lever and padlock to insure tight closure. A supplementary cover over the contact compartment is provided



Universal Switch Box

to protect the contacts from frost and condensation and from rain when the main cover is open. The wire inlet may be placed on either side of the box and is arranged to receive and hold rigidly in place either trunking or conduit. The operating crank on the cam shaft also may be attached on either side of the box. A centering mechanism which will automatically revolve the cam shaft and open all circuits if the operating rod becomes disconnected can also be provided. This type of switch box is designated by the makers as model 5, form A.

News of Electric Railways

Meeting of Illinois Electric Railways Association

The next meeting of the Illinois Electric Railways Association will be held at Bloomington, Ill., on March 17, 1911, and the program will include the discussion of affairs chiefly of interest to the electric railways in Illinois.

C. E. Flenner, Wheaton, Ill., secretary of the association, advises that the principal feature of the meeting will be the discussion of reports of committees, including a report of the traffic committee on the feasibility of establishing a union ticket office and information bureau in Chicago for interurban electric railways in Illinois. As reported in the *ELECTRIC RAILWAY JOURNAL* of Feb. 25, 1911, page 338, a representative committee was appointed to investigate and report on the possibilities of such a joint office and information bureau. The discussion of this subject, which is an important one, especially to those roads reaching Chicago, will no doubt hold the interest of the association during the larger part of the meeting. The courtesy of a special train over the Illinois Traction System has been extended to the association by H. E. Chubbuck, vice-president executive of that company.

Program of Central Electric Accounting Conference

The following program has been announced for the meeting of the Central Electric Accounting Conference which is to be held at the rooms of the Springfield Commercial Club, Springfield, Ohio, on March 11, 1911:

MORNING SESSION, 9:00 A. M.

Meeting of the executive committee, Hotel Arcade.

Regular business session and reports of the following committees: Uniform comparative statistics, membership committee, constitution and by-laws committee, special committees.

Paper, "The Traveling Auditor," by A. J. White, traveling auditor of the Ohio Electric Railway.

Discussion.

AFTERNOON SESSION, 1:30 P. M.

Paper, "Method of Accounting of Freight Claims," by O. I. Davis, local auditor of the Dayton, Covington & Piqua Traction Company.

Discussion.

General discussion of the subject "Inter-Department Charges."

Program of Meeting of New York Association

The thirteenth quarterly meeting of the Street Railway Association of the State of New York will be held at the Hotel Onondaga, at Syracuse, N. Y., on the evening of March 21, 1911, and on March 22, 1911. The session on Tuesday evening will be opened with an informal dinner at 8 o'clock at the Hotel Onondaga, after which the remainder of the evening will be given to a general discussion of one of the subjects on the program. The following program will be carried out:

Paper, "Joint Use of Poles," by W. J. Harvie, chief engineer of the Utica & Mohawk Valley Railway, Utica, N. Y.

Discussion by B. Penoyer, engineer maintenance of way of the Schenectady Railway, Schenectady, N. Y.; C. S. Stanton, electrical engineer of the Otsego & Herkimer Railroad, Hartwick, N. Y.; C. L. Cadle, chief engineer of the New York State Railways, Rochester, N. Y., and R. P. Leavitt, chief engineer of the Albany Southern Railroad, Albany, N. Y.

Paper, "Adoption of Interurban Rules," by J. K. Choate, general manager of the Otsego & Herkimer Railroad, Hartwick, N. Y.

Discussion by J. C. Calisch, vice-president and general manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., and W. H. Collins, general manager of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Paper, "Economical Limit for Flange Wear on Steel Tired and Rolled Steel Wheels," by John Sibbald, master

mechanic of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Discussion by G. M. Cameron, master mechanic of the New York State Railways, Rochester, N. Y., and F. J. Doyle, master mechanic of the Schenectady Railway, Schenectady, N. Y.

Paper, "Building Up of Interurban Territory and Best Method of Stimulating Summer Traffic," by R. H. Smith, general manager of the Albany Southern Railroad, Albany, N. Y.

Discussion by C. E. Holmes, assistant general passenger agent of the Otsego & Herkimer Railroad, Hartwick, N. Y., and R. M. Colt, general passenger agent of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Paper, "Operation of Ohmer Fare Register in City Service," by John E. Duffy, superintendent of the Syracuse Rapid Transit Railway, Syracuse, N. Y.

Arrangements have been made with the Hotel Onondaga for accommodations for those who apply direct to the hotel management prior to the date of the meeting.

Rapid Transit Proposal from Brooklyn Rapid Transit Company

On March 2, 1911, the Brooklyn Rapid Transit Company addressed to the Public Service Commission of the First District of New York a second proposal for the construction of rapid transit subway and elevated lines in the Boroughs of Brooklyn, Manhattan and Richmond which calls for 23 miles of new subways, 9.35 miles of new elevated extensions, 9.16 miles of elevated third tracks and 18.25 miles of new elevated lines to supplant old steam railroads. A total expenditure of \$90,000,000 is proposed according to the program of the company, of which \$40,000,000 would be spent by the city and \$50,000,000 by the company.

A summary of the company's proposal as it affects Brooklyn follows: To equip and operate the Fourth Avenue subway, connecting it with the Third Avenue Elevated, to be extended to Fort Hamilton, with a proposed four-track elevated on New Utrecht Avenue from Thirty-ninth to Sixty-second Street and a two-track line from there over the West End route to Coney Island; a three-track elevated to take the place of the old Sea Beach line from Sixty-second Street to Coney Island, and a double-track elevated to take the place of the present Culver line from Tenth Avenue and New Utrecht Avenue to Coney Island, including the elimination of grade crossings on these old steam roads. A tunnel under New York Bay connecting the Fourth Avenue subway with Richmond, from about Thirty-ninth Street, Brooklyn. A four-track subway under Flatbush Avenue from the Fourth Avenue subway to Prospect Park Circle, separating there into two branches, one a two-track road under Flatbush Avenue to the Brighton Beach line, which is a four-track road; the other a two-track road under Eastern Parkway to Pitkin Avenue, rising to a two-track elevated connection with the Kings County elevated road at Snediker Avenue. An extension of the Kings County Elevated Railroad from the old city line through Queens to Jamaica as a two-track road. Third-tracking the Fulton Street elevated line from the Brooklyn Bridge to East New York. Third-tracking the Broadway elevated from Williamsburg Bridge to East New York. A connection between the Myrtle Avenue and the Broadway elevated lines, and a third track on the Myrtle Avenue line from Broadway and Myrtle Avenue to Ridgewood. The elevation of the Lutheran Cemetery line from Ridgewood to Fresh Pond Road, to be a three-track line. A new elevated loop line from the Williamsburg Bridge through Grand Street, Leonard Street, Manhattan Avenue, across Newtown Creek into Queens and through Jackson Avenue to the Queensboro Bridge to a connection with a proposed line in Manhattan contained in the offer.

A summary of the company's proposal as it affects Manhattan follows: The construction of a subway under Church Street, Vesey Street, Broadway, Seventh Avenue to Fifty-ninth Street, east to the Queensboro Bridge; to be four

tracks from City Hall to Fifty-ninth, two tracks in that street to the Queensboro Bridge, and partly three and partly two tracks south of City Hall to the Battery. Connection of the Williamsburg Bridge by way of Delancey and Spring Streets with the proposed Broadway subway. Connection, grade permitting, between the proposed Broadway subway and the Brooklyn Bridge. An extension of the Centre Street subway with two tracks under Nassau, Broad and Beaver Streets to the Battery, connecting with the Church Street-Broadway line proposed. A new tunnel connecting the Church Street-Broadway and the Nassau-Beaver Street extension from Centre Street, running under the East River from the Battery to Montague Street, thence under Fulton and Willoughby Streets to a connection with the Fourth Avenue subway at Willoughby Street on the extension of Flatbush Avenue. The use of the Centre Street subway to the extent that it may offer terminal and connection facilities, particularly with reference to traffic over the three bridges and as part of the Nassau-Beaver Street subway extension. The Broadway-Lafayette Avenue section of the Centre Street loop is eliminated from the Brooklyn Rapid Transit Company's offer, the company regarding this as an undesirable route.

In regard to financing the proposal President Williams of the company said:

"It is our suggestion that the city should construct the subways and that we should equip and operate them upon such terms and for such period as may be agreed upon, in connection with our existing and proposed elevated railroads. We should expect the city also to assume, as heretofore, its reasonable share of the cost of eliminating crossings of streets at grade over the lines of the former steam railroads. The estimated expense to which the company would be subjected for carrying out its part of the above plan is between \$50,000,000 and \$60,000,000. The cost to the city, in addition to what has already been contracted for, would probably not exceed the amount to which the city would morally (if not legally) commit itself by the promised extensions in Brooklyn of subways now under construction and others covered by the Interborough Rapid Transit Company's offer."

The Public Service Commission has announced the tentative elevated and subway routes, which if built will afford to Queens Borough and some suburban sections of Long Island more important rapid transit facilities. These lines of transit as outlined by the commission are as follows: Subway or elevated road connecting the terminus of the Steinway tunnels with the Queensboro Bridge Plaza, through Van Alston and Jackson Avenues, or through Van Alston Avenue and private property adjoining the Sunnyside yards. Elevated road from the Queensboro Bridge Plaza, across the Sunnyside yards to Thomson Avenue, to Hoffman Boulevard, to Jamaica Avenue. The route completed would be the longest elevated road in the city. It is designed to serve people living in Queens, Hollis, Springfield and adjoining towns. Elevated road from the corner of Thomson and Greenpoint Avenues to Roosevelt Avenue, to Flushing Creek. This road will serve Flushing, Elmhurst and adjoining towns. Subway and elevated road, by tube from the Queensboro Bridge Plaza through Jackson Avenue to Debevoise Avenue and by elevated to Ditmars Avenue to North Beach. The commission set March 8, 1911, as the date for a hearing on the subject.

Report of Pennsylvania Railroad on New York Terminal Electrification Work

James McCrea, president of the Pennsylvania Railroad, made the following references to the electrification work of the company at New York in the annual report of the company dated March 3, 1911:

"The Newark Rapid Transit Line, consisting of the electrification of the present tracks of the New York division from a connection with the Hudson & Manhattan Railroad, near Summit Avenue, Jersey City, to Manhattan Transfer, and a branch from there to a station in Park Place, Newark, was begun during the year and will no doubt be completed by the close of the summer of 1911. This will provide a through downtown rapid transit tunnel route into New York City and additional passenger facilities in the center of Newark, thereby materially relieving

the congested conditions at Market Street Station in the latter city, where the necessary improvements of the existing facilities will be undertaken when the co-operation of the city authorities has been obtained.

"The New York tunnel extension was practically completed during the year, and on Sept. 10, 1910, the East River division, extending from Pennsylvania Station, New York, into Long Island, was opened for the operation of Long Island Railroad trains under trackage rights granted by your company and the Pennsylvania Tunnel & Terminal Railroad. The opening of the western portion of the extension from the station under the North River to Harrison (Manhattan Transfer), N. J., was completed and opened for traffic on Nov. 27, 1910, from which date the entire tunnel extension from that point to a connection with the Long Island Railroad at Sunnyside yard has been successfully operated by your company as agent for the Pennsylvania Tunnel & Terminal Railroad, the corporation under whose powers this extension was constructed for your system.

"It is evident that no extraordinary terminal development of this character can of itself be profitable if solely dependent on the passenger rates which can be charged for the short mileage operated, and it naturally follows that your company as owner will pay any deficit arising from its operation, because it was constructed primarily for the use and benefit of the entire Pennsylvania Railroad system as an entrance into and through New York City and Long Island.

"The New York tunnel extension is carried on your books at \$55,565,415.53, of which \$15,000,000 is represented by full paid capital stock of the Pennsylvania Tunnel & Terminal Railroad and the remainder by advances. The total cost of this extension to Dec. 31, 1910, including real estate not permanently required for its use and conservatively estimated to be worth between \$7,000,000 and \$8,000,000, and not yet disposed of, is \$112,965,415.52, of which \$47,400,000 has been charged against net income and profit and loss, and, as explained in previous reports, \$10,000,000 has been borne by the Pennsylvania Company and charged against its profit and loss account."

Chamber of Commerce Inquiry into Operating Conditions in Cleveland

The Cleveland Chamber of Commerce on March 2, 1911, selected a special committee of 10 members to inquire into the conditions surrounding the operations of the Cleveland Railway with particular reference to the changes in the terms necessary to enable the company to give adequate service. Particular attention will be given to the request of the company for such changes as will enable it to secure funds at the lowest interest rate and the request to amortize the discounts necessary on bond sales. The names of the members of the committee follow: F. H. Goff, president of the Cleveland Trust Company and representative of the Cleveland Railway in the Goff-Johnson negotiations, chairman; Warren S. Hayden, Hayden, Miller & Company, bonds and securities; George B. Siddall, Homer H. McKeehan, James R. Garfield and D. C. Westenhaver, attorneys; Charles E. Adams, manager of the Cleveland Hardware Company; Henry W. Stecher, secretary and treasurer the Pearl Street Savings & Trust Company; H. A. Higgins, general manager the Standard Tool Company, and Warren S. Stone, president the Brotherhood of Locomotive Engineers. Mr. Westenhaver was the attorney for the Low-Fare Railway and was connected with the administration of street railway affairs under the Johnson régime for several years.

At the first meeting of the committee, on March 4, 1911, Chairman Goff stated that all sessions would be open to the public and that suggestions would be welcomed. D. C. Westenhaver was made vice-chairman of the committee and Hudson Havens secretary. The Cleveland Railway was represented by J. J. Stanley, president, and Andrew Squire and Harry Crawford, attorneys; the city by City Solicitor Baker and G. H. Dahl, street railway commissioner.

Mr. Goff said that the committee would inquire into conditions and determine if any amendments could be suggested to the Tayler franchise to make operation successful at a fare of 3 cents plus 1 cent for a transfer, or as low a rate as is consistent with the proper upkeep of the property,

interest requirements and service of the character to which the public is entitled. The committee has decided to invite Mayor Herman Baehr, former Mayor Tom L. Johnson, Chairman Hitchins of the street railway committee of the City Council, A. B. DuPont, Newton D. Baker, G. H. Dahl and Warren S. Bicknell, former receiver of the Municipal Traction Company, to attend the meetings. Each of these men will be asked to state what he considers necessary to make the plan a success and each will be permitted to question the others. These statements and questions will relate to the main points under inquiry by the committee: "What defects exist in the Tayler grant?" "What amendments ought to be made to insure its success?" "Has the company done its utmost to make the operation of the Tayler grant a success?"

The company will be asked for a statement showing expenses incurred for extensions and betterments since 1900; the amount spent for operation under the Tayler franchise, with figures showing whether the reduction has stimulated travel and whether it has imposed burdens upon the company for greater facilities; the average rate of fare, with and without transfers; expenses of renewal and maintenance since the road has been operated under the Tayler franchise and, if the amount was in excess of the allowance, the reason therefor. Attorney Squire for the company stated that all the information which the company possessed would be furnished. The difficulty was that the company could not dispose of stock to provide funds for its needs. The company would be willing to point out defects in the grant, but doubted whether it would be willing to suggest remedies.

Mr. Baker believed that the only sure remedy was municipal ownership. When the speculative phase of street railway business was removed capital would lose interest. In other countries where plans similar to this had been tried with railroads the governments had finally found it necessary to finance the undertakings. He thought, however, that the grant might be patched up temporarily until cities were given the right to operate street railways.

Harris, Forbes & Company, New York, N. Y., advertised on March 8, 1911, an issue of \$5,000,000 of 3 per cent first mortgage gold bonds of the Cleveland Railway at 100 and interest. The bonds are dated March 1, 1911, and are due March 1, 1931, and the interest is payable March 1 and September 1 in New York or Cleveland. The bonds are of the denomination of \$1,000 and are subject to redemption at any interest date at 105. The Citizens' Savings & Trust Company, Cleveland, Ohio, and the Bankers' Trust Company, New York, N. Y., are trustees of the issue. In advertising the bonds the following statement of earnings and expenses for the year ended Dec. 31, 1910, was made: Gross earnings, \$6,160,378; expenses, taxes and reserve for maintenance, \$4,738,266; net earnings, \$1,422,111; annual bond interest, \$500,000; surplus, \$922,111. The statement was made that the City of Cleveland has recently granted the company a new 25-year franchise which provides for an automatic adjustment of the rate of fare so that in addition to fixed charges the company may pay 6 per cent dividends on the present capital stock of \$15,069,500 and all the stock hereafter issued under the limitations of the franchise. The first mortgage 5 per cent gold bonds are secured through the deposit of first mortgage bonds, by a first lien on an important part of the property and by direct lien on the entire remaining property of the company, subject to the \$500,000 of bonds of the Cleveland Electric Railway which mature on March 1, 1913. The advertisement also carried a statement addressed to the holders of the consolidated mortgage 5 per cent bonds of the Cleveland Electric Railway, due March 1, 1913, in which an offer was made to exchange these bonds on even terms for bonds of the new issue.

Several conferences have been held by Mayor Baehr, Commissioner Dahl, Chairman Hitchins of the Council committee on street railways, and others relative to the requests of the company for changes in the franchise that will allow it to finance its needs. The city officials seem disposed to allow the amortization of the discount on bonds which are sold to take care of the indebtedness of the company and refunding bonds which will soon be due. It is further said that the administration may agree to a change that will make the price of the property its capital value

instead of the appraised value in case the city should decide to take it over by purchase.

A statement of operation for January, 1911, which shows both the ordinance allowances and the actual expenditures follows:

	Allowances.	Actual Expenditures.
Gross receipts.....	\$504,649	\$504,649
Maintenance	\$88,556	\$93,313
Operating expenses.....	254,599	279,738
	<u>343,155</u>	<u>373,051</u>
Net income.....	\$161,494	\$131,598
Other income.....	3,328	3,328
Total income.....	<u>\$164,822</u>	<u>\$134,926</u>
Taxes	\$31,453	\$31,453
Interest	115,337	115,337
	<u>146,790</u>	<u>146,790</u>
Surplus	\$18,032	*\$11,864

*Deficit.

There is a deficit of \$25,139 in the operating account and of \$4,757 in the maintenance account, making \$29,896 in both. Deducting the surplus of \$18,032 on the franchise allowance, there is an actual deficit of \$11,864. The actual deficit in the operating fund for the first five months of the second adjustment period is approximately \$89,000.

Electrifying New Haven's Harlem River Branch.—Work has just been started on the electrification of the Harlem River branch of the New York, New Haven & Hartford Railroad, from New Rochelle along the shore of Long Island Sound to the Harlem River.

Electric Night at Railroad Club.—The New York Railroad Club will meet at the building of the United Engineering Societies in New York on the evening of March 17, 1911, at 8 o'clock. The committee on electrification, which expected to make a formal report, has decided that the report made a year ago represents the situation up to date and that anything further it might present now would not contain anything of particular interest in connection with the subject of electrification. The committee has, however, arranged for short addresses by a number of recognized experts and authorities, including Prof. George F. Swain, Samuel M. Vauclain, of the Baldwin Locomotive Works; C. L. Bardo, superintendent of the electric division of the New York Central & Hudson River Railroad; H. Gilliam, electrical superintendent of the New York, New Haven & Hartford Railroad, and William McClellan. Special invitations to attend the meeting have also been extended to J. R. C. Armstrong, H. G. Scott, W. B. Potter, A. H. Armstrong, L. B. Stillwell, W. S. Murray, E. W. Rice, Thomas F. Mullaney and Frank J. Sprague.

Southern Pacific Development at Los Angeles.—R. S. Lovett, president of the Southern Pacific Company, has recently been in conference in Los Angeles with Paul Shoup, manager of the company's electric railways in California, and other officers of the Southern Pacific company and the electric railways which it controls, in regard to developments near Los Angeles. One of the most important improvements contemplated is the construction of a terminal in Los Angeles to cost \$2,000,000. It is generally understood that the program for the further development of the electric railways will provide, first, the extension of the lines of the Pacific Electric Railway and Los Angeles lines of the Pacific Railway in the San Fernando Valley; second, the extension of the lines of the Pacific Electric Railway eastward from their present eastern limit into San Bernardino with lateral feeders to tap the various populous foothill cities and towns along the way; third, the development of the electric railways of the Southern Pacific Company in the vicinity of San Bernardino, Riverside and Redlands into an interurban system that will link these towns and be connected with Los Angeles by the extension to San Bernardino.

Seattle Railway Case Reversed on Appeal.—On Feb. 7, 1911, in San Francisco, the United States Circuit Court of Appeals handed down a decision in the matter of the appeal of the Seattle Electric Company against the Seattle, Renton & Southern Railway. According to the facts set forth in the decision the Seattle, Renton & Southern Railway operated a street railway in Seattle, Rainier Avenue being one of the principal streets on which the company operated,

under a franchise from the city. Under another franchise the Seattle Electric Company was granted the right to operate a railway over certain rights-of-way adjacent to Rainier Avenue. The Seattle, Renton & Southern Railway applied to the United States Circuit Court for a restraining order to prevent the Seattle Electric Company from building the line for which it had obtained permission from the city. It alleged that the operation of the new road would hamper, obstruct and render inefficient its road; that its earnings would be greatly reduced and the cost of operation greatly increased. The United States Circuit Court granted an interlocutory order restraining the Seattle Electric Company from constructing its line and from this order the company appealed. The decision holds that the Seattle Electric Company had a right to occupy Rainier Avenue, on the ground that a street railway franchise is not exclusive. The city, under its charter, has a right to construct and operate street car lines over its streets and to grant others the privilege of constructing and operating railways over them. The ordinance is not in conflict with the Constitution of the United States and the Seattle, Renton & Southern Railway erected its lines subject to the right of the city to grant to another a franchise under which it would be authorized to operate a street railway over the streets occupied by the Seattle, Renton & Southern Railway. The decision by the United States Circuit Court of Appeals says that the Circuit Court had no jurisdiction in the matter and reverses the judgment of injunction, with instructions to dismiss the case.

LEGISLATION AFFECTING ELECTRIC RAILWAYS CONNECTICUT

A hearing was given by the judiciary committee on Feb. 28, 1911, on the bill which has been suggested by C. S. Mellen, president of the New York, New Haven & Hartford Railroad, to create a court of commerce to have jurisdiction over the affairs of the public service corporations. This bill was referred to in the *ELECTRIC RAILWAY JOURNAL* of Feb. 11, 1911, as a substitute for the proposed new utilities commissions, and its purpose was briefly defined at that time. At the hearing on Feb. 28 Mr. Mellen said that the reasonableness of a rate was a question to be determined by the courts. Unnecessary publicity of corporation affairs would defeat important development of a property by acquainting others with a company's plans. Future developments depended on the chance of the investor to realize profits commensurate with the hazard involved in making the investment. Mr. Mellen said that an investigation of an accident by a State was not productive of good results. The lighting properties controlled by the New York, New Haven & Hartford Railroad were a heritage from some of the electric railways which the company had taken over, and would be disposed of at a fair price.

A hearing was held on Feb. 23 on the bill to prohibit the loading and unloading of express cars by street railways in congested centers. Lucius F. Robinson, for the Connecticut Company, and H. B. Freeman, for the Hartford & Springfield Street Railway, both opposed the bill on the ground that a general law should not be passed to cover a condition peculiar only to Norwich. The bill calling for destination signs, 6 in. high, on the front of street cars, was also opposed by Mr. Robinson and Mr. Freeman, and J. K. Punderford, general manager of the Connecticut company. It was held that this matter was administrative. The bill to require electric railways to file with the Railroad Commission the details of accidents within a week after they have happened was opposed by the electric railway interests on the ground that such a measure would benefit ambulance chasers. Mr. Punderford opposed the bill introduced to require electric railways to heat the vestibules of their cars. He said that the employees of the Connecticut Company had never complained to him about cold vestibules. Both Mr. Punderford and Mr. Robinson opposed the bill to require a motorman to turn off the searchlight of a car when approaching a vehicle under penalty of a fine of not more than \$50 for failure to comply with the law. A bulletin was posted by the Connecticut Company in September, 1910, instructing motormen to turn off the arc light and turn on the incandescent light when approaching automobiles. Later this rule was amended to cover teams. Mr. Punderford

cited places where motormen were ordered to cover distances with arc lights out for safety. He contended that the lights on the cars were no stronger than those on many automobiles.

IOWA

A joint meeting of the committee on judiciary and corporations of the Iowa Senate and the committees on railroads and municipal corporations of the House was held recently to consider public utility measures. J. H. Roemer, a member of the Railroad Commission of Wisconsin, explained what had been accomplished in his State under the utilities law in force there. Following Mr. Roemer, Jonathan W. Brown, Sioux City, opposed the measures under consideration, and particularly the Sammis bill. J. K. Welch, city attorney of Knoxville, stated, in effect, that Knoxville favored the adoption of what is known as the Wisconsin law, but argued that the Sammis bill differed materially from it. Mayor Hanna, of Des Moines, favored a general utilities commission provided the law creating it was so framed as to protect all the interests concerned. He offered no special criticism of any particular bill. John R. Lane, Davenport, made the concluding address. He analyzed the several utility measures.

MAINE

A summary of the legislation in Maine for February, the second month of the session, in matters likely to affect electric railways, follows: Signed by the governor—Ratification to Atlantic Shore Railway of charter rights of Atlantic Shore Line Railway, in accordance with receivers' sale last December; ratification of action of Presque Isle in subscribing for bonds of Aroostook Valley Electric Railway; bill to allow the Waterville, Wiscasset & Farmington Railroad, a narrow-gauge steam line, to discontinue its track between Weeks' Mills and Winslow on account of competition of Lewiston, Augusta & Waterville Electric Railway, and an alternative bill to revive the charter of the Waterville & Winslow Bridge Company; bill to renew and extend for two years charters of Northern Aroostook Electric Company and Central Aroostook Electric Company, both with rights to sell to electric railroads; bill to allow York Light & Heat Company, of Biddeford, to furnish power to electric railroads; bill to charter Maine Power Company at Orono.

The following measures have been reported favorably from committee, with no apparent opposition in legislature: Charter renewal for Cape Elizabeth & Scarborough Electric Railway; change of name of Belfast & Liberty Electric Railway to Belfast & Augusta Electric Railway, with power to sell electricity where other companies do not enjoy proscriptive rights; charter renewals for Lubec, East Machias & Machias Electric Railway, Winter Harbor & Eastern Electric Railway, Jonesport Central Electric Railway, Fairfield & Skowhegan Electric Railway, Mt. Desert Transit Company, of Bar Harbor; Bridgton Street Railway, Eastport Street Railway. The following measures have been reported from committee, "ought not to pass," and this report has been accepted by the Legislature: To authorize the Rockland, South Thomaston & St. George Electric Railway to transport freight and chattels; to authorize the same company to build its own lines into Rockland.

The bills before committee which have not yet been acted upon follow: To charter the Portland Terminal Company, to take over property of Union Station Company, now owned by Boston & Maine Railroad and Maine & Central Railroad, with power of eminent domain to enlarge its property and with right to acquire and operate electric railways; to permit municipal authorities to regulate street railway service, subject to appeal to the Railroad Commission; to charter Farmington & Augusta Railroad to build an electric railway or steam railroad between the two places; to charter the Skowhegan & Athens Electric Railway; to charter the Knox County Central Electric Railway to build from Friendship via Union to Belfast. An important general bill which has been reported "ought to pass" is an amendment to the employers' liability law making it proof of negligence of employer if it can be shown that he was notified of a defect in machinery or appliances, and making the employer responsible for the acts of the em-

ployee who is a fellow servant of the party injured or killed. Senator Carl E. Milliken has served notice of an amendment to all electric power and railway charters to forbid taking power out of the State. This action is not opposed. The Aroostook Valley Electric Railway asks for charters to build from Washburn to Caribou to New Sweden, and west to the Quebec line, and to take over and electrify the Presque Isle branch of the Canadian Pacific Railway. The bill to include all electric railways in the general law forbidding the transmission of power from the State is still before the legal affairs committee. A bill, favorably reported, would empower municipal officers to compel street railways to change locations to other parts of the public way, subject to appeal to the Railroad Commission.

The hearing on the public utilities bill was held on March 2 before the committee on legal affairs. Henry Hudson attacked the measure as unnecessary and creating needless expense. George M. Hanson, recent Democratic nominee for Congress, asked that it be amended to permit free competition in the sale of electricity in amounts exceeding 160,000 kw-hours per year, to forbid the erection of additional poles in public ways without the consent of municipal officers, to permit appeal from municipal officers to the commission for final decision, and to compel companies to permit other companies to use their poles and wires subject to regulations and rentals fixed by the commission. Lewis A. Goudy favored the rate regulation clauses, as they would obviate the difficulties in his city, where competition had effected a saving of more than \$250,000 to the city. Charles F. Johnson, United States Senator-elect, who helped draft the bill, spoke in its favor. William M. Bradley objected to investigations being made by agents of the commission instead of the commission itself. M. B. Jones, representing the New England Telephone & Telegraph Company, thought that the bill was too drastic and offered many amendments. Harvey D. Eaton, representing the Central Maine Power Company, said that his company would welcome the regulation which was objected to by Mr. Hanson. Seth L. Carter, general counsel for the Maine Central Railroad, and Herbert M. Heath, counsel for a number of electric railways and electric companies, suggested many changes in phraseology and asked that a commission of three members at \$5,000 be appointed instead of five members at \$3,500. A sub-committee of five was appointed to redraft the bill.

NEW JERSEY

The corporation committee of the New Jersey Senate reported the employers' liability bill on Feb. 28, 1911, with certain amendments. The public utilities bill, with a rate making clause, has been carefully considered by the committee on railroads and canals, and is expected to be reported soon in the form of a committee substitute. The public utilities bill favored by the Democrats would legislate the present public utilities board out of office and create a new board, while the Republican measure would not affect the personnel of the present board.

NEW YORK

A bill has been introduced in New York to require the Long Island Railroad to charge a fare of not more than 5 cents between its Flatbush Avenue terminal, Brooklyn, and its station at Railroad Avenue, Brooklyn. Senator Wainright and Assemblyman Coffey have introduced a bill to require the New York, New Haven & Hartford Railroad to sell tickets for transportation between the Grand Central Station, New York, and points in Westchester County at the same commutation rate as is charged by the company between its station in Boston and points within a distance of 25 miles of Boston.

OHIO

At the public hearing of the Winters public utility bill before the Ohio House on March 1 none of the interests affected were represented except the telephone companies. Another hearing will be held. The committee on cities of the House has killed the Geleerd municipal ownership bill by voting to postpone it indefinitely. Senator Todd has introduced a bill to allow railroad, telegraph, telephone and cable companies to interchange service. The House has passed the two Lorenz bills, which extend to interurban railways the provisions of the steam railroad law regarding fencing right-of-way and erecting cattle guards.

Financial and Corporate

New York Stock and Money Market

March 7, 1911.

After a listless week the professional interest took active hold of the Wall Street market on Saturday morning and the recovery was general, as it was thought that the bogey of an extra session had assumed less importance. Just prior to the closing of the market, however, President Taft's announcement of the extra session was made, with the result that transactions on Monday were limited. To-day the number of sales decreased further, the total being 221,341 for the day.

The bond market, despite the trend in the trading in stocks, was quite active on Monday. Quotations to-day were: Call, 2@2 2/3 per cent; 60 days, 2 3/4@3 per cent.

Other Markets

All the Philadelphia issues have continued strong. The bid for Union Traction to-day was 47 1/2. Philadelphia Rapid Transit, however, went to 20 1/2 to-day. The sale is recorded of \$120,000 of Interstate Railway 4s in blocks ex interest at 55.

The Boston market has been very irregular with little or no interest in tractions and only fractional changes in price.

The Chicago market has been featureless and dull. To-day, however, important sales were recorded of Chicago Railways 4s, Series B, Chicago Railways first mortgage 5s and Chicago Railways collateral trust 6s.

In Baltimore United Railways incomes, United Railways refunding 5s, Fairmont & Clarksburg Traction 5s and Maryland Electric 5s have all figured in the trading recently.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 28.	Mar. 7.
American Light & Traction Company (common).....	a290	a290
American Light & Traction Company (preferred).....	a106	a106
American Railway Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a44	a44
Aurora, Elgin & Chicago Railroad (preferred).....	a85 3/4	a85 3/4
Boston Elevated Railway.....	a129	a129
Boston Suburban Electric Companies (common).....	a16	*16
Boston Suburban Electric Companies (preferred).....	71	*71
Boston & Worcester Electric Companies (common).....	a10	*10
Boston & Worcester Electric Companies (preferred).....	40	*40
Brooklyn Rapid Transit.....	78	78 1/2
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83 3/4	83 3/4
Capital Traction Company, Washington.....	*129	a128
Chicago City Railway.....	*190	a200
Chicago & Oak Park Elevated Railroad (common)....	*3 1/2	*3 1/2
Chicago & Oak Park Elevated Railroad (preferred)....	*7 1/2	*7 1/2
Chicago Railways, ptcptg., ctf. 1.....	a92 1/2	a92
Chicago Railways, ptcptg., ctf. 2.....	a23 1/2	a25
Chicago Railways, ptcptg., ctf. 3.....	a32 1/2	a9 1/2
Chicago Railways, ptcptg., ctf. 4.....	a5	5 1/4
Cleveland Railway.....	a94	a95
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105 1/2
Detroit United Railway.....	a71	71
General Electric Company.....	a153	149
Georgia Railway & Electric Company (common).....	a129 1/4	*129 1/4
Georgia Railway & Electric Company (preferred)....	87	*87
Interborough Metropolitan Company (common).....	19	18 1/2
Interborough Metropolitan Company (preferred)....	53	52
Interborough Metropolitan Company (4 1/2s).....	78 5/8	78 5/8
Kansas City Railway & Light Company (common)....	a25	25
Kansas City Railway & Light Company (preferred)....	a72	a68
Manhattan Railway.....	140	140
Massachusetts Electric Companies (common).....	17	17
Massachusetts Electric Companies (preferred).....	a88	a88
Metropolitan West Side, Chicago (common).....	a20	a22
Metropolitan West Side, Chicago (preferred).....	67	a67
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred)....	110	110
North American Company.....	71 1/2	70 7/8
Northwestern Elevated Railroad (common).....	*22	a23
Northwestern Elevated Railroad (preferred).....	*62	a64
Philadelphia Company, Pittsburgh (common).....	a53 1/2	a53 1/2
Philadelphia Company, Pittsburgh (preferred).....	a43 1/2	a43 1/2
Philadelphia Rapid Transit Company.....	a20 1/2	a20 1/2
Philadelphia Traction Company.....	85	a86
Public Service Corporation, 5 per cent col. notes....	a96 1/2	a96 1/2
Public Service Corporation, ctf. s.....	a105 1/2	a105 1/2
Seattle Electric Company (common).....	a112	a112
Seattle Electric Company (preferred).....	101 1/2	a101 1/2
South Side Elevated Railroad (Chicago).....	*69	a70
Third Avenue Railroad, New York.....	11	a10
Toledo Railways & Light Company.....	a10	10
Twin City Rapid Transit, Minneapolis (common)....	a110	109 1/2
Union Traction Company, Philadelphia.....	a48	a47 3/4
United Rys. & Electric Company, Baltimore.....	17 3/4	17 3/4
United Rys. Inv. Co. (common).....	47 3/8	46 1/2
United Rys. Inv. Co. (preferred).....	74	73 3/8
Washington Ry. & Electric Company (common).....	35	a35 1/4
Washington Ry. & Electric Company (preferred)....	88	a88
West End Street Railway, Boston (common).....	a92 1/2	a92 1/2
West End Street Railway, Boston (preferred).....	a102 1/2	a103 1/2
Westinghouse Elec. & Mfg. Co.....	69 3/4	67 1/4
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a120	a120

a Asked. * Last Sale.

Annual Report of Lehigh Valley Transit Company

The report of the Lehigh Valley Transit Company for the year ended Nov. 30, 1910, has been made public. In submitting the report R. P. Stevens, president of the company, said that as this was the first time that the report has been prepared in pamphlet form and mailed to the stockholders he had quite fully described the property. Mr. Stevens has described briefly the history of the incorporation of the company, the territory through which it operates, etc., but the abstracts which are made of his statements relate only to the work carried out during the year covered by the operating report. A statement of the earnings of the company for the year ended Nov. 30, 1910, as compared with the previous year, follows:

	1910.	1909.
Passenger receipts.....	\$1,042,969	\$956,886
Operating expenses.....	562,344	548,171
Net earnings.....	\$480,625	\$408,715
Miscellaneous and sale of power.....	159,851	110,998
Gross income.....	\$640,476	\$519,713
Deductions: Bond interest, rentals, taxes, etc....	436,872	416,646
Net income.....	\$203,604	\$103,067
Miscellaneous deductions.....	261	4,956
Surplus.....	\$203,343	\$98,111
Other income.....	6,857	3,575
Surplus.....	\$210,200	\$101,686

Mr. Stevens said, in part:

"The surplus was arrived at after making liberal deductions for maintenance. The receipt of \$69,500 from sale of the Chestnut Hill and Spring House Turnpike is not included in the foregoing summary, being credited to capital account and applied largely toward installation of new power.

"On Nov. 30, 1910, your company had surplus earnings amounting to \$576,341.85. Construction and rehabilitation charges, bond discount, commission and expenditures in connection with the refinancing of the company during the past three years were charged against this surplus, leaving the balance in the surplus account \$7,324.84 on Dec. 1, 1910.

"On May 19, 1910, you authorized an issue of refunding and improvement mortgage 50-year 5 per cent gold bonds to be secured by a mortgage covering substantially the entire property of your company, subject to the prior liens hereinafter referred to. The total authorized issue of refunding and improvement mortgage bonds is \$15,000,000. The mortgage provides that bonds shall be reserved to retire or acquire the first mortgage bonds and the consolidated mortgage bonds. The authorized amount of first mortgage bonds is \$5,000,000, of which there are \$4,700,000 outstanding. The issue of consolidated mortgage bonds amounts to \$2,500,000 (in addition to bonds reserved for the retirement of the first mortgage bonds). Of these latter bonds \$2,146,000 have been acquired (leaving \$354,000 outstanding) and deposited with the trustee as additional security for the refunding and improvement mortgage bonds.

"The acquisition of consolidated mortgage bonds, the retirement of the debentures and the issuance of refunding and improvement mortgage bonds will leave the company's present bonded indebtedness outstanding as follows:

First mortgage gold bonds: 5 per cent.....	\$1,930,000
First mortgage gold bonds: 4 per cent.....	2,770,000
	\$4,700,000
Consolidated mortgage bonds.....	354,000
Refunding and improvement mortgage bonds.....	3,956,000
	\$8,110,000

"Your company has outstanding \$5,000,000 preferred stock, 5 per cent cumulative from Nov. 3, 1910, and \$3,000,000 common stock. It has no floating debt. The acquisition of the \$2,146,000 consolidated mortgage bonds and retirement of the \$900,000 debenture bonds have been accomplished with the addition of only \$12,960 to the company's annual fixed charges.

"The physical condition of your property has been improved materially during the past three years. Your cars have all been overhauled and repaired and about 40 cars have been rebuilt. Thirty-six Baldwin trucks were purchased during the past year, replacing all the St. Louis trucks and standardizing the equipment to Baldwin and Brill trucks, according to the service.

"The cost of power has steadily and substantially de-

creased during the past three years and with the installation, about June, 1911, of new apparatus, we look for still further economies in cost of power:

	1907.	1908.	1909.	1910.
Cost of power per car mile (cents).....	.0573	.0358	.0332	.0308
Power output, railway (kw.).....	15,584,795	17,683,835	17,773,610	19,139,821
Total cost, railway.....	\$88,861	\$123,617	\$113,997	\$110,623

"A new paint shop was built on land which your company owned adjoining the Allentown car house at a cost of about \$6,000. This, when completed, will permit the utilization of the present carpenter shop space for general machine shop purposes, providing adequate room for the present necessities of the company. The shops and car houses are in good condition and are well equipped.

"Ten new passenger cars, one new freight car, two new work cars and five long-broom snow sweepers have been added to the equipment this year; all of which have been used to advantage in reducing the cost of operation.

"The traffic department is a new department, organized in September, 1910, to give greater attention and study to traffic conditions in order that the company may serve the public with increasing satisfaction. It embraces a consolidation of the park, express, advertising, excursion, publicity and industrial departments. A competent man has been found to take charge of this department, and the few months of its existence have fully demonstrated the wisdom of its establishment.

"The court upheld the award of a Chester County jury for damages arising out of the condemnation of the Chestnut Hill and Spring House Turnpike, and Montgomery County has since forwarded to the company its check for \$80,913 in payment for this turnpike, representing costs and interest; of which there was received the sum of \$69,500, being the net amount of your company's interest in the turnpike company. The turnpike company therefore has been dissolved, the action ridding us of the last of our three troublesome turnpikes.

"In conclusion I wish to say that as the business of your company is steadily and substantially increasing, the percentage of operating expense to earnings steadily decreasing and the physical condition of the property materially improving, the prospects for the future are extremely promising. I wish to express my sincere appreciation of the hearty and efficient co-operation and support received from the officers and employees of the company and its allied interests."

Earnings of New York State Railways

The New York State Railways, Rochester, N. Y., has filed with the New York Stock Exchange the following report of its earnings for the year ended Dec. 30, 1910:

Earnings from operation.....	\$3,421,790
Expenses of operation.....	2,063,643
Net earnings from operation.....	\$1,358,146
Taxes.....	236,945
Net earnings.....	\$1,121,201
Dividends received from subsidiary companies.....	569,633
Total income.....	\$1,690,835
Interest, rentals, etc.....	527,124
Balance available for dividends.....	\$1,163,710
Dividends preferred stock.....	\$249,353
Dividends common stock.....	897,517
	\$1,146,871
Net surplus.....	\$16,838

Beaumont (Tex.) Traction Company.—James F. Weed, receiver of the Beaumont Traction Company, has been authorized to issue \$125,000 of receiver's certificates to provide funds to improve the property of the company.

Boston & Northern Street Railway, Boston, Mass.—The Massachusetts Railroad Commission has approved an issue of \$666,000 of 50-year 4 per cent bonds of the Boston & Northern Street Railway. The bonds shall not, without further authority of the board, be sold at less than 90 per cent of their par value. The company in its petition to the commissioner asked for authority to issue \$700,000 of 4 per cent 50-year bonds to retire its floating indebtedness incurred in new construction and equipment, also for further additions and betterments.

Boston & Worcester Street Railway, Boston, Mass.—The Massachusetts Railroad Commission has authorized the

Boston & Worcester Street Railway to issue 3972 shares of preferred stock at 110.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—A meeting of the stockholders of the Charleston Consolidated Railway, Gas & Electric Company has been called for March 22, 1911, to vote on the question of increasing the capital stock by an issue of \$1,000,000 of common stock, making the capital stock \$3,000,000, including the present common of \$1,500,000 and the preferred of \$500,000.

Chicago (Ill.) Railways.—Final settlement of the Chicago Railways litigation over the Chicago Consolidated Traction Company was made by an order of Feb. 21, 1911, which has been filed in the United States Circuit Court at Chicago, Ill.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—It is reported in Chicago that an effort is being made to reorganize the Chicago & Milwaukee Electric Railroad on the basis of an exchange of the present first mortgage bonds of 1919 for par in the first mortgage bonds of the new company, the 1922 bonds for par in first income 4 per cent bonds of the new company, and the 1925 bonds for 50 per cent in second income 4 per cent bonds and 50 per cent in the stock of the new company.

Dayton (Ohio) Street Railway.—The Dayton Street Railway has filed articles with the Secretary of State providing for an increase in the capital stock of the company from \$1,200,000 to \$1,300,000.

Denver (Col.) City Tramway.—William L. Bull, New York, N. Y., has been elected a director of the Denver City Tramway to succeed the late Charles J. Hughes.

Halifax (N. S.) Electric Tramway.—The Halifax Electric Tramway has declared a quarterly dividend of 2 per cent on its \$1,400,000 of capital stock, payable April 1, 1911. This dividend compares with $1\frac{3}{4}$ per cent paid quarterly since January, 1910, and $1\frac{1}{2}$ per cent paid previously for several years.

Interborough-Metropolitan Company, New York, N. Y.—Application has been made to the New York Stock Exchange to list \$45,740,000 preferred stock voting trust certificates of the Interborough-Metropolitan Company.

Interstate Railways, Philadelphia, Pa.—Notice has been given that the interest coupons, Nos. 14, 15 and 16, of the collateral trust bonds of the Interstate Railways, due on Feb. 1, 1910; Aug. 1, 1910, and Feb. 1, 1911, will be paid on presentation at the office of the Real Estate Title, Insurance & Trust Company, Philadelphia, Pa., trustee, on and after March 7, 1911.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The Mahoning & Shenango Railway & Light Company has announced that it will sell \$500,000 of bonds to cover proposed improvements.

Manistee Light & Traction Company, Manistee, Mich.—The sale of the property of the Manistee Light & Traction Company under foreclosure, postponed from Jan. 18, 1911, has been fixed for March 15, 1911, by order of the United States District Court.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—A syndicate composed largely of Cleveland (Ohio) capitalists is reported to have arranged with the bondholders of the Meadville & Conneaut Lake Traction Company to take over the property of this company which they purchased recently at foreclosure sale, as noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, page 135. It is proposed to organize the Northwestern Pennsylvania Railways Company to succeed the Meadville & Conneaut Lake Traction Company.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe has again adjourned the sale of the property of the Metropolitan Street Railway under foreclosure. The new date has been fixed for April 20, 1911.

Mount Vernon (Ohio) Electric Company.—The Mount Vernon Electric Company has increased its capital stock from \$300,000 to \$375,000.

North Jersey Rapid Transit Company, Paterson, N. J.—The Board of Public Utility Commissioners of New Jersey has authorized the North Jersey Rapid Transit Company to issue \$195,000 of bonds and \$163,000 of stock of the company at par.

Oakland & Antioch Electric Railway, Oakland, Cal.—Wakefield, Garthwaite & Company, San Francisco, Cal., offer for subscription at 85 and interest with 100 per cent bonus in stock the unsold portion of \$1,000,000 of first mortgage 5 per cent sinking fund gold bonds of the Oakland & Antioch Electric Railway, Oakland, Cal., dated July 1, 1910, and due July 1, 1940. The trustee of the issue is the Anglo-California Trust Company, San Francisco, Cal. The authorized capital stock of the company is \$3,500,000, all of which has been issued, and the authorized issue of bonds is \$2,000,000, of which \$1,500,000 has been issued. The first section of the Oakland & Antioch Electric Railway was recently placed in operation between Bay Point and Concord, as noted in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911, page 392.

Ottawa (Ont.) Electric Railway.—The Ottawa Electric Railway has issued its pamphlet report for the year ended Dec. 31, 1910. The company reports gross receipts for 1910 of \$748,708, as compared with \$677,357 for 1909; total expenses, including mileage payments, taxes and interest for 1910, of \$528,025, as compared with \$479,502 for 1909, and net income for 1910 of \$220,683, as compared with \$197,854 for 1909. In 1910 16,967,334 passengers were carried as against 14,983,799 for 1909. The percentage of operating expenses to gross receipts in 1910 was 63 per cent, as compared with 63.5 per cent in 1909.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia Company has informed the Philadelphia Stock Exchange that the outstanding stock of the company has been increased to \$38,531,000 through the conversion of all of the \$2,500,000 of sterling debentures which are due in 1920 and \$31,000 of the \$2,500,000 to convertible debentures which are due on Aug. 1, 1919.

Philadelphia (Pa.) Rapid Transit Company.—George H. McFadden, Arthur E. Newbold and Rudolph Ellis have been selected as the voting trustees under the plan proposed by E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., for refinancing the Philadelphia Rapid Transit Company. Mr. McFadden is head of a large cotton firm, director of a number of banks and was a director of the Lehigh Valley Railroad. Mr. Newbold is a member of J. P. Morgan & Company and Drexel & Company, and is a director of several financial institutions. Mr. Ellis is president of the Fidelity Trust Company and a director of the Pennsylvania Railroad.

Quakertown (Pa.) Traction Company.—The Lehigh Valley Transit Company has withdrawn its offer to purchase the first mortgage 5 per cent bonds of the Quakertown Traction Company.

Rochester Railway & Light Company, Rochester, N. Y.—Harris, Forbes & Company, New York, N. Y., offer for subscription at 101 and interest \$826,000 of consolidated mortgage 5 per cent bonds of the Rochester Railway & Light Company, dated July 1, 1904, and due July 1, 1954. The official statement of the earnings of the company for the year ended Jan. 31, 1911, follows: Gross earnings, \$3,203,253; operating expenses and taxes, \$1,665,255; net earnings, \$1,537,997; interest on outstanding bonds, \$759,582; surplus, \$778,415.

South Side Elevated Railroad, Chicago, Ill.—The directors of the South Side Elevated Railroad have declared a quarterly dividend of $\frac{3}{8}$ of 1 per cent, increasing the annual rate from 2 per cent to $2\frac{1}{2}$ per cent. The dividend is payable on March 31, 1911, to stock of record on March 20, 1911.

Underground Electric Railways of London, Ltd., London, Eng.—The entire issue of \$5,000,000 of 5 per cent prior lien bonds of the Underground Electric Railways of London, Ltd., due in 1920, has been called for redemption at par and interest on Sept. 1, 1911.

Utah Light & Railway Company, Salt Lake City, Utah.—The Union Trust Company, Chicago, Ill., is offering for subscription to yield 5.25 per cent a block of first mortgage 5 per cent bonds of the Consolidated Railway & Power Company, dated July 1, 1901, and due July 1, 1921. The bonds are a first lien underlying security of the Utah Light & Railway Company.

Virginia Railway & Power Company, Richmond, Va.—A meeting of the stockholders of the Virginia Railway &

Power Company has been called for March 14, 1911, to authorize a mortgage supplemental to that securing an authorized issue of \$15,000,000 of first and refunding mortgage bonds; to refund certain bonds secured by underlying mortgage liens mentioned in the first refunding mortgage, and to authorize the sale of \$2,000,000 of first and refunding mortgage bonds, being a part of the bonds reserved for refunding and retiring underlying bonds and for improvements, additions and extensions and other corporate purposes.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—It is reported in Cleveland that the Pennsylvania Railroad will probably bid for the property of the Washington, Baltimore & Annapolis Electric Railway in competition with the reorganization committee when the sale under foreclosure is held on March 20, 1911. The details of the plan of the committee representing the bondholders for the reorganization of the company were referred to in the *ELECTRIC RAILWAY JOURNAL* of Nov. 19, 1910, page 1044, and Nov. 26, 1910, page 1078.

West Penn Traction Company, Pittsburgh, Pa.—J. S. and W. S. Kuhn, Inc., Pittsburgh, Pa., and Kuhn, Fisher & Company, Boston, Mass., offer for subscription at 97 and interest the unsold portion of the present issue of \$443,500 of first mortgage 5 per cent gold bonds of the West Penn Traction Company, dated June 1, 1910, and due June 1, 1960.

Youngstown & Sharon Railway & Light Company, Youngstown, Ohio.—The Youngstown & Sharon Railway & Light Company filed its answer in the Court of Chancery at Trenton, N. J., on March 2, 1911, denying the charge of E. Clarence Jones, New York, N. Y., that the company was applying surplus profits to other purposes when such profits should be used to pay dividends.

Dividends Declared

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, $1\frac{3}{4}$ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, $2\frac{1}{2}$ per cent.

Philadelphia (Pa.) Traction Company, \$2.

Second and Third Streets Passenger Railway, Philadelphia, Pa., quarterly, \$3.

Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, quarterly, $2\frac{1}{2}$ per cent.

South Side Elevated Railroad, Chicago, Ill., quarterly, $\frac{5}{8}$ of 1 per cent.

Union Railway, Gas & Electric Company, Rockford, Ill., quarterly, $1\frac{1}{2}$ per cent, preferred.

Whatcom County Railway & Light Company, Bellingham, Wash., 3 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.

Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Jan.	'11	\$121,196	\$89,492	\$31,704	\$35,016	\$-3,314
1 "	'10	101,784	77,998	23,786	31,964	\$-8,178
7 "	'11	1,055,653	593,326	462,327	236,912	225,415
7 "	'10	959,791	522,900	436,890	209,539	227,351

CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

1m., Jan.	'11	\$23,114	*\$13,578	\$9,536	\$8,172	\$1,364
1 "	'10	21,084	*12,238	8,847	7,986	861

LAKE SHORE ELECTRIC RAILWAY SYSTEM.

1m., Jan.	'11	\$84,569	*\$49,358	\$35,212	\$34,628	\$584
1 "	'10	78,994	*48,539	30,455	34,270	\$-3,816

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

1m., Jan.	'11	\$418,427	\$218,828	\$199,599	\$119,481	\$80,118
1 "	'10	386,716	219,429	167,287	111,374	55,913

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.

1m., Jan.	'11	\$121,266	\$36,771	\$84,495	\$69,122	\$15,373
1 "	'10	112,483	36,414	76,068	67,278	\$8,790

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1m., Jan.	'11	\$186,271	*\$106,904	\$79,367	\$44,429	\$34,938
1 "	'10	164,944	*94,500	70,444	43,292	\$27,152

PUGET SOUND ELECTRIC RAILWAY.

1m., Dec.	'10	\$157,982	\$103,693	\$54,289	\$50,065	\$4,224
1 "	'09	148,994	108,402	40,592	49,080	\$-8,487
12 "	'10	1,915,289	1,252,410	662,879	608,078	54,801
12 "	'09	1,869,096	1,250,588	618,508	570,048	48,460

SAVANNAH ELECTRIC COMPANY.

1m., Dec.	'10	\$53,515	\$36,017	\$17,498	\$17,481	\$17
1 "	'09	50,288	32,683	17,605	17,599	6
12 "	'10	634,356	416,234	218,122	215,012	1,110
12 "	'09	603,814	392,351	211,463	209,693	1,770

*Includes taxes. †Deficit.

Traffic and Transportation

Resolution of Thanks from Employees to President of Public Service Railway

At a recent joint meeting of the West Hoboken and West New York Social Clubs of the Public Service Railway held at the club rooms for the employees of the company in West Hoboken the following resolutions were adopted:

"Whereas our worthy and highly respected president, Thomas N. McCarter, together with the other officers and directors of the Public Service Railway, has generously provided a sick and death benefit and pension fund for employees; therefore be it

"Resolved, That we herewith express our sincere appreciation of the steps that have been taken in promoting our welfare, and we trust that we may continue to labor for the company's interest with even greater zeal, if possible, in the future as an evidence of our recognition of the company's generosity toward us, feeling that it will spur us to the accomplishment of larger results.

"Resolved, That this tribute of respect and regard for our esteemed president and directors and for the members of the welfare committee be entered upon the minutes of our proceedings, and a copy be forwarded to our president."

The resolutions were presented to Mr. McCarter at his office in Newark by a delegation of employees who were introduced by R. E. Danforth, general manager of the company. In addressing the men Mr. McCarter said:

"We are honestly trying to solve the problems which confront large corporations, especially the problems of capital and labor, and to establish satisfactory reciprocal relations between employers and employees. We are always ready to give a hearing to matters which relate to the happiness of the men. I am inclined more and more to the view that a large corporation owes something to its men besides their daily wage. We are trying to do for our men all that the resources of the company will permit. We are helping to take care of you when you are sick. We provide a pension for your old age because you give the best years of your life to the company and, in a small way, we provide for those who are left after you die. The plan that has been put into effect has been carefully studied and is the most comprehensive we could devise. Everything is paid by the corporation.

"This is only part of the general welfare plan. You have your club rooms and we are trying to make your working conditions as pleasant as possible. We want to develop an *esprit de corps* which will redound to our own as well as to the company's benefit. I am working for the company as well as you, although our duties are along different lines. We want you to know that we appreciate the spirit you show and you will always find your superior officers ready to talk matters over with you. We want to make this corporation one in which the true feeling of brotherhood will prevail. I thank you again for these resolutions and will show them to our executive committee and our board of directors when they meet."

Increase in Fare on Illinois Road

The Galesburg & Kewanee Electric Railway, Kewanee, Ill., announced that on March 1, 1911, it would put into effect the following increase in fares on its line, which connects Kewanee and Galva, a distance of 13 miles: One way, full fare, from 18 cents to 20 cents; one way, half fare, from 9 cents to 10 cents; Sunday round trip, full fare, from 25 cents to 30 cents; Sunday round trip, half fare, from 13 cents to 15 cents; mileage books, from \$3.75 to \$4.

In announcing the increase R. H. Hayward, general manager of the company, issued a long statement in which he said: "The relation of receipts to expenses has been a constant source of anxiety to the directors of this company since the first car was started in 1903, for at no time has a dividend been earned to compensate the stockholders for the money, time and labor expended in the organization, construction and operation of the property. Not only has the company not been able to pay dividends, but it has not even earned sufficient revenue above current expenses to maintain its property in good condition and to provide for

depreciation which will necessitate the purchase of new cars, dynamos, engines, boilers and other equipment when the old property is worn out. This is a condition of affairs that cannot continue indefinitely.

"A property which cannot make both ends meet soon reaches the point where it cannot borrow money to make up the deficit. When that point is reached it may try to struggle along by lowering its standard of service, by making no expenditures for new equipment, even when needed, and by avoiding repairs to cars, track or other parts of the property that are not absolutely necessary to enable the wheels to turn. All of these measures are demoralizing to the company and disgusting to the public which depends upon it for service. If these measures fail, then the plant is closed down and the public gets no service.

"This plain statement of the facts is made because the company believes that if its patrons fully understand the situation they will approve and commend its action as a necessary business proposition, and will cheerfully accommodate themselves to it. The company values the respect and friendship of those who do business with it, and feels that it will be better entitled to these considerations if it endeavors to maintain its business on a sound financial basis than if it allowed its property to run down and depreciate and clearly neglected what the Supreme Court of the United States has declared to be 'a plain duty to the public.'"

Interurban Company Adopts Seniority Rule.—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has adopted the seniority method of assigning runs.

Riding in the Vestibule Prohibited.—The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., is strictly enforcing the rule which prohibits persons, whether or not they are employees, from riding in the motorman's vestibule of interurban cars.

Reduction in Fare Between Indianapolis and Broad Ripple.—The Indiana Union Traction Company, Indianapolis, Ind., has announced a reduction in fare between Indianapolis and Broad Ripple from 10 cents to 5 cents after April 1, 1911. Broad Ripple Park will be improved and a new hotel constructed.

Souvenir Postals of Interurban Line.—Frank I. Hardy, superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has had a large edition of souvenir postcards printed which show views along the lines of the company and pictures of cars. He will have the postcards distributed in the stations of the company.

Accident Fakir Sentenced in Baltimore.—William G. Fossbenner, who was arrested on Sept. 8, 1909, charged with attempting to defraud the United Railways & Electric Company, Baltimore, Md., out of \$60 by means of false pretenses and false representation in an accident case, pleaded guilty on March 2, 1911, in the Criminal Court, Part 2, Baltimore, and was sentenced to 60 days' imprisonment by Judge Harlan.

Advertising a Louisville Road.—The Louisville & Northern Railway & Lighting Company, Louisville, Ky., has done some effective newspaper advertising of late, calling attention to the advantages of living on the "North Side." One of its most effective advertisements follows: "Out of the turmoil and the noise and dirt of the city—that's where you will live happiest. The North Side offers this. Ask a real estate man or take the big red car and see for yourself."

Efficiency Club in Boston.—Under the title of the Efficiency Club the officials and heads of departments of the Boston (Mass.) Elevated Railway have formed an organization to meet about once a month and discuss methods of improving the efficiency of the service. The first meeting was held on the evening of March 1, 1911, at the Parker House. At the next meeting H. M. Stewart, roadmaster of the elevated division, will present a paper, "The Handling of Supplies at the George Street Yards."

Complaints to the Pennsylvania Commission.—The Railroad Commission of Pennsylvania heard several complaints in Philadelphia on March 4, 1911, including one by residents of Elmwood against the service rendered by the

Southwestern Traction Company, now in the hands of receivers. The commission decided that it had no jurisdiction in this case. The commission has received a complaint about the transfer system of the City Passenger Railway, Altoona. Ralph A. Weiss, Philadelphia, contended that the Philadelphia Rapid Transit Company had not improved service to the League Island Navy Yard.

Prize to Employees for Papers.—The Interborough Club, composed of employees of the Interborough Rapid Transit Company, New York, N. Y., has offered cash prizes for the best articles on either "The Relationship of Employees to the Traveling Public" or "How the Efficiency of the Service May Be Increased." For the best article the club will pay \$50, for the next best \$25, and for the third best \$10. The author must submit his paper to the Interborough Club through the head of his department. The paper must not contain less than 500 words or more than 1000 words. All papers must be in the hands of the club by March 15. The prize winners will be announced in the April issue of the *Interborough Bulletin*.

Seattle Electric Journal.—The *Seattle Electric Journal* has succeeded the *Live Wire*, a bi-monthly published throughout 1910 in the interest of the employees of the Seattle Electric Company. The *Electric Journal* is 6 in. x 9 in. and is different in dress from the *Live Wire*. In announcing the change the *Electric Journal* said in part: "The *Seattle Electric Journal* will promote a wider scope than its predecessor, and the field of usefulness that is intended for it to occupy has been materially extended so that a more comprehensive reflection of the sentiments of officials and subordinates alike may be obtained. The initial issue will be distributed among the employees but subsequent editions are to have a wider circulation than the limits imposed by the lists of co-workers of the Seattle Electric Company. The *Electric Journal* is to appear regularly on the second Saturday of each month."

Hearing on Commutation Fares on New Haven Out of New York.—At a hearing held in New York on Feb. 23, 1911, on the application of the Connecticut Commuters' League to the Interstate Commerce Commission for a reduction in the commutation rates established on July 1, 1910, between the Grand Central Station, New York, and New Haven, counsel were given until March 9, 1911, to file briefs with the commission. Counsel for the commuters put in evidence a schedule of rates out of Boston on the New York, New Haven & Hartford Railroad which has been in force since 1908 as a basis for comparison with the rates which prevail out of New York. William B. Hopkins, a commuter of Bridgeport, was the only witness called. He said that very few commuters used the 60 trips provided on the monthly ticket and submitted a compromise rate card on a basis of five mills per mile on a 50-trip ticket.

New Transfers in Detroit.—The Detroit United Railway has completed a new system of transfers for the Woodward Avenue cars, to enable conductors to issue slips without taking the time to punch them. The new transfers are issued in colors to distinguish those good on the so-called 3-cent lines from those good only on the 5-cent lines. The distinction is made to prevent a passenger who uses a workman's ticket from transferring to a 3-cent line. The fare in each case is represented by a ticket which sells at eight for a quarter, but the colors of the transfers are different, so as to prevent unrestricted transfer privileges. Brown transfers are used for the 5-cent lines and white for the 3-cent lines. Cuts in the transfers, indicating the month and date, are made en bloc before the transfers are turned over to the conductors. The new transfers carry a diagram in which a single punch mark, made at the beginning of a trip, indicates either a. m. or p. m., as well as the direction in which the car is moving.

Increase in Wages in Texarkana.—W. L. Wood, Jr., manager of the Texarkana Gas & Electric Company, Texarkana, Tex., recently announced an increase in wages of all motormen and conductors in the employ of the company of 16 per cent. The increase became effective on March 1, 1911. In a statement which he made public Mr. Wood requested the employees to support the company in its efforts to "deliver the city the best street railway service in a city of its size." Commenting on the increase, the *Daily Texarkanian* said: "It will be the opinion of many that Mr. Wood

might have left off the words 'in a city of its size,' as the exceptionally good service of Texarkana's public utilities, and particularly the modern street car system, has frequently occasioned favorable comment by visitors and home people." To make it plain to the public what the increase means the same paper put the matter of the increase as follows: "To the company it means that of its own volition and accord it is distributing among its employees an amount equal to interest at 10 per cent on an investment of \$35,000. In other words, the action is equivalent to the company placing \$35,000 in trust and conveying the income from this amount to the motormen and conductors. To pay this increase in wages it will be necessary for the company to haul 70,000 people. It means that the directors must give up the chance of having these 70,000 nickels added to the profits and see them go into the pockets of their employees."

Protest Against "No-Seat-No-Fare" Ordinance Carried to Commission.—The Trenton (N. J.) Street Railway appealed to the Board of Public Utility Commissioners on Feb. 28, 1911, against the "No-Seat-No-Fare" ordinance which was passed by the Trenton Common Council in April, 1910, so as to stay action that was to have been taken in the Central Police Court at Trenton looking toward the collection of penalties for violation of the ordinance. When the cases were called counsel for the company gave notice of the appeal to the commission and Justice Harris adjourned the hearing pending a decision by the commission. It is contended by the company that passengers anxious to reach their destination are willing to stand on front or rear platforms or in the aisles of cars rather than to wait for the following cars; that the public has a right to make such use of the aisles and platforms, and that the company cannot restrain them from so doing. The practice of standing in cars has become a fixed custom, the company says, and any effort of the company to remove passengers who refused to pay their fare would inconvenience the public and create disorder. On the other hand, to require the company to carry passengers without the payment of a fare would be in violation of the State Constitution, which forbids the taking of private property for public use without just compensation. In short, the company contends that the ordinance is unreasonable and unjust; that it is in contravention of the rights of the company; that it is impossible to comply with the directions of the ordinance; that it is impracticable to operate cars as prescribed by the ordinance.

Trials of a Subway Guard in New York.—A guard on the subway division of the Interborough Rapid Transit Company, New York, N. Y., recently wrote a letter to the editor of the New York *Evening Sun* in which he protested against ill use by the traveling public. The disregard of the ordinary decencies of life on the part of the traveling public which this man cites is strikingly illustrated in the following abstract of his letter: "I should like you to allow me to protest against the condition of mind of many of those who travel in the subway and to their growing spirit of hostility toward conductors and guards in the performance of their duties. The spirit of hostility manifests itself in several ways. Here are some of them: Showering wholesale abuse upon guards who accidentally touch them in closing a door on a crowded car; swearing at, abusing and threatening to report guards when caught on entering a center side door; forgetting that they have 10 times more opportunity to see and protect themselves against such occurrences than the guard; standing in the doorways and refusing to move, thus impeding the egress and ingress of passengers; savagely rushing and pushing when boarding the train during rush hours; rushing up after the starting signal has been passed and spitting in the guard's face when he refuses to open the doors; cursing, abusing and generally visiting their wrath on guards when accidents or delays tie up the service; ignorantly and savagely attempting to pass (behind the guard) from one car to another, preventing him shutting the doors and thus causing delay to the train; hurling vile names and using obscene language (quietly) at guards when they have failed to board the train and it is pulling out of the station. In most civilized countries the law is very severe on people annoying or interfering with railway servants in the discharge of their duties, but such does not seem to apply here, where in a few cases persons have been commended from the bench when they expressed their indignation by assaulting such servants."

Personal Mention.

Mr. E. O. Reed has been appointed auditor of the Western Ohio Railroad with headquarters at Lima, Ohio, to succeed Mr. R. H. Carpenter, deceased.

Mr. Julian Adams has been appointed engineer of the Los Angeles-Pacific Company and the Pacific Electric Railway, Los Angeles, Cal., in charge of the power supply and electric distribution.

Mr. D. F. Sherman, president of the Providence & Danielson Railway, Providence, R. I., has been elected president of the Sea View Railroad, Wickford, R. I., to succeed Mr. Andrew Radel.

Mr. William F. Smith has been appointed engineer of the Los Angeles-Pacific Company and the Pacific Electric Railway, Los Angeles, Cal., in charge of the substations and overhead maintenance of way.

Mr. Franklin A. Smith, Jr., secretary of the Providence & Danielson Railway, Providence, R. I., has been elected treasurer of the Sea View Railroad, Wickford, R. I., to succeed Mr. A. L. Smith, Bridgeport, Conn.

Mr. C. H. Burnett, formerly manager of the Los Angeles & Redondo Railway, Los Angeles, Cal., has been appointed manager of outside properties of the Pacific Electric Railway, Los Angeles, Cal., and consolidated properties.

Mr. Ernest Gonzenbach, president of the Sheboygan Railway & Electric Company, Sheboygan, Wis., sailed for Europe on March 7, 1911, on a trip to Switzerland, his native country. Mr. Gonzenbach expects to be gone about four weeks.

Mr. J. W. Giltner has been appointed assistant claim agent of the Portland Railway, Light & Power Company, Portland, Ore. For the last four years Mr. Giltner has been connected with the claim department of the Indiana Union Traction Company, Anderson, Ind.

Mr. H. U. Wallace, vice-president of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., assumed the duties of general manager of the company on March 1, 1911, on which date the resignation of Mr. J. L. Blake as general manager and traffic manager of the company became effective.

Mr. C. H. Crooks has been appointed traffic manager of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia. Mr. Crooks was formerly in the division freight and passenger office of the Chicago, Milwaukee & St. Paul Railway, at Des Moines. About three years ago he was appointed general freight and passenger agent of the Fort Dodge, Des Moines & Southern Railroad, in which office he made an excellent record.

Mr. Calvin Whiteley, Jr., has been appointed assistant chief engineer of the United Railways & Electric Company, Baltimore, Md. Mr. Whiteley has been chief engineer of the Virginia Railway & Power Company, Richmond, Va., for the last 11 years. Prior to his connection with the Virginia Railway & Power Company Mr. Whiteley was associated with the Western Maryland Railroad as engineer in charge of construction on work in southern Pennsylvania. He was also at one time employed as division engineer by the Baltimore Traction Company, one of the constituent companies of the United Railways & Electric Company.

Mr. Walter L. Fisher, special traction counsel to the City Council of Chicago and a member of the Railroad Securities Commission appointed by President Taft to consider the feasibility of regulating stock and bond issues of railroads, was appointed Secretary of the Interior by President Taft on March 7, 1911, to succeed Mr. Richard A. Ballinger, resigned. Mr. Fisher was born in Wheeling, W. Va., on July 4, 1862, and was graduated from Hanover College, at Hanover, Ohio. Four years after his graduation Mr. Fisher was admitted to the bar and began practice in Chicago. In 1889 he became special assessment attorney of the City Council of Chicago and was connected with the Department of Public Works. Mr. Fisher's connection with traction problems in Chicago began during the last year of Mayor Dunne's administration. In 1907 Mayor Dunne appointed Mr. Fisher special traction counsel to the City Council. Mr. Fisher drafted the street railway ordinances under which the Chicago City Railway and the

Chicago Railways operate and prepared the Mueller Law of Illinois, which legalizes municipal ownership of street railways.

Mr. Lewis C. Bewsey, whose appointment as local superintendent of the Indiana Union Traction Company at Indianapolis, Ind., was noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 25, 1911, was born in Colfax, Ind., on Jan. 26, 1882. After completing a high school education at an early age, Mr. Bewsey applied for a position as motorman on the Lafayette Street Railway, but because of his youth he was assigned to track work. He was next employed as a shop hand on repair work. Subsequently he was made a motorman and then a conductor. In 1905 he was promoted to shop foreman, but he resigned this position to become a motorman with the Indiana Union Traction Company in Muncie, Ind., in which capacity he served for more than six years. During a portion of the time he was employed as a motorman by the Indiana Union Traction Company he ran the Muncie Meteor between Muncie and Indianapolis, and from May 16, 1909, to Sept. 20, 1910, he did not miss a trip. During this period the car traveled 75,300 miles. Mr. Bewsey's exceptional operating record was referred to at a recent meeting of the Central Electric Railway Association.



L. C. Bewsey

OBITUARY

William B. Mason, president of the Mason Regulator Company, Boston, Mass., is dead.

Jerome W. Campbell, who was superintendent of the City & Suburban Railway, Portland, Ore., before that property was taken over by the Portland Railway, Light & Power Company, is dead. Mr. Campbell was born in Hocking County, Ohio, on Aug. 20, 1859, and settled in Portland in 1886. Shortly thereafter he became connected with the Willamette Bridge Railway and subsequently entered the service of the City & Suburban Railway.

The Industrial Safety Association is the title of a new association which has recently been organized with headquarters at 29 West Thirty-ninth Street, New York. Its objects, as stated in its constitution, are to "prevent accidents to life, limb or body of persons engaged in productive industry, or in the occupations contributory thereto in which mechanical or other sources of power are employed; and to promote the health and well-being of persons engaged in the wage-earning processes and other occupations of life, by disseminating knowledge of sanitation and hygiene."

The officers for the first year are: President, F. R. Hutton, consulting engineer, Department of Water, Gas and Electricity, New York City, and past-president American Society of Mechanical Engineers; vice-presidents, T. Commerford Martin, secretary National Electric Light Association, and past-president American Institute of Electrical Engineers; Charles Kirchoff, consulting mining engineer, and Henry R. Towne, president Yale & Towne Manufacturing Company; managers, Philip T. Dodge, president Mergenthaler Linotype Company; Frank E. Law, vice-president Fidelity & Casualty Company; Arthur Williams, electrical engineer, New York Edison Company, and Ira H. Woolson, consulting engineer, National Board of Fire Underwriters; treasurer, Robert A. Franks, president Home Trust Company; secretary, William J. Moran, counsel.

The association is conducting a museum of safety devices in the Engineering Societies Building and has just commenced the publication of a monthly paper. The annual dues are \$10.

The association also proposes to have a class of "contributing members" or manufacturing companies which will pay \$100 a year. This entitles them to an illustrated lecture on safety in their plant every year by one of the experts attached to the association.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Pequonnock Railway, Bridgeport, Conn.**—Application for a charter has been made in Connecticut by this company to build an electric railway between Bridgeport and Trumbull. Incorporators: C. Lewis Bill, Theodore B. Ford, F. B. Curtis and Leo C. Morehouse.

***Evansville & Chrisney Railway, Evansville, Ind.**—Incorporated in Indiana to build an interurban railway to connect Evansville, Chrisney, Troy and Tell City. Headquarters: Evansville. Capital stock, \$50,000. Incorporators: J. P. Chrisney, J. F. Bergaman, M. A. Abbott, S. W. Gwaltney, all of Chrisney, and E. E. Watts, Princeton.

***Henderson (Ky.) Interurban Railway.**—Incorporated in Kentucky as a subsidiary to the Fidelity Investment Company to build an electric railway to connect Henderson, Dixon, Providence, Morganfield, Uniontown and Owensboro. Capital stock, \$10,000. Incorporators: E. F. Wheaton and F. M. Smith, Nashville, and W. W. Cooper, Henderson.

***Winnipeg River Railway, Winnipeg, Man.**—Application for a charter has been made in Manitoba by this company to build a 65-mile electric railway from Winnipeg to Lac du Bonnet. H. P. Blackwell, Winnipeg, attorney.

***Jacksonville Traction Company, Boston, Mass.**—Application for a charter has been made in Massachusetts by this company. Capital stock, \$1,500,000. Incorporators: Frederick D. Webster, Erland F. Fish and Henry Endicott, Jr.

***Tri-State Railway & Electric Company, East Liverpool, Ohio.**—Incorporated in Ohio with a capital stock of \$10,000. Incorporators: W. R. W. Griffin, general manager of the East Liverpool Traction & Light Company; W. I. Shlep, F. J. Brady and W. B. Moore, Lisbon.

***Gallia & Meigs Electric Railroad, Gallipolis, Ohio.**—Incorporated in Ohio to build a 14-mile railway to connect Kanauga and Middleport. Rights-of-way are being secured and surveys made. Capital stock, \$50,000. Headquarters: Gallipolis. Incorporators: T. W. Jackson, of Belpre; S. H. Eagle, J. S. Howard, J. V. Lee and E. D. Davis, all of Gallipolis.

Pittsburgh, Butler, Slippery Rock, Grove City & Northern Street Railway, Butler, Pa.—Incorporated in Pennsylvania to build a 26-mile electric railway to connect Butler, Slippery Rock, Grove City, Prospect, West Liberty, Center, Franklin, Brady, North Liberty and Pine. Surveys have been made and franchises have been granted the company in a number of the towns. As soon as the rights-of-way have been secured construction will be begun. Incorporators: W. C. McCandless, John Troutman, F. L. Forrester, John C. Kerr and William M. Galbraith. [E. R. J., Feb. 18, '11.]

***Piedmont & Northern Railway, Greenville, S. C.**—Incorporated in South Carolina in connection with the plans of the Duke interests to operate a network of electric railways through the Piedmont section. Capital stock, \$5,000,000. Incorporators: J. B. Duke, Somerville, N. J.; B. N. Duke and Samuel McRoberts, New York City; W. S. Lee, Charlotte, N. C.; Ellison A. Smyth and Lewis W. Parker, Greenville, S. C.

FRANCHISES

Sacramento, Cal.—The Pacific Gas & Electric Company has received a franchise from the City Trustees to extend its railway over certain streets in Sacramento.

Vallejo, Cal.—The Vallejo & Northern Railway has received a 50-year franchise from the City Trustees to extend its railway along the waterfront to a terminal at the Main Street wall and over certain streets in Vallejo. T. T. C. Gregory, Suisun, president. [E. R. J., Feb. 25, '11.]

Macon, Ga.—The Macon Railway & Light Company has asked the City Council for a franchise to extend its railway over certain streets in Macon.

East Grand Rapids, Mich.—The Detroit, Lansing & Grand Rapids Railway, Detroit, has asked the Village Board for a

franchise to build its railway through East Grand Rapids. This proposed railway will connect Detroit and Grand Rapids. [E. R. J., July 9, '10.]

Lakewood, N. J.—The Trenton, Lakewood & Atlantic Railway, Trenton, has received a franchise from the Lakewood Township Committee to build its railway over Ocean Avenue, in Lakewood.

Belle Harbor, N. Y.—The Ocean Electric Railway, New York, has petitioned the Public Service Commission, First District, for permission to extend its line 8 miles through Belle Harbor to the property of the Neponsit Realty Company.

Brooklyn, N. Y.—The Brooklyn Rapid Transit Company has received a franchise from the Board of Estimate to extend its railway in Brooklyn along Georgia Avenue, between Liberty Avenue and Atlantic Avenue, and to connect its lines in Atlantic Avenue and Flatbush Avenue by a loop line through Flatbush, Fourth and Atlantic Avenues.

Buffalo, N. Y.—The International Traction Company has asked the Common Council for a franchise to extend its line in Abbott Road, between Cazenovia Street and City Line, in Buffalo.

New York, N. Y.—The Union Railway, New York, has received a franchise from the Board of Estimate to extend its railway across the Madison Avenue Bridge from Madison Avenue and 136th Street to East 138th Street and Exterior Street, in the Bronx.

Brantford, Ont.—The Brantford Street Railway has received a franchise from the City Council to extend its railway in Brantford to Holmedale.

Waynesburg, Pa.—The Waynesburg & Blackville Street Railway has received a 99-year franchise from the Borough Council. This proposed railway will connect Fairmont and Morgantown, W. Va., with Waynesburg and Pittsburgh, Pa. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., Aug. 27, '10.]

Wellsboro, Pa.—The Tioga Traction Company has asked the City Council for a franchise to build its railway over certain streets in Wellsboro. The line will connect Wellsboro, Middlebury, Chatham, Covington and Mansfield. Geo. F. Keagle, Avis, general manager. [E. R. J., April 16, '10.]

Montreal, Que.—The Montreal Street Railway has asked the Council for a 50-year extension of time on its franchise to build extensions in Montreal.

Providence, R. I.—The Pascoag & Providence Street Railway has asked the State Senate for a 3-year extension of time on its franchises in which to complete its railway in Providence. [E. R. J., March 2, '07.]

La Porte, Tex.—The Bay Shore Rapid Transit Company, La Porte, has received a 90-day extension of time on its franchise from the City Council to begin work on its projected railway to connect La Porte and Houston, via San Jacinto. O. L. Allen, La Porte, is interested. [E. R. J., Dec. 10, '10.]

TRACK AND ROADWAY

Ontario & San Antonio Heights Railroad, Ontario, Cal.—This company has completed and placed in operation its 7-mile extension between Pomona, North Pomona, Clairemont and Upland.

***Montezuma, Col.**—L. H. Long, Buffalo, representing the Automatic Transportation Company, Buffalo, N. Y., is said to have made preliminary arrangements for building a 12-mile elevated electric railroad from Montezuma to Keystone in Summit County. It will connect with the Colorado & Southern Railway at Keystone. Work will begin in the spring.

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—This company has contracted with the Penn Steel Company for special work for track loops to be constructed in May.

Chicago (Ill.) Railways.—This company will build 10 miles of new track during 1911.

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company will construct 20 miles of track during 1911.

Capital Circuit Traction Company, Indianapolis, Ind.—This company advises that it will soon begin construction on its railway to connect Danville, Martinsville, Franklin,

Shelbyville, Greenfield, Noblesville and Lebanon. It will operate gasoline motor cars. Construction will be carried on under the supervision of John A. Shafer, chief engineer. [E. R. J., March 4, '11.]

Vincennes & Washington Transit Company, Vincennes, Ind.—About 20 miles of track will be constructed by this company during the present year.

Kentucky & Tennessee Traction Company, Hopkinsville, Ky.—This company will let contracts early in the spring for building its 25-mile electric railway to connect Hopkinsville, Salubria, Sulphur Mineral Springs, Pembroke, Trenton and Guthrie. There will be three steel bridges and one overhead railway crossing. Charles Venden Burgh, Hopkinsville, general manager. [E. R. J., Feb. 4, '11.]

Paducah (Ky.) Traction Company.—This company is preparing plans to build an extension to Mechanicsburg. A bridge will be built over Island Creek.

Aroostook Valley Railroad, Presque Isle, Me.—This company will construct a 12-mile extension from Washburn to New Sweden during 1911.

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—This company is making plans to build an extension from Wahpeton to Hankinson and other points southwest of Wahpeton.

St. Louis, Lakewood & Grant Park Railway, St. Louis, Mo.—This company will begin on March 20 to build a 3-mile extension in St. Louis.

Missoula (Mont.) Street Railway.—About 2 miles of new track will be constructed in Missoula by this company during 1911.

Beatrice, Neb.—The Commercial Club, Beatrice, is considering plans for building a 44-mile electric railway from Adams to Diller via Beatrice.

Pine Brook Electric Railway, Caldwell, N. J.—The incorporators of this company have decided to equip this railway with storage battery cars. This proposed 10-mile railway will connect Caldwell and Denville. [E. R. J., March 4, '11.]

Fonda, Johnstown & Gloversville Railroad (Elec. Div.) Gloversville, N. Y.—About 4 miles of track will be constructed in Amsterdam by this company during 1911.

Liberty & Jeffersonville Electric Railway, Liberty, N. Y.—This company will place contracts during the next few months for building 12 miles of track. William Craig, Orange, N. J., president.

Westchester Electric Railroad, Mount Vernon, N. Y.—This company will place contracts during the next month for building one mile of single track in New Rochelle.

Interborough Rapid Transit Company, New York, N. Y.—The contract for 5000 tons of steel rails has been awarded by this company to the Lackawanna Steel Company. The order will be divided into 3000 tons of 100-lb. standard and 2000 tons of 90-lb. standard rails.

Dayton, Covington & Piqua Traction Company, Dayton, Ohio.—This company will build a double track on North Main Street, Dayton, from Fairview Park to the corporation line.

Lancaster-Buckeye Lake Traction Company, Lancaster, Ohio.—This company advises that it will begin construction about June 1. No contracts will be awarded until the company is organized. It will be incorporated as soon as the preliminary arrangements are completed. The line will connect Lancaster, Pleasantville, Thurston, Baltimore, Basil, Millersport and Buckeye Lake, 18 miles. Capital stock proposed, \$200,000. Bonds proposed, \$100,000. The power station will be located at Pleasantville and the repair shops at Lancaster. Officers: John H. Littrell, Lancaster; F. P. Barr, Lancaster, secretary, and C. W. Rowlee, treasurer. [E. R. J., March 4, '11.]

Oregon Electric Railway, Portland, Ore.—It is reported that this company has closed a contract with the General Railway Signal Company, Rochester, N. Y., for installing about 25 automatic block signals to protect trains on those portions of its tracks having the densest traffic.

Corry & Columbus Street Railway, Corry, Pa.—This company will build 3 miles of new track in Corry.

Southern Cambria Railway, Johnstown, Pa.—Sheesley & Son, Ebensburg, have been awarded the contract by this company for grading the extension from Brookdale to Ebensburg.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—The directors of this company have decided to issue bonds to the extent of \$500,000, which will be used for improvements over the entire railway from Leavittsburg to Youngstown and New Castle. The greater part will be spent in building extensions and double-tracking the existing lines in Youngstown.

Montgomery County Rapid Transit Company, Norristown, Pa.—This company will extend its railway from Skippack, the present terminus, to points along the Perkiomen Valley instead of the North Penn Valley.

***Montreal, Que.**—It is reported that a syndicate is being formed to build a 14-mile elevated railway extending along Craig Street and St. James from the western to the extreme eastern limits of Montreal.

Regina Municipal Railway, Regina, Sask.—Construction will begin on this 6-mile railway in Regina as soon as the weather permits. The city commissioner says the proposition is financed on the security of vacant property owned by the city to the amount of \$400,000. The power station and repair shops will be located in Regina. It will operate six cars and will furnish power for lighting. A. J. McPherson, Regina, city commissioner, and L. A. Thornton, Regina, city engineer. [E. R. J., March 26, '10.]

Bryan College Interurban Railway, Bryan, Tex.—About a mile of new track will be built by this company in Bryan during 1911.

Texas Traction Company, Dallas, Tex.—This company, now operating an interurban line from Dallas to Denison, will begin at once the construction of an extension to Waxahachie, Hillsboro and Waco.

Bonita Valley Rapid Transit Railway, Jourdan, Tex.—Preliminary plans are being made by this company to build its proposed railway between Jourdan and Pleasanton. C. S. Young, San Antonio, is interested. [E. R. J., Nov. 19, '10.]

Norfolk & Portsmouth Traction Company, Norfolk, Va.—This company has placed contracts for rebuilding its tracks on Botetourt Street and Olney Road with T-rails and vitrified brick pavement.

Richmond & Henrico Railway, Richmond, Va.—The Virginia Bridge & Iron Company, Roanoke, has been awarded a contract by this company for the steel work of its new viaduct. This new bridge will be 50 ft. overhead and will span 1200 ft. from Marshall Street and the National Cemetery Road to Nicholson Street, Fulton. Work will be begun at once. The cost is estimated to be about \$50,000. W. S. Forbes, president. [E. R. J., Oct. 8, '10.]

Spokane & Inland Empire Railroad, Spokane, Wash.—This company expects to build 65 miles of single track during 1911.

Tacoma Railway & Power Company, Tacoma, Wash.—About 2 miles of new track will be built by this company in Tacoma during 1911.

Middle Island Railroad, Middlebourne, W. Va.—This company has awarded the contract to Shumway & Dean, Pittsburgh, for building the first 14 miles of track between Middlebourne and Curtis of its proposed 60-mile electric railway to connect Sistersville, Kidwell, Middlebourne, Shirley and Clarksburg. John F. Shore, Middlebourne, secretary. [E. R. J., Nov. 5, '10.]

Badger Railway & Light Company, Milwaukee, Wis.—This company has received a certificate of convenience and necessity and will begin work on its proposed 22-mile electric railway between Lake Geneva and Whitewater via Elkhorn as soon as the weather permits. Gustav Pickhardt, chief engineer, 711 Majestic Building, Milwaukee. [E. R. J., Dec. 31, '10.]

SHOPS AND BUILDINGS

Mason City & Clear Lake Railway, Mason City, Ia.—This company advises that the fire which recently destroyed its car house at Mason City caused a loss of about \$5,000.

and that none of the cars were totally destroyed. [E. R. J., March 4, '11.]

Frederick (Md.) Railroad.—It is said that this company will soon build a new passenger and freight station in Frederick.

Union Street Railway, New Bedford, Mass.—This company will place contracts soon for building an addition to its car house (70 ft. x 245 ft.) on Pope's Island, New Bedford. E. S. Wilde, New Bedford, purchasing agent.

Liberty & Jeffersonville Electric Railway, Liberty, N. Y.—This company advises that during the next few months it will place contracts for building a new car house and offices in Liberty. William Craig, Orange, N. J., president.

Ohio Electric Railway, Cincinnati, Ohio.—This company has completed and opened its new station in Dayton. It is built of brick, three stories high, and cost about \$150,000. The offices of the company will be located in the building.

Scioto Valley Traction Company, Columbus, Ohio.—This company has purchased a site in the business section of Chillicothe for a new depot, and will secure two other pieces of land adjoining. A station with train shed will be erected, the work to begin as soon as the titles to the land are perfected. The cost of the depot and land will be about \$40,000.

Portland Railway, Light & Power Company, Portland, Ore.—This company is considering plans for building new car houses on Jessup Street, between Mississippi Avenue and Missouri Avenue, in North Albina. The buildings will be of brick construction, and the cost is estimated to be about \$30,000.

Hull (Que.) Electric Railway.—This company will place contracts during the next six weeks for building a new car house at Deschenes.

POWER HOUSES AND SUBSTATIONS

New London & East Lyme Street Railway, New London, Conn.—This company has completed and placed in operation its new power station at Saybrook.

Kentucky & Tennessee Traction Company, Hopkinsville, Ky.—This company will soon award contracts for building a power house and substations for its railway. Charles Vanden Burgh, Hopkinsville, general manager. [E. R. J., Feb. 4, '11.]

Springfield (Mass.) Street Railway.—The Westfield division of this company has completed and placed in operation an addition to the power plant in Westfield. An extension has been added to the buildings on Emery Street and a 500-hp engine and a 225-kw generator added.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—An additional stationary transformer with a capacity of 600 hp will be added to the Brockport substation by this company.

Ohio Traction Company, Cincinnati, Ohio.—This company, it is said, is considering plans for building a new power house at Pendleton.

Oakwood Street Railway, Dayton, Ohio.—This company is considering plans to build a new power house, probably on South Bowen Street, Dayton. H. P. Clegg is general manager. The present power plant will probably be utilized as a car house.

Mt. Hood Railway & Power Company, Portland, Ore.—This company has begun work on the superstructure of the steam auxiliary plant on the Peninsula in Portland. The main building will be 100 ft. x 80 ft. The plant will generate 4000 hp. The cost is estimated to be about \$100,000.

Frankford, Tacony & Holmesburg Street Railway, Tacony, Pa.—This company has placed contracts for two Murray boilers for its power plant at Tacony.

San Antonio (Tex.) Traction Company.—This company plans to spend \$250,000 on improvements which include new equipment and double tracks in its power house at San Antonio.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company advises that during the next month it will purchase one 300-kw motor generator set for its power plant at Eau Claire. George B. Wheeler, Eau Claire, general manager.

Manufactures & Supplies

ROLLING STOCK

Somerset Traction Company, Skowhegan, Me., expects to purchase one snow plow.

Great Falls & Old Dominion Railroad, Washington, D. C., is in the market for six passenger cars.

Montreal (Que.) Street Railway is reported as being in the market for 50 pay-as-you-enter cars.

Kankakee (Ill.) Electric Railway has ordered two passenger cars from the St. Louis Car Company.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., is in the market for six single-truck cars.

Texas Traction Company, Dallas, Texas, it is reported, is in the market for two high-power gasoline motor cars.

Boston (Mass.) Elevated Railway has placed an order with the Pressed Steel Car Company for 20 steel elevated cars.

Springfield (Mass.) Street Railway has ordered three 14-bench open car bodies from the Wason Manufacturing Company.

Mason City & Clear Lake Railway, Mason City, Ia., expects to purchase five double-truck passenger cars and one large express car.

Portland Railway, Light & Power Company, Portland, Ore., has ordered 50 28-ft pay-as-you-enter cars, from Pier-son, Roeding & Company.

Frederick (Md.) Railroad has placed an order with The J. G. Brill Company for one 30-ft. electric locomotive, mounted on Brill 27-M.C.B.-1 trucks.

Wilkes-Barre & Luzerne Railway, Wilkes-Barre, Pa., has purchased 20 passenger car bodies mounted on Brill 27-E trucks, from The J. G. Brill Company.

Sheridan Railway & Light Company, Sheridan, Wyo., has ordered three 21-ft. closed cars, mounted on Brill 21-E trucks, from the American Car Company.

Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa., has ordered three 12-bench open cars, mounted on Brill 27-G trucks, from The J. G. Brill Company.

Omaha & Council Bluffs Street Railway, Omaha, Neb., has ordered 25 29-ft. 4-in. closed cars, mounted on Brill 39-E trucks, from the American Car Company.

Oakland & Antioch Railway, Antioch, Cal., has placed an order with the American Car Company for one 45-ft. baggage and express car, mounted on Brill 27-M.C.B. trucks.

Toledo & Chicago Interurban Railway, Kendallville, Ind., is in the market for two trailer freight cars, to be not less than 40 ft. long and equipped with M.C.B. radial couplers and automatic air brakes.

North Jersey Rapid Transit Company, Paterson, N. J., noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, as being in the market for two passenger cars, has ordered these cars from the Jewett Car Company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has placed an order with the Cincinnati Car Company for five 43-ft. prepayment cars. These cars will be equipped with Brill 39-E trucks and GE-87-A motors with K-36 control.

Ohio Electric Railway, Cincinnati, Ohio, has ordered nine 61-ft. 6-in. four-motor passenger cars, three 60-ft. two-motor excursion passenger cars, two 60-ft. trail excursion cars and 12 40-ft. freight trail cars from the Cincinnati Car Company.

TRADE NOTES

Ohio Seamless Tube Company, Shelby, Ohio, has increased its capital stock from \$350,000 to \$1,000,000.

Wendell & MacDuffie Company, New York, N. Y., has been appointed sole Eastern agents for the St. Louis Car Company.

Standard Paint Company, New York, N. Y., has removed its Chicago office to the People's Gas Building at 150 Michigan Avenue.

Lindsley Brothers Company, Spokane, Wash., has removed its Chicago office from the Monadnock Building to the Fisher Building.

Fred Collins has recently accepted a position with the Dearborn Drug & Chemical Works, with offices at 229 Broadway, New York, N. Y.

Wonham, Sanger & Bates, New York, N. Y., have received an order to equip all cars of the Montreal Street Railway with "H. B." life guards.

Murphy Varnish Company, Newark, N. J., has increased its stock from \$2,500,000 to \$3,000,000 by increasing the amount of 6 per cent cumulative preferred stock from \$1,000,000 to \$1,500,000.

Chicago Pneumatic Tool Company, Chicago, Ill., at the last meeting of its board of directors re-elected the retiring directors, with the exception of J. W. Duntley, who is succeeded by J. H. Ward.

Poole Brothers, Chicago, Ill., have made an announcement of the consolidation of Poole Brothers and the Corbitt Railway Printing Company. The business will hereafter be conducted under the name of Poole Brothers.

Allis-Chalmers Company, Milwaukee, Wis., has appointed W. R. Crawford in charge of the railway department of the Chicago office. Up to this time Mr. Crawford has been connected with the Cooper Heater Company, Carlisle, Pa.

Ackley Brake Company, New York, N. Y., has recently supplied a large number of Ackley adjustable brakes to car manufacturers in Ammendorf, Wismar, Coblenz, Cologne and Budapest for European tramways through its Berlin agency.

Phoenix Iron Works Company, Meadville, Pa., announces the appointment of W. H. Bastable as district sales agent. Mr. Bastable, who has been for a number of years with the Franklin Boiler Works Company, will hereafter be located at 135 William Street, New York, N. Y.

United States Steel Corporation, New York, N. Y., has appointed Percival Roberts a member of the finance committee, succeeding W. E. Corey. Mr. Roberts was president of the American Bridge Company, New York, N. Y., when it was taken over by the steel corporation.

Hayes Track Appliances Company, Geneva, N. Y., has started the construction of a new factory, to be located at Richmond, Ind. The company intends to close the Geneva plant and to occupy the new one about April 1, 1911. This change is made to secure a location nearer the center of demand.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has ordered 3000 tons of structural steel from the American Bridge Company, to be used in the building of two new foundries at Trafford City. The company has purchased 30 acres near Trafford City, and it is planned to have all castings made at these foundries.

Pennsylvania Railway Motor Company, Warren, Pa., has recently completed a number of tests on the new "Veile" motor car, which have proved very satisfactory. The car, which is capable of developing 250 hp, was designed by J. A. Veile. Within the next few months the company intends to have its plant in operation, in which at least 100 men will be employed, turning out one car a month.

Chicago Varnish Company, Chicago, Ill., has announced the appointment of George G. Porter as Eastern representative of that company. Mr. Porter was formerly master mechanic of the New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J., and has recently been connected with J. G. White & Company. A biography of Mr. Porter was published in the *ELECTRIC RAILWAY JOURNAL* of Nov. 12, 1910.

W. R. Hulburt, of the Goldschmidt Thermit Company, New York, N. Y., delivered two lectures in Cleveland, Ohio, on March 7, 1911, on the methods and uses of the Thermit process of welding, one before the Cleveland branch of the American Chemical Society and the other before the University School of Cleveland. The thermit reaction was demonstrated before both audiences and lantern slides were used to show the various methods of applying Thermit.

Boss Nut Company, Chicago, Ill., announces that it has acquired complete rights to the "Boss" nut from B. M. Osburn Company. The nut has been extensively used on railway equipment throughout the country and also has been widely used on special crossing work. The officers of the company are Charles G. Hawley, president; B. M.

Osburn, vice-president and treasurer, and John R. Lefeore, secretary.

American Ship Windlass Company, Providence, R. I., has received an order from the Boston Elevated Railway for 16 seven-retort Taylor underfeed gravity stokers to be installed under a battery of 600-hp Babcock & Wilcox boilers in the new power station at South Boston which is now under construction. Stone & Webster Engineering Corporation is in charge of the engineering work on the new station.

Westinghouse Lamp Company, Bloomfield, N. J., has received large orders from the Pennsylvania Railroad for \$70,000 worth of lamps, the Harriman Lines for \$140,000 worth and from the Schoepf-McGowan interests, which control the Ohio Electric Railway and other properties, for \$35,000 worth of lamps. This company also reports that it has recently added the 40-watt and the 60-watt sizes to its line of wire-type tungsten lamps.

Nickel-Chrome Chilled Car Wheel Company, Newark, N. J., has been incorporated for the purpose of furnishing nickel-chrome alloy to makers of chilled car wheels. The officers of the company are: Robert C. Totten, president and treasurer; Stephen D. Barnett, vice-president and general manager, and Charles A. Millington, secretary. The New York office of the company is in the Hudson Terminal Building and the Pittsburgh (Pa.) office in the Frick Annex.

British Thomson-Houston Company, Ltd., Rugby, England, has made arrangements with Rud. Chillingworth, of Nürnberg, Germany, for the exclusive sale of the Chillingworth patent pressed steel gear cases in the United Kingdom and for export therefrom. All inquiries sent to Rud. Chillingworth at Nürnberg, or to his representatives in the United Kingdom, for the use or sale of these gear cases in Great Britain and Ireland should in future be addressed to the British Thomson-Houston Company, Ltd., Rugby, or to its branch offices.

Railway Improvement Company, New York, N. Y., manufacturer of the Hedley coasting registers, has just closed an important contract with the Hudson & Manhattan Railroad for the sale of its coasting registers. The Hudson & Manhattan Railroad operates the McAdoo tubes under the Hudson River and has recently concluded an exhaustive test of the Hedley coasting register, similar to that used on the elevated and subway lines in New York. These tests showed a possible saving of 25 per cent in the kilowatt-hours per car mile required in the Hudson tunnel line. As a result the Hudson & Manhattan Railway has ordered enough coasting registers to equip all of its cars. These registers will be installed and put into operation immediately.

Hicks Locomotive & Car Works, Chicago, Ill., noted in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911, as having been purchased by Col. William Barbour, president of the Linen Thread Company, have been reorganized by Mr. Barbour and his associates. The name of the new organization is to be the Central Locomotive & Car Works, with offices in the Fisher Building, Chicago, Ill. The company intends to make many improvements to the plant at Chicago Heights, consisting of new machinery and tools and will make a specialty of building new passenger coaches, freight equipment, rebuilt passenger cars, freight cars and locomotives. The officers of the new organization are: William McInnes, president and general manager; A. M. Gardner, vice-president; William Barbour, treasurer; C. B. Bruce, secretary, and A. M. Hicks, purchasing agent.

Railway Steel-Spring Company, New York, N. Y., has elected Otis H. Cutler, president of the American Brake Shoe & Foundry Company, a director to succeed Frank H. Layng, whose death was announced in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911. Charles Scott, Jr., has been elected a member of the executive committee of the company. The members of the executive committee who were re-elected are William M. Barnum, F. F. Fitzpatrick, Charles Miller and Waldo H. Marshall. The company reports gross earnings for the year ended Dec. 31, 1910, of \$10,035,435; net earnings of \$1,950,000, and a balance of \$810,077 after the payment of interest on its Latrobe bonds and dividends of 7 per cent on the preferred stock. The balance sheet as of Dec. 31, 1910, shows total assets of \$35,085,884 and total liabilities of \$35,085,884. The value of the plant as given is \$30,267,235.

ADVERTISING LITERATURE

Crocker-Wheeler Company, Ampere, N. J., has issued Bulletin No. 126, on "Polyphase Induction Motors."

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued sheets 16-A and 66 of series 336, describing respectively "Rope Drive and Conveyor Sheaves" and "Annular (Radial) Bearings."

Platt Iron Works Company, Dayton, Ohio, has issued Bulletins Nos. 549, 553 and 555, illustrating and describing Smith-Vaile air compressors, Victor-Francis turbines and Smith-Vaile boiler feed-pumps.

Titanium Alloy Manufacturing Company, Pittsburgh, Pa., has issued a small booklet on "Titanium in Steel." Among other interesting articles in this booklet is one on "The Effect of Titanium Alloy in Relation to Slags."

Railway Improvement Company, New York, N. Y., has printed a folder entitled "Service Stripes vs. Brains." This folder shows the advantages of the coasting time recorder, which measures the amount of time that a motorman runs a car under its own momentum.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has recently issued catalog sections Nos. 228, 229, 553, 731 and 735 on the following subjects: "Inclosed Fuse Blocks," "Subway Fuse Boxes," "Automatic Voltage Regulators," "Instrument Transformers" and "Type S and SA Distributing Transformers."

J. G. Brill Company, Philadelphia, Pa., has issued the "Brill Magazine" for February, 1911, which contains a biographical sketch of Andrew W. McLimont, vice-president and general manager of the Michigan United Railway. The sketch is accompanied with an excellent portrait of Mr. McLimont as a supplement. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Pittsburgh, Pa.," "Cars for New Line Between St. Joseph and Savannah, Mo.," "Inter-urban Cars for Eastern Pennsylvania," "Prepayment Cars for the Omaha & Council Bluffs Street Railway," "Cars for St. Louis Water Works Line," "Steel Underframes for City Cars" and Part II of "A History of The J. G. Brill Company."

Burton W. Mudge & Company, Chicago, Ill., have recently published an attractive booklet of 32 pages descriptive of typical installations of Garland ventilators as applied to steam and electric cars. In the section devoted to electric cars illustrations are given of the rolling stock of the South Side Elevated Railroad, Chicago, Bessemer & Lake Erie Traction Company, Joliet & Southern Traction Company, Detroit United Railway, West Penn Traction Company, and the Metropolitan Street Railway of Kansas City. The views of the cars of these roads illustrate the application of Garland ventilators to the monitor-type roof with deck sash and to the turtle-back roof with its smooth arched surface. The ventilators fit the slope of the roof and do not detract from the appearance of the car exterior. Special shutters make possible the adjustment of the ventilation. On some of the cars air intakes have been located in the floor under the electric heaters, thus providing for natural circulation of fresh air upward through the heaters and thence, when vitiated, out through the Garland ventilators located on the roof.

NEW PUBLICATION

How to Avoid Accidents. By J. H. Handlon, claim agent United Railroads of San Francisco. 24 pages, illustrated. Price for a single copy, 10 cents.

In this little pamphlet Mr. Handlon has compiled some very effective material for an electric railway anti-accident campaign. It is based on the theory that the carefulness of one person sometimes offsets the carelessness of another. The pamphlet is illustrated with 12 pen-and-ink sketches showing the most common forms of accidents on electric railways and the text describes these accidents and the way in which the motorman or conductor might possibly have prevented them, even though the person injured was grossly careless. Copies have been placed in the hands of each of the platform men on the United Railroads of San Francisco and they are also printed for general sale in small or large lots.

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CONTENTS.

Coming Meeting of the Interurban Roads Committee.....	445
The Stay-at-Home Master Mechanic.....	445
A Standard for Standing Load.....	446
The Path of Greatest Opportunity in Operating Economies.....	446
Specializing on Concentration of Car Maintenance.....	446
Adjusting Schedules.....	447
The Corporation Tax Decision.....	447
Track Construction in Oklahoma City.....	448
The Use of T-Rail in Streets.....	452
Meeting of the Committee on Power Distribution.....	453
Grain Transfer Elevator of Illinois Traction System.....	453
Jigs for Gaging Brake Rigging and Shop Instruction Prints.....	454
Returns of Tramways in the United Kingdom.....	454
Proposed Catenary Bridge Construction with Wood Poles.....	455
Report of Ford, Bacon & Davis on Philadelphia Service and Equipment.....	455
Decision of Commission on Coney Island Fare.....	459
Fender and Wheel Guard Tests to be Conducted in St. Louis.....	460
History of the Columbus Strike.....	461
Corporation Tax Upheld.....	462
New Laws in Indiana.....	462
Method of Accounting of Freight Claims.....	463
Proposed Changes in Cleveland Ordinance.....	463
Electrification Plans in and About Boston.....	466
The Traveling Auditor.....	467
Scientific Lubricating Methods.....	469
Moisture-Proof Telephone Cords for Railway Telephones.....	470
Cast Steel Motor Trucks for Southern Pacific Company.....	470
News of Electric Railways.....	474
Financial and Corporate.....	476
Traffic and Transportation.....	479
Personal Mention.....	481
Construction News.....	482
Manufactures and Supplies.....	483

Coming Meeting of the Interurban Rules Committee

The committee on interurban rules of the Transportation & Traffic Association is to hold its first meeting of the year in Chicago, on April 4, when the advocates of the Denver code and the American Railway Association code will have another opportunity of threshing out their differences of opinion. There have been so many valid as well as trivial objections urged against each code by the supporters of the other that it might seem to be an almost hopeless task to reconcile both sides to a compromise code. Yet when the two conflicting codes are compared without bias the differences in principle are not so very wide. Each code has its good features and its bad features which have come to be generally recognized as the result of the discussions of the last three years. By eliminating the latter and combining the former it ought to be possible to evolve a code of interurban rules which can be, and will be, generally accepted as safe in principle and practicable in application. The interurban rules committee is capable of drawing up such a code, but its work will be in vain unless the members of the association individually and collectively are willing to give their support to its adoption as standard. This would not require its use in full without additions or omissions, but only the use of such portions as would fit the conditions on each road and filling out with such special rules as might be required. All are agreed that a standard code is desirable, and it is to be hoped that small differences of opinion will be laid aside this year and a compromise reached which will be for the common good of all interurban roads regardless of their geographical location or the character of their train service.

The Stay-at-Home Master Mechanic

The faithful attendant at electric railway meetings knows well that the informal interchange of maintenance experiences which they afford often proves of more value than the formal published proceedings would lead an outsider to suppose. But such attendance should be supplemented, wherever practicable, by occasional visits to the shops of other properties where the other man's methods can be examined on the spot. We know of one master mechanic who was very skeptical concerning the merits asserted for commutator slotting. He cared nothing about printed statements, but became intensely interested when told that he could see the methods and results of commutator slotting by visiting the shops of a railway less than 100 miles distant. In another instance two master mechanics on Eastern heavy traction lines independently developed some sand-blasting apparatus. Both equipments failed for the same reason; in both the failures were overcome in the same way. A good deal of time and money certainly would have been saved if the second man had made some inquiries into the practices of

the first. Cases of this kind could be cited without end, to prove that no matter how busy a man may be his employers should give him the opportunity of seeing his daily work from a different angle than that afforded by sticking to his home grindstone.

A Standard for Standing Load

A report upon service and equipment in Philadelphia made by Ford, Bacon & Davis for the Pennsylvania State Railroad Commission contains a definite recommendation for a standard of car loading. As shown in the abstract published elsewhere in this issue, it is assumed that 4 sq. ft. of aisle and platform space per standing passenger would allow a comfortable standing space. By the application of this average to the present types of cars operated in Philadelphia there would be a standing capacity of 75 per cent to 90 per cent of the seating capacity for the cross-seat cars and of 100 per cent in the case of the longitudinal seat cars. Limitation of car loads has engaged the attention of a number of companies and various experiments in this direction have been tried. Any attempt to limit the load of cars in this way can be successful in time of rush-hour traffic only when the company provides sufficient service to meet the standard conditions of car loading prescribed. One difficulty with many of the attempts to limit the load in the past has been that the number of proposed passengers has been reduced so low that the company has not had either the track or rolling stock capacity necessary to care for the traffic in rush hours. The only practical method if any definite limitation is to be attempted is to fix a reasonable condition and try to meet it. Even this attempt would fail to restrict loads in the event of a sudden rush of traffic due to games or similar cause.

The Path of Greatest Opportunity in Operating Economies

The importance of increasing the operating efficiency of transportation, shop and power departments is an old story on many systems. Employees naturally feel that in the face of frequent repetitions of the economy cry they are doing all that they reasonably can to save money without cutting into the quality of work done. The opportunities for improving the efficiency of a department are never exhausted, however, particularly along the line of preventing unnecessary movements and waste of time. It is along this line rather than in the direction of forcing men to work at an uncomfortable and unnatural speed that the most lasting results are to be gained. What is necessary is a realization that a dollar saved the company is just as large a saving in absolute figures as a dollar saved in the personal expense account. Where thousands of brakeshoes, wheels, etc., are used yearly there is a natural tendency on the part of the individuals to fail to realize the intrinsic value of a wheel or shoe. In connection with mileage records and the adjustment of wearing parts purchased under a guarantee of travel, the failure to keep accurate data as to life and the improper installation of detail parts may easily lead to difficulties in renewing advantageous contracts, with the result that a different grade of material is often adopted in place of a previously satisfactory product. This tends to increase the uncertainties of operating cost and to add to the burden of new devices and materials which must be tried out on the road before their fitness for the service in which they are to be used can be determined.

SPECIALIZING ON CONCENTRATION OF CAR MAINTENANCE

One of the policies which have brought about higher standards of economy and efficiency in car maintenance on the Brooklyn Rapid Transit System has been that of specializing in this work and of concentrating all of a certain kind of such labor in individual shops. If the Brooklyn system should be created to-morrow it is probable that a central repair shop would be provided with sharply defined departments for the different kinds of work to be undertaken. There is no single shop of this kind on the present Brooklyn system, because, like most other large roads, the road has developed both by growth and accretion, and in this process it fell heir to at least three maintenance plants which so far as the work performed in them is concerned were more or less duplicates of one another. With these shops, however, the policy of specialization and concentration has been carried out. The advantages of such a policy were long recognized, but a real start upon its fulfilment had to be postponed until 1907 because the energies of the mechanical department were fully occupied up to that time with the extensive plans of car improvement and standardization then under way. This work was practically completed, however, about four years ago, and since that time the company has materially changed the internal organization of each shop by removing some divisions entirely and by enlarging others so as to include all work of a given nature. Thus all wheel work, gear changing and seat manufacture and repairs are done at the company's East New York shops; all air-brake, compressor, curtain, miscellaneous leather and fender jobs are performed at Thirty-ninth Street, and the electrical and wheel-guard departments are concentrated at Fifty-second Street. Specialization has been drastic even in straight maintenance, like the inspection and calibration of electric heaters.

This policy of eliminating extra shops has proved highly satisfactory in every way. First of all, it has brought about an improvement in the quality and a reduction in the net cost of the product through the employment of expert help and more specialized machinery. For instance, the air-brake department now can assign to separate individuals such subdivisions as the calibration of gages and the testing of triple valves; furthermore, it is now in the possession of such costly precision equipments as triple-valve test racks which the company could not well afford to install in duplicate. The same principle applies to wheel operations. With wheel lathes in service at several shops, there may not be sufficient work to justify the addition of extra-output devices. When, however, all of the wheels are handled at one point there is every probability that it will pay to apply some means for raising the output per machine, say, from four to 14 pairs a day.

The concentration of facilities has also led to noteworthy savings in the storeroom department. It is no longer necessary to maintain separate supplies for raw material, but each car maintenance depot carries enough finished stock to replace immediately all the defective or outworn articles, which must be forwarded to the proper repair shop. The shipment to the repair centers of all discarded goods, whether they look like scrap or not, keeps the car maintenance buildings free from litter, lessens the possibility of theft and permits the reclamation of much material by expert workmen.

It need hardly be stated that the fundamental requisites for

the success of an organization like that described are an executive headquarters which serves as a prompt clearing house for every transaction and an ample transportation equipment to tie together the different parts of the system. These facilities have been thoroughly worked out on the Brooklyn Rapid Transit System to a degree which expedites all manufacturing and overhauling processes far better than if the practice of having independent or self-contained shops for territorial divisions was followed.

ADJUSTING SCHEDULES

The need of a joint traffic association among electric railways in sections where no such organization exists, or at least its effective equivalent, makes itself felt as the season of heavy traffic draws near. During the months of mild weather there is an opportunity for a very large amount of through traffic, excursion and ordinary, which electric railways, as commonly organized, quite fail to secure. Of course, there are large networks of interurban lines under united management in which the requirements of long-distance travel are fully met, but in and between very many cities, and in the absence of any direct and through line under a single management, there is an almost complete failure to meet the requirements of the traveling public. We do not think the roads fail to meet these requirements from any unwillingness to do so, but from lack of the co-operative spirit. As it is now, it too frequently happens that one starts, let us say, from A to B by electric car, knowing that there will be changes to the rolling stock of two different companies at two points in the trip and that two transfers will have to be made.

The first line starts out, let us say, on a 10-minute schedule, leaving on the even hour. Of course, the ideal plan is to arrange for through cars if there is any considerable chance of through traffic, but, laying aside this possibility for a minute, it is very likely to happen that the first change will be made to a line running a half-hour schedule, leaving the junction point very likely at five minutes past the hour, and so on. Now, the passenger may or may not make a close connection in a case of this kind, but the chances are altogether good for waiting something over 5 minutes, even if he knows the connecting cars, and from 15 to 25 minutes if he does not know them. At the second junction point the half-hour schedule is just as likely at not to change to one of 15 or 20 minutes, entailing another wait of from 5 to 15 minutes, according to luck. In other words, it very often happens that a journey which should take, let us say, an hour, takes an hour and a half, merely because the connecting lines have not adjusted their schedules so as to make connections and advertised the fact so that the public may know it.

This is a matter for a joint traffic committee to take up, since such an adjustment as will make close and certain connection at the junction would infallibly build up through traffic when none now exists for the reasons already described. A good many connecting roads pay some attention to this matter; others do not, and the public pays the penalty of their carelessness and avenges itself by automatically cutting down the traffic. It is simply a recurrence to the conditions which existed in early days of American railroading. We have long since outgrown such conditions on a large scale. They re-

main, however, to a very undesirable extent on a small scale in the service furnished by suburban and interurban lines. It is merely a case where a little co-operation means increased profits all around, and such co-operation should be inaugurated in all places where it does not now exist.

THE CORPORATION TAX DECISION

The constitutionality of the tax laid by the United States government on the annual net earnings above \$5,000 of corporations has been upheld by the Supreme Court. In our opinion the chief objections to this act are two in number. In the first place, it constitutes a serious burden upon those public utility companies which, like the city railways, cannot increase their charges to the public so as to compensate themselves for the tax paid. The second and most important evil in the tax is the establishment of the principle of corporation taxation by the government. This principle may easily be extended in the future to a point where it would be not only very oppressive to many existing corporations, but also a serious deterrent to all business activity in corporate form.

For several reasons the electric railway interests of the country were able to offer very strong legal arguments against the imposition of the tax. Of the 16 cases considered by the Supreme Court in reaching its decision two presented the defense of electric railway companies and were considered by name in the abstract of the decision made public in the newspapers. In these two special pleas the Interborough Rapid Transit Company of New York claimed that it had a special contract with the State of New York and City of New York under which it was to be exempt from all taxation in respect to its interest in the rapid transit railroads in the city. It also claimed that the property which it administered belonged to the City of New York and hence was municipal property, which cannot be taxed under the constitution of the United States. The Coney Island & Brooklyn Railroad also claimed that its property was quasi-State in character because the State has power to fix the rates which it may charge and to describe in detail the services which it shall render. Moreover, the road must not be abandoned without the State's consent and is subject to use by the State for the transportation of troops, etc. All of these objections were swept aside by the court in affirming unanimously the constitutionality of the act. The tax must therefore be considered now as a thing accomplished, and so long as it remains on the statute books it must be taken into consideration in all plans for future enterprises.

The opposition of electric railway companies to the act, we believe, did not extend to any material extent to what are known as its publicity features. Most electric railways now recognize the right of the public to possess a knowledge of the financial condition of these properties, and the trend of practice is to make this information even more available. If the effect of the act will be to encourage a more general publicity of the accounts, not only of electric railway companies but of all corporations, it will be of benefit to the stockholders and to the public generally, as well as to the corporations themselves. With this publicity the reasonableness of the demand for higher fares on electric railways should become more apparent.

TRACK CONSTRUCTION IN OKLAHOMA CITY

BY W. A. HALLER, FORMER GENERAL MANAGER OKLAHOMA RAILWAY COMPANY

The rapid growth of Oklahoma City from a population of about 10,000 in the year 1900 to a population of 65,000 in the year 1910, together with the broad-gage and comprehensive policy adopted in laying out and building, naturally brought out

About 61 miles of track is within the city limits, 41 miles of the city track being located on private right-of-way owned by the company. About 20 miles of city track is in paved streets and something over 10 miles of the track in paved streets in the downtown section is laid on Carnegie steel ties with a reinforced concrete base. The company has title to about 75 miles of private right-of-way within the city limits, only a part of this being occupied up to the present time. The private right-of-way in question in most instances starts within less

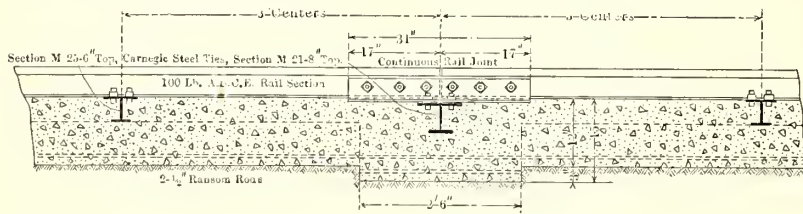


Fig. 1—Oklahoma Track—Concrete and Steel Tie Construction

many new and interesting features in connection with financing and building the street railway system in that city. There are at present about 110 miles of paved streets. Nearly all of this

than a mile of the center of the city and radiates in every direction, thus providing means for quick transit to the suburban portions of the city and very good outlets for interurban service.

STEEL TIE TRACK IN PAVED STREETS

The company's present standard construction in paved streets consists of 100-lb. rail A. S. C. E. section laid on Carnegie M-25 T-section steel ties having 6-in. tops. These ties are spaced 3 ft. apart and embedded in concrete, as shown in Fig. 1. This construction incorporates two continuous concrete girders 22 in. wide x 12 in. deep extending longitudinally under the

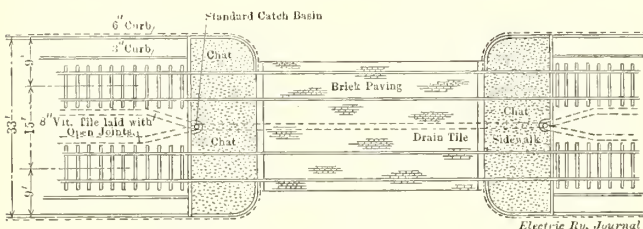


Fig. 2—Oklahoma Track—Drainage and Track Construction on Parked Right-of-Way in City

paving has been put down since 1903. The street railway system is now seven years old and comprises 71 miles of track, the growth by years having been as follows:

rails, each girder being reinforced with two 1/2-in. twisted bars. The concrete is placed within wooden forms after the track



Fig. 3—Oklahoma Track—Steel Tie Construction Ready for Paving

Fig. 4—Oklahoma Track—Concreting Steel Tie Track Direct from Mixer

Year.	Miles of Track.	Per Cent. Increase.
1904	9	..
1905	12	22
1906	17.5	46
1907	26	48 1/2
1908	37.5	44 1/2
1909	40.5	9 1/2
1910	71	75

work has been assembled, lined and leveled. The concrete used consists of 1 part Portland cement, 2 1/2 parts sand and 4 1/2 to 6 parts concrete stone mixed and placed very wet. During the concreting process the concrete is well puddled around the ties and up under the base of the rail. After being placed it is allowed to set at least 72 hours before the track is used,

and at no time during the concreting or setting process is the track subjected to any load. If concrete is placed during very hot weather, or when there is a possibility of freezing, it is covered with sand or other material as a means of protection during the setting process.

The rail used in all recent work has been 100-lb. A. S. C. E.

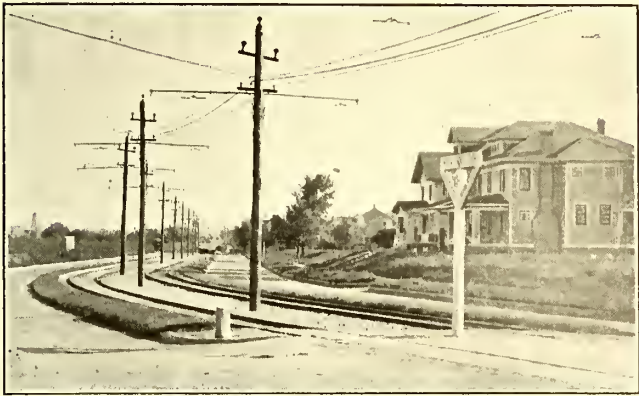


Fig. 5—Oklahoma Track—Parked Private Right-of-Way Construction

The paving outside of the rails is laid on stiff cement mortar and the paving between the rails is laid on a sand cushion, all of the paving being somewhat lower than the ball of the rail in order to let the rail present a clean surface; the whole with the exception of the flangeway is grouted. The flangeway is then filled flush with asphalt, the wheels later forming the groove. The forms used for holding the concrete in position also act as a guide for laying the paving outside of the rails.

The progress of the steel tie construction during various



Fig. 7—Oklahoma Track—Parked Right-of-Way in the City

section in 60-ft. lengths. The rails are attached to the ties by means of Carnegie No. 23 improved clips, four clips per tie being used. The rails are joined by 34-in. six-hole continuous joints and under the joints a Carnegie section, M-21 tie

stages is shown in Fig. 4, in which the assembled track work and forms are shown. A portable mixer is shown discharging concrete directly to the track structure. Fig. 3 represents track concreted ready for paving. This type of construction, it is thought, will stand up under the heaviest traffic and the design is such that sewer or other excavations of a considerable width may pass under the tracks without settlement or other injury thereto.

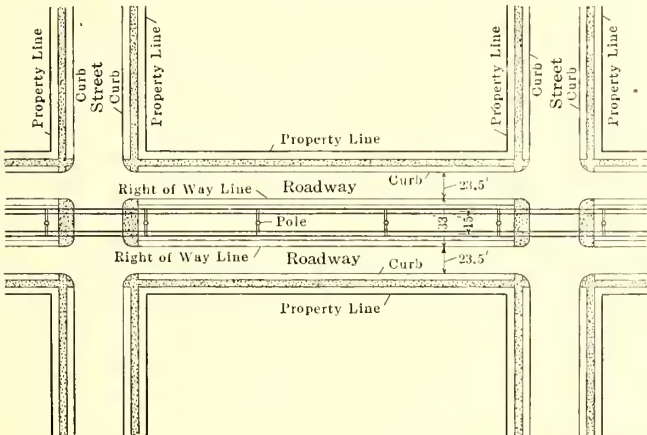


Fig. 6—Oklahoma Track—Plan of Right-of-Way in City Limits

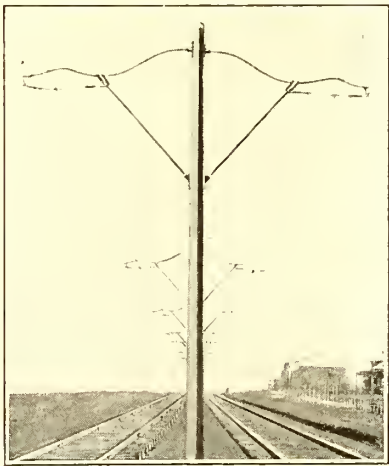


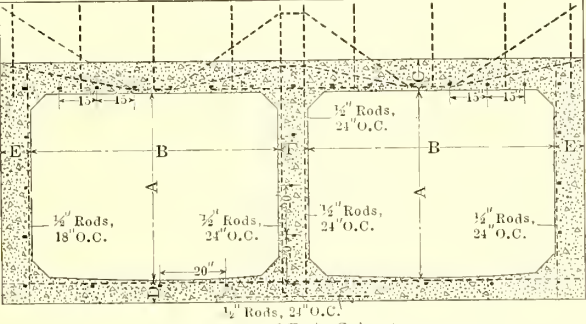
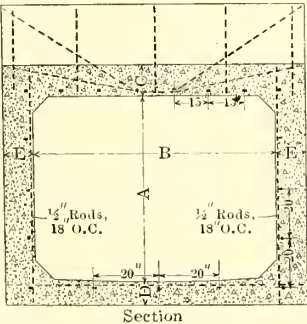
Fig. 8—Oklahoma Track—Center-Pole Construction on Right-of-Way

The company also has several miles of 70-lb. A. S. C. E. rail laid on steel ties. The construction details are similar to those employed in laying the 100-lb. section, but as the 70-lb. rail is not high enough to accommodate brick paving or other paving requiring more than 4 in. in depth, this form of construction has been discontinued except in communities where traffic is light and where there is a

with an 8-in. top is used. No tie rods are used on account of the rigid attachment to the tie and the comparatively wide base of the rail. This form of construction will permit the

likelihood of asphalt paving being maintained. The unit costs and quantities of 100-lb. and 70-lb. track construction are given in Table I, on page 452, these figures being exclusive of overhead construction.

A considerable portion of the track constructed in paved



Dimensions of Standard Culverts.					
Size of Culverts.		Thickness of Walls			
A	B	C	D	E	F
10'	10'	1 1/2" Rods, 14"	12"	14"	16"
8'	8'	12"	10"	12"	14"
6'	8'	12"	10"	12"	12"
6'	6'	10"	8"	9"	10"
4'	6'	10"	8"	7"	9"
4'	4'	8"	6"	6"	8"

Electric Ry. Journal

Fig. 9—Oklahoma Track—Standard Reinforced Concrete Box Culverts

replacement of a similar section of rail at any time merely by lifting a strip of paving paralleling the rail and without in any way disturbing the ties or concrete roadbed. Vitrified block paving has been used, but other types of paving requiring not more than 5 1/2 in. above the base of rail may be employed.

likelihood of asphalt paving being maintained. The unit costs and quantities of 100-lb. and 70-lb. track construction are given in Table I, on page 452, these figures being exclusive of overhead construction.

streets prior to 1907 was of the so-called concrete beam type, consisting of 7-in. high T-rail laid on wood ties, the ties being embedded in concrete. While this construction was considered good practice at that time, the present standard of steel tie construction promises to give so much longer life and better service that its adoption seems well warranted.

PRIVATE RIGHT-OF-WAY CONSTRUCTION

As before stated, the company controls about 75 miles of private right-of-way within the city limits and about 41 miles

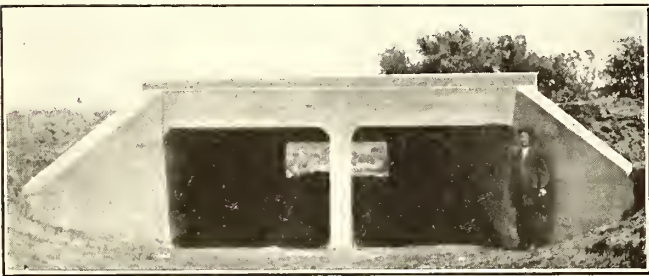


Fig. 10—Oklahoma Track—Box Culvert

of the present track system is located on this land. The very great amount of this private right-of-way, the manner in which it is laid out, the evidence of good design and adaptability indicate originality and foresight to an unusual degree and reflect great credit on the railway owners and the city officials responsible for the development of the system. The private right-

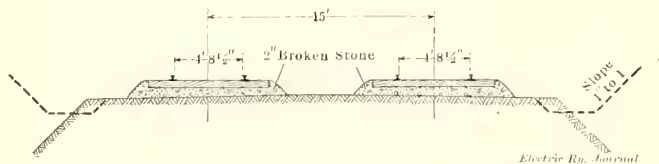


Fig. 11—Oklahoma Track—Cross-Section Through Interurban Construction

of-way before mentioned is with few exceptions owned outright by the railway company. Its only obligation is to curb each side of the right-of-way and pave street intersections where they exist only when the paralleling or intersecting streets are paved by the city. This private right-of-way in nearly every instance is paralleled by boulevards on either side, thus insuring future development. That portion of the track on private right-of-way which parallels paved streets or boulevards has been ballasted and curbed. The portion in the undeveloped sections of the city, however, has not yet been ballasted.

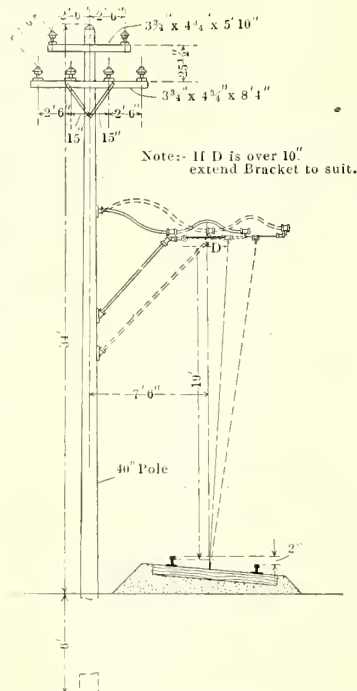
The present standard for private right-of-way construction consists of 70-lb. A. S. C. E. rail in 33-ft. lengths laid on wood ties spaced on 21-in. centers. A concrete curb is placed along



Fig. 12—Oklahoma Track—Junction of Steel Tie Work and Experimental Creosoted Wood Cushion Track

each side of the right-of-way adjoining the paving and in addition thereto a 3-in. curb is placed 6 in. from the outside end of the ties. This inner curb is level with the rail and the outer curb 2 in. below the top of the rail, the intervening space being parked. Before ballasting the roadbed is graded to slope

toward the inner end of the ties and a continuous tile drain with open joints is carried to the street intersections and there connected to the storm sewer. The tracks are ballasted with 2-in. stone, 4 in. being placed under the outside end of the tie and 6 in. under the inner end of the tie. The intervening space between the tracks is also covered with a thin layer of stone to retard the growth of weeds or other vegetation, the space between curbs being planted in Bermuda grass. The details of this construction are shown in Fig. 2 and views of the



City Lines				High Speed Interurban			
Degree of Curve	Super Elevation	E	Deflection of Trolley D	Super Elevation	E	Deflection of Trolley D	Degree of Curve
1°	5"	2 1/2"	1 3/8"	5 1/2"	11"	5 1/2"	1°
2°	1 1/4"	5"	2 3/4"	11"	11"	2"	2°
3°	1 1/2"	7 1/2"	4 3/8"	16 1/2"	3"	3"	3°
4°	2 1/2"	10"	5 1/2"	22 3/4"	4"	4"	4°
5°	3 1/2"	12 1/4"	6 3/8"	2 3/4"	5"	5"	5°
6°	3 1/2"	11 3/4"	8 3/4"	2 9/16"	6"	6"	6°
7°	4 1/4"	17 1/2"	9 3/4"	3 2 1/2"	7"	7"	7°
8°	5"	19 3/4"			8"	8"	8°
9°	5 1/2"	22"			9"	9"	9°
10°	6 1/8"	2 03 1/2"			10"	10"	10°
11°	6 3/4"	2 3"					
12°	7 3/8"	2 5 1/2"					
14°	8 1/2"	2 10"					
16°	9 3/4"	3 3"					
		3 6 1/2"					
		4 0"					

Note: Elevation should always be Maximum at P.C. & P.T. of Curve and should diminish 1/2 inch to 30 Feet.

Fig. 13—Oklahoma Track—Overhead and Track Construction at Curves

finished construction are shown in Figs. 5 and 7. Fig. 6 shows a typical plan of the right-of-way widths and clearances in the city limits. The detailed unit costs and quantities of this work, exclusive of overhead work, are also given in Table II, printed on page 452.

It is contemplated that the concrete pole and ornamental bracket shown in Fig. 8 will be used in connection with the better portions of double-track private right-of-way construction. It is obvious that this type of construction presents many advantages, namely, low first cost compared to paved track



Fig. 14—Oklahoma Track—Portable Tool Box Used by Small Construction Gangs

construction, accessibility, low maintenance cost and a clean and unobstructed track.

SUBURBAN AND INTERURBAN CONSTRUCTION

The suburban and interurban lines are all constructed on private right-of-way, there being no track on public highways;

this right-of-way varies in width from 36 ft. to 60 ft. The principal interurban lines are laid out with boulevards on either side and the grades, with few exceptions, do not exceed 1 per cent. Ultimately these boulevards will be macadamized. In some instances, when in close proximity to the city, the con-

struction is to overcome impact by providing a cushioning medium of creosoted wood between the rail and the steel tie. Another object of this construction is to permit the easy replacement of the present T-rail with 7-in. girder or any other intermediate section of rail at some future time without

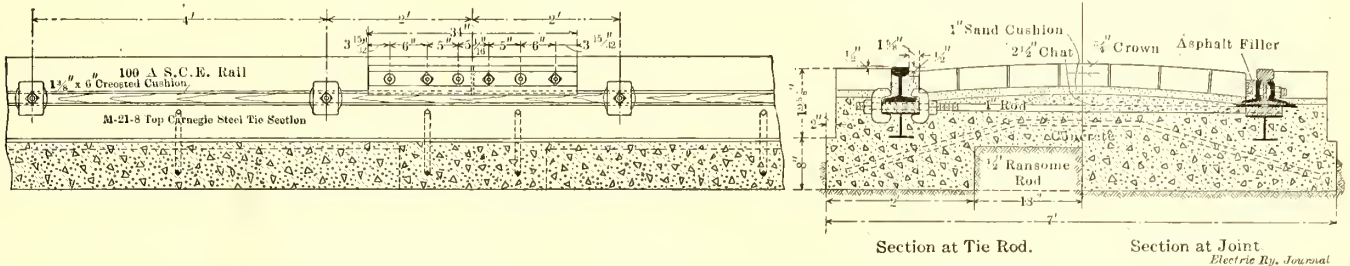


Fig. 15—Oklahoma Track—Track on Creosoted Wood Cushions

crete culverts have been carried the entire width of the railway right-of-way and boulevards. These culverts are constructed of concrete, being of the box type shown in the drawing Fig. 9 and the half-tone Fig. 10. Fig. 11 is a cross-section of simple interurban construction. Fig. 13 shows the overhead and track construction standards at curves with a table of elevations, degrees of curvature, etc. The detailed unit costs

disturbing the concrete foundation. The difference in the height of rail is compensated for by varying the thickness of the creosoted wood cushioning strip. This construction requires about the same amount of concrete as that shown in the drawing Fig. 1 and the cost per mile is about the same.

TOOLS AND EQUIPMENT

A brief description of the tools and equipment employed in carrying on the construction in Oklahoma City may be of interest.

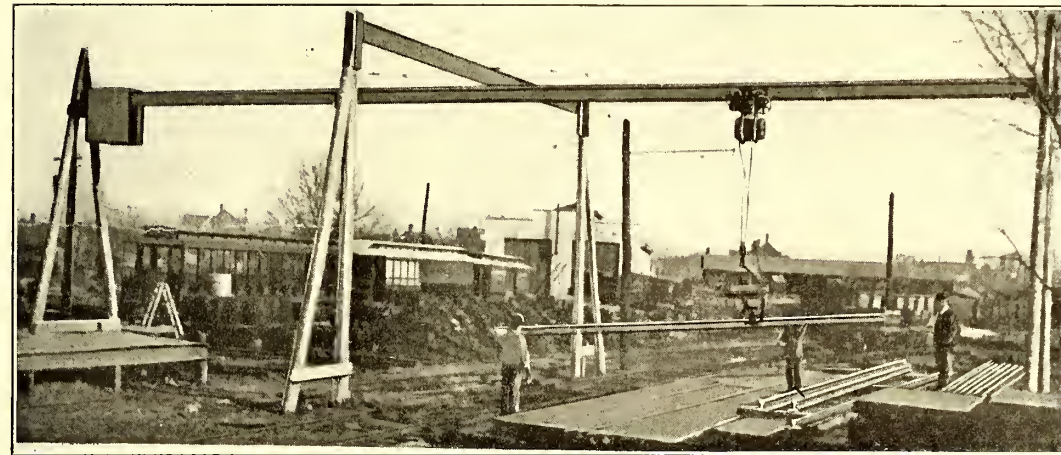


Fig. 16—Oklahoma Track—Track-Handling Outfit

and quantities of private right-of-way construction of this character, excluding all special construction and line work, are presented in Table III, on page 452.

EXPERIMENTAL TRACK

The half-tone Fig. 12 and the drawing Fig. 15 show the details of a piece of experimental track which is laid with

longitudinal steel ties with a creosoted wood cushioning strip between the tie and rail. These steel ties are 30 ft. long and are clamped to the base of the rail every 4 ft. The object of

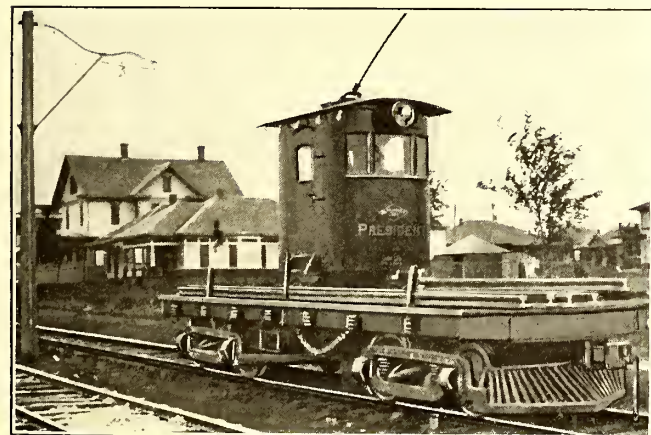


Fig. 17—Oklahoma Track—Electric Locomotive Flat Car

longitudinal steel ties with a creosoted wood cushioning strip between the tie and rail. These steel ties are 30 ft. long and are clamped to the base of the rail every 4 ft. The object of



Fig. 18—Oklahoma Track—Metal Tool Wagon

unloading, stacking and reloading. This outfit consists of a Sprague motor-operated hoist traveling under an I-beam and has a range of 100 ft. travel over tracks and storage pile.

TABLE I.—UNIT COSTS AND QUANTITIES OF 100 LB. STEEL TIE CONCRETE AND PAVED CONSTRUCTION.

Class 3. 100 Ft.	Quantities, Per Mile.		Cost Per 100 Ft.	Cost Per Mile.
30.	1600.	Cu. yd. excavation, at 50 cents...	\$15.00	\$800.00
CONCRETING.				
17.8	940.	Cu. yd. stone, at \$1.55 and 45 cts.	\$36.00	\$1,880.00
9.5	500.	Cu. yd. sand, at \$1.00 and 35 cts.	12.80	675.00
19.	1000.	Bbls. cement, at \$1.60.....	33.00	1,600.00
		Labor	19.00	1,000.00
425.	22400.	(Feet)		
360.	19000.	Lbs. ¾ twisted bars, at \$2.60....	9.00	494.00
700.	3700.	Feet form lumber, at \$20.....	14.00	740.00
		Equipment and miscellaneous.....	6.20	327.00
19.	1000.	Cu. yd. total concrete.....	\$130.00	\$6,716.00
TRACK.				
1.7	88.88	Joint ties, at \$2.50.....	\$4.27	\$220.00
31.7	1672.	M-25 steel ties, at \$2.....	64.30	3,344.00
2.97	157.14	Tons of rail.....	110.00	5,814.00
3.33	176.	Cont. joints, at \$2.20 and 80 cts.	10.00	528.00
20.	1056.	Bolts.		
.18	9.2	Kegs, 1 in. x 4½ in. bolts, at \$6..	1.08	55.20
3.3	176.	No. 0000 10 in. x ¾ in. rail bonds at 40 cents and 40 cents.....	2.50	130.80
100.	5280.	Feet track laying, at 30 cents.....	30.00	1,584.00
	5280.	Feet—Total track.....	\$222.00	\$11,676.00
PAVING.				
4590.	235000.	Brick, at \$13.....	\$58.00	\$3,055.00
	60.	Brick per sq. yd.....		
20.5	1075.	Sq. yd. border, at 40 cents.....	8.20	430.00
52.	2738.	Sq. yd. center, at 30 cents.....	15.60	820.00
4.4	235.	Bbls. cement, at \$1.60.....	7.15	376.00
4.45	235.	Yd. sand, at \$1.40.....	6.23	329.00
		Supervision and miscellaneous....	5.10	270.00
74.	3911.	Sq. yd. total paving.....	\$100.00	\$5,280.00
		Total	\$467.00	\$24,472.00
		Incidentals, 5 per cent.....	23.35	1,223.60
		Engineering and supt., 5 per cent.	23.35	1,223.60
			\$513.70	\$26,919.20

TABLE II.—UNIT COSTS AND QUANTITIES OF 70 LB. WOOD TIE PRIVATE RIGHT-OF-WAY. (Items not used omitted.)

30.	1600.	Cu. yd. excavation, at 50 cents..	\$15.15	\$800.00
CONCRETING.				
41.8	2200.	Cu. yd. ballast, at \$1.55 and 45c.	\$83.30	\$4,400.00
3.8	200.	Cu. yd. stone screenings, at \$1 and 50 cents.....	5.68	300.00
			\$88.98	\$4,700.00
TRACK.				
57.	3000.	Wood ties, at 51 cents and 5 cents	\$31.80	\$1,680.00
6.35	335.	No. 0000 10 in. x ¾ in. rail bonds, at 40 cents and 40 cents.....	5.00	268.00
2.08	110.	Tons 70 ft. rail, at \$35.....	72.90	3,850.00
6.25	330.	Pairs rail joints, at \$1.60.....	10.00	528.00
25.5	1350.	Bolts.		
.17	9.	Kegs, ¾ in. x 4 in. bolts, at \$6..	1.02	54.00
.57	30.	Kegs, 9/16 in. x 5½ in. spikes, at \$4.40	2.50	132.00
	5280.	Feet track laying and surfacing, including ballasting, at 50 cents.	50.00	2,640.00
			\$173.22	\$9,152.00
PAVING.				
14.90	780.	Sq. yd. paving, at \$1.35.		
8900.	47000.	Paving brick, at \$13.....	\$11.60	\$611.00
.89	47.	Bbls. cement, at \$1.60.....	1.40	75.20
.89	47.	Cu. yd. sand at \$1 and 50 cents..	1.30	70.50
		Labor and incidentals, at 40 cents.	5.90	312.00
102.	5409.	Lin. ft. curbing, at 60 cents.....	61.70	3,240.00
95.	5000.	Lin. ft. curbing, at 30 cents.....	28.40	1,500.00
102.	5400.	Ft. 6 in. drain tile, at 12 cents..	12.25	648.00
			\$122.55	\$6,456.00
		Total	\$399.90	\$21,108.50
		Incidentals, 5 per cent.....	10.90	\$1,055.42
		Engineering and supt., 5 per cent.	19.99	1,055.42
		Grand total.....	\$439.88	\$23,219.34

TABLE III.—UNIT COSTS AND QUANTITIES OF 70 LB. WOOD TIE PRIVATE RIGHT-OF-WAY.

30.	1600.	Cu. yd. excavation, at 50 cents...	\$15.15	\$800.00
BALLASTING.				
41.8	2200.	Cu. yd. ballast, at \$1.55 and 45 cts.	\$83.30	\$4,400.00
3.8	200.	Cu. yd. stone screenings, at \$1 and 50 cents.....	5.68	300.00
			\$88.98	\$4,700.00
TRACK.				
57.	3000.	Wood ties, at 51 cents and 5 cents	\$31.80	\$1,680.00
6.35	335.	No. 0000 10 in. x ¾ in. rail bonds, at 40 cents and 40 cents.....	5.00	268.00
2.08	110.	Tons 70 ft. rail, at \$35.....	72.90	3,850.00
6.25	330.	Pairs rail joints, at \$1.60.....	10.00	528.00
25.5	1350.	Bolts.		
.17	9.	Kegs, ¾ in. x 4 in. bolts, at \$6..	1.02	54.00
.57	30.	Kegs, 9/16 in. x 5½ in. spikes, at \$4.40	2.50	132.00
	5280.	Ft. track laying and surfacing, in- cluding ballasting, at 50 cents.	50.00	2,640.00
			\$277.35	\$14,652.00
		Incidentals, 5 per cent.....	13.61	719.20
		Engineering and supt., 5 per cent	13.61	719.20
		Grand total.....	\$304.57	\$16,090.40

THE USE OF T-RAIL IN STREETS

At the annual meeting of the Engineering Society of Wisconsin, held at Madison on March 9, Fred G. Simmons, superintendent of way, the Milwaukee Electric Railway & Light Company, presented a paper on the use of T-rail in street track.

Mr. Simmons said that practically all engineers in charge of street railway work were in favor of the use of T-rail. Where an exception occurs it was always in one of the very largest cities of the country. The only cases that had come to Mr. Simmons' knowledge were in New York, Philadelphia and Chicago. In these three cases the engineers all agreed that T-rail was preferable where the team travel was not too heavy on the track portion of the street, but when a constant stream of vehicles was encountered on this space a girder on grooved girder type of rail was preferable.

One of the most frequent arguments of those who oppose the use of T-rail was that the paving along the rail was subjected to extreme wear and ruts out with undue rapidity. The undue wear along the rail was undoubtedly brought about because of incorrect methods of paving. It had been considered advisable in the past to place rows of granite blocks or bricks on each side of the rails. While, to a large extent, these absorbed the minute vibrations which were incident to the somewhat elastic foundation necessary, they served only to transfer the undue wear to a point further from the rail itself and did not remove the cause. Many cities required the use of a grooved girder rail, but Mr. Simmons maintained that this rail did not preserve the integrity of the abutting asphalt paving to any greater extent than did the more serviceable T-rail.

The design of paving that would be permanent has been most difficult. A prejudice had existed and in some quarters still existed in favor of a groove, either molded or cut in the blocks or bricks. Up to the present time, Mr. Simmons said, such grooves had proved unsatisfactory. The best results were probably obtained with granite, but the difficulty of obtaining a smooth and even cutting of the hard material was a serious objection. With vitrified brick the use of grooves was absolutely disastrous. The sharp edge of the groove wore away quickly and the material at this point was subjected to undue wear from the beginning. A new method of solving this problem which was rapidly gaining favor in the West and Middle West was to depress the blocks or brick and extend them under the heads of the rails at the gage line, thus giving the paving a flat crown between the rails. This method had been adopted in Milwaukee and it was found after about four years of actual experience that it worked very well. It had been adopted in a number of other places with uniformly good results.

As to the proper construction of tracks in city streets, the proper paving to be laid in connection with these tracks and the proper method of laying such paving, Mr. Simmons gave the following as the result of his experience.

T-rail of proper section should be selected. The track should be so laid that, while not absolutely rigid, it will yet permit only a very minor deflection, scarcely more than a vibration. The paving should not be of the sheet variety.

Specifications for an ideal construction are: Prepare the subgrade in the trench by thorough rolling, employing an 8-ton roller. Install a tile in the center between double tracks about 8 in. below the base of the tie and connect with the sewers at about 100-ft. intervals. Use wood ties chemically treated with some efficient preservative. The ties should have not less than a 6-in. face. Lay with not more than 16 in. open space between ties. Rails should be of the 7-in. Shanghai T-rail type not less than 90 lb. per yard in weight, 60-ft. to 66-ft. lengths and preferably of open-hearth steel. Joints should be cast welded in a workmanlike manner. Track is to be ballasted on at least 6 in. of Portland cement concrete, the mixture to be no leaner than 1:2½:5 and to be well tamped to place; concrete to be continued up to the proper level for the installation of the paving.

Paving is to be as follows: On streets where commercial vehicular traffic is very heavy use granite stone paving. Where

the traffic is still commercial but not so heavy use either sandstone or vitrified brick. On residence streets use vitrified brick or creosoted blocks.

The blocks or bricks at the gage line of the rail should be depressed and projected under the head of the rail, crowning up within 17 in. to a level with the top of the rail and then extending practically level until within 17 in. of the other gage line. The outside stem of the rail should be properly filled with a creosoted strip of cement blocks and the entire paving filled with a 1:1 cement grout very carefully applied and allowed to set thoroughly before any traffic is permitted.

MEETING OF THE COMMITTEE ON POWER DISTRIBUTION

Meetings of the committee on power distribution of the American Electric Railway Engineering Association were held in New York on March 8 and 9. The meeting on March 8, as mentioned in our issue of March 11, was devoted largely to a discussion of the proposed specifications for overhead crossings of electric light and power lines which are being considered jointly by committees of the Engineering Association, National Electric Light Association and the American Railway Engineering & Maintenance of Way Association.

On March 9 the committee re-convened and went over carefully the entire list of subjects which will be considered by the committee in its report at the 1911 convention. Sub-committees were then appointed by Chairman Hovey to consider the different topics. These briefly were as follows:

At the 1910 convention the committee presented outline specifications for high-tension, three-conductor paper cables, for 30 per cent rubber compound and for paper-insulated underground railway feeders for 1200 volts or less. To a subcommittee consisting of G. W. Palmer, Jr.; A. S. Richey, William Roberts and S. D. Sprong was assigned the duty of going over these specifications again to determine whether any changes were desirable in them before they should be submitted for approval to the committee on standards.

The next subject discussed was that of a standard specification for Nos. 00 and 000 grooved trolley wires. The 1909 committee recommended a standard shape for a No. 0000 trolley wire. It was thought that if reports should be presented on these three sizes all of the sizes of copper trolley wire ordinarily used would be covered. On the committee to report on this subject were Messrs. Dunne, Palmer, Harte and Foster. The same sub-committee was also requested to report on specifications for hard-drawn copper trolley wire.

The subject of standard specifications of overhead crossings of trolley contacts was referred to a sub-committee consisting of Messrs. Richey, Dunne, Palmer and Harte. The chairman of this committee, Prof. Richey, is also the representative of the association on the joint committee to consider specifications for overhead crossings of electric light and power lines. The subjects to be taken up by the report on the overhead crossings of trolley contacts will include the standard height of the trolley wire over the tracks of steam railroads, clearances to be allowed for other wires, types of conductors to use, minimum sag permissible, proper supports and factors of safety. To this sub-committee was also assigned the subject of drafting preliminary specifications covering the joint occupancy of poles by railway wires and foreign wires.

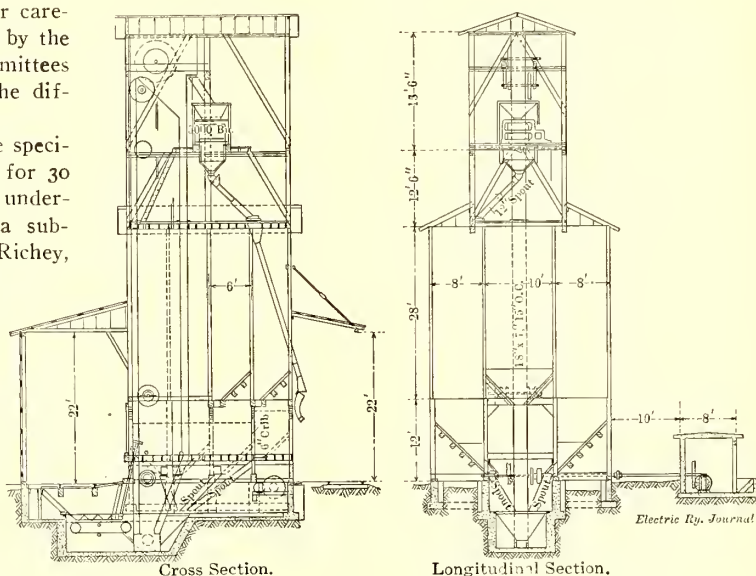
The subject of line material standardization was assigned to a sub-committee consisting of Messrs. Harte, Sprong and Dunne. The subject of concrete poles and of tubular and lattice galvanized-iron side poles was assigned to another sub-committee consisting of J. J. Brennan, William Roberts and S. L. Foster.

It was decided to ask the sub-committees to prepare preliminary reports on the subjects assigned to them for submission at the next meeting of the committee on power distribution, which will be held in New York May 3.

GRAIN TRANSFER ELEVATOR OF ILLINOIS TRACTION SYSTEM

The Illinois Traction System recently put into service at Glover, Ill., a large grain transfer elevator. It is located close to the junction of the Danville, Urbana & Champaign division of the Illinois Traction System and the main line of the Chicago & Eastern Illinois Railroad, with which the traction system has traffic interchange agreements. At this junction also the Cleveland, Chicago, Cincinnati & St. Louis Railroad intersects the Chicago & Eastern Illinois. The new plan was installed by the Burrell Engineering & Construction Company, of Chicago, acting under the supervision of E. M. Haas, superintendent of bridges and buildings for the Illinois Traction System. The purpose of the large new transfer elevator is to keep, so far as possible, the equipment of the electric road on its own lines and prevent a shortage of cars on the originating road. This is largely because so many of the steam railroad cars will not take the sharp curves in some of the cities through which the interurban road operates, while the interurban company's cars are designed to operate satisfactorily around these curves.

The new elevator, which is shown in vertical sections, is



Grain Elevator at Glover—Illinois Traction System

provided with nine storage bins, each with a capacity of approximately 1000 bushels of grain. This provision for storage in the transfer elevator is made to facilitate the handling of grain when there is a shortage of cars on the connecting steam roads. It will provide at such times for the immediate unloading of the interurban grain cars so that they may be available for service.

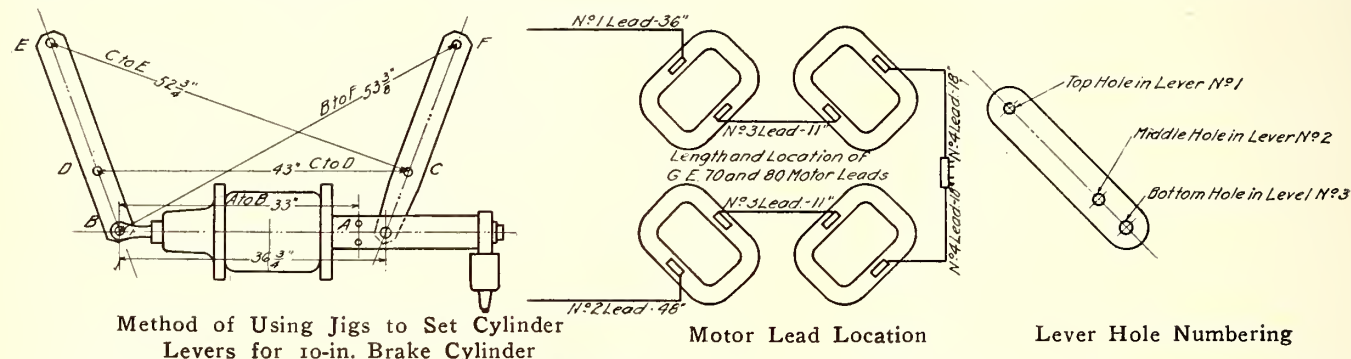
The elevator structure is located between two tracks, one serving for loading and the other for transfer. The building inclosing the elevator machinery and the bins has ground dimensions 26 ft. x 24 ft. and is 68 ft. high. It is made up of a timber framework covered with corrugated iron.

The plant is handled by a 30-hp electric motor located in a special housing at a distance of 10 ft. from the elevator building and transmitting power through a line shaft. Suitable hoppers are provided under the receiving track for feeding a bucket conveyor which is used to elevate the grain to the cupola of the building. Here the grain is passed over a Richardson automatic scale which is so equipped that it will show automatically any given amounts up to 1000 lb., for which it previously may have been adjusted, before it discharges the grain into either the bins or a spout leading to the outbound car. This automatic scale has a capacity of 5000 bushels per hour. The transfer plant is provided with an electrically driven car puller for spotting freight cars at the sides of the

building and a power shovel for moving the grain from the ends of the cars to the car doors, where it is dumped into the hoppers located under the tracks. During the month of January, 1910, when the transfer elevator was first put in service it handled 65 cars of outbound corn.

SHOP INSTRUCTION PRINTS AND JIGS FOR GAGING BRAKE RIGGING

The tendency to introduce exact methods in shop work is admirably illustrated by the brake rigging adjustment practice of the Philadelphia Rapid Transit Company. It is well known that poor braking and unequal brakeshoe wear are due partly to errors in leverage dimensions and to inaccurate ad-



justments by the shop men. To eliminate trouble from both of these causes the Philadelphia company developed over two years ago a series of accurately calculated jigs for setting the cylinder levers of its numerous types of brake rigging. All that the brake inspector is required to do is to see that the distances between certain points on these levers are to gage as shown by the jigs. These gaging points are indicated on blueprints of the style reproduced in the accompanying engravings. The prints are 6 in. x 4 in. in size and are bound for handy pocket use with other drawings of brake rigging parts such as dead and live levers, cylinder tie rods and push rods, brake beams, etc. One of the latter prints shows the standard method of numbering holes in all levers. This practice was introduced by Harry

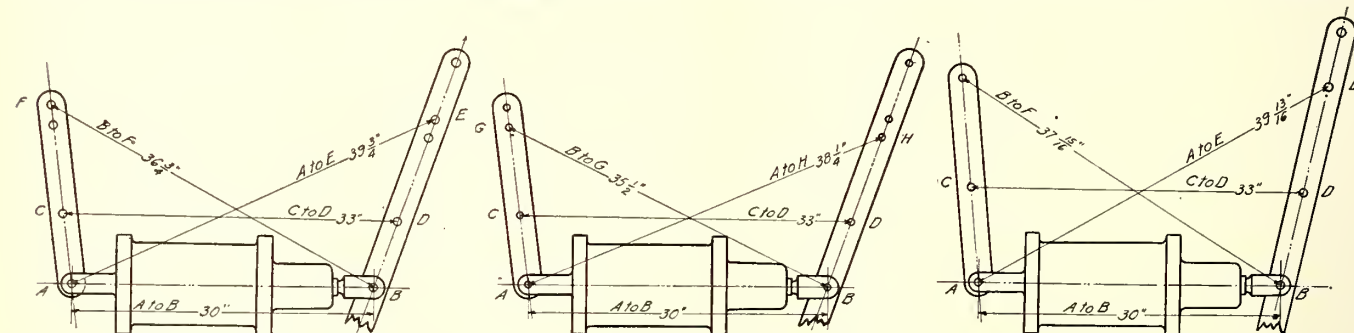
RETURNS OF TRAMWAYS IN THE UNITED KINGDOM

The miles of route of tramways and light railways open for traffic in the United Kingdom in the fiscal year 1909-10 were 2562, as compared with 2526 miles in the previous year. The returns for the fiscal year 1909-10 cover the calendar year 1909 for the companies and the fiscal year ended March 31, 1910, for the municipal authorities.

The report of the Board of Trade shows a total of 2,743,189,439 passengers during the last year, as compared with 2,659,981,136 in the previous year. The number of car miles run was 297,844,686, against 292,245,562 in the preceding year. The capital expenditures per mile of single track open compare as follows: Lines and works, £13,467 last year and £13,002 in the preceding year; all items, £17,750 last year and £17,345 the pre-

ceding year. The percentage of net receipts to the total capital outlay was 6.69 last year and 6.47 in the preceding year. This percentage for the net capital outlay, determined by the elimination of the amounts expended on construction or purchase of old lines and works now superseded, was 7.30 per cent last year, as compared with 7.06 per cent in the preceding year. The operating expenditures reached 62.18 per cent of the gross receipts, as compared with 63.64 per cent in the preceding year. The number of passengers carried per mile of route open was 1,070,872 last year, as compared with 1,053,049 in the preceding year. The average number of passengers carried per car mile was 9.21 last year and 9.10 in the previous year.

The introduction to the report says in part: "The number



Method of Using Jigs to Set Cylinder Levers for Brill 27-G, Curtis D2 and Curtis Maximum Traction Trucks; Brill Maximum Traction Trucks and Curtis C. I. Trucks

Branson, superintendent of rolling stock and equipment, who has also devised pocket shop prints for the electrical work such as the one reproduced, which shows the location of GE-70 and GE-80 motor leads. All of the leads are of No. 6, 49-strand heavy triple-braid insulation. The ends of the motor leads are soldered.

The Clarkson Engineering Assembly announced that the charter day exercises of the Thomas S. Clarkson Memorial School of Technology, Potsdam, N. Y., would be held in the assembly hall of the institution at eight o'clock on March 17, 1911. Moses Nelson Baker, C. E., one of the editors of *Engineering News*, New York, was to deliver an address on "The Engineer and Social Service."

of passengers carried in the year 1909-10 is equal to about 62 times the estimated population of the United Kingdom.

"Of the total of 1710 miles of line owned by local authorities 1503 miles are worked by those authorities themselves or (in a few cases) by other local authorities leasing from them, and the remaining 207 miles by leasing companies.

"Last year the route mileage open of electric line was 2360 miles out of a total of 2526; this year it is 2429 miles out of 2562. The mileage worked otherwise than by electric traction has thus further diminished from 166 miles to 133 miles.

"Of the 300 undertakings, 176 belong to local authorities and 124 to companies or other parties. The net receipts of local authorities who work tramway undertakings belonging to them or leased from other local authorities amounted to £3,600,191 on

the year's traffic, and they applied £1,111,888 toward the reduction of tramway debt and £346,274 in relief of rates, while carrying £761,646 to reserve and renewal funds.

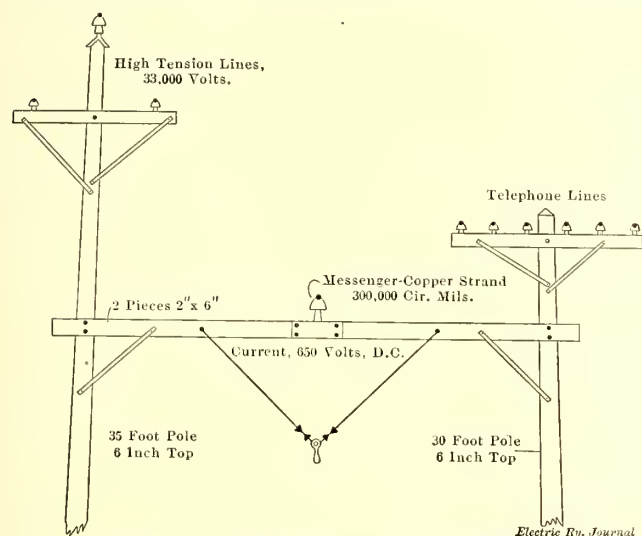
"In the case of four local authorities and eight companies the returns show an excess of working expenditure over gross receipts.

"With regard to the appropriations for interest or dividend, etc., it is desirable to explain that the present return has not been restricted to showing the disposal of the net receipts earned during the year, as was the case with former returns. The total amount allocated is now given and the return shows that in 29 cases it was necessary to obtain aid from rates to meet the charges for the year (including interest and redemption of tramway debt). The total amount thus obtained was £64,215."

The appropriation for reserve, including depreciation and renewal funds, amounted for the properties of the local authorities in the entire United Kingdom to £761,646. The corresponding appropriation by the companies was £220,258, a total for the properties of both classes of £981,904.

PROPOSED CATENARY BRIDGE CONSTRUCTION WITH WOOD POLES

The accompanying sketch shows a catenary construction proposed by A. C. Sekell, engineer of the Grand Rapids, Hastings & Battle Creek Railway, a projected line in Michigan. The two cross-pieces connecting the poles are 2-in. x 6-in. timber and 16 ft. long. The insulator pin for the messenger cables passes through a packing block about 2 ft. long bolted between the two cross-pieces and set in after the cross-pieces are fastened to the poles, so that it can easily be set to bring the pinhole exactly over the middle of the track. The feeder



Proposed Catenary Construction with Wooden Bridge Support

is used as a messenger and is designed to have a sag of $4\frac{1}{2}$ ft. in a span of 220 ft.

Owing to the cross-bracing, the designer believes that poles with 6-in. tops will be amply strong enough for the construction and that they can be spaced 220 ft. apart on straight tracks. The pole spacing on curves would depend on the degree of the curve. On long radii curves the straight-track spacing could be used and a wire from one outside pole to the other would serve as an attachment for the pull-offs.

The trolley wire has an independent support at each bridge, thus reducing the weight on messenger. With a messenger of 300,000-circ. mil capacity, having a sag of $4\frac{1}{2}$ ft., a No. 0000 trolley wire with a sag of 3 in. and hangers 55 ft. apart, the designer estimates that the strain on the copper in the messenger would be about 8300 lb. per square inch and in the trolley wire 5800 lb. per square inch.

REPORT OF FORD, BACON & DAVIS ON PHILADELPHIA SERVICE AND EQUIPMENT

A summary of a report made by Ford, Bacon & Davis, of New York, to the Pennsylvania State Railroad Commission in reference to the service and equipment of the Philadelphia Rapid Transit Company has been made public. The summary is dated March 7, 1911, and gives the conclusions derived from the detailed report. The preliminary report, practically in full, follows:

"On May 27, 1910, you commissioned us to make an examination of the service and equipment of the Philadelphia Rapid Transit Company in order to determine whether certain complaints against the service were well founded or not, and to make a report upon existing conditions with recommendations.

"We first obtained from the Philadelphia Rapid Transit Company, upon forms prepared by us, comprehensive statistics showing the amount and character of the physical property and presenting a record of its operation for a period of years. We also secured from reports of supervisory commissions and street railway companies recent comparative statistics of the four other largest American cities, New York, Brooklyn, Boston and Chicago. From July 12, 1910, to Feb. 1, 1911, we made systematic observations of the traffic and car service in Philadelphia. We also made a special examination of the car equipment of this company and of the standard cars of the four other cities.

"Following is a summary of our conclusions and recommendations:

"It is our opinion that while in many particulars the property and service of the Philadelphia Rapid Transit Company compare favorably with other large systems, there are lacking two essential features of good street railway service, upon which more largely than any other depend the comfort and convenience of the traveling public.

"While we find the track construction to be substantial, the surface track mileage larger than the average considering the population served, the overhead line of first-class design, the power plants of adequate capacity and fair economy, and the carhouse and shop facilities ample, the car equipment, which is the most important part of the physical property from the passengers' standpoint, is distinctly inferior to that of other large American cities; and while the average seats provided per passenger and total car mileage operated throughout the entire day are greater than the average of other cities, the proportion of rush-hour car service to middle-of-the-day service is considerably less than standard practice, resulting in unreasonable overcrowding at the times of heaviest traffic.

RUSH-HOUR CAR SERVICE—COUNTS OF RUSH-HOUR TRAFFIC

"An extended series of observations and passenger counts was made for each line, especially as to operation during the evening or heaviest rush hours in and adjacent to the principal delivery district, which is the central business section bounded by the Delaware River, Seventeenth Street, Cherry and Locust Streets. From these we ascertained the number of passengers on each line during each half hour of the rush hour at the point of maximum loading. We found from our observations and records covering a period of about six months that the evening rush-hour traffic for Wednesday, Oct. 5, 1910, represented an average for that time of year and consequently have used in our determinations the count made on that day. We ascertained for each line the number of passengers carried past the point of maximum loading during each half hour and the number of cars observed, and determined the absolute and the average car loading of each line and of each group of lines by sections of the city.

Having thus obtained the number of passengers by half hours from 4 p. m. to 7 p. m. carried past the maximum-load point of each line we were in position to make a critical analysis of the service operated and to devise a plan of car service which would provide adequately for this rush-hour traffic.

LIMITATIONS OF RUSH-HOUR SERVICE

"This problem involves the determination of a standard of reasonable car service for the rush hours and the definition of practicable rules for car loading. The extreme limits of such service would be, on the one hand, to provide seats for all passengers, and, on the other, to continue the midday car service through this busy period. The maximum number of cars which can be operated is absolutely limited by track and crossing capacity and the necessity of providing sufficient employment for the extra car men. The track as now operated in the delivery district of Philadelphia has not yet been used to its greatest capacity except on some streets. An efficient re-routing of lines, the replacement of present small cars by large motor cars and the use of large trailers, if practicable, would make possible a considerable increase of service in this district.

"The company now schedules in winter about 39 per cent more cars and in summer about 45 per cent more cars during the evening rush hour than on its base schedule during the middle of the day. Other large American street railway systems operate as many as 100 per cent more cars during the rush hours than on the base schedule, which proves the feasibility of at least doubling the service during the rush hours with single car operation. With the use of large trailers it is believed that a still larger proportion of rush-hour capacity would be found practicable.

"On the other hand, however, there are conditions of finance in the broad sense which place an economic limit upon the amount of car service that can be operated at this time of day. Track and street capacity must also be conserved as far as possible in the interest of speed of operation.

REASONABLE CAR LOADING

"Looking at the problem from another standpoint, if the service is proportioned upon the number that the car can accommodate comfortably, both seated and standing, its capacity would be used most efficiently and overcrowding would be prevented.

"From careful studies of car capacities we have found that 4 sq. ft. of aisle and platform space per standing passenger allows comfortable standing space. This would mean, for the Philadelphia pay-within car, two rows of standing passengers with sufficient space for passage between and a total capacity of 76, of whom 38 would be seated and 38 standing. In other words, for a car with longitudinal or lengthwise seats the standing capacity would equal the seating capacity. For a cross-seat car like those now operated in Philadelphia, with seating capacity of 40, the standing capacity would be 29 and the total 69. If the usual large prepayment platforms were used on the cross-seat car it would accommodate 36 standing passengers, or with the seated passengers a total of 76. Therefore, applying this rule to the cross-seat cars, the standing capacity would equal from 75 per cent to 90 per cent of the seating capacity. This standing load is practically within the limits used by other American street railway companies which have given attention to the subject, and as prescribed in some cases by governmental regulations abroad.

"We believe this to be a reasonable limit of car loading, and have used it in our calculations and recommendations of rush-hour service.

LIMITS TO INDIVIDUAL CAR LOADS

"In order to prevent or lessen periodical overcrowding caused by the bunching of cars or passengers, we believe it is necessary to limit the loading of cars to the standard capacity determined. This under ordinary conditions of operation can be accomplished with platform doors or gates which close the entrance and exit when the car is in motion, together with the use of the 'car full' sign.

"The reasonable use of the individual car limit and the 'car full' sign has been found beneficial by the American companies that have adopted it. This largely does away with the uncomfortable, unsanitary overcrowding, so common at present in many American cities at rush hours, and facilitates the speed and regularity of operation by eliminating the most serious cause of bunching of cars. Such a definite notice also reduces the annoyance of being passed by the motorman.

"Efforts to restrict car loading to standards sometimes used abroad have met with objection because the limit has been placed at or near the seating capacity. This is impracticable under American conditions. During the non-rush hours, however, seats should be provided for all passengers. As the traffic increases at the beginning of the rush hours sufficient cars to furnish seats should be added until the maximum schedule is in operation.

RECOMMENDED RUSH-HOUR SERVICE

"We, therefore, recommend that the Philadelphia Rapid Transit Company should furnish sufficient rush-hour car service to provide the above standard capacity, and should limit individual car loads on a practicable plan, making allowance for extraordinary conditions.

IMPROVED SERVICE PRACTICABLE IMMEDIATELY

"As the present rush-hour service is considerably less than the standard recommended, this plan cannot be put into effect until additional cars and power are secured.

"During the time of construction of this equipment we recommend that the company operate a service as far as the number of present cars and the capacity of its power system will permit, which will provide on each line during the busiest half-hour an average car loading equal to the recommended standard of maximum car capacity. This standard of service immediately practicable would require the operation of 1987 cars, an increase of 315, or 19 per cent, over the winter schedule, and of 205 cars, or 11 per cent, over the summer schedule. Although this would result in a considerable improvement of car loading, there would still be carried regularly maximum loads up to the crowding limit of the car.

RECOMMENDED SERVICE APPLIED TO TRAFFIC OF OCTOBER, 1910

"From a large number of observations both in Philadelphia and elsewhere, we find that the maximum car loads on any line in a half-hour approximate 25 per cent more than the average loading for that half-hour. Thus, for example, if 76 is fixed as the maximum load of the pay-within car, the average loading for the heaviest half-hour would be 61 passengers. Consequently, our recommendation for standard service would require approximately 25 per cent more cars to pass the maximum point of loading on each line at the busiest half-hour than would be required for the average loading just referred to, and this, as calculated for the entire system, would result in an additional number of large cars in operation of about 14 per cent.

"In order to ascertain whether our recommended standard limit of rush-hour car loading would be unreasonable or impracticable in Philadelphia we have calculated in detail for each line the car service which would have been necessary to provide for the rush-hour traffic of an average day of October, 1910, represented by Wednesday, Oct. 5. We have assumed that additional small single-truck and maximum-traction cars would be used to furnish the increase of service of lines on which these types are now operated, which would mean that practically all of the best of this class of car equipment now on hand would be used. The additional cars necessary to provide the recommended service are assumed to be motor cars having the same maximum capacity of 76 as the present pay-within car.

"With the use of these types and of the present large double-truck cars there would be required to provide the recommended service a total of 2265 cars in operation, rendering necessary the purchase of 489 cars. This total number of 2265 cars required for recommended service compares with 1672 called for by the company's winter schedule, an increase of 593 cars, or 35 per cent. Compared with the company's summer schedule, which calls for 1782 cars, it represents an increase of 483, or 27 per cent. This increase would differ for each line, in some cases being more and in some less than this average. The increase of cars on lines operating into the delivery district is from 1315 cars of present winter schedule to 1801 cars, or 37 per cent, thus necessitating some rearrangement of routing for certain of these lines.

"If 2265 cars are operated at the rush hours, there would be 89 per cent more cars in service than in the middle of the day

on the base schedule in force last October. This is within the limits of American practice.

"We estimate that this service for both morning and evening rush hours would result in additional car mileage of 11 per cent, or an increase of approximately 9 per cent in operating expenses. We believe that more efficient scheduling during the non-rush hours and the use for all-day service of the large new cars purchased to replace many of the small single-truck cars, together with the saving which might be secured by a comprehensive re-routing plan, would largely offset the additional expense of operation at the rush hours. Thus, while providing far better service to the public, the company's operations might be placed on a more provident basis and a considerable increase in gross earnings made possible.

"With regard to the subway-elevated service, we also find, especially during winter operation, a condition of overcrowding. We would recommend that additional service be provided on the basis outlined for surface cars. To accommodate the traffic on Oct. 5, 1910, in accordance with this standard 120 cars would have been required. On this division 10 per cent of the cars in operation are needed as a 'shop' reserve, or as of that date, 12 cars were required in addition to the 120 cars now owned.

FUTURE CAR SERVICE

"The number of additional cars stated above to be required for both surface and subway-elevated operation should be considered as examples of the rules recommended, not as present requirements. They were the number necessary in October, 1910. The traffic is continually increasing, and with the broader plans which have been proposed the rate of increase should be more rapid in the future. The car equipment calculated to have been necessary for last October with the additional power equipment would require probably a year to purchase and install, and by that time still more cars and power would be needed. Consequently these standards of car loading and car service should be adopted in principle and should be applied by a bureau or department to be established by the company. Based on the periodical determinations of this department, the company should estimate and provide for its car and power requirements from one to two years in advance.

CAR EQUIPMENT—PRESENT TYPE OF CARS

"The other principal criticism to which we have referred concerns the inferior character of the car equipment. Of the 3292 cars owned by the company about two-thirds are of the small, single-truck type purchased at the time of original electrification, and of the large double-truck cars 272 were reconstructed from the small cars by splicing in a short section without modernizing this equipment; consequently about 70 per cent of the total cars are of a type generally unsuited to present conditions of congested traffic. Of the remaining 772 large double-truck cars about 90 per cent have been rebuilt and changed from cross-seat cars into the present longitudinal-seat pay-within type. This conversion, largely on account of the change to longitudinal seats of poor design, has rendered this car uncomfortable and unpopular, especially for summer operation.

"Of the total surface car equipment in Philadelphia 36 per cent are large double-truck cars, in New York 75 per cent, in Brooklyn 89 per cent and in Chicago about 75 per cent. While the single-truck car has its use on lines of light regular traffic, it is generally unsuitable for operation during the rush hours in the congested delivery district of large cities, and on many lines it is uneconomical to operate. It is assumed that the company will desire gradually to replace a considerable proportion of these single-truck cars by the purchase of large cars. We do not make any definite recommendations upon this point, as it concerns principally the operating economy.

COMPARATIVE CAR PURCHASES

"Reasonable service during the rush hours, as stated above, would necessitate, as of last October, the addition of 489 large cars. With the purchase of these cars the proportion of large double-truck cars owned to total closed and semi-convertible cars would be about 63 per cent or more nearly the proportion in other cities.

"In this connection it is of interest to note that during the past 10 years the Philadelphia system purchased 655 large double-truck surface cars, while the two large surface systems of New York City purchased 1472 cars, the Brooklyn systems 1127 cars and the Chicago systems about 2200 cars. These figures do not include the large amount of subway and elevated equipment purchased in other cities, nor does the figure for the Philadelphia company include its 120 subway-elevated cars.

THE PHILADELPHIA PAY-WITHIN CAR

"The principal criticism of this car is the replacement of cross seats by longitudinal seats. This was occasioned by the retention of the small platforms, which with the adoption of the prepayment plan compelled the exit of passengers from the front platform only, requiring a wider aisle than was practicable with the double row of cross seats. The sliding platform doors necessitate door pockets which interfere materially with the comfort of passengers on the corner seats and narrow the car entrance. It is not believed, however, that this difficulty can be much improved without practically rebuilding the ends of the car and the platforms. Eight cross seats should be restored in this car, either half on each side or all on one side. The cars already altered by the company, on the former plan, are understood to operate satisfactorily. With car loads limited as recommended the passageway is ample. The remaining longitudinal seats should be remodeled by using a more comfortable, higher back of spring rattan and by proper sloping of seats and backs.

"The sliding platform doors operated by air should be provided with a simple, positive mechanical release so that they can be opened by passengers in case of emergency. This device should be under the proper restriction of motorman or conductor.

"These cars are also insufficiently provided with steadying devices, which cause an unusual number of accidents to passengers falling on cars. Suitable grab handles on the backs of the proposed cross seats, and grab handles, horizontal rails or stanchions on platforms should be provided, to reduce this risk.

"The number and capacity of the electric heaters on this car should be doubled in order to secure the heating effect of the small single-truck Philadelphia car and the usual heating effect of standard cars of other cities.

"The present number of lights should be doubled in order to provide the amount of lighting usual in modern standard cars of this size.

"Both the line and destination signs are of poor design and insufficiently illuminated. Transparent line signs should be used on the front, rear and sides of the monitor and illuminated from the car. A destination sign should be placed in the center of the front and rear vestibules directly under the hood, independently illuminated.

"This car should be provided with the usual mechanical sander so that the motorman can drop sand on the track when necessary for an emergency stop.

"The present projecting fenders should be used only on high-speed lines in the suburban districts and when thus used should be properly maintained. Automatic wheel guards should be installed for city service in place of the projecting fender. These are placed under the car platform in front of the wheels and operate automatically when the trip strikes an obstruction. They have been found to be of value in the reduction of fatal accidents where used in other cities. Persons struck constitute a large class of fatal accidents occurring in Philadelphia. With the use of these wheel guards it is advisable to change the design of drawhead so that it will not project beyond the bumper.

OTHER SURFACE CARS

"As a large proportion of the other types of surface cars will, it is assumed, be discarded within a few years, it is believed not to be desirable to reconstruct them except for the requirements of safety. We would recommend that all surface cars be equipped with mechanical sanders, automatic wheel guards and non-projecting drawheads, and that projecting fenders be used only on high-speed lines in the suburbs.

"All cars not painted within the past year should be put

through the paint shop, and thereafter painted and varnished on a definite schedule.

"We recommend that the system and nomenclature of line and destination signs be entirely rearranged and standardized.

SUBWAY-ELEVATED CARS

"The present subway-elevated cars are of good design and no changes are recommended.

NEW STANDARD SURFACE CAR

"It is assumed that the new standard car for Philadelphia will be a two-motor prepayment car with windows capable of large opening, which would make it suitable for both summer and winter operation. If the body is 28 ft. long with platforms 5 ft. 6 in. long (inside), mounted on reversed, center-bearing, maximum-traction trucks, the overhang of car without projecting fender when operated on standard track curve at 50-ft. street intersections would be approximately the same as the bumper on the present pay-within car and about 18 in. less than the overhang of the fender on the present car. Consequently the length of body might be 30 ft. if found desirable, or even longer if operated on some lines. For the purposes of this report we have assumed the use of a 28-ft. cross-seat car as generally practicable, with seating and standing capacity of 76 passengers on the basis recommended.

"This, with a car 8 ft. 4 in. wide with skeleton sides and 34-in. seats, would permit of an aisle 28 in. wide. With exits from both rear and front platforms, and with the recommended limit of car load, this width of aisle should be found practicable from an operating standpoint.

"Our recommendations upon the points of design especially affecting the traveling public are as follows:

"The illuminated line and destination signs should be of the same type as recommended for the pay-within car.

"The height of the step should be from 14 to 15 in. and the width of step at least 11 in. The step should be folding or protected and should have safety tread.

"The folding platform doors should be mechanically operated by motorman or conductor and should be kept closed while the car is in motion. The bulkheads should be open and all passageways should be at least 23 in. in the clear. The conductor should be located on the rear platform behind a suitable rail or steadying device.

"The seats and backs should be of spring rattan, of comfortable height and properly sloped.

"The vestibule windows should be given full opening. Monitors should be fixed shut and there should be provided sufficient roof or monitor automatic ventilators.

"There should be installed 16 electric heaters of a total rated capacity of 12 amp.

"Twenty 16-cp incandescent lamps should be used; fifteen inside the car, arranged in single sockets on the ceiling and lower decks, one on each platform, two for destination signs and one for headlight.

"There should be a passengers' push-button signal on each side post of car, with electric bell or buzzer on platforms.

"Mechanical sanders and automatic wheel guards should be installed. Drawheads should not project beyond bumpers.

ESTIMATED COST OF ADDITIONAL EQUIPMENT

"The addition of 489 cars, if all motor cars of the above standard, would involve an expenditure for car equipment and equivalent additional capacity of power house and feeder system, car houses and shops which we estimate at approximately \$7,126,000. The recommended changes in present pay-within and other surface-car equipment are estimated to cost not more than \$500,000. Twelve additional cars for the subway-elevated line would cost about \$144,000. These recommendations, therefore, involve a total expenditure to secure the recommended car capacity needed in October, 1910, of approximately \$7,770,000, and are exclusive of betterments and extensions of track and line. With a normal rate of growth we estimate that at least 100 additional cars per year, with power and storage capacity, will be needed to provide for additional traffic.

RE-ROUTING PLAN

"We find that the present routing of cars in Philadelphia is poorly arranged from standpoints both of public convenience and economical operation. The delivery district trackage is not accessible to lines from all sections of the city. Lines through the residence districts are not spaced uniformly, and many lines were located originally under competitive conditions on narrow streets, with numerous curves and frequently crossing each other. We submit in the detailed report a statement of the general principles involved, and have therein developed a tentative plan of re-routing covering the entire city, based on these principles and upon the information derived from observations and passenger counts. This plan is suggested as an approach to the subject, and is presented for discussion and study. A final plan of re-routing should be adopted by agreement of all parties interested and should be put into effect as soon as practicable."

STATEMENT OF MR. KRUGER

Charles O. Kruger, president and general manager of the Philadelphia Rapid Transit Company, was quoted in the *Philadelphia Press* of March 10 as having stated in reference to the report:

"In the absence of the full report I cannot make any definite statement. My first impression of the summary, as given us to-day, is that it is distinctly favorable and in keeping with the policy of the company. What is said concerning the number of cars is exactly in line with what the management has realized to be necessary. The company realizes that it has not enough cars, but its lack of capital is responsible for this condition. The new régime has already planned to fill this want. The exact number of cars required, or to be purchased out of the first year's apportionment of the proposed new loan, to fill this want, has not been determined. But if you keep within the range of 150 and 250 cars you will be near the figure. This is a subject that Mr. Mitten and I will consider.

"As to the criticism that the car equipment is poorer than that of other American cities, it is one with which I do not agree, but here as in other respects, since the report is not in hand, I am unable to know exactly what is meant, and therefore am unable to comment on the point at issue.

"Concerning the suggestion that the standing room be limited to a given number of square feet to the passenger, I feel that it is getting back to the European idea, which the average American will not stand for. The average American will board a car as long as he can get a foothold, regardless of law or regulations.

"To give you figures from memory I should say that the company now has about 4000 cars. Of this number about 1200 are summer cars, which are not now in use. About 1750 cars are run at high load line, and about 1550 at other parts of the day. We are continually experimenting on cars and are now putting on five new cars with folding doors, which are of the manual opening type. These cars will be added to-day to the service on the Willow Grove line. We find that the sliding doors operate too slowly, and for that reason will adopt the folding door type, if it proves satisfactory in all respects."

PARCEL BUSINESS OF BRADFORD TRAMWAYS

The Bradford City Tramways, Bradford, England, have developed a large parcels express business and are now collecting and delivering weekly about 14,000 parcels. The capital expenditure at present standing against the business is £2,500 and the annual profits are about £1,700. The parcel service is in charge of C. E. Hobson, parcels superintendent.

Bulletin No. 3 of Purdue University, issued under date of February, 1911, describes the complete shop and laboratory equipment of the engineering schools of the university. It is illustrated with numerous half-tone views of the exterior and interior of the buildings.

DECISION OF COMMISSION ON CONEY ISLAND FARE

In connection with the decision of the New York Public Service Commission, First District, upholding the fare of 10 cents charged by the Coney Island & Brooklyn Railroad to Coney Island on week days, separate opinions were filed by several of the commissioners. Those who voted for the order dismissing the complaint of Jonas Monheimer against the company were Commissioners William R. Willcox, William McCarroll and John E. Eustis. Negative votes were cast by Commissioners Edward M. Bassett and Milo R. Maltbie. Opinions were filed by Commissioners Eustis, Bassett and Maltbie and a statement was made by Commissioner McCarroll. A brief reference to the decision was published in the issue of the *ELECTRIC RAILWAY JOURNAL* for Jan. 14, 1911, page 95.

OPINION OF COMMISSIONER EUSTIS

The opinion of Commissioner Eustis was, in part, as follows:

"I am unable to concur in the conclusion of the sitting commissioner in which he reasons that because the company formerly maintained a 10-cent rate to Coney Island on Saturdays, Sundays and holidays and a 5-cent rate on other days and because the company has not shown that the increase made two years ago to a 10-cent fare on week days has effected any substantial improvement in the company's earnings such increased charge to those who travel on week days without any corresponding benefit to the company or to the users of the cars is an injustice to all. In my opinion, the equalization of fare on all days is distinctly an act of justice to the passengers who travel over the defendant's road on Saturdays, Sundays or holidays, rather than an injustice to any one.

"A fair price for a service of this kind seems to me to mean the same price for the same service every day, and such uniformity is, in my judgment, the first essential of a fair and reasonable rate. The fact that the company voluntarily maintained two rates of fare to Coney Island, one for week days and one for holidays, Saturdays and Sundays, does not constitute a reason for this commission to require a return to such a practice. There is much force in the suggestion that there is a moral obligation in favor of the patrons who have located along the line of this road and built homes on the implied promise of a 5-cent fare five days in the week. But the commission would exceed its powers if it undertook to enforce such an obligation in the absence of evidence that the fare charged was unreasonable.

"No inference that the fare is excessive or unreasonable is to be derived from figures of the company's earnings in 1905 and 1906. Since the early part of 1907 the Coney Island & Brooklyn Railroad Company has paid no dividends whatever. In that time the company has been called upon to spend large sums to rehabilitate its property, extensive repairs have been made to its track and equipment, and these repairs are not yet completed. For nearly four years all surplus earnings have been required for replacements and they will continue to be so required for some time to come.

"The evidence in the case contains a careful appraisal of the company's property, from which, after deciding all doubtful questions against the company, I derive a figure between \$4,900,000 and \$5,000,000 as the present value of the company's property used for purposes of transportation. This value is the net value after thorough depreciation and after a rigid exclusion of all items of which there could be any question. It covers property upon which the evidence shows that \$8,641,952 of securities have been issued, the average market price of which securities during the six months preceding Aug. 31, 1909, was \$7,868,152. The figure which I have taken does not include any franchise value, although the defendant company owns two franchises, the original Coney Island & Brooklyn Railroad franchise and the Brooklyn City & Newtown Railroad franchise, which are assessed for purposes of franchise taxation at over \$5,000,000.

"For the year ended June 30, 1909, the company's profits

from operation were \$413,790, or less than 8½ per cent on the minimum valuation of \$4,900,000. This return would be reduced to about 6¾ per cent if corrections were made in the profit and loss account to adjust operating expenses to conditions that could reasonably be defined as normal. The actual profit for the year ended June 30, 1910, is shown to be about 7.9 per cent upon the figure which I have taken. From these recent figures of earnings I conclude that it is safe to assume 7½ per cent as a fair average figure for the company's profit on the depreciated value of its property under the present fare schedule of 10 cents every day. This return would represent about 5 per cent on the outstanding securities. I do not consider 7½ per cent an unreasonable profit to a company of this kind going through a period of rehabilitation."

STATEMENT OF COMMISSIONER M'CARROLL

Commissioner McCarroll concurred in the opinion of Commissioner Eustis, "with the expression of the additional view that the testimony in the case rather shows that the financial results of the present rate to the company are more favorable than formerly."

OPINION OF COMMISSIONER BASSETT

Commissioner Bassett discussed the case at length and said, in part:

"The 10-cent fare is not restricted to Coney Island passengers exclusively, but is a long-ride fare, adjusted with a rough approximation to the distance traveled. The adjustment is effected by means of a fare zone located in the southern portion of the several routes. The arrangement is that a passenger may ride between any point within the fare zone and any point north or south of the zone for a single fare of 5 cents, whereas a passenger boarding a car outside of the fare zone and riding across the zone into the territory on the other side is charged a second fare of 5 cents on passing out of the zone. The effect of this arrangement is that passengers riding between the territory in the vicinity of Coney Island and points in Manhattan or in the northern portion of the Borough of Brooklyn are charged 10 cents. The southern boundary of the fare zone is Kings Highway, 2.62 miles north of Coney Island, and the width of the zone is about 4.16 miles. The maximum distance that a passenger can travel for 5 cents is nearly 10 miles, from Delancey Street, Manhattan, to Kings Highway. The minimum distance for which the company charges a 10-cent fare is less than 5 miles, from a point south of Kings Highway to a point north of the corner of Ninth Avenue and Ninth Street. The maximum distances traveled for a 5-cent fare and a 10-cent fare respectively on the six different routes operated to Coney Island by this company are stated approximately in the following table:

Between	Route.	5 Cent Fare.	10 Cent Fare.
	Covert Avenue and Coney Island.....	8.91	11.53
"	Delancey Street, Manhattan, and Coney Island.....	9.76	12.38
"	Grand Street Ferry and Coney Island.....	8.56	11.18
"	Park Row, Manhattan, and Coney Island...	8.65	11.27
"	Fulton Ferry and Coney Island.....	7.89	10.51
"	Hamilton Ferry and Coney Island.....	6.68	9.3

"On the theory that the fare charged is a reasonable price for the average distance traveled by all passengers, the uniform rate of 5 cents for transportation on a city street surface railway has met with public acceptance in most cities in this country, notwithstanding the disparity in the service rendered to different passengers.

"The inequality in the ordinary case of a flat rate of 5 cents is enhanced under a system of fare such as that in force on the Coney Island & Brooklyn Railroad, by which the maximum distance traveled on one route for 10 cents is less than a distance a traveler may ride on another route for 5 cents, and by which some passengers pay 10 cents for a ride of 4.6 miles on a particular route while other passengers travel 9.5 miles over a slightly different portion of the same route for 5 cents. It is impossible under these circumstances to test the reasonableness of the company's charge except by studying the entire business of the company.

"I am forced by a consideration of the evidence to the con-

clusion that the increase in fare does not substantially, if at all, increase the receipts of the company and does not in a broad sense benefit it by any economy in expenditure."

OPINION OF COMMISSIONER MALTBIE

Commissioner Maltbie stated that he concurred with Commissioner Bassett, and added:

"The basic question is whether the company is justified in increasing the rate to 10 cents upon every day of the week. If a company cannot show that an increase in rates does result in an increase of its net income, it seems to me that the increase should be disapproved and the company ordered to institute its former or a lower rate. The evidence presented by the company in this case does not prove that the increase in rates has resulted in an increase in net income, at least not beyond a few thousand dollars, which would not affect the conclusion. Consequently, the company should be ordered to return to its former rate or a lower rate fixed."

FENDER AND WHEELGUARD TESTS TO BE CONDUCTED IN ST. LOUIS

The Board of Public Improvements of the City of St. Louis, Mo., has arranged to conduct a series of fender and wheelguard tests beginning April 10, 1911. The trials will be conducted on the tracks of the Water Works Electric Railway (St. Louis Electric Terminal Railway), at Bissell's Point, under Francis T. Cutts, engineer in charge fender and wheelguard tests.

In addition to the rules governing the assignment of ratings, Mr. Cutts has prepared for the information of prospective competitors two blueprints which show the platform construction and clearances of the cars to which the fenders and wheelguards would be attached. The rules follow in full:

RULES GOVERNING TESTS

Generally, the tests will consist of picking up or removing from the track two sizes and weights of dummies placed in various positions in front of the car, approaching them at three different speeds. The fenders will be attached to a double-truck car. A granite block pavement will be imitated on the roadbed to conform with street conditions in St. Louis.

The two dummies will represent, respectively, a man and a child. The first will be about 5 ft. 9 in. in height and weigh 200 lb. and the second about 4 ft. in height and weigh 50 lb. The dummies will be placed on the granite block not more than 30 ft. from the end of such pavement nearest the approaching car.

The three speeds at which the tests will be made will be approximately 5, 10 and 15 m.p.h. The portion of the track prepared for the test will be about 100 ft. long.

The positions in which the dummies will be placed for the test are as follows:

Test No. 1—Dummy placed in an upright position on the track with its back toward the car.

Test No. 2—Dummy placed in an upright position on the track with its side toward the car.

Test No. 3—Dummy lying on its side, with arms extended toward the car.

Test No. 4—Dummy lying somewhat diagonally on the track with its feet toward the car.

Test No. 5—Dummy lying along the rail, with its head and one arm extended toward the car.

The board reserves the right to eliminate any of the above tests.

Each projecting fender will be submitted to tests Nos. 1, 2 and 3, with each size of dummy, over roadbed paved with granite block, and at three speeds, provided the tests are not discontinued as hereinafter prescribed. Each underneath fender or wheelguard will be submitted to tests Nos. 3, 4 and 5, with each size of dummy, over roadbed paved with granite blocks, and at three speeds, provided also the tests are not discontinued as hereinafter prescribed.

The entire conduct of the tests will be under the Board of

Public Improvements. Applications for tests must be filed with the Board of Public Improvements on or before April 3, 1911. Applications received after this date will not be considered. The testing grounds will be roped off, and all disinterested parties will be excluded therefrom.

Each fender or wheelguard submitted for test may be represented by accredited representatives, who must be named before the tests are begun. The order in which devices will be tested will be determined by the Board of Public Improvements. Its decisions will be announced as far in advance as possible. A failure on the part of a competitor to be ready in his proper order may result in his being dropped from the competition. The competitors will be notified in advance and will have ample time to arrange for the tests.

The fenders must be shipped by the manufacturers or inventors themselves, care of the Board of Public Improvements (Water Works office, 34 East Grand Avenue, St. Louis). The Board of Public Improvements will not be responsible for the receipt or for care of any devices.

The number of tests will be determined by the Board of Public Improvements. If 50 per cent of the tests in any series on any fender or wheelguard are not of grade "B," as herein-after defined, the tests on such fender or wheelguard will be immediately discontinued.

The tests will be conducted in the following order:

First Series—50-lb. dummy at 5 m.p.h.

Second Series—50-lb. dummy at 10 m.p.h.

Third Series—50-lb. dummy at 15 m.p.h.

Fourth Series—200-lb. dummy at 5 m.p.h.

Fifth Series—200-lb. dummy at 10 m.p.h.

Sixth Series—200-lb. dummy at 15 m.p.h.

Only the predetermined number of tests will be permitted, except as provided in these rules. If a device does not pass satisfactorily a sufficient number of tests in any series a protest may be filed and considered as provided in the following rule:

If the ruling of the engineer in charge, or his representative, is disputed at any point in a test, notice of a formal protest shall be given immediately. The formal protest shall be filed on the date of the test, setting forth all particulars, and a hearing shall be held and final ruling rendered in time to permit other tests to be made, if allowed by the Board of Public Improvements.

The points for the tests will be apportioned as follows:

"A"—Complete pick-up..... 6 points

"B"—Partial pick-up..... 3 points

"C"—Drag along..... 1 point

"D"—Miss 0 point

X—Interference with traffic and storage.

None. Slight. Considerable.

25 20 5

Y—Design.

Good. Fair. Complicated.

27 20 3

Complete pick-up on Series Nos. 1, 2, 3, 4, 5 and 6 will give a rating of 108 points (which is highest possible score in action). If fender has no interference with traffic it will be credited with 25 points. If fender is of *good* design it will be credited with 27 points. A possible high score is therefore 160 points. If a fender receives a 160-point credit its efficiency will be 100 per cent.

EXAMPLE.—Given fender of following qualifications:

X—Interference with traffic..... Slight

Y—Design Complicated

OPERATIVE TESTS

Series.	1.	2.	3.	Ttl. Operation	87 points
1.....	6	6	6	18 X	20 points
2.....	6	6	6	18 Y	3 points
3.....	3	6	6	15	—
4.....	6	6	6	18	Total
5.....	6	3	3	12	110 points
6.....	3	3	0	6	Possible score..... 160 points
Total..	30	30	27	87	Efficiency 68¾%

HISTORY OF THE COLUMBUS STRIKE

A condensed history of the strike of a minority of the trainmen of the Columbus Railway & Light Company in the spring and summer of 1910 has been published in pamphlet form by the company. The causes and results of the strike were given in articles published in the current issues of the *ELECTRIC RAILWAY JOURNAL* last year. A number of additional facts are given in the history, an abstract of which follows:

"For more than 18 years prior to February-March, 1910, relations between the Columbus Railway & Light Company (including its predecessors) and its employees were all that either could desire. The first intimation of any uneasiness among the employees of the company was in the latter part of February or first part of March, 1910, when the general manager was waited upon by a committee of seven or eight employees with a copy of a petition which was being circulated for signatures at the various car barns. It was a very modest request for an increase in wages.

"The general manager carefully read the paper and stated to the men that he was sorry that they thought it necessary to go to the trouble to get up a petition on a matter of this kind, for the reason that the subject of increase of wages had already been up before the board of directors and a substantial advance had been decided upon to take effect in the early spring, just as soon as it could be conveniently arranged, and that the company had made advances from time to time in the way of increased dividends to employees by reason of increased dividends to the stockholders of the company (this company having several years since adopted the plan of distributing dividends to its employees on wages earned in the same ratio that dividends are paid to stockholders of the company). This seemingly had been overlooked by the men, although as a matter of fact it was equivalent to an increase in wages.

"The men complained of the increased cost of living, which the general manager could not deny, but in reply said: 'Well, boys, the company is hardly responsible for that state of affairs, but we are all alike in that particular, and about the only thing left for all of us to do is to try and get along and if possible live more economically.' From that time on trouble began to brew and early in April, 1910, a strike was threatened but was averted by an agreement entered into at the suggestion of the secretary of the State Board of Arbitration, through whom an agreement was consummated April 6, 1910. Under this agreement the wages of all conductors and motormen were increased 1 cent per hour beginning April 1 and were to be again increased $\frac{1}{2}$ cent per hour on Jan. 1, 1911. Thirty-five men who had been discharged were to be reinstated 'provided the men who were promoted to fill the positions so created will assent thereto.'

"In the latter part of April the union men claimed that the company broke the agreement and decided to go out on a strike, which they did April 29, 1910.

"As to the charge that the company broke the agreement, the facts were as follows:

"Section 4 of the agreement of April 6 provided that some thirty-five men who had been discharged for cause be taken back and reinstated in the places occupied by them previous to their discharge *provided that the men who had been promoted to fill vacancies so created would assent thereto*. All of these 35 men were reinstated within a few days after this agreement had been entered into except four, who were not reinstated (although the company offered them positions on the extra list) for the reason that four employees who had been moved up refused to move back, in short would not 'assent thereto.' These employees felt that they were entitled to the places to which they had been promoted and which they had earned, and declined to move back. Because of this fact and because the company would not force them to go back (which would have been a most unjust thing to these men, involving the surrender of a principle of justness and fairness to which no company or person could honorably yield) the union men went out on a strike April 29, thereby breaking the agreement.

"This strike was ultimately settled on May 3 by the company agreeing to an interpretation of certain clauses of the agreement of April 6. The acceptance of the interpretation by the union men was simply to give an excuse for calling off the strike, the four men being given city positions by the Mayor.

"This settlement was satisfactory to the employees of the company, but was not to the professional agitators and organizers or to the officers of the national union of the Street Railway Amalgamated Association. They sought a 'closed shop,' the company having declared for an 'open shop.' The national union officers, the agitators and the organizers set about producing another strike for the purpose of securing, if possible, their demand for the 'closed shop.' On June 21 they voted for a second strike, the time for making it effective being left to a committee of the union. Before the second strike was made effective the Chamber of Commerce asked the State Board of Arbitration to intervene. Both the company and the men were called before the State Board.

"While the hearing was in progress an offer was made by the union on behalf of the union that the men would accept the award of the board if the company would sign in writing a similar offer to submit to such award. This would have meant a contract between the company and the union; a complete recognition of the union by the company, and the unionizing of a company where 75 per cent of its employees were non-union. The offer was refused on those grounds, as the company in all of its negotiations had declined to deal with or recognize the union.

"The deductions from the findings of the State Board of Arbitration showed that of about 50 charges made by the men against the company less than 20 per cent were sustained by the board. Of those sustained, more than one-half were sustained on the supposition that men who were in fact still working had been discharged from the service; in fact the whole 50 charges simmered down to the discharge of two men. The findings of the board were made public late Saturday evening, July 23, and at four o'clock the following morning (Sunday), without conferring further or seeking to ascertain even whether the company would or would not abide by the award of the board, the union men went out on a strike and inaugurated the warfare that for 12 weeks and 3 days disgraced the State and its capital with lawlessness and a reign of terror.

"From the beginning of the second strike mob law was supreme in Columbus for a period of 9 or 10 weeks, during which cars were attacked and crews beaten almost daily, over 200 cars were disabled, 24 of them having been blown up with dynamite, 120 employees were so injured as to require surgical attention, many of them being most brutally beaten, many passengers were assaulted and one murdered. Cars were stoned and shot at continuously. Bottles of acid were thrown from the dark into the faces of the motormen and hundreds of attempts were made to wreck the cars.

"The Mayor of the city was responsible in a large degree for this shameful record. His open and secret encouragement of the lawless element, his positive refusal to take any effective method of restraining the mob, his open denunciation of the company and its employees who attempted to operate cars in the face of the mob, and his zeal in seeking technical pretexts for the arrest of the loyal employees of the company who continued to operate cars, combined to produce a spirit of insubordination in the police department which resulted in an open mutiny on the part of a large number of policemen, lent encouragement to the lawless and discouraged all officers who honestly sought to conserve the peace.

"To the shame and disgrace of the city, the strikers and their sympathizers were allowed full sway in attacking and dismantling cars, beating and driving off the crews and instituting a reign of terror in the very heart of the city. The Mayor and his police force stood by in plain sight, refusing to raise a hand to quell the rioting, restrain the mob or protect either the cars or crews, until the men had been thoroughly taught this lesson, viz., that if any non-union man dared to operate a car he could expect no protection from the civil authorities but

would be turned over to the mercy of the mob. Not till then did the Mayor make even a pretense of restoring order; and after that his efforts were only a pretense.

"Throughout both strikes the real controversy has been one between the 'open shop' and the 'closed shop.' The company decided not to accede to the demand for a closed shop nor to submit that demand to arbitration.

"The strike was officially declared off on Tuesday night, Oct. 18, and thus ended one of the most disastrous labor agitations in the annals of the country.

"A large number of new men have been employed and occupy the places made vacant by the striking men; quite a number of the striking employees have returned to work, accepting such places as they could obtain, so that at the present time the company is operating its full quota of cars and the business of the company is again about normal.

"As an exhibition of error accompanied with violence on the part of misguided men led by crafty and vicious leaders, of incompetence and disregard of duty by those in authority, of public sympathy wasted on an unworthy and unrighteous cause, and of a final and deserved collapse of a dangerous movement, this strike was without a parallel. It was inaugurated without excuse. It was conducted in utter disregard of the rights and interests of the public. Misdeeds committed in its interests were winked at by those intrusted with power whose sworn and sacred duty it was to suppress them and punish the perpetrators. That it proved a miserable failure was due to the firm and uncompromising stand taken by the company. The lesson of this strike was a dear one, but it may prove valuable as an obstacle to a repetition of such an event in the future and a warning to unprincipled agitators who thrive by such misfortunes.

"The value of it as a lesson should inure not only to the benefit of the company whose welfare was directly involved, and to that of all manufacturing and commercial interests of the City of Columbus, but to the benefit of all like industries throughout the country at large, and to the peace and protection of the public."

CORPORATION TAX UPHeld BY THE SUPREME COURT

In a decision rendered by the Supreme Court, March 13, the constitutionality of the corporation tax law was affirmed by unanimous decision. The case came before the Supreme Court through suits brought in United States courts by stockholders to restrain the companies in which they held stock from paying to the government the amount of the tax. Sixteen of these cases were appealed to the Supreme Court and formed a basis for the decision rendered on Monday.

The Supreme Court upheld the argument advanced by the government that the tax was an excise law on "its doing of business in a corporate capacity." The court held that the tax was not applicable to the Real Estate Trust of Boston, which was organized, not under any statute, but under the common law, and that it was also not applicable to the Minneapolis Real Estate Syndicate on the ground that "that enterprise was not doing business within meaning of the law." It also decided that the Coney Island & Brooklyn Railroad and the Interborough Rapid Transit Company in New York were subject to the tax because it was no part of the essential governmental functions of a State to provide means of transportation or to supply artificial light, water or the like.

The exemption of certain labor organizations and charity institutions was briefly upheld on the theory that Congress has the power to select objects of taxation and to omit others. In this connection, but in another part of the decision, the court says:

"The right to select the measure and objects of taxation devolves upon the Congress and not upon the courts, and such selections are valid unless constitutional limitations are overstepped."

NEW LAWS IN INDIANA

Laws have been passed by the Legislature of Indiana relating to the equipment of interurban cars with hand brakes in addition to air brakes and the installation of block signals. The laws have been approved by the Governor. Abstracts of the new measures follow:

LAW RELATING TO BRAKES

"That it shall be unlawful for any common carrier in this State operating an interurban railway by electric power to operate or run upon any railroad in this State any motor car used in regular interurban passenger traffic which is not equipped with an approved power air brake in good condition, and subject to the control and operation of the motorman in charge of such cars, and of sufficient capacity to control the speed of the car. It shall also be unlawful for any common carrier operating a steam or electric railway and engaged in moving traffic between points in this State to operate or run upon any railroad in this State any freight or passenger train which is not equipped, at least, as to a steam railroad 75 per cent and as to an interurban street railroad 50 per cent of the cars in said train, with an approved system of hand brakes in addition to power or train brakes. The hand brakes shall be kept at all times in proper working condition and of sufficient capacity to control the speed of such train. Provided, that the hand brakes upon every passenger coach, both steam and electric, shall be so constructed that they can be operated in connection with the air or power brakes upon such coach. Provided, however, that whenever such power air brake becomes disabled from any cause while such car is in service on any such railroad, then if such car is equipped with a hand brake sufficient therefor it may complete its run: and provided, further, that this act shall not make it unlawful to run a disabled car to the most convenient repair shop upon the road upon which it is then being operated. Provided, that this act shall not apply to city street railway cars or cars engaged in suburban traffic.

LAW RELATING TO BLOCK SIGNALS

"After Jan. 1, 1912, it shall be unlawful for any person, firm or corporation which shall own or operate any line of steam or interurban railroad in this State to operate any train or car over such railroad by steam, by electric power or other power unless such railroad is equipped with and has in operation an automatic block signal system for the control of train or car movements thereon, unless the time therefor be extended by such Railroad Commission.

"Power and authority are hereby conferred upon the Railroad Commission of Indiana to extend the time specified when it shall be made to appear to it that a reasonable necessity for such extension shall exist. Provided, that the extension so granted shall not exceed one year. Full power and authority are also hereby conferred upon such commission to relieve any such carrier from the obligations imposed when it shall be made to appear that the volume of traffic or train or car movement over such railroad is such that the same can be dispatched without substantial hazard to life and property over a line not so protected. Full power and authority are also hereby conferred upon such commission to permit, authorize and order in place of the automatic block either a controlled manual block, or a manual block, or a dispatcher's block, or any other form of block signaling that may be hereafter devised or used, if in the judgment of such commission it shall be made to appear that a controlled manual block, or a manual block, or a dispatcher's block, or any other form of block signaling now or hereafter devised or used shall reasonably conserve the safety of life and property, and whenever such order is made by the Railroad Commission and such other form of block signaling is installed, operated and maintained in obedience to such order it shall be taken and held as a full compliance with this act.

"Any person, firm or corporation, receiver or lessee who or which shall violate any of the provisions of this act shall forfeit and pay to the State of Indiana the sum of \$1,000 per

week for each week that trains shall be operated over any such railroad in violation of the act, the same to be collected by the Railroad Commission of Indiana by a suit in its name for the use of the State of Indiana in any court of competent jurisdiction."

METHOD OF ACCOUNTING OF FREIGHT CLAIMS*

BY O. I. DAVIS, LOCAL AUDITOR DAYTON, COVINGTON & PIQUA
TRACTION COMPANY

The reports of over, short, damaged, refused or unclaimed freight and the investigation of the same relate so closely to the subject of this paper that I cannot treat it as I should without also considering this phase of accounting.

To handle to advantage the work in any department of accounting proper forms of stationery must first be provided. Several kinds of O. S. & D. forms are used by different roads, but the best one that has come to my attention is employed by one of the larger lines where the investigation of O. S. & D.'s and claims is conducted by the superintendent of transportation. The form is printed on paper sufficiently thin to allow four copies to be made at one writing by the use of carbons. The original is sent direct to the superintendent, a copy to the auditor, a copy to the forwarding agent and a copy is retained by the issuing agent for his file. The reports are numbered consecutively throughout the year by the various agents. The auditor files the copies sent him in station order and can always refer to them if the original papers should become lost. The advantages of sending a copy to the forwarding agent are many, for in a number of cases the cause of "overs and shorts" is the result of error in billing. This can be adjusted immediately by correction. If, however, the trouble cannot be corrected by the forwarding agent he adds his complete forwarding record to the report and sends it to the superintendent for investigation. After the investigation is completed, the entire file is sent to the auditor to be held awaiting claim, or to swell the volume of correspondence, reports and the like with which our record rooms are already burdened.

I consider the following records necessary in each claim department: A claim record book in which each claim is entered in numerical order and a good index system. For a road having only a few claims a card index system would probably answer. In case the claims are numerous, a loose-leaf book, properly ruled, would be found much better, as several accounts may be kept on one sheet and many more accounts can be kept in one book than could be filed in two or three card index files. A stock letter containing the questions most used in investigating damage claims with agents and train crews is also of advantage. A blank claim statement or base, when properly filled out, will show at a glance the name and address of the claimant, the amount, the nature of the claim, whether for loss, damage or overcharge; billing reference, date entered, and the supporting papers attached to the file. It is very important that the claimant furnish the necessary supporting papers, including the original bill of lading, the paid expense bill and the shipper's invoice. The statement can be made in duplicate so that there is a complete record of the claim while the original papers are out of the office undergoing investigation.

Most of you no doubt are familiar with the loss, damage and overage rules adopted by this conference, Feb. 11, 1908. These are, so far as I know, sufficient to meet the present requirements of the roads interested. Several cases have come to my attention where a duplicate claim was presented for the same damage. This is possible if the shipper uses the original bill of lading and a copy of the expense bill, while the consignee supports his claim by a copy of the bill of lading and the original expense bill. In order to detect duplication, each claim number should be checked against the auditor's

record of the waybill. I believe the best way is to insert the claim number on the abstract of freight forwarded.

If the head of the claim department keeps a statement of "over" or "unclaimed" freight he will no doubt be able to fill some of the shortages for which claims have been made. He will also be in position to reply promptly to connecting lines which may trace him for shortages. When the volume of business is sufficient, it is of advantage to maintain an "unclaimed freight" wareroom at some central point to which all unclaimed shipments may be sent after they have been held the required length of time at the original destination. Shippers should be notified in case the destination agent is unable to make delivery. Better freight facilities and the training of agents and others directly concerned in the handling of freight will do much toward reducing the number of claims.

Regarding interline shipments, one of the conference rules (Rule 2, Loss and Damage) specifies that the carrier agent to which claim is presented shall place its claim-back on the papers. It is understood that the carrier that accepts the claim, whether it is presented by the shipper or the consignee, should handle the matter to a conclusion and make final report to the claimant, either paying or rejecting the claim. There may be a difference of opinion on this, but I contend that a claimant would prefer to deal with the company whose agent is located in his town. If the carrier against which claim is made advises the claimant that his papers have been sent to the company with which the shipment originated and that he should look to that company for payment it is sure to create dissatisfaction among claimants. I further believe that when the consignee presents the claim to the delivering carrier the investigation should first be made between junction point and destination; if the loss or damage is found to have existed at the junction point it is then proper to send the claim to the initial carrier. I do not think it advisable or necessary, however, to forward claims arising on interline shipments to the initial carrier without first ascertaining the condition of the shipment at the junction point. To do so often places an unnecessary claim in the files of the connecting line and unnecessarily delays the settlement of the claim.

The freight claim authorized or draft authority is generally used on all steam roads in the settlement of claims affecting interline shipments. Inquiries among the officials of the various electric lines develop the fact that very few of us are making use of this excellent plan in our claim departments. The draft authority simplifies this line of accounting, reduces the work to a minimum and, best of all, it is the speediest method of paying to the connecting line all or a portion of a claim in which two or more carriers are interested.

I now wish to speak of the advantage of prompt attention to freight claims. Delay in handling papers results in dissatisfaction among shippers and increases the work in the claim department of the lines interested. Unless the obligation is paid promptly the claimant is sure to trace for settlement; this necessitates a reply to him and an additional letter to the party who has the claim papers.

I find the long-haul or interline business is steadily increasing, as well as the number of local freight shipments because of the ability of electric lines to handle freight with greater dispatch than the steam railroads. The increase is gratifying, indeed, but it should not serve as an excuse for careless or tardy settlement of freight claims, for I believe the future freight business of the electric railways depends greatly on the treatment accorded the shippers. In many instances a flat declination of the claim would be far more satisfactory to the claimant (especially if he be a wholesale dealer) than a series of excuses and finally an offer to compromise for about 50 per cent. Freight claim agents should, in my opinion, deal as liberally with the claimants as the circumstances permit. This also applies to transactions between claim departments of the roads doing interline business. To haggle about the payment of an insignificant amount may do much harm and is surely a very poor advertisement.

*Abstract of a paper presented at the Central Electric Accounting Conference held in Springfield, Ohio, March 11, 1911.

PROPOSED CHANGES IN CLEVELAND ORDINANCE

The second meeting of the special committee of the Cleveland Chamber of Commerce appointed to investigate the needs of the Cleveland Railway was held on March 9, when statements were made by F. H. Goff, Henry J. Davies, secretary of the company; Andrew Squire, street railway commissioner; G. M. Dahl and others.

STATEMENT OF F. H. GOFF

Mr. Goff spoke in part as follows:

"The success of the Tayler plan, as I see it, necessitates the railway company being in a position now and throughout the grant to obtain funds in a large way for development and extension at reasonable rates.

"The possibility of continuing the rate of fare at 3 cents, if it can be accomplished, will necessitate the utmost economy in the operation of the property, which, as I now see it, can be best secured by providing for a sliding scale of return to capital proportionate to the successes and achievements of the management.

"To obtain the best results from the operation of public service corporations, as it seems to me, capital invested in them should be penalized for inefficiency and waste and rewarded for efficiency and economies.

"If the ordinance necessitates extravagance in financing, and I would regard a sale of a guaranteed stock at par and of a 5 per cent first mortgage bond at a discount as wasteful, the loss is going to fall upon the car riders and not upon the company.

"It is going to be contended, as I understand, that the ordinance permits the company to maintain additions and betterments only up to a standard of 70 per cent of reproduction cost, entailing, it is claimed, a loss of 30 per cent on all capital hereafter invested, and that this provision makes it impossible or unduly expensive to secure funds for these purposes. If this be true, as to which I express no opinion, the vital question is not what ought to be done to protect the interests of the railway company, but what ought to and must be done to protect the interests of the public by putting the company in a position which will enable it to secure necessary facilities without delay to take care of our rapidly increasing traffic.

"If it is true that by a fair construction of the ordinance a loss of 30 per cent will be sustained on all money hereafter invested, there can be no question that neither money nor needed improvements will be forthcoming. If I interpret the ordinance correctly, the railway company cannot be compelled to provide any additional facilities, and one of the important questions that may arise may be whether some amendment ought not to be suggested in the ordinance making the furnishing of needed facilities compulsory. However that may be, I am clearly of the opinion that it would not only be ineffectual but unconscionable for the company to invite investment of capital upon the terms prescribed in the ordinance, if the ordinance is subject to the interpretation claimed for it in the matters I have referred to."

STATEMENT OF ANDREW SQUIRE

Andrew Squire, of Squire, Sanders & Dempsey, counsel for the company, said, in part, in his statement:

"While you have cordially requested representatives of the street railway company, of the city and of the public to be present at your meetings, it seems to me that, except as represented by yourselves, the most important factor in the settlement of the street railway question has not been invited to take part in your counsels. By this factor I mean the conservation investor.

"There are some people who do not believe sufficient money for the purpose of the railway company can be attracted upon a 6 per cent basis. Judge Tayler believed that it could. This chamber believed that it could, and many persons connected with the street railway company so believed, and the time has not yet arrived when any other basis than 6 per cent can be considered, if it ever need be. However, a period of more than

14 months since the passage of the ordinance has demonstrated that the security of the property invested is not sufficiently safeguarded to attract the investor. By 'investor' I do not mean the casual person who may be willing to take his chances by buying stock in the Cleveland Railway Company, who may have faith in the management of the property, who may have faith in the city's protecting the property, and who may be able to invest a few thousands or even a few hundreds of thousands of dollars.

"The situation and the demands of the city for improved street railroad service and facilities make it imperative that the investor should be some person or some group of persons who can furnish millions of dollars almost immediately, and further millions as increased demands shall require. Such investors would view the property from their standpoint. They are generally represented by so-called leaders of finance, bond houses or bankers with large clienteles, who examine into the merits of each investment.

"How will an investment in the securities of the street railway company stand investigation? The company has recently sold, or contracted to sell, \$5,000,000 of bonds, the proceeds of which are to be used in retiring \$3,150,000 of bonds maturing on Jan. 1 next and the floating indebtedness of the company. When the aggregate of this indebtedness shall have been retired a small amount of money may be left to put into betterments. Five million dollars more of bonds mature March 1, 1913, and probably will have to be retired by the sale of additional bonds. The sale of these \$10,000,000 of bonds, therefore, is practically the substitution of a new indebtedness for an old one. The mortgage securing the bonds, in order to meet the views of the purchaser of the indebtedness, contains conditions intended to protect the security for the outstanding bonds and all future bonds to be issued under this same mortgage. The stockholders of the company who have investigated the ordinance of December, 1909, are convinced that any substantial increase of indebtedness is made at the expense of the value of their stock, and the board of directors cannot be expected to continue to sell bonds and increase the indebtedness when by so doing the value of the stock would be diminished; so that, under the present ordinance, after the present indebtedness shall have been refunded the only available resource for new money is the investor. The only thing which the company has to offer to the investor is its stock at par, the security behind that stock being the property of the company and the ordinance of Dec. 18, 1909.

"The investor, when he looks to the perpetuity of the property and the security of his principal, will find that on May 1, 1934, all rights of the company in the streets of the City of Cleveland terminate and that the city has the power to do what has been done, to wit: order the company to take its property from the streets. He will not rely upon the moral obligation of the city to continue his property in the streets upon some fair basis, and he will look in vain for a legal obligation so to continue it. He will be advised that there is no absolute safeguard in Sections 35 and 36 of the ordinance, which sections provide that at the end of the grant the city may, if it desires, purchase the property, but it is not obliged to do so and could not be obligated to do so; and, even if purchased, he will be advised that the purchase would in all probability be made at a price far below the amount of the capital value. He will be advised that Section 37, which provides, in substance, that if the city grants a franchise to any other person or corporation to operate a railroad over any of the then existing lines of the company the city shall require such new grantee to purchase the property of the Cleveland Railway Company at the depreciated price provided in Sections 35 and 36, has no legality whatever; that at most it is a moral statement made by the Council of 1909 that cannot bind the Council of 1934 or any grantee not choosing to be bound by it. He will be further advised that any stock he may purchase to-day is on a parity with the present outstanding stock, and that there is no provision made in the ordinance to amortize several millions of value; that there is no provision to keep the property from depreciation to the

extent of at least 30 per cent of its value. In fact, the investor will look at all of the other defects in the present ordinance and weigh them carefully before making his investment.

"So far as I have talked with investors having some ability to furnish the money required, they have said to me that the city should willingly amortize the franchise value; that there should be no difficulty in arranging that the property be kept up to its par value, either by keeping it in a condition to be worth 100 per cent or by allowing a maintenance and reserve or depreciation fund to go into additional extensions and betterments, so that the full value of the property shall be maintained; that so long as the stockholder is limited to 6 per cent upon his stock the city, having supervision, should not hesitate to permit its representative to allow the fare to be increased to any rate that will enable the company to earn the 6 per cent and preserve and protect the property; that they are exceedingly doubtful about the maximum rate specified in the ordinance providing such a return, and that it should be abolished, the city receiving its protection from the fact that the stockholder can never get more than 6 per cent; that there is no way of insuring to the investor on May 1, 1934, the return of his principal except to allow the railway company, during the last years of its grant, to charge any rate of fare necessary to recover so much of his principal as will leave him protected in the remainder of it by the value of the property of the company.

"The present ordinance provides that, within the limitations of the grant, whenever the ordinance has less than 15 years to run the company may charge the maximum rate of fare. There is no special virtue in 15 years. It might be 12, possibly as small a number as 10, but the investor must have the right in those last years to withdraw a substantial percentage of his investment, or his investment will be seriously imperiled. The city can always protect itself against any such increase in fare by keeping at least 15 years of the grant alive."

STATEMENT OF HENRY J. DAVIES

Henry J. Davies, secretary of the company, said, in part:

"The interests of the city and the company under this franchise seeming to me to be mutual, as Judge Tayler intended that they should be, it will not be difficult, I think, to show that the amendments desired by the company will, if made, be to the advantage of the city as well as to the advantage of the company, or, at least, will not operate to the disadvantage of the city. Some of the respects in which the interests of the two parties to this contract are mutual are these:

"1. That the capital liabilities of the company represent actual value. The city has the right under the franchise to purchase the property of the company if the State ever authorizes the ownership of street railway properties by municipalities at a price fixed in the franchise—a price not only equal to but in excess of the capitalization. It is to its interest, therefore, that the value of the property be somewhere near the price to be paid. The franchise gives the city another and a different right to buy—the right to buy, at the grant's termination, at a price to be agreed upon or to be fixed by arbitration plus a bonus of 10 per cent. This price is to include the value of the physical property only—and not all of that, for the cash in the interest fund is to be excluded, and, as I read Section 36, part at least of the value of pavement paid for by the company is also to be excluded. It is to the interest of the company, therefore, that the property at that time be equal in value to the total capital obligations of the company.

"2. That the property of the company be kept in good condition, thorough repair and working order. This is in the interest of the city because of the provisions of Section 32, reserving to the city the right to buy the property at the capital value plus 10 per cent, and because a good road is essential to good service. It is in the interest of the company because of the provisions of Sections 35 and 36, under which it may be required to sell at the appraised value of its physical property.

"3. That operating expenses, taxes and interest charges—in other words, the cost of running the road—be as low as pos-

sible consistently with good maintenance and good service. The city desires this because low cost means low fares for the car riders, the company because the rates of fares which it may charge are limited, and if the cost of running the road exceeds the maximum rates of fare permitted by the ordinance the excess must come out of the dividends of the stockholders.

"4. That each party to the franchise contract be just to the other.

"Having in mind this mutuality of interest in these and other respects the company asks simply that the ordinance be so amended as to protect the principal of the investment of its stockholders and bondholders, to the end that if the company be compelled to sell to the city within the lifetime of the franchise it may, in justice to the city, give to it a property worth the price that the city must pay or that, if it be compelled to sell to the city at the end of the grant, it may, in justice to its stockholders and bondholders, receive for its property a price equal to the capital value defined by Section 16 of the ordinance. This is all."

STATEMENT OF G. M. DAHL

Street Railway Commissioner G. M. Dahl read a statement in which he asserted that the city is not adequately protected in certain features. He believes that the city should have the right to initiate improvements and that any franchise which is dependent upon the company in this particular will be a failure. The city should have the right to pass upon maintenance and renewals, he said, and should be represented in any arbitration with the employees, should arbitration be necessary. Mr. Dahl stated that the inability of the company to market its securities was a mark of weakness in its franchise and that something should be done to relieve the company from the interest that is being paid upon the interest fund which it was compelled to borrow when it took the properties over. The interest paid on the fund is at the rate of 6 per cent and taxes are 3 per cent. Interest received from the banks is 4 per cent, so the company is losing 5 per cent interest on the money. He intimated that a provision should be inserted in the grant that would allow the suburban villages the same fare as is enjoyed within the present limits of the city, whenever they are annexed.

Chairman Hitchins, of the street railway committee of the City Council, stated that the franchise does not represent what was intended by Judge Tayler, as those who were close to him know. He asked that the grant be interpreted by attorneys.

Peter Witt, city clerk during the Johnson administrations, suggested that the city do away with the office of street railway commissioner and save the company \$50,000 a year, adopt a sliding scale of income on the stock, based upon economical management, and make the safety of the investment unquestionable. Then the problem of securing funds and the economical management of the property would be solved. Mr. Witt, however, said that it would be impossible to induce men to purchase stock if they believed they would get back only 70 per cent of what they paid for the stock.

Commissioner Dahl said that 200 cars are needed now and that \$2,500,000 should be invested in improvements in power. James A. Garfield asked him what security would be required to make the investment safe. An automatic renewal of franchise was suggested by Mr. Dahl as one plan and restrictions that would cause the city to act upon renewal quickly was another. If the service was poor, he would have the city empowered to nominate a purchaser. He said he believed that 30 per cent loss was an unreasonable probability.

On the evening of March 6 a resolution, presented by Mr. Hitchins, chairman of the street railway committee, was adopted by the City Council giving the company authority to sell \$5,000,000 of its bonds at 97.

Chairman Hitchins introduced a resolution on March 6 increasing the operating allowance from 11½ cents to 12 cents per car mile in order to offset the increased wages of the motormen and conductors. The matter has been referred to the street railway committee. Councilman Burke has presented a resolution calling upon the street railway commissioner to abolish the fine of 3 cents levied upon conductors for accepting

transfers which are punched incorrectly. This question was also referred to the street railway committee.

ELECTRIFICATION PLANS IN AND ABOUT BOSTON

Comprehensive plans for the railroad development of Boston and eastern Massachusetts are embodied in a bill coming from the New York, New Haven & Hartford Railroad on which a hearing was given Thursday, March 9, by the committee on railroads and metropolitan affairs sitting jointly. The acquisition by the Boston & Maine of the Boston, Revere Beach & Lynn and the acquisition by the New Haven of the Boston & Providence; the construction of a tunnel, to be known as the "Boston Tunnel," under the harbor from a point between the South Station and the Back Bay Station to East Boston, and the establishment of a through electric service from Readville on the south to Beverly on the north as a first step in a scheme of much further extension of electric service, all this to be effected within four years, are the principal points in the proposed legislation.

Vice-president Timothy E. Byrnes of the New Haven and Boston & Maine railroads presented the railroad's views. Mr. Byrnes outlined graphically the possibilities from electrification of existing and new roads and said in part:

"Logically the great trunk-line route for one of the most intensely developed traffic areas in the United States runs northeasterly from New York along the shore of Long Island Sound, traverses Rhode Island and southeastern Massachusetts, passes through the heart of Boston, and thence proceeds by a second 'Shore Line' onward through Lynn, Salem, Beverly, Newburyport and Portsmouth to Portland and beyond. All the way this is the line of the lowest grades and the greatest population. These conditions invite the highest type of transportation development.

"By means of the Boston Tunnel the several other lines entering on the north are made to share the benefits of direct connection with the great longitudinal routes. Defective and unrelated terminals have kept these lines upon a plane of low efficiency. Their development under the new conditions will be of the highest order.

"Along the eastern New England seaboard lie two great regions of dense population and intense industrial development. One centers about Narragansett Bay; the other, and the greater, about Massachusetts Bay. These two huge industrial districts together form the great eastern New England belt of intensive manufacturing and commercial development.

"The transportation axis of this belt is coincident with the main railroad line between Providence and Boston and the original course of the old Eastern Railroad. The line from Providence to Beverly by this route is practically as direct as topographical circumstances will permit.

"First may be considered the relation to the service now performed by the Boston, Revere Beach & Lynn Railroad. With electrification there will be great improvement over the present service. The frequent express train service to be installed to and from Lynn for the Revere Beach route will immensely improve the transportation facilities of that city. The popularity of the great metropolitan pleasure resort at Revere Beach will correspondingly advance, while the development of the Winthrop shore and of Nahant, Lynn and Swampscott beaches may be expected to compare with Brighton and other English watering places.

"Winthrop, Revere and Lynn will also benefit greatly from the connection with the South Station by way of the tunnel under the harbor built to parallel the existing East Boston tunnel. The quicker transit than that by way of the ferry will well be worth the additional fare. With the Railroad Commission empowered to determine the just rate for this additional fare through the tunnel the amount cannot be excessive at the most.

"In terms of transportation greater Boston will practically be extended to Cape Ann by the swift transit facilities planned for the entire region. This means a fairly marvelous acceler-

ation in population and industry for this great region, which beyond Lynn includes Swampscott, Marblehead, Salem, Peabody, Danvers, Beverly. The electrification of the Gloucester branch must soon follow as a matter of course.

"This improvement should effectively promote the transatlantic passenger and freight business from Boston. At present the Cunard company and other steamship lines that dock at East Boston complain of the handicap upon their business imposed by the inadequate ferry service. With a tunnel under the harbor passengers could be landed with their baggage at a suitable station near the East Boston docks directly from the South Station.

"By taking over the Revere Beach road and making rail connection with the piers in East Boston, the great export traffic from the West and the Canadian Northwest is given opportunity for convenient and unobstructed access to the dock system, which on that side of the harbor is capable of enormous expansion. The marine terminals of the Boston & Maine at the Mystic River and the Hoosac Tunnel Docks are so limited that room for expansion must be provided. East Boston will offer, with this tunnel connection, exceptionally good facilities for ocean traffic from all the railroads entering Boston.

"The contemplated tunnel under the harbor, available for freight as well as for passenger service, likewise has a bearing upon the development of the Commonwealth's water front at South Boston as well as East Boston. The physical connection thus effected across the harbor co-ordinates the two water fronts and should make each more accessible from the other.

"The task of steam line electrification for metropolitan Boston goes far beyond anything that might be looked for in a strictly metropolitan scheme of electrification; that is to say, a scheme practically restricted to the limits of the metropolitan district. As a piece of main-route electrification it achieves with efficiency and economy the ends aimed at. Undertaken immediately upon the giving of legislative sanction, the work will be pushed as rapidly as possible to completion. The entire task would be taken in hand all of a piece, so that with the finishing of the tunnel under the harbor there would also be completed the electrification of the Revere Beach property, including the Winthrop loop; the newly restored line of the Boston & Maine from Revere Junction into East Boston, its connection with the tunnel and its electrification to Lynn; the costly work of adapting the lower level of the South Station to the requirements of this service and the electrification of at least two tracks of the Providence line as far as Readville. With the exception of the double track tunnel under the harbor there will be a continuous four-track electrified line all the way from Beverly to Readville. The conditions are most favorable for the intensive form of traffic that electric traction is best adapted to serve. Under such conditions a service of high frequency at certain times of day could easily be maintained throughout the entire route."

The work outlined, Mr. Byrnes thought, could easily be completed in four years and he was willing that that time limit be fixed by the bill.

Eight pages of the Springfield (Ill.) *Record* of Feb. 28, 1911, were devoted to a description of the properties of the Illinois Traction System. The subjects were "The McKinley Bridge, St. Louis," "Illinois Traction System, Equipment and Power Shops," "Terminals," "Safety," "Stations, Bridges and Buildings," "Illinois Valley Scenes," and "The Road of Good Service," and to each of these a page was devoted. The first page contained a portrait of W. B. McKinley, president of the Illinois Traction System. There also were portraits of George M. Mattis, vice-president and treasurer of the system, and H. E. Chubbuck, vice-president executive, and biographies of these officials. The article "The Road of Good Service" contained a map of the Illinois Traction System and a group picture which showed the operating and traffic officials of the system and the superintendents.

THE TRAVELING AUDITOR *

BY A. J. WHITE, TRAVELING AUDITOR OHIO ELECTRIC RAILWAY

I desire first to speak of the traveling auditor's opportunities: First, he has a great opportunity for creating a willing service on the part of agents; second, the opportunity of gaining the good will and respect of agents; third, the opportunity for using his eyes and ears in a thousand and one ways. Too often the traveling auditor has a wrong conception of what is essential in dealing with agents, and he goes along groping his way and failing to achieve the most important things in his work, namely, creating a willing service and getting the good will and respect of those with whom he necessarily deals.

The traveling auditor should feel for the shortcomings of others and keep the conviction strong in his mind that every educated person should be able to keep an intelligent account of the things intrusted to him, but that such a person should also aim to present the accounts in such simple form that their keeping shall come within the apprehension of any mind of ordinary intelligence. With the right principle in the mind of agents, experience will readily suggest the proper manner of handling an account.

AGENCY ACCOUNTS

The first duty of the traveling auditor in his checking agencies is to impress upon agents the importance of the cash book and of having an absolute balance of his cash daily. This in itself locates errors of any description in his account because it entails the listing of uncollected bills and all items, such as overcharges, unrefunded and prepaid beyond unpaid. This impressed on an agent's mind and carried out by him leaves him little room for any serious errors in so far as his freight account is concerned.

Next in importance is the instruction as to the making of bills of lading, waybills forwarded, freight received and freight forwarded, reports and balance sheets and the proper filling of these documents. Too much stress cannot be laid on the importance of complete files placed in such manner that every document may be found with the least work. Then, too, the changing of agents at different periods makes it difficult for new incumbents to locate documents unless they have been filed properly.

On our line at all our larger agencies the progressive number system is used on all inbound waybills and cash book entries are made from progressive reference instead of waybill reference. In this way the freight receipt for any shipment will always be found filed in progressive number order by dates of delivery as shown in cash book carried to the freight received abstract. Hence in tracing for delivery of any shipment it is necessary only to go to the freight received abstract and secure the date of delivery, which gives you the key to the file. The proper filing of copies of O. S. & D. reports, corrections, circulars and tariffs for ready reference is also important. In fact, I believe a perfect file makes any agency practically immune from serious trouble. Therefore, it should be the aim of the traveling auditor to watch closely, and from time to time make suggestions that will improve any existing system of files and then to see that instructions are carried out. Talks with agents as to method of checking freight from cars, loading freight to cars and general matters of this kind, including passing record of overhead freight, bring good results, as sometimes the agent has the faculty of teaching the traveling auditor a thing or two. With these fundamental ideas inculcated in the minds of agents the hard part of the traveling auditor's life is in a measure ameliorated.

TICKET ACCOUNTS

Ticket accounts constitute an important part of the traveling auditor's duties. It is his duty to go to the agencies at odd times. Never under any circumstances should he make his visits for checking stations uniform as to time. After he has learned the dispositions and habits of the men he is in position to know when it is best to visit any certain place. I have

found that this system gets the dishonest man when all other methods fail. A study of the different methods of covering dishonest ticket transactions is a splendid thing for him. For instance, the measuring of a man, his method of work, manner of keeping accounts, etc., gives the traveling auditor his cue for proper visits.

The traveling auditor should scrutinize all tickets in the ticket case, watching closely for rear end and middle work. When an agent is working with a conductor tickets given to the agents by the conductor are placed in the ticket case for early sale and as often for late sale, so that the fellow who is here, there and everywhere has each individual between the devil and the deep blue sea as to any knowledge of when he might drop in. It is a good practice for the traveling auditor to time his visits for odd hours and let the other fellow do much more guessing than he.

Another important thing in ticket accounts at agencies is the changing of tricks from day to night men. Our system is to open a book, much of the same nature as a ticket book, writing destinations and all ticket forms once and carrying daily sales of the day and night men together with the cash on hand by each man. This is a thorough check to fix responsibility for shortages, and at the same time is a check against the ticket book itself as to total sales each day. It is necessary for each man to O.K. his trick with total sales and cash on hand, which in turn is O.K'd by the agent in the morning of the following day. This works very well and I have less trouble in fixing responsibility for shortages than on any other line for which I have worked.

It is also a good habit to drop into agencies at various times and look over things generally without a check of the station. This keeps the traveling auditor up to date and also permits him to give agents such instructions as may seem necessary. At the same time it is wise to open at random and to look into all drawers, safes and compartments of same.

COUNTING CASH—INSTRUCTING AGENTS, ETC.

The traveling auditor should never, unless absolutely necessary to take charge of a station, count the cash himself. He should require agents to count the cash from drawer and tabulate and have the agent count back into the cash drawer. This works admirably, as there is never a question of a shortage between the traveling auditor and an agent. It is just to the agents that all persons keep hands off the money, and the agents are, as a rule, better satisfied.

The traveling auditor in the short time allotted to him at stations in making transfers has insufficient time to explain thoroughly the entire business to a new incumbent. Hence, it is necessary, especially on electric lines, to go back from time to time and coach the agent, as it were. It is too bad that experienced men cannot always be secured to fill vacancies as on steam railroads, where men are promoted from small agencies to larger ones, and grow up with the business. On our line this mode is meeting with more favor as we grow. In a great measure promotions are being made from the ranks. I am heartily in favor of promoting those who are making good. It has a tendency to keep down shortages on account of the known reliability of the men promoted and also creates a loyalty not to be measured by dollars and cents. The placing of unknown quantities in agencies causes more shortages than anything else. I believe also that superintendents should consult with the accounting department in making changes at agencies. The chances are that then fewer mistakes will be made in appointments, as the accounting department has a general line on agents. On our line the auditor and traveling auditor keep in close touch with the superintendents, advising with them from time to time.

It is the duty of the traveling auditor to instruct the agent as to the exact meaning and result of each thing that he does. First comes the proper explanation of the first step in handling freight, namely, the bill of lading and the importance of securing the signature of the shipper; then numbering the shipping order consecutively with waybills; next the explanation of what a waybill means and its importance—that a waybill is the car-

* Abstract of a paper presented at the Central Electric Accounting Conference held in Springfield, Ohio, March 11, 1911.

rier's note in hand against receiving agents for so much money and so much merchandise—the importance of reporting every waybill received on day of receipt, whether the freight covering the same has arrived or not.

The traveling auditor should ever keep before him the chance for suppression of waybills by an agent. This, of course, needs the co-operation of two or more men; one man cannot suppress a waybill alone. The traveling auditor's ingenuity is often taxed to catch up with this kind of work and unless (especially in carload shipments) all employees are instructed to report the movement of all cars there is a chance of revenue escaping for a time through the connivance of freight crews and agents. The traveling auditor must also watch very closely such miscellaneous collections as car service, switching, freight storage, etc.

In the making of "over, short and damaged" reports, the receiving agent should send a copy of the O. S. and D. to the forwarding agent, to the superintendent and to the auditor. This completes a chain of investigation that must result in a reduction in the number of claims.

In the collection of freight it is perhaps unfortunate that such a thing as a credit list exists. If it could be dispensed with a source of trouble could be avoided, as it is possible for an agent to cover up a shortage in his account by manipulating his uncollected bills. Any large number of uncollected bills on hand means that it is the traveling auditor's duty to verify by collection and visits to consignees.

Some lines have a daily report of business; others, weekly, semi-monthly and monthly. Advocates of each, of course, stick to theirs as the best. All are good and we could all use some of the good things of the others. On our line we use the daily reports on freight, a memorandum daily report on ticket sales and a monthly ticket report and balance sheet or account current.

Another thing that requires continual watching is the kiting of bank accounts; in other words, when agents bank the company's money and check against it for daily remittance. I have had a half-dozen shortages (in no case losing a cent) where an agent would draw checks on a bank and fail to deposit, this being made possible because the checks went to foreign banks after having reached the cashier of our company. Of course, as soon as I reach a station where the check system is used a balance of the bank account is made at once and special supervision is made of these agencies.

ASSISTING CONDUCTORS

The traveling auditor should make it his business to help the conductors in their difficulties. The fact is that nowadays conductors on electric lines are expected to do so many things in the way of keeping records, detaching cash fare receipts, watching dates on tickets and keeping in touch with all passengers boarding cars and watching their orders that fares are missed many times. Since I have been on the road I have picked up hundreds of passengers who had escaped the conductor's eye by some subterfuge or other. By calling the conductor's attention to the matter fares have been collected or tickets lifted.

We are all more or less lame in respect to conductor's cash fare receipts as we make the passenger the auditor for the company. I am sorry to say that a goodly percentage of passengers will assist the conductor in pilfering instead of assisting the company by reporting. Personally I would like to see the straight steam line cash fare receipt in use on electric lines as the re-tearing of one of these means the increasing of the amount collected from the passenger, and it is the best proposition I have seen.

At the meeting of the Central Electric Accounting Conference at Springfield, Ohio, on March 11, A. F. Elkins was elected president. Mr. Elkins is auditor of the Columbus, Delaware & Marion Railway, Columbus, Ohio. Walter Shroyer, auditor of the Indiana Union Traction Company, Anderson, Ind., was elected secretary and treasurer.

ENGINEERING MEETING IN NEW YORK

A meeting of the American Electric Railway Engineering Association's committee for conference with the American Society for Testing Materials was held in New York on Wednesday, March 15. Those present were: W. J. Harvie, president of the association; Norman Litchfield, secretary-treasurer of the association; John Lindall, superintendent rolling stock and shops Boston Elevated Railway; Martin Schreiber, engineer maintenance of way Public Service Railway, and H. H. Adams, superintendent of rolling stock and shops Metropolitan Street Railway, New York, who was present to assist the committee.

Mr. Litchfield, who had been appointed to open negotiations with the American Society for Testing Materials, reported that he had conferred in Philadelphia on Feb. 6 with Edgar Marburg, secretary of the society. Mr. Marburg suggested that the Engineering Association should appoint representatives for joint sub-committees on specifications for steel axles, rolled-steel wheels, steel rails and wrought iron. On such sub-committees the two or three representatives of the Engineering Association would have a single vote in the name of the association, but should they join the society each man could vote separately. The secretary of the Society for Testing Materials suggested that J. S. Doyle, superintendent of equipment Interborough Rapid Transit Company, be appointed a member of the axle specification committee with a view to becoming its chairman. Mr. Marburg advised that the specifications on steel wheels practically were ready. He said also that the Testing Society desired to have the four specifications previously mentioned ready for presentation at its annual meeting to be held next June.

On motion it was decided that the chairman of each standing committee should be instructed by the president to select sub-committees, each consisting of not more than three members, to serve on those sub-committees of the Testing Society which are considering subjects in which his standing committee is interested. The appointments are to be confirmed by the president, and one member, at least, of each sub-committee is to be a member of the standing committee in question. Each sub-committee is to cast one vote to represent the American Electric Railway Engineering Association in the sub-committees of the Testing Society.

The secretary was instructed to explain to the chairmen of the standing committees that arrangements have already been completed by which the Testing Society will appoint on the sub-committees the representatives of the association as above indicated. The secretary will also notify the several chairmen of the different subjects under consideration by the Testing Society for the current year.

Upon the completion of his appointments the chairman of each standing committee is to notify the secretary of the Engineering Association, so that the latter may arrange with the secretary of the American Society for Testing Materials to commence active work.

The subject of heat-treated axles will be referred to the committee on heavy electric traction with instructions to appoint a sub-committee. In like manner the question of wrought-iron bar specifications will be referred to the committee on equipment.

In regard to the rolled-steel wheel specification it was suggested that the secretary notify the chairman of the committee on equipment that this matter is now being taken up by the Testing Society and that he can take action toward co-operation if he considers it desirable. The chairman of the way committee will likewise be notified that the question of steel rail specifications is open for joint discussion.

The meeting then adjourned.

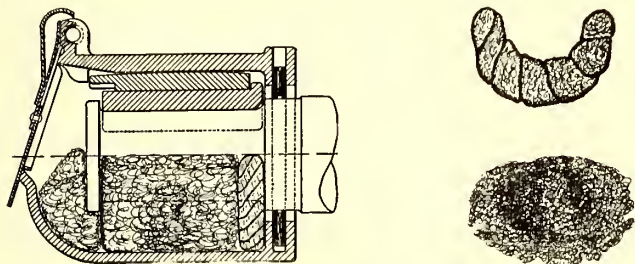
The American Electric Railway Association's committee on the location of the 1911 convention will meet at the Blackstone Hotel, Chicago, Ill., on Friday, March 24, at 9:30 a. m.

SCIENTIFIC LUBRICATING METHODS

The Galena Signal Oil Company publishes on a 14-in. x 22-in. card for distribution in electric railway shops some valuable information on how to prepare and apply lubricating materials. In order to give these instructions a wider circulation, they are reproduced herewith in the following paragraphs and the accompanying drawings:

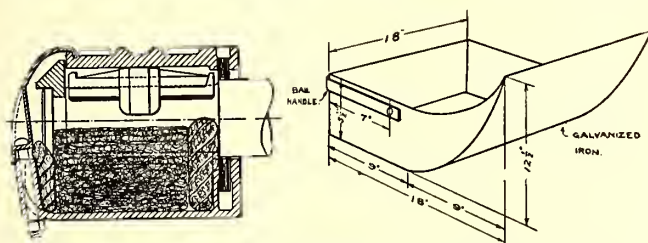
INSTRUCTIONS FOR THE PREPARATION OF PACKING FOR JOURNAL
BOXES

First: The waste should be loosened up and submerged in the soaking tank for about 48 hours. Then drain or press off



Figs. 1, 2 and 3—Proper Method of Packing; Twisted Packing for Back of Box and Loose Packing for Rest of Box

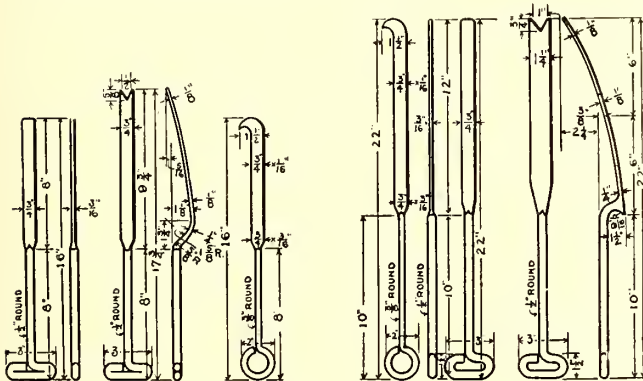
the surplus oil, allowing sufficient to remain approximately to equal four pints of oil per pound of dry waste, when the packing will be ready for use. To obtain proper saturation and draining, it is absolutely necessary that a temperature of not less than 70 deg. be maintained in the oil room at all times. After preparation, if the waste is gently squeezed in the hand



Figs. 4 and 5—Method of Packing Small Boxes; Floor Pan Which Serves to Catch Drip When Packing Boxes and to Carry Packing Tools

and does not show oil it is proof that it has been pressed too hard or drained too long. It should not be used but returned to the tank for re-saturation.

Second: The packing placed in the journal box first should



Figs. 6 and 7—Steel Packing Tools for Small and M.C.B. Journal Boxes

be in the form of a roll pressed out moderately dry and packed tightly around the back end of box, for the purpose not only of retaining the oil, but also better to exclude the dust, as shown in Fig. 2. To obtain satisfactory results strict attention must

be given to the condition of the dust guard in the back of the box before inserting the packing.

Third: Then proceed to pack the box with loosely formed packing under the journal, as shown in illustrations Figs. 1, 2 and 3, sufficiently firm to avoid the settling which is caused by shocks when the car is in motion. Pack it more lightly on each side of the journal, to avoid the wiping effect produced when waste is pressed too tightly between the journal and the side of box. The height of packing should not extend above the center line of journal and not beyond the inside of collar, as indicated in Fig. 1. This will avoid bad results caused by an excess of packing and by packing the boxes too tightly.

Fourth: The portion of packing placed between the end of the journal and the front end of the box, being the last which is put in the box (shown in Fig. 1), should have no thread connection with the packing under or on the side of the journal, and it should not extend more than $\frac{1}{2}$ in. above the lower edge of the collar. This packing affords no means of lubrication to the journal, but prevents the packing on the sides and under the journal from working forward out of the normal position for satisfactory service.

Fifth: In boxes using check plates pack to the outer edge of the groove in the journal for holding check plate in place. After putting in check plate, roll packing and pack tightly in front of collar. See Fig. 4. See that the opening in the check plate is larger than the diameter of the bottom of the groove in the axle.

CARE OF PACKING IN JOURNAL BOXES

The most important part of the work for successful lubrica-

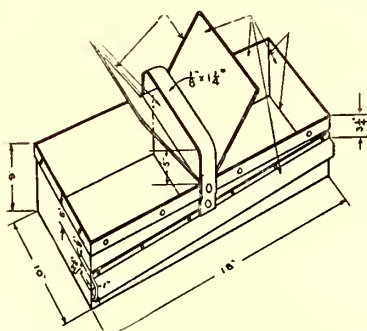


Fig. 8—Galvanized Iron Carrying Box for Waste and Tools

tion is intelligent attention to the packing in boxes on equipment in service. Briefly it consists of lightly loosening up the packing on each side of journal to avoid the hardened and glazed condition which is caused by the packing remaining too long in direct contact with journal. This work can be effectively accomplished by the use of a good steel tool, which should have a sharp V-shaped

end, as shown in Figs. 6 and 7, to secure a free flow of oil from packing to journal.

Cars in the shops for general repairs should have the packing removed and the boxes repacked with freshly saturated

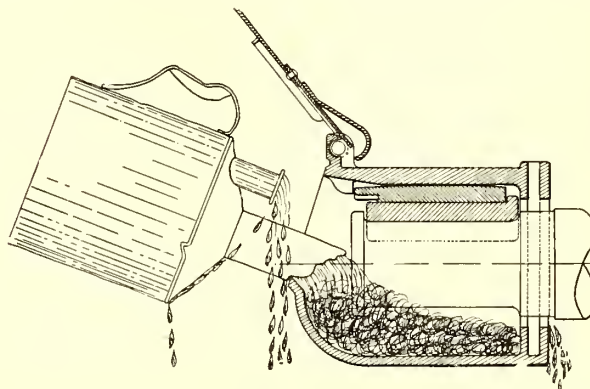


Fig. 9—An Example of Improper and Wasteful Oiling Practice

packing. Packing removed should be repicked, cleaned and re-saturated for future use. This work should be done when inspection shows it necessary. The object is to maintain an elastic condition of the packing.

Brasses should not be transferred from one journal to another. Before applying suitable-sized brasses the journal and the surface of the brass should be cleaned and oiled with Galena car oil. Where M. C. B. brasses using wedge or key are employed, they should be examined carefully before going into service to see if the key and wedge are a proper fit and work correctly together. All lumps or uneven places should be carefully removed before installing. The brasses should not be allowed in service when they are worn down to 3/16 in. thickness, as the dross metal then becomes exposed to contact with the journal and hot bearings result. Check plates should be carefully fitted and frequently examined. The lids of journal boxes should be kept tight and in good repair. Broken check plates should not be allowed to remain in service.

In case of a hot box when the car is at a distance from the shops and the journal cannot be jacked up to install a new brass, all old packing should be removed and the box repacked with good saturated packing. In case of a hot box when it is possible to run the car to the shop, the box should be jacked up, the brass removed, the journal thoroughly cleaned, a new brass installed and properly repacked. If time and facilities will not permit this proceeding, it is well to have an emergency brass convenient, lined with some soft metal to assist in cooling the journal until the car can be properly attended to. When necessary the dust guard should be replaced. All new and good second-hand journals should be protected from rust by the use of center-plate grease.

A floor pan made of galvanized iron with a folding down handle in the middle and a bevel shape at one end to insert in the bell of the wheel under the journal box when packing or emptying the journal box will be found a handy and economical tool in the car house to keep oil off the wheels and floor, and it can be used to carry packing and tools. A convenient size is 16 in. long, 16 in. wide, 3 in. deep, bevel 4 in. from end. Fig. 8 shows a carrying box for waste and tools made of No. 22 galvanized sheet iron with all corners soldered.

MOISTURE-PROOF TELEPHONE CORDS FOR RAILWAY TELEPHONES

The Western Electric Company has recently developed a new line of telephone cords designed especially to meet the severe conditions common to electric railway work. The construction of these new cords is different from that of the standard cords now in use, the most radical change being that the insulation of each conductor is treated with a moisture-proof compound and that each conductor in the cords which are subjected to the greatest wear is reinforced with copper wires. For example, each of the two conductors in the No. 408 receiver cord consists of a number of strands of the best tinsel reinforced with six strands of copper wire. The conductors are made up with an improved twist, and with the copper wires a great amount of strength is added to the cord. Each conductor is wrapped with a covering of wool which has been saturated with a waterproof asphaltum solution. Over this is placed the conductor braid of mercerized cotton, and the entire cord is then inclosed in a special external braid of a high grade of mercerized cotton.

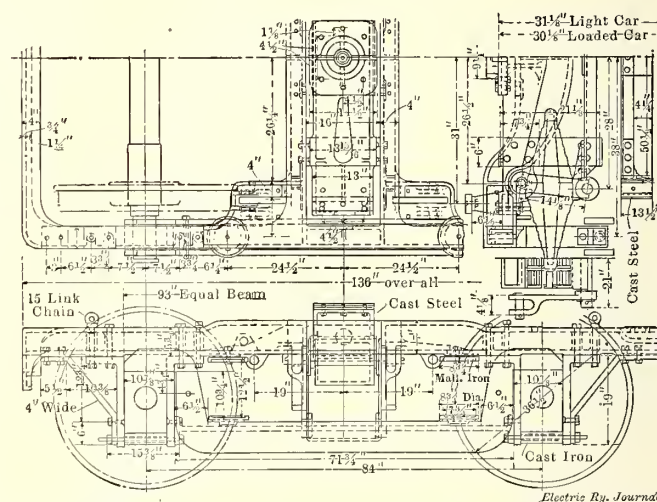
This construction insures a flexible, moisture-proof cord, with long life and increased strength throughout. These cords are made in standard lengths, consisting of one, two, three and four conductors for use as receiver, transmitter and extension cords in connection with the various types of desk stands, transmitter arms and flexiphones.

On account of the increase of its rolling stock the Sheffield City Council has decided to erect a new car house, to cost about £26,000. The new structure will accommodate about 100 cars and will save a large amount of mileage on account of its convenient location.

CAST-STEEL MOTOR TRUCKS FOR THE SOUTHERN PACIFIC COMPANY

In the *ELECTRIC RAILWAY JOURNAL* for Oct. 22, 1910, there was illustrated and described an electric motor truck, built by the Baldwin Locomotive Works for the Southern Pacific Company. This truck had forged iron side frames and steel channel transoms, and was one of an order for 130 motor and 120 trailer trucks recently completed for the Alameda electrification of the Southern Pacific Railroad. This order included 10 motor and 10 trailer trucks, which are equipped with cast-steel frames; and one of these motor trucks is the subject of the accompanying illustrations.

Like the previous examples, this truck is built for standard gage track, with a wheel base of 84 in., and is designed for a center pin load of 35,000 lb. It is of the equalized pedestal type and weighs, without motors, 15,275 lb., or practically the same as the truck with forged frames. The motors are inside hung and arranged for nose suspension. The side frames, end frames and transoms are of steel, cast in one piece. Special attention has been given to providing a light yet strong construction and to arranging the frames so that a minimum amount of finishing and fitting will be necessary. With this end in view such parts as the lugs for the swing link and brake hanger pins are cast in one piece with the truck frame.



Side Elevation and Half-Plan of Cast-Steel Truck for Southern Pacific Company

The transoms are deepened at the center in order to provide ample strength and rigidity.

The pedestals are of forged iron, machine-fitted to the frames. The inner pedestals are tied together by a horizontal brace, while the outer pedestals are braced to the frames by diagonal members. The center truss members and usual filling castings are omitted in this design. The bolster is of cast steel and is suspended on wrought-iron swing links. The bolster springs are triple elliptic and are carried on cast-steel spring seats. The equalizing beam spring seats are of malleable iron. The center plate is a steel casting bolted in place.

The wheels are steel-tired, with cast-steel centers, and measure 36½ in. in diameter. The axles are of Taylor iron, with 5-in. x 9-in. journals. The wheels and axles were assembled by the Standard Steel Works Company.

The 10 trailer trucks, with cast-steel frames, are generally similar to the motor trucks described above. The wheel bases are the same and the bolsters used in the two classes are interchangeable. The trailer trucks are designed for a center pin load of 32,000 lb.

These trucks are of interest because of the extensive use of cast steel in their construction and also because they illustrate an increasing tendency to use a minimum number of separate parts and thus dispense with fitting where possible. They will run in regular service with trucks of the usual type.

News of Electric Railways

Program of Meeting of Central Electric Railway Association

The following program has been announced for the meeting of the Central Electric Railway Association which is to be held at the Hartman Hotel, Columbus, Ohio, on March 23, 1911:

MORNING SESSION, 9:30 A. M.

Business session and reports of special committees.

Paper, "Wheel Turning," by H. S. Williams, engineer of the Peter Smith Heater Company, Detroit, Mich.

Paper, "Development of Long Distance Travel," by T. J. Gore, general agent of the Indianapolis Interurban Joint Ticket Agency Association.

Paper, "Interline Accounting," by L. T. Hixson, auditor of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Discussion.

AFTERNOON SESSION, 1 P. M.

Paper, "Use of Sand on Interurban Cars," by W. H. Evans, superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind.

Paper, "Asphaltic Oils as Economical Wood Preservatives," by F. W. Cherrington, representative of the Indian Refining Company, Incorporated, Cincinnati, Ohio.

Discussion.

Annual Meeting American Railway Engineering & Maintenance of Way Association

The American Railway Engineering & Maintenance of Way Association and the Railway Signal Association will hold their annual meetings in the Florentine room of the Congress Hotel and Annex at Chicago, Ill., on March 20, 21, 22 and 23. The program as issued by E. H. Fritch, secretary, Monadnock Building, Chicago, announces a number of features of interest to electric railway men. In connection with the annual meetings of these two associations the Railway Appliance Association will hold an exhibition at the Coliseum. The exhibits of appliances used in steam and electric railway construction and maintenance will occupy the first floor of the Coliseum and Annex, as well as the balcony of the Coliseum, the entire space of the ground floor having been under reservation for some time. This is the third annual exhibition held at the Coliseum and one of the attractions for this year will be a working model of the Brennan mono-rail car occupying the entire south end of the balcony. The sessions will be held from 9 a. m. to 12:30 p. m. and from 2 p. m. to 5:30 p. m. The program for the sessions of the Railway Signal Association for March 20 has not been announced. The program of the Maintenance of Way Association follows:

MARCH 21

President's address.

Reports of secretary and treasurer.

Reports of standing and special committees.

XII. Rules and Organization, Bulletin 129; X. Signals and Interlocking, Bulletin 130; XVIII. Electricity, Bulletins 127, 130; Special. Brine Drippings from Refrigerator Cars, Bulletin 129; XIV. Yards and Terminals, Bulletin 129; VII. Wooden Bridges and Trestles, Bulletin 129; XV. Iron and Steel Structures, Bulletin 130; XVI. Economics of Railway Location, Bulletin 130.

EVENING SESSION, MARCH 21

Special illustrated lecture on steel rails, by M. H. Wickhorst, engineer of tests for the rail committee, being a digest of the investigations made by the rail committee.

Informal smoker.

MARCH 22

II. Ballast, Bulletin 129; III. Ties, Bulletin 131; V. Track, Bulletin 131; IV. Rail, Bulletins 123, 132; VIII. Masonry, Bulletin 130; XIII. Water Service, Bulletin 130; IX. Signs, Fences and Crossings, Bulletin 130.

Annual dinner at 7 p. m.

MARCH 23

XI. Records and Accounts, Bulletin 131; XVII. Wood Preservation, Bulletin 131; Special. Grading Rules for Maintenance of Way Lumber, Bulletin 133; VI. Buildings,

Bulletin 131; I. Roadway, Bulletin 133; Special. Uniform General Contract Forms, Bulletin 133; XIX. Conservation of Natural Resources, Bulletin 133.

New business.

Election of officers.

Adjournment.

Annual Meeting of New England Street Railway Club

The program has been announced for the eleventh annual meeting of the New England Street Railway Club, which is to be held at the Hotel Somerset, Boston, Mass., on the evening of March 23, 1911, as mentioned briefly in the ELECTRIC RAILWAY JOURNAL of March 4, 1911. The annual business meeting will be held on the afternoon of March 23. At 6 p. m. there will be a reception and at 6:30 p. m. sharp the banquet will be held. The speakers announced are Eugene N. Foss, Governor of Massachusetts; William A. Bancroft, president of the Boston Elevated Railway; Arthur W. Brady, president of the American Electric Railway Association; Dr. Richard C. Maclaurin, president of the Massachusetts Institute of Technology; James F. Swift, Attorney General of Massachusetts; Walter Perley Hall, chairman of the Railroad Commission of Massachusetts; Patrick Calhoun, president of the United Railroads of San Francisco, and Joseph Smith, Lowell, Mass., newspaper representative. Henry F. Hurlburt will act as toastmaster. Members are requested to arrange for tickets for themselves and their guests at once and March 18 has been fixed as the latest date on which applications can be received to insure reserved seats. The tables will be arranged to seat six persons. The price of the banquet tickets is \$3 each.

Settlement Ordinance in St. Louis

A new ordinance providing for the settlement of a number of questions affecting the United Railways Company of St. Louis has been introduced in the Municipal Assembly of the city. It was prepared by a joint committee appointed by the Assembly and provides for the settlement of the mill tax and other controversies between the company and the municipality.

The amount of the mill tax accrued under the ordinance from January, 1904, when this revenue measure became effective, to and including December, 1910, is for the St. Louis & Suburban Railway, the St. Louis Transit Company and the United Railways Company, \$1,470,608. The committee considered that if it secured part of the sum in controversy directly and part through valuable rights and transportation betterments it would secure all the value either to the city directly or to the city indirectly through the people. The city was without power to compel the company to give the betterments which it was believed would increase the adequacy of the service.

The subject of subways was not considered by the committee in a way which would entitle it to present any report on this topic.

New conditions relating to transfers are part of the settlement. The committee had evidence of the flagrant abuse of the transfer system, but believes co-operation between the public authorities, the riding public and the company will practically eliminate the abuse.

The committee secured an agreement from the company to reconstruct certain extensions specifically mentioned and also future extensions at the rate of 1 mile or more of double track per year, beginning with 1916 and extending to 1940. Three new east and west through crosstown lines will be operated.

The committee found that the new traffic law eliminates a great many complaints due to unreasonable delay of passengers in cars by team traffic, but hopes that the supervision by the city secured by the settlement ordinance will improve this condition.

The committee has worked out a plan for the creation of a board of supervision to be charged with the duty of supervising the enforcement of the ordinances and laws respecting street railways. Under this plan the company

is to select one supervisor and the city another, while the two will select a third. The costs of the board are to be borne equally by the company and the city. The company is to pay the salary of the member of the board which it appoints; the salary of the city member and the third member will be \$3,000 per year. The cost of the assistants and supplies is not to exceed \$3,000 per year.

It is believed that some rapid transit can be furnished on certain lines by the elimination of stops. The settlement extends the underlying franchises until April 12, 1948. It eliminates various controversies as to transfers.

The company now pays \$147,000 per annum under its underlying ordinances. The settlement ordinance secures to the city the payment of an aggregate amount of \$3,466,000 from Feb. 1, 1911, to Feb. 1, 1920, and includes \$1,000,000 paid to the city in lieu of all accrued mill tax as for the three companies until Dec. 31, 1910. It secures to the city the annual payment thereafter of \$291,500 for the year from Feb. 1, 1920, to Feb. 1, 1921, and thereafter increasing amounts to the expiration of the franchises, the company paying in the last year \$389,500. The aggregate amount to be paid after Feb. 1, 1920, and secured to the city is \$9,570,000. These payments are in addition to the general taxes, special taxes for local improvement and the performance of other charter and ordinance obligations.

Eight loops will be constructed in order to eliminate the congestion and inadequacy of the service in rush hours. The settlement will authorize the board of supervision to allow some of the cars to be turned back before they reach terminals.

Des Moines City Council Rejects Proposal for Sale from Des Moines City Railway

At the meeting of the Council of Des Moines, Ia., on March 8, 1911, Mayor Hanna introduced a resolution rejecting the offer made by Harris, Forbes & Company, New York, N. Y., on Feb. 21, 1911, to dispose of the property of the Des Moines City Railway to the city for \$4,579,478. This motion was not seconded. Later Commissioner MacVicar presented a resolution accepting the terms made by Harris, Forbes & Company. This resolution was seconded, but pending discussion no vote was taken. Mr. MacVicar's resolution was then amended, but when the matter was put to a vote the Mayor voted against the resolution on the ground that the price which was asked was excessive. Thus the vote to submit the proposal of Harris, Forbes & Company to the people was four to one, but as one of the requirements of the proposal was that it should be accepted by a unanimous vote of the Council before 5 p. m. on March 8 the resolution was lost. The result of the vote was telegraphed to Harris, Forbes & Company, and the Mayor announced that he would advise the firm in detail in a letter about the reasons for his action in voting against the resolution. The commissioners who voted for the resolution all expressed the opinion after the meeting that the people should be allowed to signify their desire in the matter. In an interview which the Mayor gave after the meeting he is reported to have said:

"I voted against the proposition for two reasons. First, because the increased price will make it improbable that the proposition would carry before the people; second, because it would make it that much harder for the city to manage the property without loss. We cannot afford to put city ownership up to the people at such a price as to insure its being voted down. Neither can we afford to undertake municipal ownership under such a load of interest as to make it a failure.

"In the franchise the floating debt was given as \$400,000, less the amount taken up by bonds, but this debt appears at \$618,000 in the letter of Geo. B. Hippee, president of the company, dated March 6. This difference alone would buy 40 new cars. I firmly believe city purchase is the only means of securing to Des Moines first-class street car service under fair conditions. We can either then lease to a good operating company on favorable terms or we could successfully operate the plant ourselves under a board of directors of three men which would be entirely divorced from politics.

"The raising of the price \$218,000 has the effect of reducing the amount which the company proposed to furnish

the city for purpose of rehabilitation to somewhat less than \$900,000, which, of course, would make any complete rehabilitation impossible."

The Question of Providing Funds for Improvements in Kansas City

On March 4, 1911, Darius Brown, Mayor of Kansas City, Mo., addressed a letter to John M. Egan, president of the Metropolitan Street Railway, in regard to the plans of the company for carrying out certain work suggested to the company by the Common Council which it is claimed it was within the right of the Council to urge under the terms of the present franchise of the company. Perhaps the most important work to which the attention of the company was directed was the construction of the so-called Chestnut Street extension. The Mayor requested a reply by March 15 to his communication and indicated the probable course of action of the city as follows:

"In the event that your company shall fail, refuse or neglect so to signify in writing within the period of time specified, or in the event that the company shall fail to begin and prosecute with reasonable dispatch to completion the doing of the things specified, I shall instruct the city counselor and the counselor of the Public Utilities Commission to exercise every right and remedy of the city under the laws of Missouri, the charter and ordinances of Kansas City and the terms of the franchise contract, to compel the company to meet every obligation under the terms of the franchise contract which it has failed thus far to meet."

Thus far the company has been prevented from carrying out the program for improving the property which it made some time ago on account of its inability to finance the new work in contemplation without paying too great a premium for the needed capital. If the franchise extension had passed at the recent election the funds to carry out all needed work could have been raised. Recently when R. J. Dunham, chairman of the board of directors of the company, and J. J. Storrow, of Lee, Higginson & Company, Boston, Mass., bankers, were in Kansas City this phase of the situation was considered. Mr. Dunham said at that time that in 1910 the company spent \$824,840.92 in excess of its net earnings in improvements and betterments and built 11 miles of new single track. An amount equal to \$1,000,000 in excess of the company's anticipated revenues was planned to be spent in 1911, and this did not include the \$370,000 asked of the company for its share of building the West Twelfth Street trafficway and the demands of the city for the construction of the crosstown line on Chestnut Street and other new extensions.

Mr. Dunham was quoted as favoring the formation of an independent company to carry out the improvements and extensions, the new capital to be protected by a new franchise. In this connection Mr. Dunham is reported to have said:

"Let the title to the improvement be taken in the name of another, the property only to become that of the Metropolitan Street Railway when the money loaned to pay therefore shall be returned to the lender. The city should not renew the grant or grant any new general franchise without requiring the grantee to repay this money. If the Metropolitan Street Railway's franchise should expire and no franchise be issued to any other company, then the lender of the money should have the right to retain possession of and operate the improvement made until the loan is repaid. Of course, no property could be acquired except by direction from the city and the obligations issued for money loaned would all be under the supervision and direction of the city."

Mr. Storrow was quoted as saying:

"It looks to me as though the new money could be secured without tying the city's hands in any way. The company's suggestion strikes me as fair to both sides. Neither I nor my firm owns a share of stock in the company. I only see a situation that needs a bit of patience and fairness on both sides if the people of Kansas City are interested in good service."

It was felt by the company that the Mayor, judging from his published statements, did not understand the spirit of the suggestions which had been made for financing the

additions and improvements, and Frank Hagerman, vice-president of the company, issued a statement in which he said:

"(a) The growth of the city and consequent demands for additions, equipment and improvement, both under and outside of the franchise, has become so great that in view of the bonded debt and short remaining period of the right to operate it is impossible to borrow, without security, the money necessary to meet the demands of the public and give the service it desires, for those demands are not limited to franchise requirements. The question then is whether such a security can be given without changing, modifying, renewing or extending the present franchise.

"(b) If borrowed money be used for additions, the property acquired therewith goes immediately under the present mortgages, because they cover all property owned at the time of their execution and all that is subsequently acquired. The lender then would advance the money for the new property and could not have it for security because it would go in under the present mortgages for the benefit of the old bonds.

"(c) The suggestion then is: Let the title to the new property acquired by the new money be kept in the name of another company or some individual until the money borrowed is repaid, to be, however, operated as part of the Metropolitan system, the city agreeing that it will not renew the present franchise or grant one to another company without requiring the grantee to provide for the unpaid debt. If by June, 1925, no grant shall have been made to the Metropolitan Street Railway or any other company, then the lender may take possession of the new property made by his money and use it until the sum due him be paid by some one.

"(d) No addition or improvement will come under the arrangement except when hereafter ordered by the city, and no obligation recognized as coming thereunder except when approved by the city.

"(e) This is far from the arrangement mentioned by the Mayor, but is one which will bear open, full and frank discussion. This we would be glad to participate in at any time or place."

President Egan of the Metropolitan Street Railway replied at length under date of March 11, 1911, to the letter from the Mayor.

Bonds Authorized for Municipal Railway in Seattle.—At the municipal election held in Seattle, Wash., on March 8, 1911, an issue of bonds to the amount of \$800,000 was authorized to provide for the construction of a street railway by the municipality on a north and south trunk highway.

Report to Be Made on Municipal Terminal Railway.—The municipal railway committee, consisting of the Board of Harbor Commissioners, Board of Public Utilities and the City Engineer of Los Angeles, will report at the earliest possible date the terms upon which an engineer can be secured to estimate the cost of preparing plans for a municipal terminal railway to be projected as part of the whole transportation system of the city.

Council Postpones Action on Philadelphia Rapid Transit Company's Loan.—The committee on finance of the City Councils of Philadelphia has decided to postpone action on the measure before the body to sanction the proposed loan of \$10,000,000 which the Philadelphia Rapid Transit Company desires to make. More time is said to be desired in which to consider the report on the finances of the company presented recently and the report on the physical property made for the State Railroad Commission by Ford, Bacon & Davis, New York, N. Y.

Prosecution of Men Responsible for Disorder in Columbus Strike.—Twenty-five men have been indicted so far for stone throwing and interference with the property of the Columbus Railway & Light Company, Columbus, Ohio, during the strike in the summer of 1910. Six men have been sentenced to the penitentiary for terms of one or two years. Eight men have been sentenced to the reformatory and three given jail sentences. Four men are under indictment for dynamiting cars and one for having dynamite in his possession. No disposition has been made yet of six cases in which indictments for stone throwing were voted.

Bonds for the Geary Street, Park & Ocean Railroad.—The Board of Supervisors of San Francisco, Cal., has instructed the city clerk to call for bids for \$600,000 of bonds for the Geary Street, Park & Ocean Railroad. No date was set in the resolution, but it was understood the call would be for March 13. The money will be used to construct the municipal railway and to purchase the sites for the power house and the car house. The money for the rails and other materials has been appropriated from the first \$500,000 of bonds which were sold.

Complaints to Public Service Commission.—The Public Service Commission of the First District of New York reports that during 1910 a total of 1988 complaints was received, directed against 35 different operating companies. Of this number 1719 were either satisfied or otherwise disposed of, the others remaining open for further investigation or adjustment at the end of the year. In 1908, the first calendar year of the commission's existence, more than 3000 such complaints were received. For the year 1910 such complaints aggregated only 1988.

Headquarters of the Manufacturers' Association.—The American Electric Railway Manufacturers' Association has issued the following official announcement of the establishment of headquarters in New York: "We beg to announce the opening of the offices of this association at room 1002, 165 Broadway, New York City. This office will be the official headquarters of the association and all members are cordially invited to visit same. Out-of-town members will be welcome to use this headquarters for the receipt of their mail and to carry on correspondence, etc., while in the city. Very truly yours, Executive Committee, by George Keegan, secretary."

Parking Plan Approved.—The plan of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., to move its tracks from the east side of Coney Island Avenue to the center of the thoroughfare and to park the roadway from Prospect Park Circle, Brooklyn, to Coney Island, a distance of more than five miles, will be carried out. The plan was approved 18 months ago by the Board of Estimate, during the administration of Mayor George B. McClellan, but it was held up by the present board until recently, when it came up for final action. William N. Dyckman, vice-president of the company, says that it will cost more than \$300,000 to relocate the railroad and carry out the work which is proposed.

Pittsburgh Railways Re-employing Former Employees.—In October, 1910, the Pittsburgh (Pa.) Railways laid off 139 men employed in its shops because the special work for which they were engaged had been completed. Since then the company has re-engaged 39 of the men formerly in its employ and is said to have employed eight new men for special work. In this connection the company has issued a notice in which it has renewed the statement that "when men are needed in the shops preference will be given to the 139 men laid off when they are fitted for the positions open." The original explanation of the company in regard to the reduction in its working force was referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 29, 1910, page 923.

Oklahoma Strike Settled.—The strike of the employees of the Oklahoma Railway, Oklahoma City, Okla., was declared off on March 13, 1911. It is understood that the question of reinstating a number of employees of the company whose discharge precipitated the strike will be submitted to a board of arbitration. The strike was declared on March 5. Recognition of the union which had been organized among the men was demanded. The men also demanded an increase in wages and revised working conditions. The attempts made by the company to operate cars resulted in such disorder that on March 9 Governor Cruce ordered out three companies of the State militia. On March 8 the negotiations for a settlement were entered into between the city authorities and officers of the company. The State Board of Arbitration also held several sessions on March 8 and finally adjourned until March 9 at the request of the attorneys of the company. Representatives of the strikers and of the company appeared before the board and made statements, but no evidence was taken. On the same day a meeting was held at the city hall at which representatives of the labor unions, officials of the company and city authorities were present.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

The Rawleigh bill in the lower house of the Illinois Legislature giving the State Railroad & Warehouse Commission jurisdiction over public utilities in cities having less than 200,000 population is in charge of the municipal corporations committee, of which Representative L. I. Butts is chairman. The first hearing of the committee was held on March 7. I. C. Vopley, Aurora, president of the Western United Gas & Electric Company, and Frank J. Baker, Chicago, vice-president of the North Shore Electric Company, which serves a territory including 71 cities and villages, appeared among others to favor the bill. A representative of the Mayor's organization of Illinois opposed the bill on the ground that it would take even the control of municipal water works from the City Councils and vest it in the commission. Other hearings will be held.

INDIANA

During the 60 days the Indiana Legislature was in session the following bills were passed and have been signed by the Governor: Requiring interurban railways to maintain waiting rooms in cities with a population of more than 4800; requiring telephone and telegraph wires to be constructed 21 ft. above the tracks of railroads and interurban railways; authorizing railroads to hold the stock of interurban railways to facilitate the building of union terminals; requiring railroads to pay wages to discharged employees within 24 hours after discharge and to furnish a letter showing the cause of discharge; permitting electric railways to contract with hydraulic companies for power; compelling railroads to give advance notice of proposed increases of rates; compelling railroads to erect suitable stations in cities; requiring the examination of employees on section gangs of railroads and providing that at least two men in each gang shall understand the flagging system of the road; providing for the erection of suitable depots at all stops on railroads and prohibiting the use of box cars for depots; requiring steam railroads and interurban railways to maintain adequate highway crossing signs.

The following bills asked for by the Railroad Commission have been enacted into law: Making interurban railways amenable to the same law that governs the steam railroads in relation to the adoption of rules for the operation of their trains and compelling employees to submit to examination concerning the rules (a section of the law makes it a misdemeanor for any one engaged in operating steam or interurban cars to become intoxicated, and provides that should the commission on investigation find that an accident was due to the violation of the rules by employees it shall report such matter to the prosecuting attorney); extending the power of the commission in the matter of examining witnesses and requiring answers; a law requiring interurban cars to be equipped with hand brakes in addition to air brakes; a law providing that steam railroads and interurban railways shall install such block signal systems as the commission may approve. This last bill provoked long discussion on account of an attempt to amend the bill to allow railroads to install any one of three suggested systems.

KANSAS

The session of the Kansas Legislature was concluded on March 9, an extra day being added so that the work in hand might all be concluded. It was expected that the public utilities bill would not pass, but on March 7 the House appointed a committee to confer with the Senate committee on the public utilities bill. This joint committee reached an agreement, and the bill was reported to both houses on March 8. The Senate adopted the utilities bill by a vote of 35 to 3 and the House adopted the measure by a vote of 100 to 15. The bill is now before the Governor. The bill will become operative as soon as the Governor signs it. The present railroad commissioners, who were elected last fall, will be the first members of the new commission and will serve for the next two years. Their pay will remain at \$2,500 a year, but after the expiration of their term of office each commissioner will receive \$4,000 a year. The power to appoint the commissioners is vested with the Governor. An attorney is to be employed at a salary of \$2,500 a year, and \$5,000 is appropriated to retain an expert rate clerk.

MASSACHUSETTS

The committee on street railways recently gave a number of hearings upon bills before the Legislature relating to fares. The first bill considered required the Boston Elevated Railway to issue free transfers between its night cars good for a continuous ride from any station or transfer point to any other station or transfer point on the system, between the hours of midnight and 6 a. m. A. A. Ballantine, for the company, said the bill provided for the amendment of a chapter of the statutes already repealed by chapter 500 of the Acts of 1897. The chairman of the committee doubted the power of the Legislature to pass any transfer act in connection with the Boston Elevated Railway, and intimated that any relief sought by the petitioner should be secured through the Railroad Commission. Another bill heard on the same day provides that street railways be required to furnish special service for workmen and women between the hours of 5 a. m. and 8 a. m., instead of providing special service between 5 a. m. and 7 a. m., as at present. The present arrangements for special service in the evening would be retained. Bentley W. Warren opposed the bill on behalf of the Massachusetts Street Railway Association. He pointed out that the bill is unnecessary and probably unconstitutional. The granting of lower rates to workmen as a class appears to be entirely inconsistent with the duties of a common carrier. So-called workmen's tickets are in use in Massachusetts, but they are good for anyone's use in the hours specified.

Hearings have been given recently by the committee on metropolitan affairs in connection with the proposed repeal of the Riverbank subway act, under the terms of which the construction of a subway is authorized between Park Street, Boston, and the Charlesgate district of the Back Bay. Elaborate arguments for and against the construction of a subway system under Boylston Street have been heard, with considerable testimony of an engineering character submitted by residents of the territory concerned. The principal argument presented in favor of the Riverbank subway is that it will provide an underground route for incoming and outgoing cars at very moderate cost, with great benefit to suburban traffic. Advocates of the repeal desire a subway under Boylston Street on account of the growing importance of that section of the city as a retail business center. The committee on street railways has sent in adverse reports upon House bills 771, 1165 and 1367, each of which provides for the compulsory equipment of cars of street railways with lifting jacks. A similar report has been sent in by the same committee on House Bill 1368, providing for the compulsory use of fenders on street railways. The committee has reported leave to withdraw House Bill 1162, which provides for a compulsory investigation by the Railroad Commission of the fares in use on the Milford & Uxbridge Street Railway. A hearing was recently given by the committee on railroads and street railways sitting jointly, upon House Bill 1359, which provides that United States letter carriers be carried free by railroads and street railways. A. A. Ballantine, for the Boston Elevated Railway, and Bentley W. Warren, for the Massachusetts Street Railway Association, pointed out that letter carriers are employees of the government, well paid and have short hours of work, and that no logical reason exists for their free transportation. Police and firemen are carried free because they aid in maintaining order and the arrangement often is part of the franchise agreement.

The aim of the New York, New Haven & Hartford Railroad in relation to the proposed merger with the Boston, Revere Beach & Lynn Railroad was discussed at a hearing during the week ended March 11, 1911, before the committee on railroads. T. E. Byrnes, vice-president of the New Haven system, was the principal speaker. Included with the proposed purchase is the building of a tunnel under Boston Harbor to connect the Boston & Maine Railroad, Revere Beach Line and the New Haven systems, and to provide a means of operating electrified train service between the northern and southern suburban areas. Mr. Byrnes stated that if the Legislature authorized the purchase of the Revere Beach line and the construction of the tunnel work would be started immediately. The plans include the electrification of the Revere Beach property, including the Winthrop loop, the electrification of the newly restored line of the Boston & Maine Railroad from Revere Beach Junction to East Boston, the adaptation of the lower

level of the Boston South Station to the requirements of this service and the electrification of the main line of the Providence division between Boston and Readville. With the exception of the double-track tunnel under the harbor there will ultimately be a four-track electrified line from Readville to Beverly. Suburban traffic from Lynn and Salem will then be handled by electricity and brought into the heart of Boston, probably by a connection with the Boston Elevated Railway through the existing East Boston tunnel. It might be necessary to raise the fare 5 cents if the tunnel for electric trains was authorized, but no increase in fare was contemplated in connection with the operation of the electrified Revere Beach system and the present ferry service across Boston harbor.

MICHIGAN

In compliance with a request from the House the Michigan State Tax Commission has sent a communication to that body explaining the results of the ad valorem system of taxation and its advantages over the specific system. In addition to this information, the commission made the following recommendations: That the power of the State Board of Assessors to initiate assessments and review the work of the local assessors should be clearly defined; that the commission should be authorized to employ the necessary assistants and experts to insure the cash valuation of all property in the State; that the valuation of all public utility corporations in the State, such as street railway, lighting, heating and power companies, should be determined by the commission each year and serve as a basis for the local assessors; that the law of 1905 should be amended so as to include personal property within the meaning of the statutes. The first three of these recommendations are included in the Lord bill, which has passed the House. A bill has been introduced in the House which provides for condemnation of public utilities by municipalities and counties and placing public service corporations on the same plane with the individual in the matter of condemnation procedure.

NEW JERSEY

A substitute for the four public utilities bills already before the Legislature has been introduced in the Senate. The new measure was reported in the Senate by Senator Bradley. It would amend and supplement the original act to create a Board of Railroad Commissioners for New Jersey, approved in 1907. The measure gives the commission power to fix rates after complaint has been made to it that the charge for any service is unreasonable or unjustly discriminatory and to enforce the regulations which it makes. Power is also given the commission to direct any railroad or street railway to establish and maintain connections with other railroads and street railways. Public service corporations would be required to report all accidents which result in loss of life or serious personal injuries and to file with the board statements of every classification employed and every individual or joint rate charged. In the House on March 8 substitutes were reported by the municipal and corporations committee for Mr. Leveen's subway bill and the Military Park subway terminal bill introduced by Mr. McGowan, both of which measures affect Newark materially. The bill introduced by Assemblyman Simpson to furnish rapid transit for Hudson County has been reported and placed on second reading. The bill is practically the same as the one introduced on Jan. 23, except that an amendment has been incorporated which provides for a referendum before the rapid transit plan can be carried out. The Rapid Transit Commission, under which the work will be furthered, is to consist of four members to be appointed by the Supreme Court, one of whom is to be a director of the Board of Freeholders.

NEW YORK

The replacing of the two Public Service Commissions by two similar departments to be under Democratic control is provided for in a bill introduced by Senator Grady. The Public Service Commissions took the place of the State Railroad Commission, the State Commission of Gas and Electricity, the State Inspector of Gas Meters, the Bureau of Grade Crossings, and the Rapid Transit Commission. Since Governor Dix took office he has insisted that the commissions are too expensive. Senator Grady

has provided in his bill for a reduction in the number of members of each commission from five to three and for a reduction of the salary of each commissioner from \$15,000 to \$10,000 a year. Furthermore the Grady bill limits the annual expense of the New York City commission to \$650,000, and the annual expense of the up-State commission to \$160,000. The bill provides that one member of each commission shall be a Republican. Senator Grady says the expense of the up-State board last year was \$300,000, and of the New York City commission \$1,200,000.

OHIO

Senate Bill No. 181, introduced by Mr. Andrews, would require all city and interurban electric railways to equip their double-track cars "with an air or electric brake * * * capable of applying the maximum braking power for all of the * * * wheels of such car." Fifty per cent of such cars must be equipped prior to Jan. 1, 1912, 75 per cent prior to Jan. 1, 1913, and all cars by Jan. 1, 1914. This bill is introduced as an amendment of section 9149-1 of the General Code, passed May 10, 1910, which required all electric cars to be equipped with an electric device by which the braking pressure would be automatically reduced as the speed of the car decreased. It is understood that the existing law did not have the sanction of the Railroad Commission and that the commission has not considered it practicable to enforce this law. The present bill is understood to have the approval of the Railroad Commission.

PENNSYLVANIA

There is talk of concluding the Pennsylvania session about April 27. The public utilities commission bill is ready to be presented. Among the measures affecting transportation companies which were introduced during the week ended March 11, 1911, were the following: Providing that no railway or express company shall charge one person or firm a higher rate per pound or ton than another, with power to appeal to the Court of Quarter Sessions, which is empowered to order the books of the offending company brought into court for review; limiting to 30 years the period for which municipalities may grant public utility franchises with power to the municipalities to acquire, maintain and operate street railways and public utilities; giving counties similar power to acquire public utilities; requiring railroads to equip all their locomotives with electric power headlights of 1500 cp before April 1, 1915, the right being vested in the State Railroad Commission to relieve railroads from the operations of the act on small roads or branches where the commission deems such lights unnecessary; forbidding any street or electric railway to use in the "built-up" parts of any city a certain type of prepayment car or any car that will not permit free ingress and egress. The penalty for the violation of the last act would be \$100 fine, "each car and each day constituting a separate offense." A bill has also been introduced to abolish the offices of superintendent and assistant superintendent of the Bureau of Railways in the Department of Internal Affairs and to substitute therefor the offices of chief and assistant chief of that bureau.

A bill has been introduced which it is thought will adequately protect street railways from the ambulance chaser. The measure makes it a misdemeanor for a lawyer to solicit or induce a person who has sustained a personal injury to bring a suit to recover damages. A bill has been introduced to compel electric railways more than 10 miles long to equip their cars with water coolers and toilets and to provide similarly equipped stations at their terminals. The bill to fix \$5,000 as the penalty for making false statements in regard to the assets of a company has been amended so as to make the penalty \$1,000.

A bill has been introduced to give departments of public safety in cities of the first class the right to regulate traffic. Representative Hilton has introduced a bill which provides that holders of 10 per cent of the stock of a corporation can petition the Common Pleas Court for a reduction in the salary of any official of the corporation. The bill to tax express companies has been passed. The bill to require electric railways to provide suitable waiting rooms at terminal stations and to equip all cars on suburban lines with toilets and providing penalties for violation was up for third reading in the House on March 6.

Financial and Corporate

New York Stock and Money Market

March 14, 1911.

There was a slight increase in activity in the stock market to-day. The recent condition of the market can be understood when transactions amounting to 407,000 shares are regarded as showing activity. Prices during the week have been steady with an upward tendency. All of the happenings of the week were negative and the outside public was still apathetic. The demand for bonds and other investment securities continued to be excellent.

The money market is very easy and rates are cheap. Quotations to-day were: Call, 2@2½ per cent; 90 days, 2¾@3 per cent.

Other Markets

Traction shares were rather less active in the Philadelphia market last week than they were previous to the final settlement of the Rapid Transit financial plan. There is little desire to buy at present and no pressure to sell, so the market has turned to other interests. Prices have remained practically stationary.

In the Boston market Massachusetts Electric and Boston Elevated continue to be the only traction stocks in evidence. These are only moderately active and prices are unchanged.

Beyond fairly active trading in both the stock and bonds of the United Railways Company there was no trading in tractions in the Baltimore market last week.

Quotations of traction and manufacturing securities as compared with last week follow:

	March 7.	March 14.
American Light & Traction Company (common).....	a290	a290
American Light & Traction Company (preferred).....	a106	a106
American Railway Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a44	a44
Aurora, Elgin & Chicago Railroad (preferred).....	a85¾	a85¾
Boston Elevated Railway.....	a129	a128½
Boston Suburban Electric Companies (common).....	16	15½
Boston & Worcester Electric Companies (preferred).....	71	72
Boston & Worcester Electric Companies (common).....	10	9
Boston & Worcester Electric Companies (preferred).....	40	41
Brooklyn Rapid Transit.....	78½	77¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83¾	84
Capital Traction Company, Washington.....	a128	a128
Chicago City Railway.....	a200	200
Chicago & Oak Park Elevated Railroad (common).....	3¼	3¼
Chicago & Oak Park Elevated Railroad (preferred).....	7¼	7¼
Chicago Railways, pteptg., ctf. 1.....	a92	a92½
Chicago Railways, pteptg., ctf. 2.....	a25	a24½
Chicago Railways, pteptg., ctf. 3.....	a9½	a9½
Chicago Railways, pteptg., ctf. 4.....	5¼	5
Cincinnati Street Railway.....	130	a132
Cleveland Railway.....	a95	95
Colorado Railway & Light Company.....	100½	100½
Columbus Railway (common).....	94	a96
Columbus Railway (preferred).....	100½	100½
Consolidated Traction of New Jersey.....	a76	a76½
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Detroit United Railway.....	71	a75
General Electric Company.....	159	159
Georgia Railway & Electric Company (common).....	*129¼	a133
Georgia Railway & Electric Company (preferred).....	*87	a92
Interborough Metropolitan Company (common).....	187½	190¾
Interborough Metropolitan Company (preferred).....	52	52¾
Interborough Metropolitan Company (4½s).....	78¾	78½
Kansas City Railway & Light Company (common).....	25	a25
Kansas City Railway & Light Company (preferred).....	a68	a70
Manhattan Railway.....	140	138¾
Massachusetts Electric Companies (common).....	17	a17¾
Massachusetts Electric Companies (preferred).....	a88	a88
Metropolitan West Side, Chicago (common).....	a22	a23½
Metropolitan West Side, Chicago (preferred).....	a67	a68½
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	70¾	71
Northern Ohio Light & Traction Company.....	40½	43¼
Northwestern Elevated Railroad (common).....	a23	a23
Northwestern Elevated Railroad (preferred).....	a64	a63½
Philadelphia Company, Pittsburgh (common).....	a53½	a53½
Philadelphia Company, Pittsburgh (preferred).....	a43½	a43½
Philadelphia Rapid Transit Company.....	a20½	a20½
Philadelphia Traction Company.....	a86	a84
Public Service Corporation, 5 per cent col. notes.....	a96½	a96½
Public Service Corporation, ctf. 5.....	a105½	a105½
Seattle Electric Company (common).....	a112	a109½
Seattle Electric Company (preferred).....	a101½	a99½
South Side Elevated Railroad (Chicago).....	a70	a70
Third Avenue Railroad, New York.....	a10	a9¾
Toledo Railways & Light Company.....	10	a8½
Twin City Rapid Transit, Minneapolis (common).....	109½	a110
Union Traction Company, Philadelphia.....	a47¾	a47½
United Rys. & Electric Company, Baltimore.....	17¾	17¾
United Rys. Inv. Co. (common).....	46½	46
United Rys. Inv. Co. (preferred).....	73¾	73
Washington Ry. & Electric Company (common).....	a35¼	a35¼
Washington Ry. & Electric Company (preferred).....	a88	a87½
West End Street Railway, Boston (common).....	a92½	91
West End Street Railway, Boston (preferred).....	a103½	a102½
Westinghouse Elec. & Mfg. Co.....	67½	67
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a120	a120¾

a Asked. * Last sale.

Annual Report of the Washington Railway & Electric Company

The comparative income account of the Washington (D. C.) Railway & Electric Company and subsidiary companies for the year ended Dec. 31, 1910, with comparisons, is as follows:

	1908.	1909.	1910.
Gross earnings from operation.....	\$3,720,573	\$4,080,063	\$4,123,559
Operating expenses.....	1,856,170	2,110,578	2,151,828
Net earnings from operation.....	\$1,864,403	\$1,969,485	\$1,971,731
Miscellaneous income.....	37,525	10,602	23,310
Gross income less operating expenses.....	\$1,901,928	\$1,980,087	\$1,995,041
Fixed charges:			
Taxes.....	\$183,385	\$200,027	\$210,780
Interest.....	994,106	1,030,265	1,056,439
Miscellaneous.....	.....	.....	13,179
Total.....	\$1,177,491	\$1,230,292	\$1,280,398
Surplus.....	\$724,437	\$749,795	\$714,643
Percentage of operating expenses to gross earnings.....	49.89	51.73	52.18

The net income of the whole system for the year ended Dec. 31, 1910, was \$714,643, of which \$104,401 was applied directly by the subsidiary companies without passing through the profit and loss account of the Washington Railway & Electric Company. The surplus of this company on Dec. 31, 1909, was \$941,484, and its net income for the last year was \$610,242, making a total of \$1,551,726. Against this sum there were charged \$51,847 for depreciation in equipment retired or sold during the year, \$1,540 for removal of abandoned tracks, \$425,000 dividends on preferred stock and \$130,000, or 2 per cent, dividends on the common stock. The final surplus as of Dec. 31, 1910, was \$943,339.

The increase in gross earnings from operation was 1.07 per cent, in operating expenses 1.95 per cent and in net earnings from operation 0.11 per cent.

Clarence F. Norment, the president, states in his report in part:

"It will be seen that the increase in gross earnings is far below the normal average. This may be attributed, among other causes, to the heavy traffic during the spring of 1909 on account of the inauguration and the special session of Congress.

"Operating expenses have increased in a somewhat higher proportion than gross earnings. Liberal expenditures for maintenance of track and roadway, buildings, electric lines and equipment have been made and charged to operating expenses, with the result that the physical condition of your properties is steadily improving."

"Depreciation on the equipment of the railways was provided for by charges aggregating \$60,000, the same figure as in 1909, deducted from surplus earnings.

"The surplus revenue, after deducting fixed charges for the year ended Dec. 31, 1910, was partially applied to the needs of the several companies in which it originated without being carried to the profit and loss account of the Washington Railway & Electric Company. The application is stated briefly as follows:

"Potomac Electric Power Company, to sinking fund requirements, \$64,520; to loss on second-hand equipment sold during the year, \$6,680; total, \$71,200.

"Other subsidiary companies: To depreciation on equipment, \$8,152; to removal of abandoned tracks, \$18,561; to credit of profit and loss, net, \$6,487; total, \$33,200.

"Washington Railway & Electric Company: To depreciation on equipment, \$51,847; to removal of abandoned tracks, \$1,540; to payment of 5 per cent dividend on preferred stock, \$425,000; to payment of 2 per cent dividend on common stock, \$130,000; to credit of profit and loss, \$1,855; total, \$610,242.

"During the year \$20,000 additional Washington Railway & Electric Company 4 per cent consolidated mortgage bonds were issued and used in the acquisition of additional shares of stock of subsidiary companies.

"The Potomac Electric Power Company issued \$600,000 additional of consolidated mortgage 5 per cent bonds. The above bonds, together with \$49,000 bonds in the treasury of the company at the beginning of the year, were sold at par and interest, and the proceeds thereof were applied to the obligations of the company and its capital require-

ments for extensions, betterments and improvements. No change was made during the year in the securities received from the reorganization committee to be used for the purposes of the new company, heretofore set aside as a depreciation reserve.

"The year's requirements for the sinking fund of the Potomac Electric Power Company consolidated mortgage amounted to \$64,520. This sum was deducted from surplus earnings and invested in the company's consolidated mortgage bonds. The total amount so invested is now \$149,000.

"On May 1, 1910, in accordance with an act of the Maryland General Assembly, the number of fare zones on the Washington & Rockville Railway Company was reduced from four to three. Application was made in the United States Circuit Court for the District of Maryland for an injunction against the enforcement of this law. A temporary injunction was issued so far as the law related to the sale of commutation and school commutation tickets. The litigation is still pending."

The passenger revenue of the companies decreased 3.10 per cent in 1910 as compared with 1909.

A condensed balance sheet as of Dec. 31, 1910, shows a depreciation reserve of \$516,290, and a reserve for settlement of damage claims and renewals of \$69,882.

Leases at Trenton Approved

The Board of Public Utility Commissioners of New Jersey has given conditional approval to the leases of the Trenton Street Railway, Trenton, Hamilton & Ewing Traction Company, Mercer County Traction Company and the Trenton, Pennington & Hopewell Street Railway to the Trenton & Mercer County Traction Corporation. The terms of the leases submitted for approval provide that the Trenton & Mercer County Traction Corporation is to pay the interest charges, taxes and insurance, all operating expenses, proper maintenance charges and definite sums as rentals, these sums to increase during a period of about 15 years. In approving the leases the board said:

"The board, therefore, hereby approves the several leases so submitted to it, but such approval is conditioned upon the formal acceptance by the lessors, respectively, and the lessee of the additional terms and modification of terms now contained therein, as follows:

"(1) That the lessee accept and covenant to comply in all particulars with the mandatory provisions of the order issued by this board to the Trenton Street Railway, under date of March 3, 1911; (2) that the lessee covenant to set up and maintain during the period that the lease remains in force a depreciation fund; (3) that the lessee covenant to pay into such fund annually, for a period of two years, a sum that shall not be less than 5 per cent of its gross income; (4) that within two years from the date hereof the lessee submit to this board (or any board succeeding to its powers and duties) a proposed rule to govern and regulate the maintenance of a depreciation fund by it thereafter; (5) that the lessee covenant to abide by and conform to the action of such board upon the rule so submitted to it, provided that such action does not require the payment into such fund of a sum in excess of 15 per cent of the gross income of such lessee.

"The conditions so imposed are intended to meet somewhat unusual circumstances which have developed in the course of the hearings, not only on this application, but also upon the complaint of the City of Trenton of the present maintenance of unsafe and inadequate service; upon which complaint the board has made an order requiring a large amount of work in repair and reconstruction to be done within a comparatively short period of time.

"The moneys required in this work cannot, in view of the necessity of meeting fixed charges, be wholly met out of the current earnings of the company, and some of the work required by such order is of such a nature that it may fairly be contended that the expenditures therefor should be charged to capital account. The conditions imposed must, therefore, not be taken as indicating the general policy of the board as to depreciation accounts. The leases provided for an issue by the Trenton Street Railway of mortgage bonds in the sum of \$500,000. The board will, therefore, when formal application is made to it, approve

this proposed issue of bonds, subject to the terms of conference order No. 7."

Earnings of Interborough Rapid Transit Company for Seven Months

The Interborough Rapid Transit Company reports earnings as follows for the seven months ended Jan. 31, 1911:

	1911.	1910.
Gross operating revenue.....	\$16,946,641	\$16,512,299
Operating expenses.....	7,017,922	6,349,577
Net operating revenue.....	\$9,928,719	\$10,162,722
Taxes	1,080,528	985,663
Income from operation.....	\$8,848,191	\$9,177,059
Non-operating income.....	199,695	258,945
Gross income.....	\$9,047,886	\$9,436,004
Charges, including guarantee to Manhattan Ry.	6,222,329	6,159,074
Net corporate income.....	\$2,825,557	\$3,276,930
Dividends for six months, at rate of 9 per cent. per annum.....	1,575,000	1,575,000
Surplus	\$1,250,557	\$1,701,930

The percentage of operating costs was 41.41, against 38.45 in the previous period. The company states that the increase in operating expenses was due largely to extraordinary expenditures, the result of changes in subway equipment made necessary in connection with the operation of 10-car express and 6-car local trains.

The number of passengers carried in the seven months was 328,862,042, against 320,560,226 in the corresponding period of the previous year, an increase of 8,301,816 passengers.

The company reports earnings as follows for January:

	1911.	1910.
Gross operating revenue.....	\$2,659,952	\$2,587,487
Operating expenses.....	1,091,360	969,769
Net operating revenue.....	\$1,568,593	\$1,617,719
Taxes	157,053	151,885
Income from operation.....	\$1,411,541	\$1,465,836
Other income.....	25,248	30,956
Total income.....	\$1,436,789	\$1,496,791
Interest, rents, etc., including Manhattan Railway guarantee.....	888,463	886,142
Net corporate income.....	\$548,326	\$610,649

Annual Report of the Fonda, Johnstown & Gloversville Railroad

The annual report of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., for the year ended June 30, 1910, compares as follows:

INCOME ACCOUNT.			
RAILWAY OPERATING REVENUE—YEAR		ENDED JUNE 30.	
		Miles Operated.	
	84.36.	84.36.	84.36.
	1910.	1909.	1908.
Freight revenue.....	\$247,354	\$223,752	\$215,814
Passenger revenue, steam division.....	68,653	64,165	66,045
Passenger revenue, electric division.....	534,666	474,720	468,376
Mail revenue.....	3,148	3,286	3,289
Express revenue.....	17,950	15,403	14,732
All other revenues from transportation..	7,088	5,453	5,197
Revenue from operation other than transportation	25,882	5,880	4,021
Totals operating revenue.....	\$904,751	\$792,659	\$777,474
Railway Operating Expenses. Per Cent.	46.59	46.86	51.25
Maintenance of way and structures.....	\$80,990	\$63,426	\$79,095
Maintenance of equipment.....	49,284	43,931	46,517
Traffic expenses.....	7,268	5,772	5,929
Transportation expenses.....	227,926	222,991	232,971
General expenses.....	56,054	37,197	31,852
Totals operating expenses.....	\$421,522	\$373,317	\$396,364
Net operating revenue.....	\$483,229	\$419,342	\$381,110
Outside operations (Sacandaga Park) deficit	6,266	4,716	5,567
Totals net revenue.....	\$476,963	\$414,626	\$375,543
Taxes accrued.....	36,491	34,341	32,099
Operating income.....	\$440,472	\$380,285	\$343,444
Other income.....	30,352	30,526	28,890
Gross corporate income.....	\$470,824	\$410,811	\$366,334
Deductions from gross corporate income.	353,650	369,607	338,737
Net income (available for dividends).....	\$117,174	\$41,204	\$27,597
Dividends on preferred stock.....	\$30,000	\$3,750	.....
Dividends on common stock.....	50,000	.....	.....
Total dividends for year.....	\$80,000	\$3,750	.....
Balance to profit and loss.....	\$37,174	\$37,454	\$27,597

J. Ledlie Hees, the president, says in the report in part: "Sacandaga Park, which is owned by the company, has con-

Traffic and Transportation

Court Decision in Rensselaer Fare Case

The Appellate Division of the Supreme Court of New York has handed down a decision unanimously affirming the order of the Public Service Commission of the Second District of New York directing the Cohoes Railroad, which constitutes the Rensselaer branch of the United Traction Company, to charge a 5-cent fare instead of a 6-cent fare between Albany and Rensselaer. The company will appeal to the Court of Appeals. If the court continues the stay the company will continue to give slips to passengers riding between Albany and Rensselaer, on each one of which 1 cent can be redeemed in case the company loses its suit.

The company carried the case to the Appellate Division under a certiorari proceeding. An opinion on the decision of the Appellate Division was written by Justice Betts, and all concurred. It was held in the opinion that in collecting the extra cent the company was not acting as an agent for the Greenbush Bridge Company, whose bridge it crosses in going over the river. The 6 cents are collected as its own fare, said the judge, and the 1 cent that is paid to the bridge company is an operating expense like any other expense. Justice Betts held that the Barnes act of 1905 is constitutional and that being so the company is bound to charge only a 5-cent fare. During the hearings before the commission Patrick C. Dugan, the company's attorney, argued that the Barnes act is unconstitutional and was contradictory to the company's franchise, which fixed the fare at 6 cents. He also held that in charging the extra cent the company was acting as an agent for the Greenbush Bridge Company and that if it were not permitted to charge the 6 cents it could not pay its operating expenses, let alone dividends. These are the grounds upon which the appeal will be made to the Court of Appeals.

The Trenton No-Seat-No-Fare Ordinance

Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of March 11, 1911, of the appeal of the Trenton (N. J.) Street Railway to the Board of Public Utility Commissioners against the "No-Seat-No-Fare" ordinance which was passed by the Trenton Common Council in April, 1910. This ordinance follows:

"Section 1. It shall be the duty of all corporations operating a line or lines of street railway within the city limits, between the hours of 6 and 9 a. m. and 5 and 7 p. m. of each day, to furnish and run a sufficient number of cars to provide a seat for each passenger from whom a fare is demanded.

"Section 2. That persons desiring transportation thereon shall not be kept waiting longer than 10 minutes.

"Section 3. Any corporation violating the foregoing provision shall forfeit and pay a penalty of \$50 for each offense."

This ordinance was approved by the Mayor on April 9, 1910.

In its appeal to the Board of Public Utility Commissioners the Trenton Street Railway refers to the terms under which its franchise was granted and submits a copy of the no-seat-no-fare ordinance. It concludes its appeal to the board as follows:

"The Trenton Street Railway, being joined herein by the Trenton & Mercer County Traction Corporation, appeals to this honorable board from the ordinance passed by the said Common Council above set forth, and complains that the said ordinance is (1) unreasonable and unjust; (2) in contravention of the rights of the said Trenton Street Railway and the Trenton & Mercer County Traction Corporation; (3) that it is impossible to comply with the directions of the said ordinance, or with the direction of either the first or second section thereof; (4) that it is impracticable for said companies to operate their cars in the manner required by said ordinance; (5) that the practice of passengers standing on the rear and front platforms and in the aisles of the cars has been followed so long as to have become a fixed custom which the said company cannot disregard; (6) that passengers in a hurry to reach their destination are willing to stand on front or rear platforms or in

the aisles of the cars rather than wait for the following car, and such persons have a right to do so which these companies under the provisions of the said ordinance cannot restrain or violate; (7) because any effort on the part of the said companies to comply with the directions of said ordinance and to remove passengers from the cars who refuse to pay their fare would cause a serious inconvenience to the public and perhaps cause disorder; (8) that the Common Council of Trenton had no legal authority to pass the said ordinance or to require the said companies to carry any passengers without the payment of a fare; (9) that to require said companies to carry passengers without the payment of a fare is a violation of the constitution of the State, which forbids the taking of private property for public use without just compensation.

"Therefore, the said Trenton Street Railway and the Trenton & Mercer County Traction Corporation respectfully pray that your honorable board hear said appeal and determine that said ordinance is unfair and unjust and in contravention of the rights of the said companies, and therefore void; and that your honorable board shall make such order in the premises as may seem just and reasonable."

Despite the fact that the no-seat-no-fare matter had been carried to the commission the company on March 10, 1911, was convicted in three instances of violating the ordinance. Justice Harris imposed a fine of \$50 in one case and suspended sentence in the others. Counsel for the company announced that an appeal would be taken. The complaints were made by Councilman Everett Townsend, who is responsible for the ordinance, and by two patrolmen.

The Value of Politeness and Courtesy.

J. S. Moulton, of the Interborough Rapid Transit Company, has contributed to the *Interborough Bulletin* an article, "Keep Your Temper—Make Few Arrests," addressed in particular to the employees of the subway division of the company. The article, however, contains the following advice which is pertinent to employees in general:

"Politeness and courtesy are essential to every business, whether it be a railroad or not, and it is no more trouble to be courteous to a person than it is to be gruff and impolite.

"It is not necessary to lose your temper or speak or act uncivilly toward passengers because they think, rightly or wrongly, that everything should go along smoothly. There should be nothing but the kindest and politest answers to both sane and foolish questions. It is not expected that employees should raise their hats every time a question is asked of them, but it is certainly possible to be courteous and polite in every instance.

"An employee of a railroad is no different from any other human being, and even if a foolish or impertinent question is asked by a passenger he need not reply along similar lines; but he can and should be firm and polite in making his reply. Aggravations are constant, but at the same time an employee in any branch of the service knows when he accepts his position, no matter what it is, that he will meet all sorts of people, and it is not necessary, even in extreme cases, for him to be discourteous.

"Employees should always remember that insults come from ignorance or arrogance. Employees stand a great deal more abuse from the public than the public will stand from them, and this is a condition of the employment accepted at the time they entered the service. Surliness is worse, perhaps, than impoliteness, and goes far toward inciting the public's resentment.

"Another important factor is the neatness of person. It is just as easy to be neat about one's self as it is to be slouchy. When in your opinion you are insulted or harried by a passenger, let the old saying come into your mind, 'When angry count 10 before you speak, and if very angry count 100.' You will find that a civil answer in 9 cases out of 10 will be received by a passenger in the right spirit, and if that passenger does not receive it in the right spirit it is not up to you to argue.

"Another very important thing is the care of the passengers in trains and on stations. A judge has recently said: 'It has been decided that the employees of a railroad are to a very large degree peace officers in charge of that train,

because it has been held that a guard or an employee in uniform of a railroad must see to the safety and comfort of the passengers of that railroad under any and all circumstances.

"Many times employees find themselves in trying situations because of the unreasonable and insulting course of passengers; but if they will remain calm and unruffled they will get out of them with a minimum of annoyance and difficulty. No matter what your provocation, be courteous and civil; speak softly and use your best judgment—make an arrest only when persuasion has failed.

"If an emergency arises demanding quick judgment on a train, for instance, where a passenger is threatened with an assault, it is the guard's duty to protect the peaceful passenger or passengers, if he is convinced that violence or disorder is imminent. Under such circumstances the guard must do all in his power to stop the disorder, and finding himself unable to do so must have such unruly passenger arrested. See to it, then, that you are justified by the facts when you make an arrest, or cause one to be made."

To Enforce Rule Against Smoking.—Conductors of the Gardiner, Westminster & Fitchburg Street Railroad, Gardiner, Mass., have been instructed to enforce rigidly the rule of the company which prohibits smoking on the rear platform of the cars of the company.

Good Accident Record in Ohio.—According to reports filed with the State Railroad Commission of Ohio only one death resulted from accidents on electric railways in February, 1911. Steam roads reported 67 fatalities, of which 27 were to employees, 35 to trespassers, 4 to highway travelers and 1 to a passenger.

Reduction in Speed Recommended.—At the request of the Railroad Commission of Indiana the Evansville & Mt. Vernon Electric Railway, Evansville, Ind., has reduced the speed of its trains between Evansville and Mt. Vernon until certain improvements to the track which are now being carried out are completed.

Service Stripes in Chattanooga.—The Chattanooga Railway & Light Company, Chattanooga, Tenn., has introduced the use of service stripes as a means of recognizing faithful service. Each stripe will indicate two years of service. After a man has served 10 years stars will be used to show the term of service.

City Island Railroad Ordered to Renovate Cars.—The City Island Railroad, which operates between Bartow station, on the New York, New Haven & Hartford Railroad, through Pelham Bay Park, has been ordered by the Public Service Commission of the First District of New York to renovate its horse cars within 30 days from March 3, 1911, so as to make them "rainproof and comfortable."

Souvenir Postals.—The Central California Traction Company, Stockton, Cal., has published for gratuitous distribution a picture postcard which shows a view of the company's reinforced concrete bridge over the Mokelumne River with a Stockton-Sacramento vestibuled train passing over the structure. The span is 110 feet and the bridge is said to be the longest single-span structure of the kind in the Far West.

Complaint Against Oneida Railway.—A complaint has been filed with the Public Service Commission of the Second District of New York against the Oneida (N. Y.) Railway in which it is alleged that the terminal facilities for the city line in Oneida are inadequate; that insufficient cars are operated to accommodate the passenger traffic between Sherrill and Oneida Main Street, and that the arrangement of schedules necessitates long waits at transfer points.

Hudson & Manhattan Railroad Reduces Running Time.—The Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey, has revised its train schedules so that service between Jersey City and Hoboken and points in New York is one minute faster than heretofore. The time between the Lackawanna station at Hoboken and Thirty-third Street, Herald Square, has been cut down from 15 minutes to 14 minutes, and the time from Hoboken to Cortlandt Street from 10 minutes to 9 minutes.

Special Rewards in Memphis for Efficiency.—E. W. Ford, general superintendent of the Memphis (Tenn.) Street

Railway, has announced that the year will be divided hereafter into two periods, the first running from Dec. 1 to May 30 and the second from June 1 to Nov. 30. This year, however, the first period is from March 1 to May 31. Every conductor and every motorman who has a clean accident record and against whom there has been no complaint of inattention or impoliteness or violation of the rules will be paid a bonus of 1 cent an hour for every hour's service during the period. Mr. Ford says that the plan is part of the company's campaign for better and safer service. The first award of prizes will be made on June 15, 1911.

Red Lights at Grade Crossings in Indiana.—The Railroad Commission of Indiana addressed the following circular on March 8, 1911, to all steam and interurban railways: "The Railroad Commission calls your attention to the stop signal for railroad crossings at grade where there is no interlocking plant in use by the Pennsylvania Railroad and Baltimore & Ohio Railroad and some other companies. This stop signal is a red light placed on the right-hand side for an approaching train, showing about five feet above the ground. This light to be used in connection with the stop sign. It can be maintained with very little expense and will be especially useful at grade crossings of railroads out in the country where there is nothing at night to call the engineer's attention to the fact that he is approaching a crossing. The commission hereby requests and directs that railroads operating trains over railroad grade crossings in this State shall adopt and use this light, and that you will report your action in this behalf to the commission."

Accident Record of the Chicago & Milwaukee Electric Railroad.—Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of the letter on accidents addressed to the *Chicago Record-Herald* by E. E. Downs, general manager for the receivers of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. In his letter Mr. Downs said: "I have read with considerable interest the editorial in your issue of Feb. 15, 1911, stating that the Harriman lines had operated their system during 1910 without a fatal accident to a passenger. This, of course, must be very gratifying to the traveling public and a source of satisfaction to every one connected with those lines. These comments by the *Record-Herald* will do a lot toward inspiring public confidence in the management and operation of our great railroads. I notice particularly one paragraph in your editorial referring to the fact that if a small line could operate a year without a fatal accident to a passenger, the result would be considered in itself purely accidental. I do not agree with you in this statement. The Chicago & Milwaukee Electric Railroad has been in operation 13 years and the records of E. H. Vivian, the claim agent, who has been with the company during the entire period, show that during that time we have carried between 75,000,000 and 100,000,000 passengers without a single fatal accident to a passenger."

Ruling by Wisconsin Commission on Fare Case.—Through the courtesy of Thomas Higgins, vice-president and general manager of the Manitowoc & Northern Traction Company, Manitowoc, Wis., this paper has been put into possession of some additional facts in regard to the recent decision of the Supreme Court of Wisconsin in the fare case in Manitowoc against the Manitowoc & Northern Traction Company, reported on page 353 of the issue of Feb. 25, 1911. The history of the case follows: The company first appealed to the Railroad Commission of Wisconsin for permission to increase its rate of fare. The commission replied that the law gave the company permission to establish its own rate of fare, but in case complaint was made to the commission about the rate being excessive or discriminatory the commission would investigate and fix a just and reasonable rate. On the strength of this the company changed its rates and was enjoined by the City of Manitowoc, which claimed that the franchise fixed the fare to Two Rivers and that the Railroad Commission had no jurisdiction in the matter. The Supreme Court held that the commission had jurisdiction, but had not exercised that jurisdiction by fixing a just and reasonable rate and until it did so the old rate of 10 cents must stand. The commission immediately fixed the rate and the company has been charging 15 cents as a just and reasonable rate subject to a future hearing in the case.

Personal Mention.

Mr. E. H. Vivian has resigned as claim agent and traffic manager of the Chicago & Milwaukee Electric Railroad, Chicago, Ill.

Mr. E. E. Downs has resigned as general manager of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., effective April 1, 1911.

Mr. J. B. Duke has been elected president of the Greenville, Spartanburg & Anderson Railway, Greenville, S. C., to succeed Mr. W. J. Thackston, resigned.

Mr. F. E. Brooks has resigned as chief engineer and superintendent of construction of the Oakland & Antioch Railway, Oakland, Cal., the first section of which was placed in operation recently.

Mr. H. M. Winter, who has been connected with the Seattle office of the General Electric Company, has been appointed general sales manager of the lighting department of the Seattle Electric Company.

Mr. A. C. Adams, superintendent of motive power of the Spokane, Portland & Seattle Railway, has also been appointed superintendent of motive power of the Oregon Electric Railway and the United Railways, Portland, Ore.

Mr. John M. Hood, Jr., chief engineer of the United Railways & Electric Company, Baltimore, Md., has sailed for Europe in the interest of the Crown Cork & Seal Company, Baltimore, of which he was recently elected secretary. Mr. Hood expects to be gone about six weeks.

Mr. Charles Murray has been appointed general manager of the Northwestern Railways Company, Meadville, Pa., which has taken over the Meadville & Conneaut Lake Traction Company, the Meadville Traction Company and the People's Incandescent Light Company, of Meadville.

Dr. Johannes Puppe, who was appointed by the German Street & Interurban Railway Association and the rail manufacturers of Germany to study the causes of rail corrugation, is visiting this country to investigate this subject and to pursue special studies for the Siemens-Schuckert Company. The itinerary of Dr. Puppe will include the principal steel and electro-chemical centers as far West as Chicago. He will visit Detroit, Philadelphia, Boston and New York in connection with his investigation into the causes of rail corrugation.

Mr. Sidney Ossoski, who has been secretary of the finance committee of the Chicago (Ill.) Railways for the last three years, has been appointed general claim agent of the company. Mr. Ossoski was born in 1874 in Hornell, N. Y., and was graduated from the Hornell High School and in 1893 from Cornell University. Afterward he was graduated from the Columbia Law School in New York. He also attended the University of Berlin for a year. Mr. Ossoski was admitted to the bar in 1897, at Rochester, N. Y., and practised in New York. He specialized in corporation law until he entered the service of the Chicago Railways.

Mr. J. C. Rockwell has resigned as superintendent of the Charleston Interurban Railroad, Charleston-Kanawha, W. Va., to go to Manila, Philippine Islands in the interests of J. G. White & Company, Inc., New York, N. Y., where he will be connected with the operating staff of the Manila Electric Railroad & Light Company, with the title of superintendent of transportation or general superintendent. Mr. Rockwell was graduated from Cornell in 1904 and from 1904 to 1906 was with the Hurley Tracklaying Machine Company, Chicago, Ill. From 1906 until the end of 1908 he was assistant to the general manager of the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., and since January, 1909, he has been superintendent of the Charleston Interurban Railroad.

Mr. John L. Sullivan has been appointed assistant general freight agent of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., with headquarters at Chicago, Ill. Mr. Sullivan entered the service of the Chicago & Northwestern Railroad 25 years ago and remained with that company for nine years. He next accepted service with the Chicago & Great Western Railroad. After seven years' service with that company he resigned to assist in building the Manchester & Oneida Railway and was general manager of that short line for three years. He returned to the

Chicago & Great Western Railroad as traveling freight agent with headquarters at Fort Dodge, Ia., which position he resigned to become connected with the Fort Dodge, Des Moines & Southern Railway as assistant general freight agent, with headquarters at Chicago.

Mr. Henry W. Thornton, assistant general superintendent of the Long Island Railroad, Long Island City, N. Y., has been elected president of the Northwestern Railways Company, Meadville, Pa., which has recently taken over the Meadville & Conneaut Lake Traction Company, the Meadville Traction Company and the People's Incandescent Light Company of Meadville. Mr. Thornton will retain his connection with the Long Island Railroad. He was born on Nov. 6, 1871, and was educated at the University of Pennsylvania. He entered railway service in 1894 as a draftsman with the Pennsylvania lines west of Pittsburgh. From that time until November, 1899, he was consecutively assistant engineer on construction for the Cleveland & Marietta Railway, topographer attached to the chief engineer's office of the Southwest system of the Pennsylvania lines, assistant in the engineers' corps of the Pittsburgh division of the Pennsylvania lines; assistant engineer in field work attached to the chief engineer's office of the Southwest system; supervisor of yards at Columbus, Ohio; assistant engineer of the Cincinnati division and assistant engineer assigned to special work. From November, 1899, to March, 1901, Mr. Thornton served as engineer of maintenance of way of the Erie & Ashtabula division of the Northwest system of the Pennsylvania lines west of Pittsburgh, and from March, 1901, to May, 1902, he was superintendent of the Marietta division of the Northwest system. From May, 1902, to Dec. 23, 1903, he was superintendent of the Cleveland, Akron & Columbus Railway. Subsequently he served as superintendent of the Erie & Ashtabula division of the Northwest system of the Pennsylvania lines west of Pittsburgh.

Mr. William F. Ham, comptroller Washington Railway & Electric Company, was presented on March 15 by the American Electric Railway Accountants' Association with a testimonial of its appreciation of the valuable services which he has rendered to the association for many years past as chairman of the committee on the Standard Classification of Accounts and in other ways. The committee appointed by the Accountants' Association to make the presentation consisted of Messrs. W. B. Brockway, W. H. Forse, Jr., and H. L. Wilson, and the gift consisted of a handsome silver salad bowl which was engraved as follows: "William F. Ham, from American Electric Railway Accountants' Association. In appreciation, March 15, 1911." The gift was accompanied with the following letter from President Forse of the Accountants' Association: "It is my great pleasure to report to you the action taken by the executive committee of the American Electric Railway Accountants' Association last January, when it was unanimously resolved that the association should present you with a token of its appreciation. The silver bowl which this letter accompanies is the association's birthday present to you. Your services to the association, and through it to the electric railways of America and to the individuals connected with the industry, have been incalculable. No gift can suitably express their value. As an officer of the association and as chairman of the committee on a standard classification of accounts you have been a loyal and efficient executive. Speaking for your associates on the committee, I desire to express their appreciation of your wise counsel, unfailing good nature and broad knowledge of accounting. In the words of Jefferson, 'May you live long and prosper.'" March 15, the day upon which the bowl was received by Mr. Ham, was the anniversary of his birthday.

OBITUARY

William J. Calder, the first president of the East Harrisburg Passenger Railway, Harrisburg, Pa., and secretary and treasurer of the Central Pennsylvania Traction Company, Harrisburg, since its organization, is dead. He was 58 years old. Mr. Calder was elected president of the East Harrisburg Passenger Railway, which is a part of the Central Pennsylvania Traction Company, in 1886, and served in that capacity until 1889, when he became general manager and treasurer. In 1891 he was elected secretary and treasurer of the Central Pennsylvania Traction Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Westchester & Northern Railway, New York, N. Y.**—Incorporated in New York to build an electric railway from the White Plains terminal of the New York, Westchester & Boston Railway northward to Brewster and Danbury. A branch will also be built to Lake Waccabuc and Lake Maliopac. Surveys have been made.

***Erie & Suburban Railway, Erie, Pa.**—Application for a charter has been made in Pennsylvania by this company to build an electric railway between Millcreek and Harborcreek. Incorporators: J. M. Sherwin, W. F. Burgess, Dorman Weaver, H. Schuwerk and Frank Brown.

***Lock Haven & Jersey Shore Railroad, Lock Haven, Pa.**—Incorporated in Pennsylvania to build an electric railway to connect Lock Haven and Jersey Shore, via Dunnstable, Pine Creek, Charlton, Woolrich and Avis.

***Steubenville, Wellsburg & Weirton Railway, Charleston, W. Va.**—Incorporated in West Virginia to build an electric railway from the West Virginia end of the Steubenville (Ohio) bridge to Weirton, W. Va. Capital stock, \$10,000. Incorporators: Frank D. Sinclair, Albert G. Lee, J. G. Wheaton and Michael Keene, all of Steubenville.

FRANCHISES

Contra Costa, Cal.—The Oakland & Antioch Railway, Oakland, has asked the County Council for a franchise to build its railway from Concord to Castle Rock, at the base of Mount Diablo.

Oakland, Cal.—The Oakland Traction Company has asked the City Council for a 35-year franchise to extend its tracks 2 miles on East Sixteenth Street to the Boulevard in Oakland.

Watertown, Ill.—The Moline, East Moline & Watertown Railway, Moline, has asked the Board of Trustees for a 20-year franchise to extend its tracks in Watertown.

Gary, Ind.—The Chicago, South Bend & Northern Indiana Railway, South Bend, has received a franchise from the Board of Public Works to operate its cars into Gary over the New York, Chicago & St. Louis Railroad.

Sheridan, Ind.—The Carmel & Delphi Traction Company has received a 50-year franchise from the Council to build its tracks in Sheridan. This line, when built, will connect with the Logansport division of the Indiana Union Traction Company at Carmel.

Iola, Kan.—D. H. Siggins, president of the Union Traction Company, has received a 20-year franchise from the City Commissioners to build an electric railway in Iola. [E. R. J., March 4, '11.]

Waltham, Mass.—The Boston & Western Electric Railway has asked the City Council for a franchise to build its railway in Waltham. [E. R. J., Jan. 7, '11.]

Lake City, Minn.—The St. Paul Railway Promotion Company, St. Paul, has received a franchise to build its railway through Lake City. This proposed line will connect St. Paul, Park, Hastings, Red Wing and Lake City. W. L. Sonntag, 709 Metropolitan Opera House Building, St. Paul, general manager. [E. R. J., Jan. 21, '11.]

***St. Louis, Mo.**—T. G. Portis, Chas. F. Vogel and E. R. Kinsey have received a franchise from railroad commissioners to build an electric railway in the southwest part of St. Louis, independent of the United Railways.

Brookhaven, N. Y.—The Suffolk Traction Company, Patchogue, has received an extension of time of its franchise from the Town Board of Brookhaven in which to complete its two routes between Brookhaven and Blue Point and Patchogue and Port Jefferson.

Cicero, N. Y.—The Syracuse & South Bay Electric Railway, Syracuse, has received a franchise from the Town Board and Town Superintendent of Highways to build its tracks through Cicero for its proposed extension to Brewerton and Central Square. This company will now ask for a franchise to build its railway through Hastings.

Pleasantville, N. Y.—The Hudson River & Eastern Traction Company, Ossining, has received a franchise from the Board of Trustees to build its track through Pleasantville.

Chillicothe, Ohio.—The Sciota Valley Traction Company, Columbus, Ohio, has accepted the franchise recently granted by the Council at Chillicothe. Work on the construction of the line to the business section of Chillicothe will begin at once. In return the company will erect a depot.

Middletown, Ohio.—The Ohio Traction Company has asked the City Council for a 25-year franchise to build its railway in Middletown.

Toronto, Ont.—The Toronto Suburban Railway has received a 1-year extension of time from the railway committee of the Legislature in which to construct its line from Lambton to Brampton, with an extension from Guelph to Preston and Hespeler, also to Berlin and Hamilton.

Corpus Christi, Tex.—The Corpus Christi Street & Interurban Railway has received a franchise from the City Council to build an extension to suburban parts of Corpus Christi.

Salt Lake City, Utah.—The Utah & Salt Lake Electric Railway, Salt Lake City, will soon ask the County Commissioners and City Councils for franchises to build its proposed 70-mile railway between Salt Lake City and Payson, via Sandy, Draper, Murray, Lehi, Provo, Spanish Fork and Springville. S. Bamberger is interested. [E. R. J., July 23, '10.]

Wheeling, W. Va.—The Pan-Handle Traction Company, Wheeling, has received a franchise from the County Commissioners to build a third rail from the northern limits of Wheeling to Fourth Street, Glenova.

Bellingham, Wash.—The Nooksack Valley Traction Company has received a year's extension of time on its franchise in which to begin work on its railway in Bellingham. It will connect Bellingham, Sumas, Ferndale, Lynden and Blaine. Samuel Alsop, Bellingham, is interested. [E. R. J., March 4, '11.]

South Bend, Wash.—J. O. Crary, representing the Twin City Electric Railway, has accepted the franchise recently granted by the City Council to build its railway through South Bend and extend it to Raymond. [E. R. J., Jan. 28, '11.]

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—About three miles of track will be built by this company during 1911. It will connect Birmingham, Rosedale, Edgewood, Oak Grove and Shades Cliff.

Tidewater Development Company, Birmingham, Ala.—This company has begun work near Corey on its line to connect East Lake with Bessemer and which will pass through the business section of Birmingham.

Bakersfield & Ventura Railroad, Bakersfield, Cal.—About 10 miles of track will be constructed by this company during the year.

Bakersfield & Kern Electric Railway, Bakersfield, Cal.—This company will build seven miles of new line in Bakersfield during 1911.

Los Angeles (Cal.) Railway.—This company has completed and placed in operation the extension of its Main Street line in Los Angeles from Garvanza to Eagle Rock Park.

The Los Angeles-Pacific Railway, Los Angeles, Cal.—This company has leased from the Southern Pacific Company that portion of the latter company's steam road which extends west from Clements Junction to the city limits of Los Angeles, and has requested the City Council for permission to operate it by electricity.

Connecticut Company, New Haven, Conn.—This company is considering plans for building a four-mile extension to Staffordville.

Shore Line Electric Railway, Saybrook, Conn.—About 14 miles of track will be built by this company to connect Guilford and New Haven via North Branford, Totoket and Foxen during the year.

Atlanta Northern Railroad, Atlanta, Ga.—This company is said to be considering plans to build an extension from Marietta to Cartersville via Acworth, Kennesaw, Emerson, Allatoona, Elizabeth, Bartow, Huga, Lena and other stations, thereby making a direct electric line from these points to Atlanta.

Belleville & Mascoutah Traction Company, Belleville, Ill.—About 12 miles of track will be constructed by this company during 1911.

Northern Illinois Electric Railway, Chicago, Ill.—This company will build 25 miles of new line during this year.

Kankakee (Ill.) Electric Railway.—This company will build two miles of new track in Kankakee during 1911.

Moline, East Moline & Watertown Railway, Moline, Ill.—This company will build about three miles of new track in Moline during 1911.

Creston-Winterset Interurban, Creston, Ia.—This company advises that it will only build this year the Creston-Macksburg section of its proposed 23-mile railway to connect Creston and Des Moines. It is expected to begin work in June. It will operate gasoline motor cars for passenger service and steam for freight. Capital stock, authorized, \$500,000. Bonds authorized, two-thirds of capital stock. Officers: R. Brown, Creston, president; Clarence Wilson, Macksburg, vice-president; A. S. Lynn, Arient, secretary; W. W. Walker, Macksburg, treasurer, and C. B. Judd, electrical engineer. [E. R. J., Feb. 25, '11.]

Tri-City Railway & Light Company, Davenport, Ia.—This company has awarded the contract to J. G. White Company for building the line between Davenport and Muscatine via Blue Grass, Pleasant Prairie and Sweetland, a distance of 28 miles.

Forest City & Mason City Railway, Forest City, Ia.—Colonel Baldwin, of the firm of Foults & Baldwin, Mason City, it is said, will finance the proposed railway to be built from Mason City to Forest City via Fertile. [E. R. J., Jan. 21, '11.]

Salina Street & Interurban Railway, Salina, Kan.—This company will build about two miles of track in Salina during the year.

Portland, Gray & Lewiston Railroad, Lewiston, Maine.—This company will resume construction on its extension between Portland and Lewiston as soon as conditions will permit.

Lewiston, Augusta & Waterville Railway, Lewiston, Maine.—Herbert M. Heat, chief counsel for this company and the Rockland, Thomaston & Camden Street Railway, Rockland, announces that it is the intention to build a line in the near future from Togus to Warren, affording direct connection from Augusta to Rockland. This line was given a preliminary survey some years ago and since then local lines have been built from Augusta to Togus, five miles, and from Thomaston to Warren, a distance of six miles. The distance from Augusta to Rockland by the proposed route will be about 39 miles.

Winnipeg, Man., Can.—The Municipal Council of Springfield has decided to construct an electric street railway system and operate it as a municipal system. Work will start in April.

***Winnipeg, Man., Can.**—The Municipality of St. Vital, having failed to come to an agreement with the Winnipeg Electric Railway, will construct and operate a municipal electric railway. Work will be begun this spring.

Boston & Worcester Street Railway, Boston, Mass.—This company will finish double tracking its railway through Framingham during the next few weeks. This will complete the double tracking of its entire line from Park Square, Boston, to City Hall, Worcester. Contracts for all required material have been placed.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company will build 10 miles of new track during the year between Eau Claire and Dowagiac, thereby completing the line from Benton Harbor and Dowagiac.

St. Paul Railway Promotion Company, St. Paul, Minn.—W. L. Sonntag, general manager of this company, advises that surveys have been completed and rights-of-way are being secured for building this proposed railway to connect

St. Paul, Hastings, Red Wing and Lake City. The line to be constructed will be known as the St. Paul Southern Electric Railway. [E. R. J., Jan. 21, '11.]

Kansas City, Olathe, Ottawa & Iola Railway, Kansas City, Mo.—This company will build about 106 miles of new line between Iola and Kansas City during 1911.

Mountain Railway, West Orange, N. J.—About two miles of new track will be built by this company during the present year in West Orange.

Elmira Water, Light & Railway, Elmira, N. Y.—About five miles of track will be rebuilt and one mile of new track will be constructed by this company during 1911.

Lima & Honeoye Electric Light & Railroad Company, Lima, N. Y.—About 43 miles of track will be constructed by this company during the year.

Penn Yan, Keuka Park & Branchport Railway, Penn Yan, N. Y.—This company will place a contract at once for building an 80-ft. trestle on its main line at Branchport. Wm. J. Tylee, Penn Yan, purchasing agent.

Elmira, Corning & Waverly Railroad, Waverly, N. Y.—This company will construct 12 miles of track during this year.

Southern Power Company, Charlotte, N. C.—This company has awarded the contract to Stewart & Jones, Baltimore, to build from Charlotte to King's Mountain, a distance of 35 miles, which is the first link in the interurban line to be constructed. The contract for the next link, from Greenwood to Greenville, S. C., a distance of 90 miles, will be awarded in the near future. Eventually the line will connect Concord, Salisbury, Greensboro and Durham. W. S. Lee, vice-president. [E. R. J., Jan. 21, '11.]

Price Hill Inclined Plane Railroad, Cincinnati, Ohio.—This company has placed a contract for building 500 ft. of trestle work. Construction will begin the latter part of this month. Geo. T. McDuffie, secretary.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—This company has purchased material for electrifying its railway. This 13-mile railway will connect Nelsonville, Gloucester and Athens. Power will be furnished by the Nelsonville Electric Light Company. The capacity of the old plant is being increased by the addition of new equipment. [E. R. J., Dec. 10, '10.]

Hamilton, Waterloo & Guelph Railway, Hamilton, Ont.—This company will build 140 miles of new line to connect Hamilton, Galt, Preston, Berlin, Waterloo, Guelph and various villages during 1911.

Portland Railway, Light & Power Company, Portland, Ore.—This company will build a five-mile extension from West Oregon City to near Oswego and a four-mile extension up the Clackamas River from Cazadeso to site of its new power plant during the present year.

Lehigh Valley Transit Company, Allentown, Pa.—This company has completed the surveys for its extension from Quakertown to Perkasio on the Philadelphia line.

Southwestern Street Railway, Philadelphia, Pa.—This company has completed and placed in operation its new line between Market Street Square, Philadelphia, and Eddystone.

The Jackson Railway & Light Company, Jackson, Tenn.—This company is reported to be considering plans for building extensions to West Jackson and Bemis, suburbs of Jackson, as well as to the West Tennessee experiment station.

Johnson City (Tenn.) Traction Company.—About one mile of new track will be constructed in Johnson City by this company during the year.

Tennessee Rapid Transit Company, Nashville, Tenn.—This company advises that it will soon begin construction on its projected 110-mile railway to connect Nashville, Nolensville, Clarksville, Lewisburg and Springfield. It has organized by electing the following officers: Richard T. Wilson, Nashville, president; Robert L. Burch, vice-president, and Joseph Frank, Nashville, secretary. [E. R. J., Jan. 7, '11.]

Beaumont (Tex.) Traction Company.—This company will place contracts during the next few weeks for building about 2 miles of double track through the business section of Beaumont. C. H. Kretz, general manager.

Denton (Tex.) Traction Company.—This company will place contracts during the next few weeks for building about 2 miles of new track in Denton. R. J. Wilson, general manager.

Galveston-Houston Electric Railway, Houston, Tex.—The Pearson Company is building for this company a 1900-ft. steel and concrete viaduct over the Santa Fé Railroad tracks about four miles out on the Leeland Road from Houston.

San Antonio & San José Interurban Railway, San José, Tex.—This company advises that it has begun construction on its proposed 5-mile electric railway to connect San Antonio and San José. The company will operate 2 cars and it will purchase power from the San Antonio Traction Company. Bonds authorized, \$20,000. Bonds issued, \$20,000. Officers: A. D. Powers, San José, owner; J. D. Powers, Jr., San Antonio, purchasing agent, and G. W. Nock, San Antonio, chief engineer. [E. R. J., Jan. 21, '11.]

Citizens Railway, Waco, Tex.—This company is now building two concrete bridges and two miles of railway in Waco.

Utah Light & Railway Company, Salt Lake City, Utah.—This company will build 5 miles of single track from Salt Lake City to Holliday. The company will do its own work and will not let any contracts.

Rutland Railway, Light & Power Company, Rutland, Vt.—This company which is now building an extension from its Fair Haven to Rutland line, will extend its railway nine miles from Fair Haven to Whitehall. In preparation for this the company is building up the Carver's Falls power plant in Whitehall to furnish power for this extension.

Graham (Va.) Electric Railway.—It is reported that this company is making preliminary arrangements for building its proposed railway in Graham and has organized by electing the following officers: J. F. Dudley, president; C. W. Keister, vice-president; R. B. Williamson, secretary, and John Gose, treasurer, all of Graham. [E. R. J., July 9, '10.]

Roanoke Railway & Electric Company, Roanoke, Va.—This company has begun work on its 1½-mile extension to Raleigh Court, a suburb of Roanoke.

Twin City Light & Power Company, Centralia, Wash.—About 10 miles of track will be constructed through the Chehalis and Big Balton section by this company during this year.

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—A three-mile extension will be built by this company through Asage during the year.

SHOPS AND BUILDINGS

Los Angeles (Cal.) Railway.—Revised plans have been completed by this company for its new car houses to be built in Los Angeles. The structure will be one story, 350 ft. x 625 ft., of reinforced concrete construction.

Rockford & Interurban Railway, Rockford, Ill.—This company will build during the next few weeks a fireproof operating car house at Rockford.

Indiana Union Traction Company, Anderson, Ind.—This company is preparing plans to build a one-story and basement brick interurban depot at Winchester. The cost is estimated to be about \$10,000.

Evansville Suburban & Newburgh Railway, Evansville, Ind.—A new passenger and freight station will be built by this company in Newburgh. Contracts will be awarded during the next six weeks. G. Muhlhausen, Evansville, general manager.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—This company is considering plans for building a two-story brick passenger and freight station at Shelbyville. Charles L. Henry, Indianapolis, general manager.

Louisville & Interurban Railway, Louisville, Ky.—This company has placed in service its new freight depot at Brook Street and Green Street in Louisville. The building is 300 ft. x 40 ft., of fireproof construction and contains four tracks. This relieves the main depot on Jefferson Street, between Third Street and Fourth Street, of congestion, and also terminates the use of the old depot of the Louisville & Eastern Company, which was recently taken over by the Louisville & Interurban Railway.

Muskegon Traction & Lighting Company, Muskegon, Mich.—This company has closed a 10-year lease for a waiting room and four suites of offices in the Houseman Building in Muskegon.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company will build a new car house within the next few weeks. The work will be done with its own force.

Sciota Valley Traction Company, Columbus, Ohio.—This company will build its new depot at Chillicothe as soon as the title for the site can be secured. The structure will be of brick and stone, fireproof, with train sheds. The estimated cost of the building and land is \$40,000.

Hummelstown & Campbelltown Street Railway, Hershey, Pa.—This company is considering plans for building a car house in Lebanon.

Utah Light & Railway Company, Salt Lake City, Utah.—This company expects to complete during the summer its new car house, machine shops, carpenter shops, paint shops and store house. The contracts are all let and much of the work is completed.

POWER HOUSES AND SUBSTATIONS

Augusta-Aiken Railway & Electric Company, Atlanta, Ga.—This company has purchased from the Westinghouse & Electric Manufacturing Company, through the J. G. White Company, one switchboard and several transformers for its power plant in Augusta.

Connecticut Valley Street Railway, Greenfield, Mass.—This company expects to purchase within the next few weeks one 500-kw rotary for its power house in Greenfield.

Worcester Consolidated Street Railway, Worcester, Mass.—This company has completed and placed in operation its new power station in Millbury. The full development of the new plant is 5500 kw.

Gulfport & Mississippi Coast Traction, Gulfport, Miss.—This company will place contracts during the next two weeks for building a 15-mile, three-phase, high-tension transmission line, 13,200-volt. W. F. Gorenflo, Gulfport, general manager.

New York & Long Island Traction Company, Hempstead, N. Y.—This company is in the market for one 750-kw rotary converter and three transformers.

Portland Railway, Light & Power Company, Portland, Ore.—This company has placed an order with the General Electric Company for six 1000-kw motor generator sets. Four of these will furnish power to the railway and each will consist of a 1060-hp, 10,000-volt, 3-phase synchronous motor connected to a 1000-kw, 600-volt, direct-current generator. The other two will furnish power for lighting. This company has just installed a 500-kw frequency changer at its Portland power house.

Hummelstown & Campbelltown Street Railway, Hershey, Pa.—This company is considering plans for constructing a power plant in Lebanon.

Beaumont (Tex.) Traction Company.—This company expects to purchase during the next few weeks one 250-hp boiler for its power house in Beaumont. C. H. Kretz, general manager.

Galveston-Houston Electric Railway, Galveston, Tex.—This company has begun the erection of its subsidiary power station at South Houston. The steel superstructure of the main power station at La Marque is finished and the other work on the plant is making good progress.

Citizens' Railway, Waco, Tex.—This company is now installing a 2000-kw turbine, a 300-kw rotary, a 4500-lb. surface condenser and is in the market for storage battery and a 500-600-lb. water tube boiler.

Graham (Va.) Electric Railway.—A power plant will soon be built by this company in Graham. Plans are being considered for the development of water power near Burkes Garden. J. F. Dudley, Graham, president. [E. R. J., July 9, '10.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The power plant of this company at Racine was recently destroyed by fire, causing a loss of about \$125,000. It is expected that power for the present for operating the system will be secured from the plant of the company in Milwaukee.

Manufactures & Supplies

ROLLING STOCK

Denton (Tex.) Traction Company is in the market for two new cars.

Rockford & Interurban Railway, Rockford, Ill., is in the market for trucks for four rebuilt cars.

San Francisco, Oakland & San José Railway, Oakland, Cal., is in the market for 25 passenger cars.

Oklahoma (Okla.) Railway, through J. G. White & Company, has issued specifications for 10 center-entrance steel cars.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y., has ordered 10 Brill 39-E trucks from The J. G. Brill Company.

Carolina Power & Light Company, Raleigh, N. C., has ordered five 12-bench open motor car bodies from The J. G. Brill Company.

Municipal Street Railway, Regina, Sask., has ordered a number of passenger cars from the Brush Company, Loughborough, England.

United Railroads of San Francisco, San Francisco, Cal., will reconstruct the cars of all its Market Street lines to the pay-as-you-enter type.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill., has ordered five motor cars and 10 Brill 27-MCB-2 trucks from the American Car Company.

Atchison Railway, Light & Power Company, Atchison, Kan., has ordered one 18-ft. 3-in. semi-convertible car body and one Brill 21-E truck from the American Car Company.

Hudson & Manhattan Railroad, New York, N. Y., has ordered for the Newark extension six additional GE-212 four-motor equipments, with type M control, from the General Electric Company.

New York, Westchester & Boston Railway, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 25, 1911, as being in the market for a number of cars, has placed an order with the Pressed Steel Car Company for 30 all-steel passenger cars.

Boston & Worcester Street Railway, Boston, Mass., has received from the Osgood-Bradley Car Company five closed cars, mounted on Standard trucks and equipped with GE-219 motors. This company also reports that it has placed an order for eight more sets of trucks with the Standard Motor Truck Company.

Portland (Maine) Railroad has recently ordered three closed motor cars and three 12-bench open cars from The J. G. Brill Company, for which the following details have been specified:

Closed cars:

Seating capacity.....36	Couplers.....Brill
Weight (body).....12,000 lb.	Curtain fixtures,
Length of body.....28 ft.	Curtain Supply Company
Over platforms.....38 ft.	Curtain material...Pantasote
Width over sills...7 ft. 5 in.	Destination signs ....4-sided
Width over all...7 ft. 7½ in.	Gongs.....Dedenda
Height, rail to sills...32¼ in.	Journal boxes.....Brill
Body.....Wood	Motors.....G.E.-80
Interior trim....Mahogany	Registers.....Inter.
Headlining.....Oak veneer	Sanders.....Brill "Dumpit"
Roof.....Monitor	Seats.....longitudinal
Underframe.....Wood	Seating material.....plush
Axles.....Brill	Springs.....Brill
Bumpers.....Brill	Trolley catchers....Wilson
Car trimmings.....Bronze	Trucks, type.....27-GE1

Open cars:

Seating capacity .. .. .60	Car trimmings.....Bronze
Weight (body).....12,000 lb.	Couplers.....Brill
Bolster centers....22 ft. ¾ in.	Curtain fixtures.....Acme
Length over platform,	Curtain material.....duck
34 ft. ¾ in.	Destination signs ....4-sided
Width over sills...7 ft. 7½ in.	Gongs.....Dedenda
Height, rail to sills...30½ in.	Journal boxes.....Brill
Interior trim.Cherry and ash	Motors.....GE-80
Headlining.....Oak veneer	Sanders.....Brill "Dumpit"
Roof.....Monitor	Springs.....Brill
Underframe.....Wood	Trucks, type.....Brill 39-E

TRADE NOTES

Union Spring & Manufacturing Company, Pittsburgh, Pa., has removed its offices from the Farmers' Bank Building to the Oliver Building.

B. M. Rollins Company, Kankakee, Ill., has received an order from the Durham (N. C.) Traction Company to install one No. 3 coaster at its park at Durham.

Consolidated Car-Heating Company, New York, N. Y., has received an order from the Hudson & Manhattan Railroad to equip 36 new cars with panel type and cab heaters.

McKeen Motor Car Company, Omaha, Neb., has received an order from the Sand Springs Interurban Railway, Tulsa, Okla., for one 70-ft. motor car. Three 70-ft. motor cars have just been shipped to the Southern Pacific Railroad under their own power.

Western Electric Company, New York, N. Y., has issued a report for the first two months of 1911, which shows a marked increase in business. The gross business in February alone was more than 20 per cent larger than the corresponding month last year.

The J. G. Brill Company, Philadelphia, Pa., has made a shipment of 10 Brill 21-E trucks to the Yokohama Electric Railway, Yokohama, Japan, and also another shipment of 10 Brill 21-E trucks to the Compagnie Générale des Tramways Electriques de Rosario, Argentina.

Kennicott Company, Chicago, Ill., has equipped its works at Chicago Heights, Ill., for the manufacture of all-steel structural freight cars, steel underframes for freight and passenger equipment, steel reinforcements for wooden cars, steel tank cars, trucks and special steel construction of all kinds.

A. B. Sanders, Philadelphia, Pa., announces that he has severed his connection with John B. Watson, as manager of the electrical department, and has established a business under the name of A. B. Sanders & Company, engineers and brokers, with offices in the Witherspoon Building, Philadelphia, Pa.

National Association of Credit Men, New York, N. Y., has issued a pamphlet containing an address by W. L. Brownell, treasurer of the Crocker-Wheeler Company, entitled "Should Terms of Payment Be Enforced?" This address was delivered before the Newark (N. J.) branch of the association.

Pawling & Harnischfeger Company, Milwaukee, Wis., at a recent meeting of its board of directors elected S. H. Squier a director and secretary of the company. W. H. Hassenplug, sales manager, was elected a director and second vice-president, and F. P. Breck also associated with the company for many years was elected a director.

National Brake & Electric Company, Milwaukee, Wis., has appointed W. H. Beattys western district manager of the company, with offices in the First National Bank Building, Chicago, Ill. The territory covered by this office is from Detroit, Mich., to the Pacific Coast. Mr. Beattys was formerly connected with the Westinghouse Electric & Manufacturing Company.

Union Swith & Signal Company, Pittsburgh, Pa., called a meeting of the stockholders for March 14, 1911, to vote on the question of authorizing the directors to set aside \$100,000 of the \$500,000 of unissued common stock of the company authorized by the shareholders on Dec. 14, 1910, for subscription by present and future employees on terms to be fixed by the directors.

Consolidated Concrete Tie Company, Cairo, Ill., has been organized to manufacture concrete ties under the Cowan and Sneed patents. The capital stock of the company is \$100,000, and the officers are: J. R. Sneed, president; A. E. Reader, first vice-president; D. W. Heilig, second vice-president; H. B. Eshleman, secretary and treasurer, and R. J. D. Cowan, general manager.

H. W. Johns-Manville Company, New York, N. Y., has placed on the market a line of cements for use in furnace settings of various types, cupolas, lining brass furnaces, assayers' crucibles, oil burning, tilting and rotary furnaces, and for patching and facing bricks in place in the fire zone under various conditions. These cements are rated to resist a temperature as high as 3000 deg. Fahr.

Wilmington Institute Free Library, Wilmington, Del., writes that it has perfected arrangements for filing and cataloging trade catalogs and that it would be glad to receive such catalogs from all manufacturers. The library proposes to maintain a collection of catalogs similar to the one in the Newark Public Library, Pratt Institute Free Library and others throughout the country.

Cambria Steel Company, Johnstown, Pa., has issued its annual report for the fiscal year ended Dec. 31, 1910, which shows earnings, after all expenses had been deducted, of \$5,461,336 in 1910, as compared with \$3,329,849 in 1909. The net income in 1910 was \$4,553,332, as compared with \$2,538,087 in 1909. In 1910 the dividends paid out were \$2,250,000, as compared with \$1,800,000 in 1909. The balance in 1910 carried to profit and loss was \$113,294.

Albert B. Bowman, St. Louis, Mo., announces that G. H. Blackman has become connected with the business, the new name of the firm to be Bowman-Blackman Machine Tool Company. The firm also reports that it will continue the manufacture of boring and turning mills, pulley lathes, bolt cutters, milling machines, planers, sharpeners, drill presses and grinders, cold saws, punches and shears, steam hammers, forging and air riveting machines, electric and hand cranes, hydraulic presses, foundry cupolas and equipment, etc.

Warren Electric & Specialty Company, Warren, Ohio, recently shipped a carload of incandescent lamps to the Interborough Rapid Transit Company, New York, N. Y. The aggregate number of lamps in the shipment was 41,000, of which 15,000 were series-burning Mazda lamps, and 26,000 were of the carbon filament type. The Mazda lamps, which are all of the 40-watt, unskirted base type, will be chiefly used in the lighting of subway stations, while most of the carbon filament lamps, which were of the 64-watt and 115-watt types, will be used for car lighting.

Hale & Kilburn Manufacturing Company, Philadelphia, Pa., has elected F. H. Greene president of the company, to succeed Henry S. Hale. Mr. Greene was born April 3, 1868. At the age of 17 he entered the employ of the Grand Trunk Railroad. Since then he has been consecutively chief clerk in the general stores department of the Chicago & Northwestern Railroad, secretary to the superintendent of motive power and traveling auditor in charge of material and supplies. In July, 1899, he accepted a position as secretary to the superintendent of motive power of the Lake Shore & Michigan Southern Railroad. From 1900 to 1906 he was purchasing agent of the Lake Shore & Michigan Southern Railroad, the Lake Erie & Western Railroad and the Indiana, Illinois & Iowa Railroad, with offices at Cleveland, Ohio. At this time Mr. Greene accepted the position of general purchasing agent for the New York Central & Hudson River Railroad, which he held until a short time ago, when he was elected president of this company.

Ackley Brake Company, New York, announces the formation of its German company under the name of "Deutsche Ackley Bremsen Company m. b. H.," with registered offices at Krausenstrasse 42-43 Berlin S. W. 19. The object of this new company is to control the Ackley brake patents in Germany, Russia, Austria-Hungary, etc. The demand for Ackley brakes in these countries is so great as to necessitate suitable arrangements being made for the manufacture of the brakes in these countries in order that the trade be properly supplied. All these arrangements have been completed and with the launching of the new company manufacturing has been commenced on a large scale. Eugen Eichel, who has acted as consulting engineer of the company for Continental Europe during the past year, has been appointed managing director of the new company with offices at the above address. Mr. Eichel's wide knowledge and experience in tramway and railway matters especially fits him to the post to which he has been appointed and the success of the Deutsche Ackley Bremsen Company m. b. H. under his management is practically assured.

ADVERTISING LITERATURE

Hall Signal Company, New York, N. Y., has issued a catalog on relays for use in signal work.

Strong, Carlisle & Hammond Company, Cleveland, Ohio, has issued a small catalog describing the Strong steam traps.

Railway Improvement Company, New York, N. Y., has issued a large post card giving several reasons for using the coasting time recorder.

Bayonne Casting Company, Bayonne, N. J., has issued a small catalog describing "Monel Metal," the forms in which it is sold, its uses and physical properties.

MacGovern, Archer & Company, New York, N. Y., have issued their list of electrical and steam machinery, power-house equipment, cars, etc., for March, 1911.

Electric Service Supplies Company, Philadelphia, Pa., has issued the "Keystone Traveler" for March, 1911, containing articles on "The Transition Point," "Garton-Daniels Arresters," "Protected Rail Bonds" and "Pay-Within Cars."

Pettingell-Andrews Company, Boston, Mass., discussed in the March issue of *Juice* the following, among other subjects: "Long Leaf Southern Pine Cross-Arms," "Insulator Specifications," "Economy in Flaming Arc Maintenance," "Entrance Cut-Outs for National Code Fuses," "Opalux" Glassware and "Mueller Insulated Clips."

Under-Feed Stoker Company of America, Chicago, Ill., has published "The Publicity Magazine" for March, 1911, which is devoted to the interests of the Jones stoker. It contains views and descriptions of several recent installations of the Jones stoker in large office buildings, and also a coal curve plotted to show the relation of per cent of fixed carbon per pound of combustible, dry and free from ash, to the b.t.u. per pound of combustible.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued circular No. 1028, describing the new self-starting rotary converters, supplied with mechanical oscillators and speed-limit devices. The circular contains a view of a Westinghouse 3000-kw rotary converter, installed in a substation of the Interborough Rapid Transit Company, mentioned in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 83, and shows a portable substation for the Ft. Wayne & Wabash Valley Traction Company.

De Laval Steam Turbine Company, Trenton, N. J., has published a catalog containing a discussion of the practical thermodynamics of the steam turbine and of the bearing of various types of construction upon ultimate efficiency. There are also numerous illustrations of the several applications of steam turbines in driving a.c. and d.c. generators for belt and rope drives, etc., and a chapter on low-pressure and mixed-flow turbines for the utilization of exhaust steam and of low-pressure vapors from industrial processes.

E. R. Stout, financial secretary of the Louisville Railway Relief Association, reports that for the year ended Dec. 31, 1910, the association paid out a total of \$3,725. Sick claims amounting to \$2,555 were paid to members and death claims for the year amounted to \$875. The general expenses of the association amounted to \$102, and the salaries of the two secretaries amounted to \$192. The total receipts for the year were \$5,516.87, of which \$3,780 was collected as dues, \$126.87 interest on reserve fund, \$10 was donated by Prof. B. B. Huntton, \$600 by the Louisville Railway, and \$1,000 by J. B. Speed.

The Board of Public Utility Commissioners of New Jersey on March 21, 1911, in Trenton, will hear the case of the South Englewood Improvement Association, which has requested that the fares over the line of the New Jersey & Hudson River Railway & Ferry Company, from Edgewater Ferry to Englewood be reduced from 10 to 5 cents. The Public Service Corporation, which controls the New Jersey & Hudson River Railway & Ferry Company, replied as follows to the request for the reduction in fare: "This respondent, New Jersey & Hudson River Railway and Ferry Company, is not obligated to answer the above complaint because it avers that it is not charging any unauthorized or unlawful fee for the transportation of passengers over the section of road specified in the above-named complaint, and, therefore, this commission has no authority in the law to grant the prayer of said petition or to investigate the complaint therein made."

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CONTENTS.

Controversies Eliminated in St. Louis.....	487
Personal Relations with Patrons.....	487
Brake Setting and Energy Consumption.....	488
Shortening Car Routes in Proportion to Traffic Density.....	488
The Electrification of Railroads.....	488
Franchise Taxation in New York.....	489
Car Building and Repair Shops of the Chicago Railway.....	490
Harper Avenue Yards of the Detroit United Railway.....	494
Electrical Night at the New York Railroad Club.....	495
Annual Convention of Maintenance of Way Association.....	497
Electrification of Railroads Discussed at Boston.....	501
Meeting of Joint Freight and Express Accounting Committee of Accountants and Transportation Associations.....	501
Meeting of the Central Electric Accounting Conference.....	502
Inter-line Accounting.....	503
Asphaltic Oils as Economical Wood Preservatives.....	504
Wheel Turning.....	505
Conferences on Interurban Operation.....	506
The Development of Long-Distance Travel.....	507
New York Meeting of Committee on Power Generation.....	508
Convention of the Railway Signal Association.....	508
Economical Limits for Flange Wear on Steel Tired and Rolled Steel Wheels.....	509
Operation of Ohmer Fare Registers in City Service.....	510
Building Up of Interurban Territory and Methods of Stimulating Summer Traffic.....	513
Report on Joint Use of Poles.....	515
Quarterly Meeting of New York Association.....	516
News of Electric Railways.....	529
Financial and Corporate.....	535
Traffic and Transportation.....	537
Personal Mention.....	539
Construction News.....	541
Manufactures and Supplies.....	543

Controversies Eliminated in St. Louis

Under the proposed settlement ordinance in St. Louis all points which have been in controversy between the United Railways Company and the municipality will be eliminated. The principal long-standing difficulty which it was desired to remove through the negotiations between the two interests related to the mill tax under the ordinance which became effective in 1904. The city has endeavored to secure a judgment in court which would be enforceable against the company, and litigation in reference to the proposed tax has been continuous. Under the form of the ordinance upon which the company and the committee representing the municipality have now agreed, material concessions are made by each side, with the result that new conditions which are reasonable and workable are evidently to be adopted. While the city secures increased and definite compensation from the company, new conditions relating to transfers and additional facilities and a provision for municipal regulation are embodied in the agreement. Through a Board of Supervision the city is to undertake a direction of the affairs of the company which will bear upon questions of operation. The elimination of small differences between the company and municipality is a long step toward that ideal state of co-operation which is essential to the proper handling of the difficult questions of transportation in a developing city.

Personal Relations with Patrons

The paper read by Raymond H. Smith before the Street Railway Association of the State of New York at its meeting this week points out very suggestively the advantage of the use of personal effort with individuals who may produce or influence increased traffic. The large railway system that reaches many communities scattered through a number of States must depend upon general advertising for a large part of its results, but the interurban line of comparatively small mileage is able to attain a closeness of relation with its patrons which is not possible for a company with extended mileage. Mr. Smith advises that the traffic man interest himself in the active development of the towns and villages reached, and there is no doubt that the influence of one individual, supported by a railroad company, can do a good deal to stimulate increased public concern in civic affairs. The suggestion is made in the paper that while it is natural to concentrate effort in directions that will produce quick results, the prospects that will yield returns only in the future should not be neglected. It is a weakness in any business organization if sight is lost of future possibilities which can be realized only by the expenditure of attention and money many years before any direct results can be seen. Ordinarily the promotion of a new line of interurban railroad is made possible because of faith in future development. Some measure

of the efforts of the officials of the property should be directed in avenues that can yield no tangible returns for years, but that nevertheless will advance the day of far greater traffic possibilities for the property.

Brake Setting and Energy Consumption

There is no doubt that wrong brake setting largely increases the total amount of energy required to propel a car. The waste from this cause is often not realized on the ordinary electric railway system because the motorman has so much extra motor capacity at his command that such a defect as dragging brake shoes is of no concern to him. It has remained for a large user of storage battery cars, the Third Avenue Railroad, New York, to determine with measurable certainty the real bearing of proper brake adjustment on the power requirements. All but one of this company's storage battery cars carry the same number and size of accumulators and consequently begin the day's work with the same supply of energy. If other conditions are equal each car should make approximately the same mileage with the same charge. It was soon observed, however, that the equipments of some of the cars were fully discharged long before they had made the calculated mileage possible under correct operating conditions. Investigation disclosed the fact that these losses were due to tight brakes and that merely by eliminating unnecessary brake friction the radius of action of one car was raised 60 per cent. The effect of the brake setting was also determined experimentally by means of drawbar tests by which variations of several hundred pounds in drawbar pull were noted. This trial is of special interest in view of the same company's decision to equip all of the cars on one of its conduit lines with coasting clocks. One can hardly expect that on city streets with obstructive wagon traffic such a device, even if watched with the greatest care, will effect so great a saving in energy as on elevated or interurban lines where many chances exist for coasting. Nevertheless, when the motormen realize that their methods of operation are being checked, they will appreciate the necessity of paying more attention to the setting of the brakes because the latter must strongly influence the coasting records.

Shortening Car Routes in Proportion to Traffic Density

One of the chief difficulties in the operation of large urban railway systems is to proportion the car service to the density of traffic. The advantages of avoiding car mileage which is either dead or characterized by exceedingly limited patronage are self-evident, and progressive transportation officials are devoting more and more time to the important problem of cutting down the volume of unprofitable service. The policy of shortening car routes in proportion to the traffic density gives promise of considerable success if the car service is controlled closely. There is no logical reason for running a heavy car of large carrying capacity to the extremes of a system where the density of population, and hence of patronage, falls off rapidly as the distance from the urban center increases. In one specific case it was found that the building of a loop in a square and the reduction of several through trips per day by shortening the route enabled the company to dispense with the purchase of two additional semi-convertible cars, without sacrificing the quality of service rendered. A cross-over already existed a short distance beyond the location of the loop, but it was found that with a car moving over the line every 60 seconds the

time required to change ends at the cross-over interfered with the schedules of the through cars. By cutting off about 2 miles of the through trip for certain cars the company found that the daily saving amounted to \$3.06 in wages, \$1.50 in power, \$2.50 in car and track maintenance, or about \$2,100 per year, with a further saving of about \$2,043 per year in interest, depreciation and taxes upon the two additional cars which would have been required had the old plan of operating every trip to the limit of the system been followed. The cost of building the loop was about \$6,000, so that its construction at an annual saving of about \$4,100 would pay for itself in less than two years.

THE ELECTRIFICATION OF RAILROADS

The annual electrical night of the New York Railroad Club gave remarkable evidence of the change in viewpoint that can be produced by practical experience. Time was when the active railroad men at such a gathering were of very dubious mind regarding the introduction of electric traction, looking at it either as a fad not to be encouraged by those engaged in the serious work of transportation or as a very disagreeable necessity which had unwillingly to be endured. Last week, however, the practical railway men voiced a very cheerful optimism, while the conservative rôle was left to the electrical engineers. Of a specially encouraging tone were the statements of Mr. McCrea, of the Long Island Railroad, and Mr. Murray, of the New York, New Haven & Hartford Railroad. The communication of the former was practically the first contribution which we now recall to have been made in this country to this much debated subject from a steam railroad transportation manager. As such it possessed peculiar interest because hitherto all of the discussions have represented primarily engineering points of view. Mr. McCrea spoke with enthusiasm of both the reliability of the electrical equipment and the results obtained from its use, and emphasized the point which we have often made, that the best results can be secured only when steam operation is forgotten and full advantage is taken of the transportation possibilities of the multiple unit system. Mr. McCrea went so far as to state frankly that the present service on the Long Island Railroad could not be duplicated with any degree of efficiency if the road were to revert to steam. In particular, a great increase of yard area would be necessary, and the terminal operation would become very troublesome. Altogether it was a most instructive and encouraging statement.

Equally optimistic was the report of Mr. Murray, representing another type of equipment operated under still different conditions. The New Haven road is now operating 100 miles of single track, including its yards, and is engaged in electrifying 272 miles more on the same system. Still further, it is working out the equipment of this large mileage on the theory of ultimate extension of the main line electric service clear through to Boston. The system had proved itself so thoroughly reliable that the delays due to electrical causes were very trivial. He emphasized this point by stating that if a transcontinental train were credited with only that proportion of delay which was the average delay rate of all the electric trains operating on his system that train could go from New York to San Francisco and back eleven times with just three minutes charged up for electrical delays.

It is certain that the earlier difficulties with electrical equipment have been pretty thoroughly overcome, and it seems to be

generally agreed both by practical railway men who have had experience with electric traction and by electrical engineers that the electric service has proved extraordinarily reliable. Mr. Gilliam, electrical superintendent of the New Haven road, emphasized especially the saving of time that is actually accomplished by the use of electric locomotives and in particular the saving in energy that could be obtained by judicious coasting. Each railway man in fact had full confidence in the system of electric traction he was using and was entirely satisfied with the results. If the situation was different and each operating manager and operating engineer thought that there might be merit in some other electrical system, but did not care particularly to recommend his own, there would be reason for pessimism. But the single-phase engineer is enthusiastic over single-phase operation and wishes all roads to standardize along that system. The three-phase engineer and the direct-current advocate feel the same way about the systems with which they are best acquainted. From an operative standpoint such a situation leaves little to be desired.

As to the extension of electrical service a particularly keen and pertinent suggestion came from Mr. Sprague, who deprecated the tendency to confuse necessary terminal improvements with the cost of electrification which would accompany them. True enough, the terminal improvements could not readily be made without electricity, but they were in and of themselves necessary and desirable, and the fact that electrification facilitated them is one which was to the credit of electric traction, rather than otherwise. It seems to us that in calling attention to this particular matter Mr. Sprague put his finger on the real difficulty of the electrification situation. There is no material trouble about getting reliable and efficient electrical motive power by any one of several now well-tried systems. If, however, the whole service about a city is to be electrified, concurrent changes of a very extensive character become desirable, not on account of electrification but as a part of the general improvement, and it certainly is not fair to consider the great expense of such improvements as in any way due to the electrification as such, nor is it right to discourage complete renovation of terminal facilities in terms that ascribe the chief expense to electrical equipment.

There is something of this error mixed up in many discussions upon the electrical equipment of steam railroads. It is of course perfectly true that if such electrical equipment is merely to do the same work as the steam equipment which it replaces the change may appear sometimes economically disadvantageous. On the other hand, there is very little doubt that if the operation of that same section of road, after electrification, is conducted so as to take full advantage of the traffic-developing possibilities of the electrical system the results will be astonishing in their favorable character. We should like to see the following experiment tried in some such case. Let a typical suburban division with a heavy passenger traffic on which the present owners claim to be sustaining a loss be leased to the local electric railway company at such modest price as would be appropriate for a service now losing money. Then let the electric railway company electrify and operate the line at its own expense and divide the net profits with the original owners as a bonus on the lease. We do not believe that any steam railroad would be willing to give up its alleged money-losing suburban service on any such terms, but it would be a most interesting experiment and profitable for the lessee.

Certainly electrification is coming along. Its progress is not

so fast as its friends would wish, but we have yet to hear of any road that has tried it being tempted to go back to steam.

FRANCHISE TAXATION IN NEW YORK

Taxes have been in force ever since governments were established, or as far back as there is authentic history, yet so far as evidence goes they are paid with no greater relish now than when the British government tried to tax the tea of the American colonists or when the ancient Israelites groaned under the imposts of Pharaoh. In 1899 the Legislature of New York State discovered, under the guidance of Theodore Roosevelt, a brand new subject for assessment and taxation, namely, public utility franchises, and ever since that time the courts of the State have been endeavoring to determine how much a franchise is worth and when it begins to have value. Light was thrown on the latter subject, so far as electric railway franchises are concerned, by a decision just rendered by the Appellate Division of the New York Supreme Court in the case of the assessment of the Hudson & Manhattan Railroad. The full and complete method of determining values as practised by the Tax Commission, however, is still as much of a mystery as is the moral code of the ancient mound builders. The court decided that the commission is not obliged to disclose the ways by which it reaches its conclusions of value. All that an aggrieved person can do is to assume the burden of proof that the final valuation placed upon his property is too high.

While in this respect the opinion is disappointing, we can derive from it some knowledge of the proper methods of valuating franchises for tax assessment purposes, although this information is mostly of a negative character. One principle enunciated by the court is that the net earnings rule is only one of many ways in which the value of property may be measured. In this particular instance the question of net earnings had no bearing upon the case because the suit was brought upon a franchise assessment made before the line was put in operation. Another point decided was that the uses to which a franchise is put, or is to be put, have an important bearing on its value. Thus, the evidence in the case under discussion indicated that although the Pennsylvania tunnel cost much more per mile than that of the Hudson & Manhattan Railroad it was assessed at a lower rate per mile. But the record did not show that the Pennsylvania tunnel was intended to be in itself a direct revenue producer or anything more than an additional convenience to the public or an advertisement and indirect benefit to the system of which it is a part. This fact, the court considered, was an important one and differentiated the Pennsylvania installation from that of the Hudson & Manhattan Railroad, which was a separate enterprise and was intended as a distinct revenue earner by itself.

We believe that the Tax Commission could very properly disclose its methods of determining the value of franchises—indeed, that it should be compelled by legislative act to do so. There is nothing of a similar mysterious policy in connection with real estate taxation. There any property owner can determine for himself with fairly close accuracy how his assessment compares with that of the owners of other property of the same character. But with the present esoteric methods of assessing franchise taxes great injustice may be committed by the Tax Commission with practically no means of redress on the part of the aggrieved persons or companies.

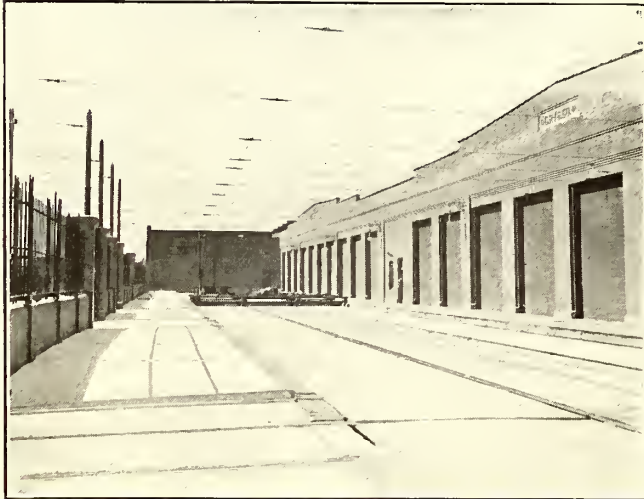
CAR BUILDING AND REPAIR SHOPS OF THE CHICAGO RAILWAYS COMPANY

The Chicago Railways Company just recently has completed the installation of its car shops in a group of buildings which are particularly interesting because of their design and size. The reconstructed shops, exclusive of an adjacent carhouse, cover a ground area of 291,000 sq. ft. Of this area 112,100

have been completed for the construction in these shops of 215 large double-truck semi-steel cars with turtle-back roofs and platforms arranged for prepayment fare collection.

SHOP ARRANGEMENT

As shown by the ground plan on pages 492 and 493, the new and reconstructed shop plant occupies a piece of property approximately 350 ft. wide by 1600 ft. long, extending from Lake Street on the north to Madison Street on the south. This loca-



Chicago Railways Shops—Front of Carpenter Shop, Showing Transfer Table.



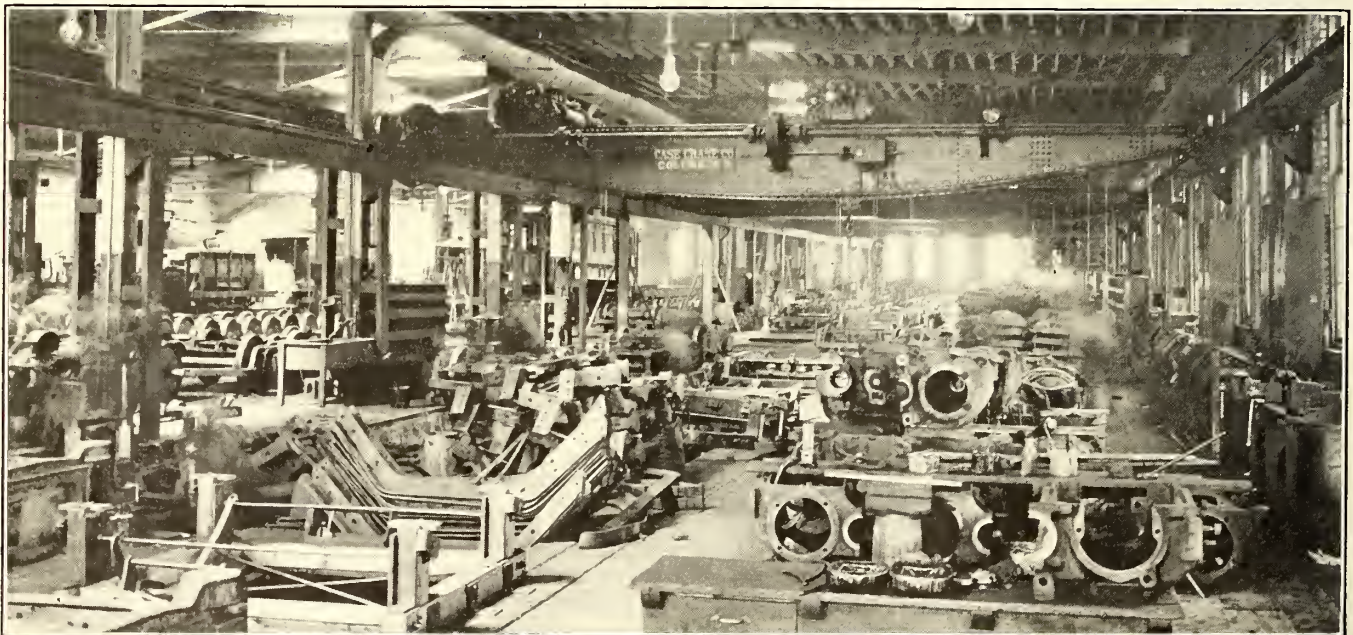
Chicago Railways Shops—Interior of Paint Shop, Showing Hot-Air Pipes

sq. ft. were added during 1910 by the completion of the wood-mill and erection shop. The design and construction of the large new shop buildings was carried out by the engineering department of the Chicago Railways Company in consultation with the Board of Supervising Engineers of Chicago Traction.

The Chicago Railways Company now has 2160 cars in regular service. All of the repair work on these and about 200

tion is one block west of Garfield Park. Three intermediate streets subdivide the group of buildings into four sections of approximately equal size, one of which is used as an operating carhouse. A private alley in which is a service track extends along the east side of all the shops. Quarters for the shop departments are subdivided as follows:

(1) Old shop section now rearranged—truck and wheel shop,



Chicago Railways Shops—Interior of Truck Shop

miscellaneous service cars is done at the newly reconstructed West Side shops, which regularly employ more than 700 men. In addition to the repair and maintenance work these shops now are rebuilding 328 old cars into modern pay-as-you-enter double-end rolling stock at a rate of 25 new cars per month. The approximate amount spent in reconstructing each car is about \$2,000, and the details of the work were described in the *ELECTRIC RAILWAY JOURNAL* of Nov. 27, 1909, page 1092. Plans

machine shop, electrical and armature shops, blacksmith shop and brass foundry, storehouse and offices.

(2) Buildings completed in 1909—carpenter shop, paint shop and miscellaneous auxiliary departments.

(3) Buildings completed in 1910—erecting shop, fender shop, wood mill, cabinet, pattern, broom and tin shops and a boiler house and dry kiln.

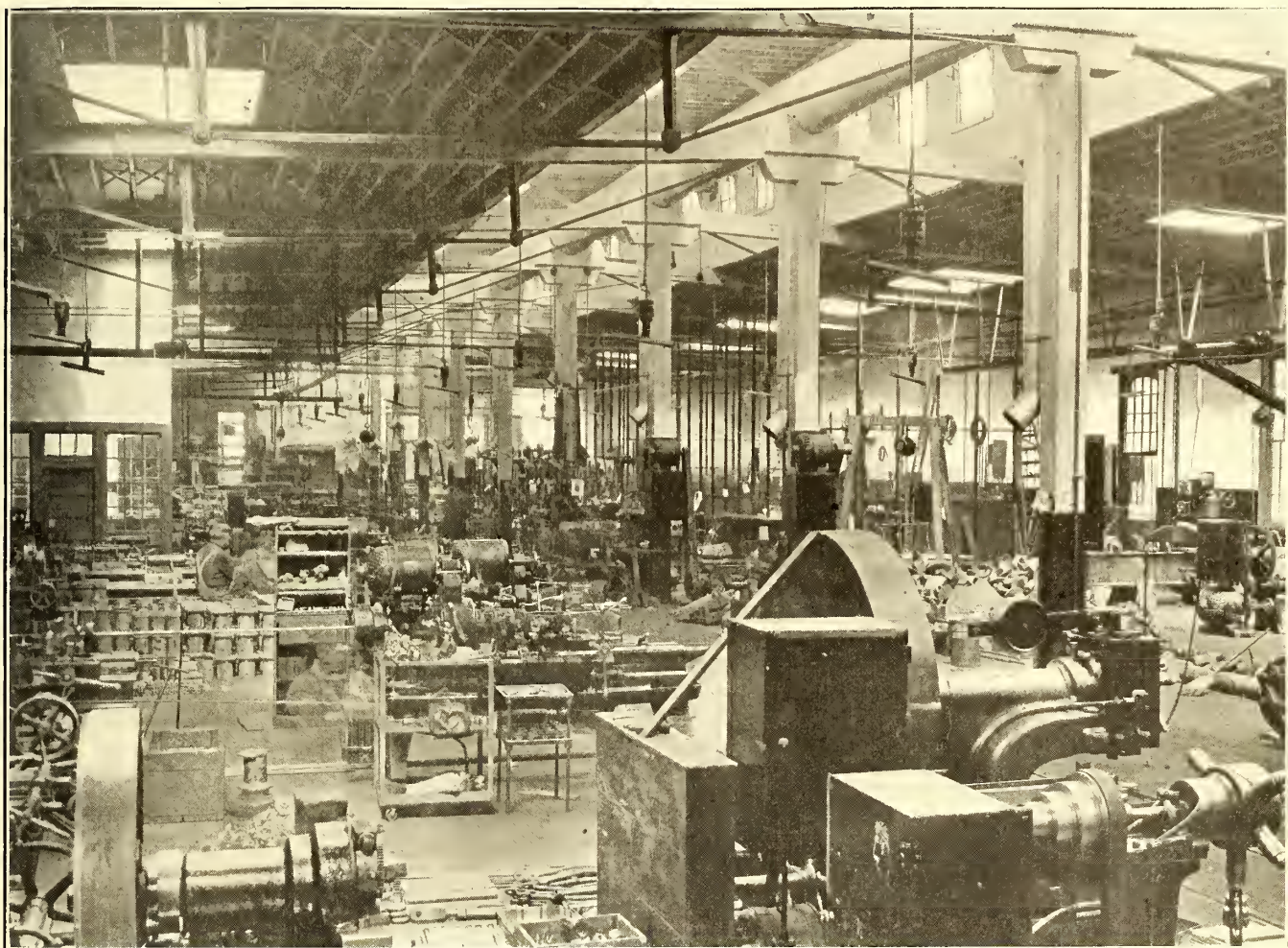
During the past year the machine-shop equipment and the

wood-mill equipment have been increased, by the addition of 49 and 56 motor-driven tools respectively. Independent motor drive with automatic control has also been installed on practically every other machine tool in these large shops.

TYPES OF BUILDINGS

Each of the three principal shop sections has been built according to a different design. That section inclosing the machine, truck and armature shops has brick walls surmounted by mill-construction wood roofs. The newer shop sections were built entirely of non-combustible material, except for window frames, sash and a few doors. They have concrete substructures, concrete and hollow-tile roofs and brick side and partition walls. Some of the controlling features of design in these buildings will be described.

The carpenter and paint shop building is notable for its wide bays. It has a saw-tooth roof. The height from the floor to the ridge of the saw teeth is 33 ft. Each of the two subdivisions of the building has its roof subdivided from side wall to side wall into three spans, 48 ft., 60 ft. and 48 ft. in length respectively. The original design for the roof included steel trusses covered with metal lath and plaster, but the estimates showed the construction cost to be such that the design was changed to include reinforced concrete girders, which were built at less first cost and require no maintenance expense. The reinforced concrete girders supporting the saw-tooth roof rest on two intermediate rows of concrete columns incased in steel cylinders 17 in. in diameter. Use was made of the steel cylinders for inclosing the reinforced concrete columns because



Chicago Railways Shops—Reconstructed Machine Shop with Motor-Driven Tools

CARPENTER AND PAINT SHOP BUILDING

The first of the newer buildings to be erected was that occupied by the carpenter and paint shops. This has over-all dimensions of 316 ft. x 223 ft. for the main portion, and it also has an addition 316 ft. long with an extreme width of 51 ft. The main portion of this shop is halved by a fire-resisting wall. Only one opening connects the two subdivisions and that is protected by a vestibule and two sets of automatic double fire doors. This shop building is set back 55 ft. from the street lines at each end to make room for transfer tables. The two tables connect with all of the tracks through both subdivisions of the building and those tracks which extend across the streets to other buildings. The location of the transfer tables outside of the building walls relieved the company from making large openings in the dividing fire wall inside the structure. These were considered dangerous from the fire-protection standpoint. The plan as adopted brought about a large saving in insurance premiums and greatly reduced the liability for loss of shop and equipment by fire.

of the protection from injury which they would afford to the concrete.

The roof girders are simple beams with the roof framed in at 17-ft. intervals. The 60-ft. supporting girders have a maximum cross-section of 16 in. x 17 in. and the slab beams are 10 in. x 20 in. in section with a broadened upper flange to provide for compression stresses. Each roof slab is composed of small reinforced concrete joists formed by spacing 12-in. x 12-in. x 4-in. hollow tile on 16-in. centers, reinforced with Kahn bars and covering it with 1 in. of concrete to afford a smooth base for the roofing.

The carpenter shop section of this building has nine through tracks each carried over a continuous concrete pit. The track rails weigh 85 lb. per yard and are bolted to cast-iron chairs embedded in the pit walls. The carpenter shop floor is concrete. In the aisles between the pits a ¾-in. wash-water pipe terminates in a faucet at every fourth column. No pits have been built in the paint shop section of this building, but the concrete floor is sloped to drains located 50 ft. apart.

A two-story subdivision in one corner of the carpenter shop incloses on the first floor the foreman's office and a general locker and washroom, and on the second floor a toilet room and two sets of fans and coils for the indirect heating system supplying the paint and carpenter shops.

Adjoining the paint and carpenter shop building are a finishing room and stockroom, one story high, with floor dimensions of 50 ft. x 158 ft., and a two-story section 26 ft. x 158 ft. The ground floor of the latter section is used for glass storage and the second floor accommodates sign and curtain rooms and toilet facilities. These additions are built of fireproof materials throughout and have roofs composed of 5½-in. reinforced concrete and tile slabs of the same design as that of the main portion of the building.

In the carpenter and paint shop building with its saw-tooth roof the pivoted windows are operated by the Pond mechanisms.

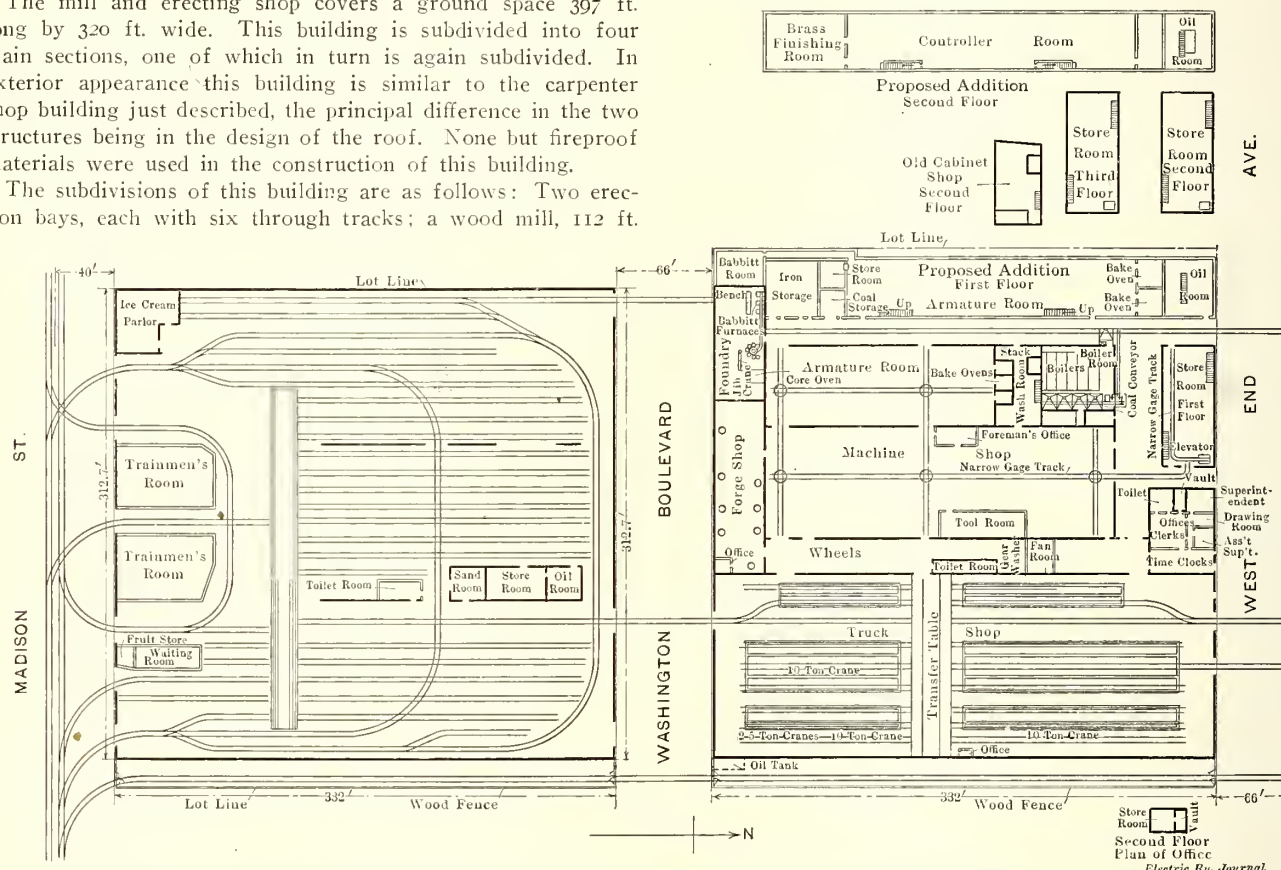
MILL AND ERECTING SHOP BUILDING

The mill and erecting shop covers a ground space 397 ft. long by 320 ft. wide. This building is subdivided into four main sections, one of which in turn is again subdivided. In exterior appearance this building is similar to the carpenter shop building just described, the principal difference in the two structures being in the design of the roof. None but fireproof materials were used in the construction of this building.

The subdivisions of this building are as follows: Two erection bays, each with six through tracks; a wood mill, 112 ft.

of the three shop sections. The fan room in the mill building is typical. It incloses two 108-in. Sturtevant fans driven by independent motors. The heated air discharged by these fans is distributed through two lines of galvanized-iron pipe carried the length of the mill building. These connect with branch pipes which discharge the air downward into the aisles between the wood-mill machinery. The heat outlets in the paint shop terminate in square frames inclosed in brass screens. Where these outlets are close to the tracks the paint on the cars is protected from heat by sheet-iron plates which deflect the hot air along the aisle. An idea of the appearance of the heat distribution pipes may be obtained from the view of the paint shop on page 490.

The steam for heating the buildings is generated by two boiler plants, one located in the reconstructed machine shop building and the other at the north end of the new wood mill. The new boiler plant has one Stirling high-pressure boiler of 200-hp capacity, which furnishes steam at 150 lb. and is con-



Chicago Railways Shops—Portion of Shops South of West End Avenue

wide by 265 ft. long; fender shop, 100 ft. x 112 ft., and a two-story bay, 28 ft. wide by 370 ft. long. An annex at the Lake Street end incloses a dry kiln, ash storage, boiler and fan-rooms. The relative arrangements of these subdivisions of this large shop is shown in the general plan.

Because of insurance requirements about one-third of the total skylight area was raised high enough above the roof to include balanced windows between the roof of the building and the tops of the monitors. These pivoted windows provide an exhaust for smoke in case of fire. They are operated by fixtures supplied by the Dearborn Hardware Company. Plain glass has been inserted in these skylights in order to satisfy the requirements of the Chicago Board of Fire Underwriters. Wire nettings have been placed underneath all plain glass.

HEATING AND VENTILATING

All the shops are heated with hot air distributed by fans located on mezzanine floors in the different buildings. These fans take fresh air from above the roofs and force it through steam coils into distribution ducts supported close to the ceilings. There are three fan rooms, each centrally located in one

connected with two low-pressure boilers through a reducing valve so that it may assist these boilers or be substituted for them in feeding the heating system. The boiler furnaces exhaust into a concrete-steel stack 125 ft. high. Mechanical coal and ash-handling systems are provided for the boilers of both of these plants.

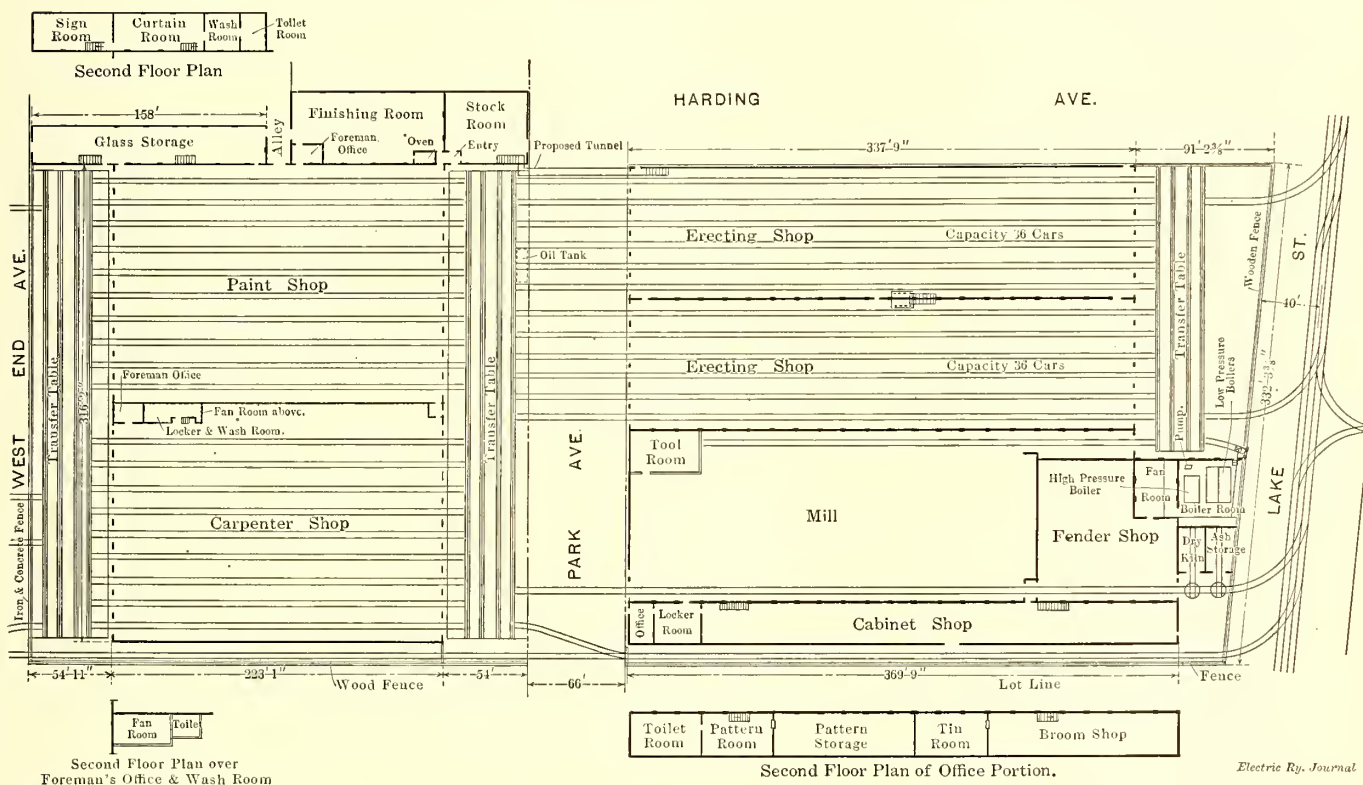
Drainage for all of the shops has been installed according to a general plan. Six-in. vitrified-tile branches connect with 12-in. mains leading to catchbasins outside of the buildings.

The coatroom and toilet rooms of the reconstructed shops have been fitted up in particularly neat shape. Each of the shop buildings has a large locker room, in all of which are about 700 all-steel lockers built by the Lyon Metallic Manufacturing Company. Sanitary drinking fountains, as illustrated, are placed in each coatroom and at other central locations about the shops. The toilet and washrooms have high-grade white-enamel fittings, concrete floors, and are well lighted and ventilated. Particular care is taken to keep the toilet and washrooms neat and clean. The skylights over the toilet room are fitted with 18-in. Burt ventilators.

Compressed air for general use is furnished by a system of mains and branches which are fed in each of the three shop sections by a 3 V. S. compressor. Each of these air compressors has a capacity of 225 cu. ft. per minute. The reserve supply of air is stored in eight large tanks, connected with which is a single governor that controls all three pumps, thus starting and stopping them in unison according to the fall and rise of the air pressure in the main storage tanks. The control board is located close to the air pump, which is in the machine shop section. This board is provided with switches so that any one of the pumps may be shut down without interfering with the operation of the others.

ELECTRICAL DISTRIBUTION

On account of the large number of tools with individual motors, aggregating 600 hp, and the general use of electricity for every possible service in these shops the design and construction of the electrical distribution system were executed with particular regard for continuity of service. The current supply is received at a central board located at the north end of the wood-mill building. In this building the distribution is made from four panel boxes conveniently located. A similar plan



Chicago Railways Shops—Portion of Shops North of West End Avenue

is followed in each of the other shop buildings. The conducting mains from the central switchboard are lead-covered cables inclosed in tile conduit laid beneath the shop floors and terminating in the local distribution panel boxes in each bay or subdivision of each building. The panel boxes are made of sheet steel inclosing black-slate panels on which are mounted individual circuit breakers for each machine-driven tool. The leads from the panel boxes to the tools are inclosed in galvanized-iron pipe with threaded joints and elbows.

With the exception of the machine, fender and cabinet shops, which are illuminated by mercury vapor lamps, all of the shops are illuminated by inclosed arcs with clear globes. The lamps which furnish the general illumination are controlled from the panel boards earlier mentioned. Local illumination is furnished by clusters of incandescent lamps. Sockets for portable clusters have been placed on each column and are connected with the distribution panel through wires protected in steel conduit. The yard space on three sides of each of the buildings is illuminated by arc lamps hung from ornamental brackets on the side walls.

TRANSFER TABLES

Reference to the ground plan will show the general arrangement of the shop sections and the layout of the transfer and work tracks. The shops may be entered from the north over four tracks leading from a double-track line on Lake Street. Two of these tracks connect with a transfer table at the north end of the north shop section and the other two extend through and by this building section to reach the other shop sections directly or by way of two intermediate transfer tables, one at either end of the carpenter shop section.

Three of the four transfer tables at these shops are of recent construction. Two of these are at opposite ends of the carpenter shop building and the third is connected with the track layout of the erection shop building. The runways for these transfer tables are shallow pits paved with concrete and located about 12 ft. from the faces of the buildings. The tables are of sufficient length to handle 60-ft. cars. Each table consists of a cast and structural steel frame supported on eight wheels resting on four track rails. Two pairs of these wheels are connected through gears to a railway motor equipped with two pinions. This motor is fed through an R-28 controller and drives four of the eight wheels on the table.

NEXT ARTICLE

In the next issue of this paper an extended description will be published of the departments of the new shops of the Chicago Railways Company, not described in the foregoing article, the equipment of these departments and some details of the shop practice of the company.

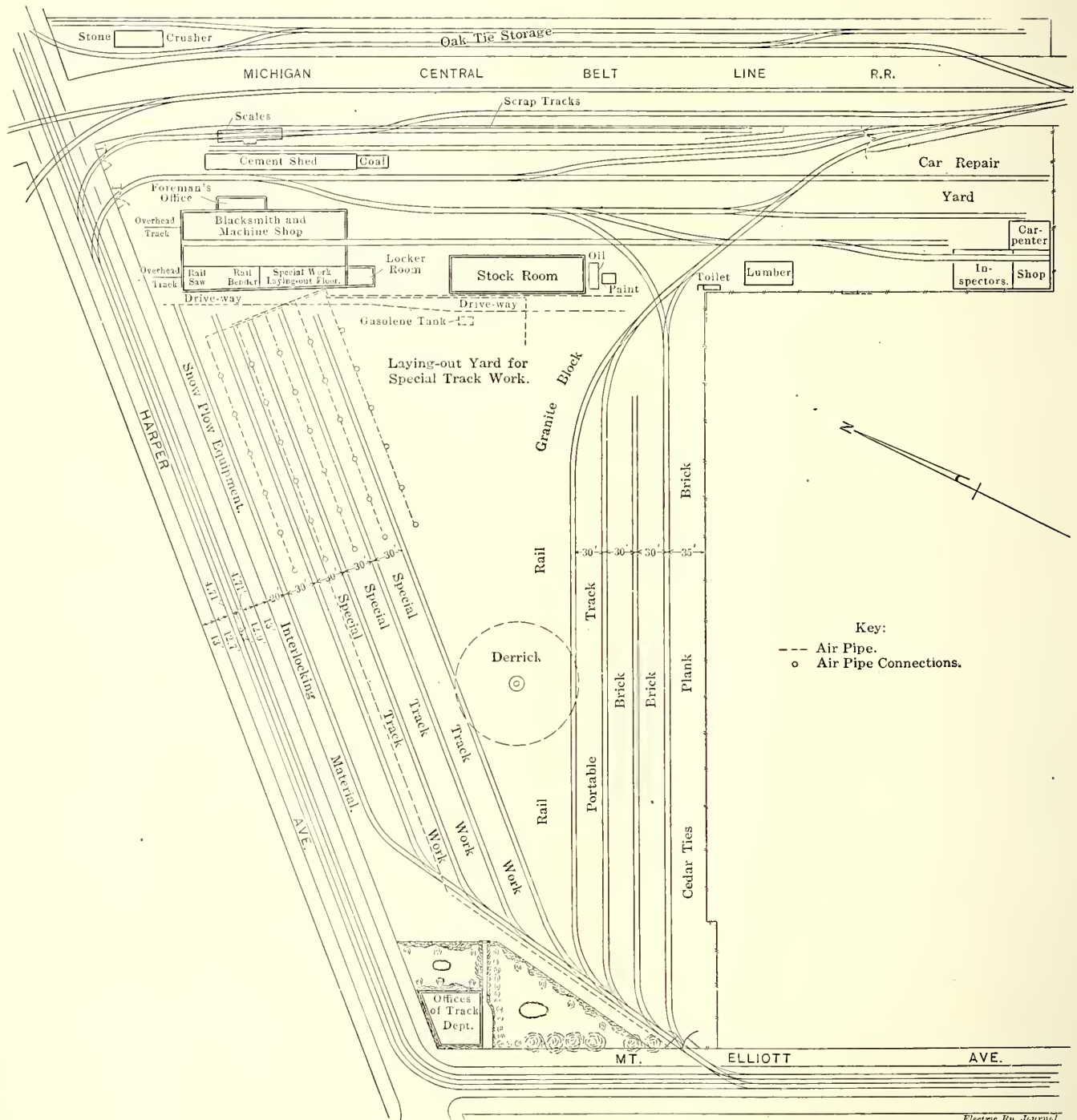
MEETING OF INTERURBAN RULES COMMITTEE POSTPONED

J. W. Brown, superintendent of transportation Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has announced that the meeting of the interurban rules committee of the American Electric Railway Transportation & Traffic Association has been postponed one week. Mr. Brown, who is chairman of this committee, had set the dates of April 4 and 5. It was found, however, that these dates were inconvenient for F. A. Boutelle, superintendent Puget Sound Railway. The dates of April 11 and 12, however, were found to be satisfactory to all the members of the committee. The meeting will be held in Chicago.

HARPER AVENUE YARDS OF THE DETROIT UNITED RAILWAY

The Detroit United Railway has a large tract of land at Harper and Mount Elliott Avenues on which it has completed important improvements. The property includes the main yard of the track department and the accompanying illustration

The office building, which has just been completed, is two stories in height and is of red wire-cut pressed brick. The entrance way, which faces Harper Avenue, is paneled in marble and green tile and has mosaic flooring. It opens into a large lobby, which is paneled in oak. The floor of the lobby is of mosaic design. A general information room, which is opposite the doorway, contains the telephone switchboards at which an operator is present day and night throughout the year. The



Harper Avenue Yards of the Detroit United Railway

indicates the convenient arrangement of the buildings and the track layout.

The buildings located on the property comprise an office building, smith and machine shop, carpenter shop, storerooms, lumber sheds, stone crusher, inspectors' shop, etc. The office building is located at the corner of the two avenues and is surrounded by grass. Shrubbery and beds of flowers will improve the plot further. For facility in the handling of material and supplies all the other buildings are located on the east end of the property adjoining the belt line of the Michigan Central Railroad.

offices of the superintendent of tracks are at the right of the doorway. These offices are finished in mahogany and all others in the building are of oak. All the floors are of oak.

At the left of the entrance is a time-keeping office through which the private office of the chief timekeeper is reached. The hallway extends from the entrance lobby to the rear of the building, where the office of the city roadmaster is located.

The stairway which leads to the second floor is between the general information room and the hallway. At the left of the stairs on the second floor is the blue-print room. This is equipped with a large electrical blue-printing machine. At the

right side at the head of the stairs is the office of the assistant superintendent of tracks, and adjoining it is the private office of the engineering department. The drafting room is also on the second floor.

A fireproof vault, 16 ft. square in area, extends from the basement to the first and second floors. Heater and fuel rooms and a cement testing laboratory with complete equipment for testing cement are in the basement, the walls of which are of white-lime brick in order to improve the light. Toilet rooms are in the basement and on each floor.

The company has installed recently in the smith and machine shops a rail bender manufactured by the Cleveland Punch & Shear Company, an Imperial type No. 10 air compressor made by the Ingersoll-Rand Company, of New York, and a shaper made by the Morton Manufacturing Company, of Muskegon Heights, Mich. This shop is equipped thoroughly for the fabrication of the special track work used on the system. It has air compressors, an air hammer, a planer, drills, etc. The company has also ordered a 26-in. x 16-ft. Schumaker & Boye lathe and a Newton combination cold saw and cutting-off machine. In the arrangement of this shop a large floor has been provided on which special track work is laid down. For convenience in handling large pieces of work in and out of the shop, the west side of the building is a series of large sliding doors. The private office of the shop foreman is contained in the building.

With the arrangement of the stone crusher, the material is handled only once. The storage bins are built above the ground and the stone crusher machinery is sunk below the ground level. As the concrete, granite, old brick, etc., are hauled from the various shops, they are unloaded directly into the jaws of the crusher, and after the material is crushed, it is elevated into the storage bins. It is then emptied by means of gravity chutes into dump cars and is taken to suburban lines of the system, on which it is used for ballast.

The carpenter shop is well equipped with lathes, drills, band and circular saws, etc.

The entire track layout was arranged in order to permit the economical handling of materials. The yard is filled level to the track rails with cinders. A ladder track runs into the property from Mount Elliott Avenue. Nine tracks branch from the ladder track and along them are stored various materials, such as special track work, granite block, rail, ties, planks, brick, etc. The arrangement of this material is shown in the accompanying illustration. The north tracks running from the ladder track about the west side of the machine shops, and on these tracks and in the open space adjacent special work is assembled in the same way as if it were being placed in the street. This work is checked by an engineer so that the positive correctness of the work can be proved before it is sent to the place of installation.

In the open space between the tracks there is a large stationary derrick for loading and unloading materials on cars. The company has for the handling of heavy material a 30-ton locomotive crane manufactured by the Industrial Works, of Bay City, Mich., and several derrick cars. At the end of the property adjacent to the Michigan Central Railroad tracks there are several tracks which extend north and south. Cars can be run on these tracks into the shops for repairs or on to a scale in order to be weighed. By means of the south track running from the ladder track which extends from Mount Elliott Avenue a loop is formed with the tracks adjacent to the Michigan Central Railroad track so that a car can be run through the yards to Harper Avenue and be headed toward the business district of the city. A storage track on the extreme east side of the property opens on Harper Avenue and all the white oak ties are handled on this track and stored adjacent thereto.

John Kerwin is the superintendent of tracks of the Detroit United Railway.

The Columbia Power, Light & Railway Company, Bloomsburg, Pa., has adopted the merit system and established club rooms for the employees.

ELECTRICAL NIGHT AT THE NEW YORK RAILROAD CLUB

The meeting of the New York Railroad Club held in the Engineering Societies Building on March 17 was the annual "electrical night" of this body. W. J. Harahan, assistant to the president of the Erie Railroad, explained, as chairman of the electrical committee, that this committee had considered it unnecessary to submit a formal report during the present year, in view of the fact that the report submitted one year ago covers conditions as they now exist, almost no changes having been made in systems or methods of operation during the past few months. He stated, however, that experience had shown that all of the systems have points of merit. Each one seems particularly well adapted for certain service requirements. Last year's report was published on page 527 of the issue of this paper for March 26, 1910. The committee consisted of Messrs. Harahan, Fritch, Warren, Vaughan, Davis, Wildin, William McClellan, Mailloux and Katte.

Although no formal papers were presented, Mr. Harahan read a communication from J. A. McCrea, general superintendent of the Long Island Railroad, giving an outline of the experience of this railway with electrical operation.

Mr. McCrea said that if a man had had transportation experience or understood the theory of moving traffic he was apt to have an advantage in taking up electric operation over a man who attempted to handle multiple-unit service as though it were steam. The use of any motive power except electricity could hardly be considered now in connection with the western terminals of the Long Island Railroad. The traffic had developed along lines made possible by multiple-unit train service. If the company to-day should for any reason be forced to abandon electricity as a motive power it would mean a complete revolution in the train service and either the enlargement of the Flatbush Avenue (Brooklyn) station to two or three times its present size, at an almost prohibitory expense, or, what was more probable, the abandonment of much of the service because it would not be possible under the restrictions of steam operation. The Long Island Railroad began electric operation in 1905 and now has about 62 route miles of road and 164 miles of track electrified. The change to electricity was made gradually and no sudden change in the operating methods of the company was required. The points in multiple-unit electric operation which most impressed one who had been identified with steam operation were (1) regularity and reliability of service; (2) the possibilities of running with close headway and great increase of speed in local service, and (3) the very marked reduction in amount of switching and lay-over time at a terminal.

Referring more in detail to the reliability of the electrical equipment, Mr. McCrea said that in five years there had been but one serious delay to the electric operation on the Long Island, and this was due entirely to something over which the company had no control, and the same sort of an accident might have crippled steam service. A leak in a gas main in Brooklyn had filled a manhole in the high-tension conduit line with gas, which was ignited. The cables were badly damaged and service was not re-established for some five or six hours. Motor failures on the road that caused delay had been practically unknown, and experience was rapidly eliminating the troubles with the maintenance of the third, or conductor, rail. Very little delay also was caused by either electrical storms, to which the Long Island is subject in summer, or by snowstorms. A marked feature of the electrical operation is the increased speed of local trains, due to rapid acceleration and the possibility of running with close headway on account of the constant speed of trains of the same class.

In discussing terminal operation Mr. McCrea said that in the average steam terminal it was rarely possible to place, load and dispatch more than five or six trains per hour from any one track. In fact, this would be a high average. But with multiple-unit equipment, even under adverse circumstances, it was possible to get the number of movements out of one track up to 8 or 10 trains per hour, the equipment of some four

or five of them being that of trains that had come in and unloaded their passengers on that track. This performance was further emphasized by the fact that the time of the day when the terminal is taxed to its capacity is usually during the rush hours in the late afternoon and it is necessary to fill out by adding cars to all trains that come into the terminal, which, in the case of multiple-unit operation, must be done on the station track and not in the coach yard as with steam. A multiple-unit shifting crew makes but half the number of movements as compared with steam service. A crew usually consists of a motorman and a conductor; sometimes a helper or yard brakeman or car inspector is added. This crew is very flexible, being able to move with great rapidity from one track to another and easily accomplishing the work of two yard engines. If 60 minutes are assumed as the maximum time which will be taken by a commuter per trip this would correspond to a distance from the terminal of about 24 miles by the best local steam service, with the stops averaging from 1 mile to 2 miles apart. A multiple-unit electric train would cover under these conditions a 25 per cent greater distance in the same time, or, say, 30 miles, or it would make the 24 miles in 45 minutes. It has been remarkable, Mr. McCrea said, to see the manner in which enginemen and trainmen educated in steam service have adapted themselves to the new conditions of electric service. At first it was difficult for them to make their part of the schedule, but this changed rapidly and now he thought it entirely proper to say that the increased speed of multiple-unit service had even accelerated the passengers in loading and unloading. Part of this condition, of course, was due to high platforms, but also part, probably, to the knowledge of passengers that after a train had started there was no chance to get on or off the train.

Finally, in steam service most railway men know from various reports the cost per passenger car mile, but this figure rarely entered seriously into the daily routine of the superintendent or train master. With multiple-unit service it was entirely different. The cost per car mile stared him in the face, and no matter where he was when he saw an empty car or a train on which one or two cars could be cut off, the figure of the power cost of 6 cents to 8 cents per car mile for moving that identical car would come up before him, and he had a definite knowledge that this power cost, at any rate, might have been saved, with several other cents per mile as trailers to every car mile that was run.

The next speaker was Prof. George F. Swain, of the department of engineering, Harvard University, who spoke on the reports of the Massachusetts Joint Board on Electrification, which were published on page 225 of the *ELECTRIC RAILWAY JOURNAL* for Feb. 4. Professor Swain was a member of the committee which made the majority report. He explained the reasons which led the majority to believe that while electrification was desirable for the public and possessed many advantages over steam it should not be forced upon the railroads. The electrification of the lines in the Metropolitan District of Boston was an economic and financial rather than an engineering problem. Professor Swain concluded with a strong plea against the compulsory electrification of railroads except where it was absolutely demanded by considerations of the public health and safety. The State had no right to demand electrification otherwise unless it was willing to guarantee a return on the investment.

H. Gilliam, electrical superintendent of the New York, New Haven & Hartford Railroad, said that that company was now operating electrically for 33½ miles on the main division between New York and Stamford and 7½ miles from Stamford to New Canaan. The present equipment comprised the use of high-speed gearless locomotives, motor cars and freight locomotives, all designed for direct-current and alternating-current operation and capable of operation in single or multiple units. As an instance of the saving in time which is afforded by handling trains with electric locomotives, the speaker said the company had found that an electric locomotive could be taken off one train and coupled to another ready for starting in

about one-half the time that was required merely to back up a steam locomotive. The "coasting" possibilities of electrical equipment had long been understood, but not until recently had advantage been taken of this quality in cutting down power consumption. The grades on the New Haven system were very slight, not exceeding 0.4 of 1 per cent. Nevertheless some recent coasting tests on freight trains had shown that in the 33½ miles between New York and Stamford current was applied for 12 miles only, equivalent to 17 minutes in a 50-minute run. Coasting ought to be encouraged by a bonus system for the engine men. The heating and lighting of the electrical equipment also required much less attention and was better than in the steam service.

William McClellan, consulting engineer, New York, said that, while there had been very little progress in electrification from an electrical engineer's standpoint, yet steam railroad men were studying the problem more closely than ever. Steam operators were now satisfied that all of the systems usually considered were absolutely reliable, but there was still great doubt in their minds as to which would become the ultimate standard. It was no longer necessary for the adherents of the different types to call attention to complexities which experience had shown were not at all serious. Electrification on a broad scale was not a local problem, so far as the choice of the systems was concerned. In this country one could regard all the railroads practically as part of one great network. Therefore, it would be hazardous to consider just one situation, say a terminal and yard electrification, without bearing in mind the later extension of electrification for a considerable distance along the main line. In conclusion he said that it would be very desirable if the electrification of steam railroads in and about our large cities were discussed harmoniously by joint boards which would consider the broader aspects of the problem rather than to have legislatures compel electrification which the railroads could not afford.

Frank J. Sprague, consulting engineer, New York, did not believe we would arrive at any one system in the near future. All engineers who had experience in electric operation were most enthusiastic about the particular system for which they had been responsible. The Italian engineers, for instance, greatly favored the three-phase system, just as the New Haven engineers favored single-phase and the New York Central engineers favored direct current. It was unfortunate that the cost of the great terminal improvements had been confused with the cost of electrification. These improvements were an absolute necessity and furthermore they could not have been made on so grand a scale if electricity had not been available. Only a few of the railroads of this country were prepared for electrification. There were thousands and thousands of miles where the money could be spent to much better advantage, as in duplicating tracks, rectifying the alignment, improving the track and rolling stock, etc. He referred to the electrification, considered three years ago, of the Sierra Nevada mountain division of the Sacramento branch of the Southern Pacific Company. He had studied this situation carefully, but the tenders received from the electrical manufacturers upon the equipment required were so diverse that he did not dare to recommend electrification at that time. But he thought the time was fast approaching when the problem would have to be taken up again. Referring to the Chicago electrification problem, Mr. Sprague said that the municipality and railroads should get together so that electrification could be carried out co-operatively by the different railroads; that it would be very undesirable and uneconomical if each railroad should build an independent power station and transmission system.

W. S. Murray, electrical engineer, New York, New Haven & Hartford Railroad, did not believe that there was any trunk line situation *per se* in this country whose electrification could not fittingly, properly and economically be taken care of by the single-phase system. Its capital investment and operating expenses were such that the economy of the two combined would give the best net return to the railroad. The New York, New Haven & Hartford Railroad was now operating 100 miles

of line measured as single track and including yards from Woodlawn to Stamford. It had in its immediate budget the electrification of the Harlem division, comprising, with the Harlem yards, about 200 more miles of track. To this should be added the New York, Westchester & Boston Railway two and four-track system under construction and comprising another 50 miles and the Hoosac tunnel with 22 miles of single track. This total of 372 miles of track to be operated by single-phase current was a pretty strong argument in favor of standardizing trunk lines according to this system. He still believed that direct current was the right thing to perpetuate in the larger cities and for the interurbans between those cities, but it was not suitable for heavy trunk line high-speed traffic. The New Haven problem was worked out on the assumption that ultimately there will be an electric line for the entire distance of 232 miles between New York and Boston. As to the reliability of the system, if a train was given a delay rate which was the average delay rate of all electric locomotives operating on the New Haven system, that train would go from New York to San Francisco and back eleven times with but three minutes delay from electrical causes.

W. B. Potter, chief engineer railway department, General Electric Company, said that he would like to refer briefly to the possibilities of the self-propelled car for replacing steam service under certain conditions. After mentioning the success of the McKen gasoline motor car, he described the gasoline-electric car of his company. One of the first cars of this type had run for about 45,000 miles with less than three hours' total delays. The cost of operating such a car, considering reasonable interest and depreciation charges, was about 20 cents a mile. One advantage of the gasoline-electric car was that, as 600-volt motors were used, the rolling stock could be operated over ordinary electric lines merely by adding the usual trolley-pole equipment. These cars are started rapidly by means of compressed air.

W. F. Zimmerman, New York, referred briefly to the experiences which he had had on the Spokane Inland Empire Railroad. Although this company operated part of its lines by direct current and part by single-phase current, the conditions were so different that it was impossible to compare the costs with any degree of fairness. The same fact held true in comparing the cost of the single-phase long-distance service with that of the steam railroads in the same territory. Steam railroads did not hesitate to use diverse types of locomotives for different kinds of service, and a similar flexibility ought to be considered in electrification problems. There was no reason, for instance, why the Pennsylvania Railroad should not use one system between New York and Philadelphia and another between Altoona and Pittsburgh.

A. H. Armstrong, General Electric Company, said that most of the call for standardization came from those who were advocating one system, and that system was not the direct-current system. He then mentioned some personal observations made by him on a simple-type steam locomotive. While this locomotive was in operation it consumed 40 lb. of steam per brake horse-power at the rim of the drivers and used 5 lb. of water per pound of coal. There were required per brake hp-hour 8 lb. of coal, containing not more than 12,000 B.T.U. per pound. So far as fuel consumption was concerned, this result could hardly be bettered by electrification after considering the transmission and conversion losses. The locomotive's standby losses, however, greatly increased the effective fuel consumption. Thus the locomotive required from 300 lb. to 500 lb. of coal an hour even when standing on a siding. Taking all losses into account, the actual fuel consumption was about 12 lb. per brake hp-hour. The small radius of action of the steam locomotives must also be considered in the electrification problem. Steam locomotives cannot run much more than 150 miles before they must be inspected, and their annual overhauling requires from four to five weeks. On the New York Central & Hudson River Railroad the electric locomotives are inspected every 1200 to 1300 miles, which means that they could easily run from New York to Chicago

without any inspection whatsoever. In one case he found that over a run of 1000 miles the freight trains could be moved in 36 hours less time if the railroad were electrified.

The meeting then adjourned after the usual vote of thanks to the speakers of the evening.

ANNUAL CONVENTION OF MAINTENANCE OF WAY ASSOCIATION

The twelfth annual convention of the American Railway Engineering & Maintenance of Way Association was held at Chicago on Mar. 21, 22 and 23. During the week of the convention the Road & Track Supply Association held an exhibition of railway appliances and supplies at the Coliseum. The exhibits of the manufacturers were complimented by a large attendance. The proceedings of the Maintenance of Way Association consisted almost entirely of the discussion of reports of standing committees prepared in advance and distributed to the members. Among the reports discussed this year are those covering a large number of subjects interesting to electric railroads. An abstract of some of these reports follows:

RAIL

The rail committee of the Association held a number of meetings at various steel plants and met during the year with representatives of the rail manufacturers. Its report reviewed statistics of rail failures, including information on the use of open-hearth and special alloy steel rails. One point emphasized was that the differences in the production of ingots and the finished rail made from them may annihilate all advantages derived from any particular rail section. The design of a rail section is not, therefore, the main cure for poor material. During the last year experiments and tests have been carried out under the direction of the committee and the results as obtained by M. H. Wickhorst, engineer of tests, form an appendix to the committee report. The expense of the tests was borne entirely by the American Railway Association. The committee stated that it hoped to have enough information during the coming year to enable it to make further recommendations with regard to improving rail specifications. It is not attempting to design a new rail section, but is obtaining information on the relative strength of rails with thin and with heavy heads. A tabulated statement of the different practices in connection with rail rolling in American mills was submitted. This tabulation was compiled by Robert W. Hunt & Company. The committee recommended a standard location for borings for chemical analyses and for tensile test pieces.

MASONRY

The committee on masonry suggested changes in the definitions as included in the association's manual of recommended practice. Waterproofing of masonry was studied by the committee and its report contained a detailed tabulation of the service obtained from different waterproofing compounds and materials, together with their costs for installation. The conclusions of the committee, based upon the supposition that the structure is well designed and that the foundation is good, were:

(1) That monolithic concrete construction may be used without danger of cracking for abutments of any length that the working conditions will permit, provided the length does not exceed about three times the height.

(2) That where abutments with wing walls are not of monolithic construction joints should be provided at the intersections of the wing walls and the body of the abutments.

(3) That reinforced concrete abutments may be built in units of any length that economic conditions will permit.

(4) That monolithic concrete construction may be used for arches where the conditions will permit, otherwise the arch ring should be constructed with radial joints.

RULES AND ORGANIZATION

The committee on rules and organization suggested changes in some of the rules contained in the Maintenance of Way rule book. One of the proposed new rules was as follows:

"Employees must exercise care and watchfulness to prevent injury to themselves, other employees and the public, and to prevent damage to property. In case of doubt they must take the safe course. They must know that all tools and appliances are in safe condition before using. They must move away from tracks upon approach and during passage of trains, and, so far as practicable, prevent the public from walking on tracks or otherwise trespassing on the right-of-way."

BALLAST

The ballast committee discussed the proper thickness for track ballast, character of subgrade, number of ties, stiffness of rail, and asked for more time to study the subject of the proper thickness of ballast, suggesting the advisability of making independent investigations with some instrument designed for the purpose of measuring the actual pressures transmitted by the ballast.

TRACK

The track committee studied and reported on revisions in the manual regarding the adjustment of curves with consideration as to easement curves. It recommended that "ordinarily an elevation of 8 in. should not be exceeded. Speed of trains should be regulated to conform to the maximum elevation used," and "in ordinary practice it is recommended that the elevation be run out at the rate of 1 in. in 60 ft., but this will be modified by the same conditions that would vary the length of the easement curve used." "Tie plates are recommended in all cases where economy in maintenance will result from their use." The committee recommended for publication in the manual "general instructions for ordering and contracting for frogs, crossings and switches." It suggested that the subject of specifications for manganese steel in frogs, crossings and switchpoints should be further investigated so that the committee might be in a position to recommend a specification that would meet with the approval of the association. The following statements in the opinion of the committee seemed warranted by a study of replies to circular letters concerning track fastenings with treated ties:

"(1) Tie-plates with some form of fastening which can be removed and replaced at will without injury to the wood fibers are desirable. Your committee feels that such a fastening has not as yet been fully demonstrated.

"(2) In shoulder tie-plates the holes for outside fastenings should be so placed that the base of the rail bears only against the body of the fastenings.

"(3) Tie-plates should be flat-bottomed, as projections of any kind tend to destroy the tie. One striking photograph is shown of a treated bridge tie entirely sound except where the projections of the plate have injured the fiber. This effect would perhaps be lessened if the tie-plate were independently fastened to the tie by screws other than the rail fastenings, and by use of the principle mentioned in paragraph 5.

"(4) The bearing surface of tie-plates should be proportioned by each road to the resistance of the wood most largely used for ties on its line. In general, plates 6 in. wide for hard woods and 7 in. wide for soft woods should be sufficient, but some roads report trouble with plates of these widths.

"(5) A tie-plate thicker through the whole or a part of the middle of its length than at the edges, with only a central bearing, is suggested for trial as theoretically sound. There would be less tendency for such a plate to rock under the action of the passing load and less pressure tending to force first one edge and then the other into the tie, and the plate would be strongest where the bending moment is greatest. The essentials of such a plate are the thicker central portion and the central bearing of the rail."

WOOD PRESERVATION

The report of the sub-committee on the revision of the manual recommends certain revised specifications for creosote oil which are summarized as follows:

(1) The definition of creosote oil restricts its origin to coal tar, and allows an admixture of refined coal tar to the creosote oil.

(2) Fixes the per cent of insoluble matter at 2 per cent. This

is necessary to control the amount of free carbon in the oil when coal tar is added thereto.

(3) Places an upper limit of 1.10 on the specific gravity. This limit is placed arbitrarily. Inasmuch as the gravity of oil for paving blocks has been fixed at from 1.10 to 1.15, it would seem that the oil for treatment of ties and timbers should not have any higher gravity than the paving-block oil. As experience develops, it will be possible later to fix intelligently a limit of the amount of refined coal tar that may be mixed with creosote oil without affecting the viscosity to an extent that will prejudice the penetration.

After some discussion, the statement of the per cents of the various fractions was kept at the present standards.

The committee recommends an additional paragraph to the recommended practice providing for accurate tests of the life of ties, in an especially selected and carefully inspected test track. The sub-committee for piles and timber to be treated proposes an addition to recommend practice providing for the framing of timbers before treatment.

Last year's report on strength of treated timber mentioned certain tests of ties treated with crude oil. Subsequent tests on the same ties are reported and show that the temporary softening of the surface had disappeared upon exposure, but that the reduction of the spike-holding power in the treated ties still remains.

In a tabulation of the average cost of cross ties purchased in 1909 it was shown that for all kinds of ties the average cost was 49 cents per tie to steam roads and 50 cents per tie to electric roads.

Many species of timber unfitted for use as ties because they lack decay-resisting qualities or immunity to insect attacks are made available for the purpose by the use of a preservative treatment. Even in the case of wood that is naturally more or less durable, such treatment is often economical, the added life in service more than paying for the increase in the original cost. Of the seventy-eight species of timber which the different specifications of the steam railroads of the United States permit to be used as cross-ties over one-half are acceptable for such use only after the application of a preservative.

The steam railroads treated more ties after purchase in 1909 than in 1908 or 1907, although the total number of treated ties reported by them was 1,959,000 less in 1909 than in 1908. The number purchased by them already treated was 3,485,000 less than in 1908. The electric railroads reported 835,000 treated ties, of which 582,000, or 69.7 per cent, were treated before purchase and 253,000, or 30.3 per cent after purchase. Fifty-one million five hundred thousand gallons of creosote and 16,250,000 lb. of zinc chloride were used in preserving timber in the United States in 1909. Small quantities of crude oil, corrosive sublimate, coal tar and water-gas tar were also used. Since timber treating began on a commercial scale in the United States the domestic supply of creosote has never been equal to the needs of the industry. With the development of wood preservation in recent years the insufficiency of the home production of creosote has become more marked.

A paper on the strength of ties treated with crude oil, and another on the electrical resistance of timber as affected by treatment with preservatives, were included in the report of the wood preservation committee.

BUILDINGS

The committee on buildings submitted specifications for roofing various structures with different classes of materials. It summed up its conclusions by saying that the annoyance and indirect expense occasioned by leaking and short-lived roofs was never compensated for by any possible saving in first cost. A paper on the tests and investigations at the underwriters' laboratories written by William H. Merrill was included in the report, as was a report of tests on roof covering by George W. Riddle.

TIES

The report of the committee on ties included no recommendations and consisted largely of statistics, a discussion of metal and composite ties and reports of service obtained from metal

ties. These reports included communications from a number of electric railway engineers, some of which follow:

Utica & Mohawk Valley Railway: Nov. 1, 1910, M. J. French, engineer maintenance of way, reported: "We have used this year 1433 Carnegie M-25 steel ties, under 80-lb. A. S. C. E. T-rail, with concrete construction and brick pavement, in the village of New Hartford, and we have used 2414 steel ties of the same type, under 60-lb. T-rail, with concrete bitulithic pavement, in the village of Whitesboro. We have also used four sets of switch ties, fifty-six ties in all, of the same section, under 80-lb. A. S. C. E. T-rail, with concrete construction and bitulithic pavement. We have had no renewals on account of failures or for any other cause and are more convinced than ever that the steel ties with concrete and T-rails give us the best type of track construction for paved streets. We have used with the ties placed this year the Carnegie No. 23 type of rail fastening and have found it very satisfactory."

Joliet & Southern Traction Company: This line has 300 steel ties in use in paved streets. L. D. Fisher, superintendent, advised on Nov. 2, 1910: "The metal ties used by this company are all laid in concrete covered with brick pavement and have now been down three years. The track is in perfect condition and we have had no occasion to open up the ties since they were laid."

Boston Elevated Railway Company: A. L. Plimpton, Nov. 5, 1910, stated that his company had installed the following steel ties:

1905—760 Lorain Steel Company ties. (That company's catalog No. 13, p. 160.)

1908—94 Carnegie ties. (Section M-14-1/2-lb. per ft., 7 ft. long.)

1909—1570 Carnegie ties. (Section M-14-1/2-lb. per ft., 7 ft. long.)

1910—2235 Carnegie ties. (Section M-14-1/2-lb. per ft., 7 ft. long.)

As an experiment the company has made about 600 reinforced concrete ties, none of which, however, has as yet been put in the ground.

Virginia Railway & Power Co., Richmond, Va.: In a prior report this company stated it had several thousand Pennsylvania and Lorain Steel Company steel ties in use; also several hundred Carnegie steel ties.

On Oct. 31, 1910, Calvin Whiteley, Jr., chief engineer of railways, wrote: "We have adopted the metal ties for all city work in concrete. We have been using the ties made by the Lorain and the Pennsylvania Steel companies, but have finally adopted the Carnegie tie M-25. My objection to using this tie heretofore was on account of the method of attaching the rail to the tie. I have solved this, however, to my own satisfaction by using the Carnegie tie with the Lorain brace. The 150 metal ties recently put in our car shed on Robinson street were of the Carnegie type, and the 400 on Main Street of the Lorain type."

Denver City Tramway Company: This company installed 2500 Carnegie ties during May, 1908, in connection with concrete paving. John Evans, chief engineer, stated Nov. 3, 1910: "There have been no further installations of such ties, or repairs, or other data, on those already installed by us. It might be well to note, however, that we have had more trouble with the maintenance of street paving where the steel ties are than where wooden ties have been used, presumably due to increased rigidity and vibration."

Oklahoma Railway Company, Oklahoma City: In 1909 this company advised it had about 4 miles of 6-in. base Carnegie steel ties in use in concrete street railway. W. E. Haller, former general manager, wrote Nov. 8, 1910: "We now have about 10 miles of steel tie, concreted paved construction, in city streets. We are using the Carnegie steel tie, section M-25, 6-in. top, and Section M-21, 8-in. top, for joint ties; all ties 6 ft. 8 in. long fitted with No. 23 new style clips and bolts, the present track standard being 100-lb. A. S. C. E. rail, with Carnegie ties spaced 3-ft. centers, and with twisted bar reinforcement in the concrete bottom underneath the ties. We recently made an examination of some of the construction in-

stalled one year and eight months ago, which is still in a perfect state."

Brooklyn Heights Railroad Company: Previous reports stated that this company was using Carnegie steel ties to a limited extent. On Nov. 2, 1910, C. L. Crabbs, engineer maintenance of way, wrote: "There have been no further developments in connection with the use of metal and composite ties since our last report. We have discontinued, for the present, the use of the metal tie, and have had no occasion to make renewals of those already installed."

Cleveland Railway Company: This company has laid 1 mile of track with steel ties manufactured by the International Steel Tie Company of Altoona, Pa. These ties are 6-in. "I" beams arranged in pairs, with concrete blocks and steel plates under the rails between each pair of the ties. The plates are slotted to receive three metal clips on either side of the rail. Wedges are driven back of the clips to hold them in place. The joined pairs of ties are 30 in. apart, while the spacing between pairs is 19 in. The plates are 12 in. wide by 30 in. long and 5/16 in. thick. The ties, plates, clips and wedges weigh 188 lb. per pair. The track is laid with 80-lb. A. S. C. E. rail, ballasted with 12 to 16 in. of screened rock.

The committee was informed that this company is using a number of Carnegie steel ties in concrete.

ELECTRICITY

The committee on electricity was instructed to consider during 1910 and submit recommendations on the following subjects: (1) Clearance; (2) transmission lines and crossings;

DATA REGARDING THIRD-RAIL CLEARINGS, REVISED OCTOBER 17, 1910.

Name of Company.	Top or Under Contact.	Pro-tected.	Uses Steam Equip-ment.	Mileage Planned in Opera-tion.	Mileage for Immed. Future.
Albany Southern.....	Top	No	Yes	52.00	....
Aurora, Elgin & Chicago.....	"	No	"	88.00	....
Baltimore & Ohio.....	"	Yes	"	8.70	....
Boston Elevated Ry.....	"	No	No	24.09	....
Brooklyn Rapid Transit.....	"	"	"	82.50	....
Northwestern Elevated, Chicago.	"	"	"	60.00	....
Central California Traction.....	Under	Yes	Yes	45.00	....
Grand Rapids, Grand Haven & Muskegon.....	Top	No	No	41.26	....
Hudson & Manhattan.....	"	Yes	"	14.50	5.35
Interborough Rapid Transit.....	"	Partly	"	199.94	....
Lackawanna & Wyoming Valley.....	"	No	Yes	44.00	....
Long Island R. R.....	"	Yes	"	147.50	....
Metropolitan West Side, Chicago.	"	No	No	49.28	....
Michigan United.....	"	"	Yes	82.00	....
Northern Elec. Ry., Chico, Cal..	"	"	"	130.00	....
Penna. Tunnel & Terminal Co..	"	Yes	"	83.00	9.60
Puget Sound Electric Ry.....	"	No	"	37.50	....
Philadelphia & Western.....	Under	Yes	"	22.00	....
Scioto Valley Traction Co.....	Top	No	"	65.82	....
"South Side Elevated, Chicago..	"	"	No	46.41	....
Southern Pacific R. R.....	....	....	....	....	139.00
West Jersey & Sea Shore.....	Top	No	No	143.00	....
Wilkes-Barre & Hazelton.....	"	"	"	29.50	....
N. Y. C. & H. R. R.R.....	Under	"	"	131.40	114.20
N. Y. C. & H. R. R. R., Utica to Syracuse.....	"	"	"	105.76	....
Detroit River Tunnel Co.....	"	"	"	18.50	....
Phila. Rapid Transit Co.....	"	"	No	17.65	....
Totals .....	....	....	....	1,769.31	268.15

*Type not determined.

(3) insulation; (4) maintenance organization; (5) electrolysis and (6) relation to track structures. Sub-committees were appointed to consider each of these subjects. The report of the main committee includes twenty printed pages of bibliography with definite references to the literature on railway electrification. The sub-committee on clearances reported in part as follows:

"It has been the experience of steam railroads operating a portion of their territory by third rail that, in spite of rigid requirements that equipment be not allowed to extend beyond the line of maximum equipment, cars frequently have to be cut out of service in the electrified territory because of heavy loading, defective springs or other reasons causing the equipment to project beyond the limiting lines. Principally on account of this reason it is thought that the distance of 1/2 in. between the outline of maximum clearance for structures and the outline of maximum equipment is too small, and that if structures and equipment are allowed to approach so close there will be trouble from fouling in the event of adverse conditions. We have,

therefore, recommended a distance of $1\frac{1}{8}$ in. apart for these two vertical and horizontal lines and a distance varying from $13/16$ in. to $15/16$ in. apart on the inclined part of the diagram which takes care of the side inclines at approaches to the curves, and specified that 'equipment shall under no circumstances project beyond line of maximum equipment except as provided for on curves of 800 ft. radius and less. Structural variation, end play and wear of equipment shall be provided for by the equipment manufacturer inside this line.' "

A table prepared by this committee showed that 1769.31 miles of track are now operated in the United States with third-rail current conductors and that 268.15 miles of additional electrification with third rail has been planned for the immediate future.

A sub-committee on transmission-line crossings submitted a report of twenty-one printed pages stating that:

"It is necessary to consider all phases of the question, as well as all voltages, but since the probability of danger to life or property is mainly confined to the immediate vicinity of the power line, and particularly to the space over or under the same, this report will deal with the so-called 'crossings,' and not with the construction of the power line *per se*. The crossings of trolley contact wires will not be included, because the conditions governing their construction are radically different and the protective measures possible for transmission lines could not be enforced."

Before discussing the responsibility of transmission companies or the features calculated to insure a greater degree of safety, the possible accidents which better transmission-line crossings would tend to prevent were stated to be as follows:

"(1) Injury or death from direct contact with a live wire.

"(2) Injury or death from indirect contact, i. e., contact with an object harmless in itself but which is in contact with a live wire.

"(3) Fires, caused by either direct or indirect contact.

"(4) Interference with the operation of signals, and, therefore, with the safe and convenient movement of trains.

"(5) Interruption or interference with the service of telegraph and telephone lines not included in the above classes.

"(6) Electrical interference with the proper operation of other power circuits.

"(7) Mechanical obstruction of tracks by large cables."

The possible causes for these accidents also were enumerated and it was stated that nearly all of the foregoing causes of accidents might be very successfully guarded against, in the design, workmanship, and maintenance, and by providing the necessary clearance between the power line and adjoining tracks, buildings, trees, etc. Several suggestions have been made as to the proper divisions, and discussion of this feature is especially requested. Merely as suggestions the following were given for consideration:

(A) By Voltage and Circuit: (1) All constant-potential circuits up to and including 6600 volts and all constant-current circuits not exceeding 10,000 volts. (2) 6600 to 24,000 volts, a. c. (3) 24,000 to 44,000 volts, a. c. (4) Over 44,000 volts, a. c.

(B) By Voltage: (1) 220 to 5000 volts. (2) 5000 volts and over. Attention was called to the fact that voltage might not be the governing feature, as amperage in some cases was more important.

An introductory discussion of specifications for transmission-line crossings comprised the major part of this sub-committee report. This discussion considered the stresses in the overhead structures due to various classes of loading and presented tables of the maximum wind velocities for different parts of the country with attendant wind pressures. The function of a cradle net or guard wire was discussed, and it was stated that the general use of cradles would involve the presence of many unsightly structures over public thoroughfares and railroad rights-of-way, particularly if the types used in Europe, where the cradle has attained its greatest development, are to be followed.

Consideration was given to the reasons and method of grounding the wire supports and to the size and material of

wires, choice of insulators, pins, tie wires, clamping devices and preservative treatment of the parts of the crossing structure. The physical properties of wires that might be used for transmission-line crossings were presented in tabular form, together with the mathematical discussion of the catenary and illustrations of cable and wire-clamping devices now in use on electrified steam roads.

A sub-committee of the committee on electricity reported on a maintenance organization for electrified roads. Letters of inquiry were sent out to those roads qualified to answer, the replies to which enabled the sub-committee to report in part as follows:

"While many roads addressed did not reply, a sufficient number of replies were received to afford very interesting study with a view of reaching conclusions and making possible recommendations in the future. It was found that on one road the entire construction work, including the rearrangements of tracks and the building of power houses, substations, transmission lines, third rail, equipment, etc., was done under the direction of a new organization, separate and distinct from either the construction or maintenance organization on the railroad, the work being done by contract or by company forces under the direction of its new staff, working as closely as possible in harmony with the existing maintenance and operating organizations. When the plant was ready for operation separate organizations were created for the maintenance of equipment, power houses and transmission lines, and for third rail and appurtenances. This was subsequently modified so that these three separate organizations were brought under the jurisdiction of the operating department, which already had jurisdiction over the maintenance of track and other structures.

"In a second case, while a new organization was created to design and supervise the installation, much of the work was performed by the existing construction department, and after the work was finished the maintenance was assigned to existing branches of the service, which were enlarged and modified to meet the new conditions."

The committee emphasized the fact that the classification of expense accounts as established by the Interstate Commerce Commission and by various State Commissions placed in the maintenance of way the expense of maintenance of transmission lines, contact lines, power houses, etc., so that it seemed to be exceedingly logical that the actual supervision of the work of maintenance should be done under the supervision of the maintenance of way organization.

The report of a sub-committee on relations to track structures included diagrams of the third-rail clearance lines and equipment clearance lines of a number of typical roads operating by third rail.

CONSERVATION OF NATURAL RESOURCES

A report on this subject contained a considerable amount of historical matter and sub-committee reports on (1) tree planting and general reforestation, (2) coal and fuel oil resources and (3) iron and steel resources. That committee has carried on its lines of investigations and held itself in readiness to co-operate with the National Conservation Commission and its kindred and subsidiary organizations. The report included recommendations to the legislatures of the separate states regarding protection of timber against fire.

MAINTENANCE OF WAY LUMBER

A special committee on rules for grading and inspection of maintenance of way lumber made a report of 60 printed pages, covering its subject in a very thorough way and illustrating its definitions with halftone engravings. Specifications for various timbers and rules for grading and dressing different woods were presented.

ROADWAY

The report of the committee on roadway was largely confined to the collection of formulas for the determination of the size of waterways and a tabulation of these formulas in such a manner that they may intelligently be compared. It also considered the introduction of factors suiting local conditions. Its report included an index to literature on the subject of waterways for culverts and allied topics.

ELECTRIFICATION OF RAILROADS DISCUSSED AT BOSTON

An extended discussion of steam railroad electrification was the principal feature of the annual meeting of the Boston Society of Civil Engineers, which was held at the Boston City Club on March 15, with President Henry F. Bryant in the chair. Electrification with reference to Boston conditions was considered by Prof. George F. Swain, of the Joint Commission on Metropolitan Improvements, and Prof. Dugald C. Jackson, president of the American Institute of Electrical Engineers. W. S. Murray, electrical engineer of the New York, New Haven & Hartford Railroad, also spoke.

Prof. Swain delivered an extended address in justification of the recent report of the majority of the Joint Commission to the Legislature. This report, which was published in abstract in the *ELECTRIC RAILWAY JOURNAL* for Feb. 14, 1911, determined that it was inadvisable to enact any legislation at present compelling the steam railroads at Boston to electrify. He felt that the petition of the New York, New Haven & Hartford Railroad now pending in the Massachusetts Legislature for authority to purchase the Boston, Revere Beach & Lynn Railroad and build a tunnel under Boston Harbor to connect the northern and southern railway systems meant the real beginning of electrification at Boston. Electrical operation of the harbor tunnel and approaches must be presupposed, and with this initial work extension would be made as conditions determined and in line with the best all-around development of the entire district.

President Dugald C. Jackson of the American Institute of Electrical Engineers paid a high tribute to the manner in which the New Haven organization has overcome the difficulties inherent in adapting electricity to heavy railroad service. He took issue with the majority report of the Joint Commission against legislative stimulation of electrification at Boston, and stated that the Boston radial lines of travel were not all individualized; that the traffic density showed almost twice as many passengers per mile as at New York; that less investment per train mile would be required to electrify at Boston than was the case at New York, and that caution was necessary in considering the conditions at New York as controlling at Boston.

He doubted whether the railroads themselves would oppose a requirement to electrify certain lines. There was a vast difference between electrifying on a step-by-step basis and attempting to change over the motive power of the entire metropolitan district at one time. In reality only portions of the Boston territory were ripe for electrification; but it was time that certain routes were thus treated. Prof. Jackson emphasized the fact that in the reports of the minority members of the Joint Commission electrification was favored by the men whose duties have for years led them into closest supervision of and relation with the transportation companies. Closing, he stated that perhaps electrification was not a luxury after all, in view of the economic cost to the city of the smoke nuisance with its attendant dirt.

Mr. Murray concurred with Prof. Swain in regard to the general problem of electrification at Boston. He stated that he was personally an enthusiast on the subject of electric motive power, but that a problem as large as that at Boston was not to be solved by the childish plan of crying for a thing because it was good. The fixed charges in such work were literally tremendous. The New York Central, Pennsylvania and New Haven electrifications in New York were essentially trunk line propositions, and where the train density was very high the fixed charges could be carried much better. At Boston there were many devious routes radiating from the city, and these imposed much expense in connection with a change in motive power. The light amount of traffic on many of these lines made the policy of mandatory electrification unwise and unjustified from a reasonable point of view.

Regarding systems of electrification, Mr. Murray said both the direct and the alternating current systems had their appropriate spheres of usefulness, but that for trunk lines, long distances and train service requiring large units of power

alternating current was fundamentally necessary, the problem being essentially an island proposition. Mr. Murray said that in his experience he had never found it difficult to obtain adequate judgment by railroad officers upon electrical matters, assuming proper initial presentation. The company has a system capable of extension to Boston, in accordance with the desires of its president. Touching upon the advantages of alternating current service, Mr. Murray said that the only power plant the company has is located at Cos Cob, 18 miles north of the Woodlawn junction with the New York Central Lines. If direct current distribution had been used it would have been necessary to install a substation every 6 or 8 miles in order to enable each train to get its full quota of power. It was not true that the saving in locomotive repairs and fuel paid for the fixed charges on electrification unless the traffic density was very high. The savings were chiefly in fuel and locomotive repairs, combined with a decided increase in the traffic capacity of the equipment. The actual drop in voltage between Cos Cob and the Harlem River yard, 25.6 miles, at peak load gave a resulting potential of over 9000 volts, which enabled all schedules to be made. On "Football Day" the output at Cos Cob would rise to 20,000 hp, and the actual average loss in distribution for the entire day would be only 3 per cent, with a momentary drop of about 14 per cent at Woodlawn. Confidence could be placed in electrification, but engineers must do what they can to check the popular clamor for it.

Mr. Murray showed a large number of lantern slides exhibiting improvements in construction within the New Haven electrified zone, and concluded by briefly describing various features of the Hoosac Tunnel electrification. Two insulators are used in series in this tunnel, the insulation being sufficient to withstand 300,000 volts. One insulator pair tested after three months' exposure to steam locomotive operation withstood 60,000 volts even when incrustated with soot and dirt, and when cleaned showed practically its initial insulating qualities.

MEETINGS OF JOINT FREIGHT AND EXPRESS AND SIGNAL COMMITTEES

A meeting of the joint express and freight accounting committee of the Accountants' and the Transportation & Traffic Associations was held at Congress Hall, Chicago, on Feb. 25. There were present Co-chairmen Walter Shroyer, auditor Indiana Union Traction Company, Anderson, Ind.; P. P. Crafts, general manager Iowa & Illinois Railway Company, Davenport, Ia., and members, E. L. Kasemeier, auditor the Ohio Electric Railway Company, Springfield, Ohio, and George H. Harris, manager railway department Birmingham Railway, Light & Power Company, Birmingham, Ala. The classification suggested at the 1910 convention to cover this branch of electric railway business was taken up and certain changes recommended. Another meeting of the committee will be held later, and undoubtedly further revision will be made and presented to the 1911 convention for suitable action. No inquiry forms will be sent out by the committee this year.

A meeting of the signal committee of the Engineering Association was held in Chicago, March 22. Those present were: J. M. Waldron, signal engineer Interborough Rapid Transit Company; C. D. Emmons, general manager Fort Wayne & Wabash Valley Traction Company; John Ross, assistant superintendent of tracks Detroit United Railways, and G. H. Kelsey, superintendent of power Indiana Union Traction Company. L. E. Gould, *ELECTRIC RAILWAY JOURNAL*, was made temporary secretary. Upon invitation, representatives of manufacturers in attendance at the steam railroad signal convention were present, and each manufacturer was permitted to address the committee and describe his apparatus. There were also a number of visitors from among the steam railroad signal engineers, and the total attendance was 22. Two sessions were held. At the conclusion of the meeting the committee voted to request each manufacturer to furnish it with a written description of his apparatus and his recommendations.

MEETING OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The regular meeting of the Central Electric Accounting Conference was held on March 11 in the rooms of the Springfield Commercial Club, Springfield, Ohio.

President S. C. Rogers, former treasurer of the Mahoning & Shenango Railway & Light Company, called the meeting to order. G. H. Long made a short address of welcome. A. F. Elkins, the secretary, read the minutes of the last meeting and then presented his report as treasurer. The report of the executive committee was then presented. It stated that the most important business for consideration was the recommendation for a successor to Mr. Rogers as president, owing to his resignation from the Mahoning & Shenango Railway & Light Company. In the natural order C. E. Thompson, vice-president, should succeed to the duties of president, but he did not feel that he was able to give the office the attention that it deserved and had therefore written to the committee that he found it impossible to consider the subject of assuming the responsibilities of the work of the conference this year. The committee therefore recommended that Mr. Elkins be elected president to succeed Mr. Rogers, and that Walter Shroyer, auditor of the Indiana Union Traction Company, be elected secretary and treasurer to succeed Mr. Elkins. The committee recommended that a vote of thanks be given to Mr. Rogers for his services and that he be made an honorary member of the conference. It was decided to postpone action upon the recommendations of the committee until the close of the morning session.

E. L. Kasemeier, auditor of the Ohio Electric Railway, presented the report of the committee on uniform comparative statistics. Mr. Kasemeier said that owing to changes in the committee and the lateness of his notification regarding the work it had not been possible to prepare a written report. It was suggested that the committee be continued, to report at the next meeting of the conference. Mr. Shroyer presented the report of the membership committee, which has taken up the matter of securing new members. The committee hopes to do some effective work in the near future.

The report of the committee on constitution and by-laws was then presented. The committee recommended changes to provide for the election of two vice-presidents. There was some discussion regarding a plan to hold meetings semi-annually instead of quarterly.

A. J. White, Ohio Electric Railway, then read his paper on "The Traveling Auditor." An abstract of this paper was published in last week's issue, page 467.

The resignation of Mr. Rogers as president was then accepted, and the secretary and treasurer was instructed to cast a ballot for the election of Mr. Elkins as president and Mr. Shroyer as secretary and treasurer. Mr. Rogers said that he retired from the presidency of the conference with sincere regret.

Mr. Elkins thanked the members for his election as president. At the invitation of Mr. Kasemeier the members then adjourned and visited the offices of the Ohio Electric Railway.

The afternoon session was called to order at 1:40 p. m. and the discussion of Mr. White's paper was taken up. L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, said that it had been found desirable to have agents deposit their receipts in the bank subject to the check of the company. Agents sent a duplicate deposit slip with their remittance slip and no check whatever was used except from the main office.

F. K. Young, auditor Scioto Valley Traction Company, suggested the use of certificates of deposit.

J. D. Maynes, auditor of receipts Illinois Traction System, stated that there were three reliable methods of remitting cash—the purchase of a bank draft, through an express company, or through the designation of depositories for company funds. Under the latter method accounts were opened in the name of the company and conductors and agents at the terminals and all conductors whose run ended at the terminals deposited through

the agent into this account. A four-end deposit slip was used; one end was retained by the man making the deposit; one was sent to the office of the auditor and constituted a receipt from the bank; one was receipted by the bank and forwarded to the office of the treasurer, and the other end was retained by the bank. The deposit in these cases was subject to draft by the treasurer of the company at the end of 30 days.

Mr. Elkins said that interviews with bankers showed that they were very glad to have the currency deposited with them by agents and would issue certificates of deposit or stamped duplicate deposit slips.

Mr. Shroyer said that certificates of deposit were used on the lines of the Indiana Union Traction Company. The banks appeared to be glad to issue such certificates.

Mr. Rogers suggested that it would be better organization to have agents employed by the treasury or accounting departments than by the operating department. On the Mahoning & Shenango Railway & Light Company each man that handled funds was an employee of the treasury department.

Mr. White said that on some of the divisions of the Ohio Electric Railway relief agents were held who were capable of going to any station and taking care of it for a brief period if necessary.

Mr. Elkins said that agents of the Columbus, Delaware & Marion Railway were appointed under a blanket bond issue by the American Surety Company. When an agent or conductor was employed he was required to fill out an application blank which was forwarded to the surety company and an interim certificate was issued immediately. That held for 30 days and was renewed automatically until the bond was either issued or rejected. When the bond was received it must be signed by the agent and witnessed by a notary public.

Mr. Maynes called attention to the balance sheet and special report used by a traveling auditor of the Illinois Traction System. The special report had been adapted to meet his requirements from a form put into effect on the Rock Island System by W. H. Burns, the general auditor. Mr. Maynes receives a copy of every order for ticket stock and keeps a general ticket stock ledger.

O. I. Davis, local auditor Dayton, Covington & Piqua Traction Company, then read a paper on "Method of Accounting of Freight Claims." An abstract of this paper was published in last week's issue, page 463.

Mr. Rogers called attention to a decision of the Interstate Commerce Commission holding the initial carrier of an inter-line shipment responsible for the settlement of claims.

Mr. Davis thought it would facilitate the rapid adjustment of claims if the delivering carrier took up the matter as promptly as possible. It was known often that the initial carrier was not to blame.

Mr. Young said that on the Scioto Valley Traction Company the freight department handled all the claims and when they were approved for payment he paid them.

Mr. Shroyer said that on the Indiana Union Traction Company the accounting department handled all claims and investigated them. After the investigations were complete the papers were referred to the general manager for his approval.

Mr. Rogers said that it was the practice on the Mahoning & Shenango Railway & Light Company to have the claim department investigate freight claims and make a requisition, which was approved by the general manager.

Mr. Maynes said that the Interstate Commerce Commission had ruled that the question of claims was purely a matter for the accounting department. The traffic department was interested in a claim only when the question as to the application of rate arose, or when a question was asked as to the classification of a shipment. The question of damage or loss was a question of fact to be determined.

Mr. Elkins appointed a committee composed of Gus A. Keohler, H. B. Cavanaugh and J. M. Brick to draft resolutions regarding the death of R. H. Carpenter, Western Ohio Railroad.

President Elkins said that Mr. Maynes had written a letter to

him asking that the conference consider the advisability of conferring with the Interstate Commerce Commission in regard to the promulgation of rules and instructions concerning the filing and retention of records. Mr. Maynes said that he had had some correspondence on the subject.

The following members were admitted: George L. Ford, auditor of the Evansville Railways; C. W. Witt, auditor of the Indianapolis, New Castle & Toledo Railway; F. Pantel, auditor of the Chicago, Lake Shore & South Bend Railway.

A special committee was appointed to meet with the committee of the Central Electric Railway Association at Columbus on March 22 to take up the question of the affiliation of the Central Electric Accounting Conference with the Central Electric Railway Association. The members of the special committee of the Central Electric Accounting Conference are: Chairman, A. F. Elkins, auditor Columbus, Delaware & Marion Railway; E. L. Fasemeier, auditor Ohio Electric Railway; Walter Shroyer, auditor Indiana Union Traction Company; H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway; L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, and J. D. Maynes, auditor of receipts Illinois Traction System.

The conference has accepted the invitation of the accounting department of the Illinois Traction System to hold the next meeting of the Central Electric Accounting Conference at Springfield, Ill., and the date of the meeting has been fixed for June 10. After the meeting at Springfield the members of conference will be taken over the lines of the Illinois Traction System.

INTERLINE ACCOUNTING*

BY L. T. HIXSON, AUDITOR TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

We might liken the traction business to a manufacturing institution or a mercantile establishment. Our commodity is passenger and freight service, and in order to get the best returns on the investment the sales of this commodity, at profitable prices, must be brought to the highest mark. Of course, one difference between our business and the manufacturing or mercantile business is that traction rates are fixed by law. We are also prone to consider the territory as limited. In endeavoring to overcome this territorial limitation a number of traction lines have adopted a plan for interchanging both passenger and freight business, commonly known as the "interline" system. Inasmuch as the passenger is enabled to proceed to destination without the annoyance and delay caused by purchasing a ticket at the end of each line and his baggage may also be checked through to destination, there is no question that this system encourages long-distance travel and promotes shipments of freight to greater distances. The transportation of freight is expedited by through billing with auditor's settlement for the reason that it is necessary to take only a memorandum of freight passing the junction, instead of rebilling.

These interline arrangements are in reality reciprocity agreements—the managements of the roads mutually agreeing to secure as much traffic as possible for stations on all the lines interested.

After such arrangements have been made, schedules which will make close connection prepared and proper joint tariffs provided, the matter of tickets next presents itself. These tickets should be uniform as to size and conditions in order that the passenger and conductor may become more familiar with these conditions, knowing that they are the same on all lines, thus making a special study of each ticket unnecessary. If the tickets are uniform in size they are more easily filed in the auditor's office.

I am pleased to state that the Central Electric Traffic Association has accomplished a great deal in regard to preparing the joint tariffs, and the interline tickets now in use are practically uniform. The present Central Electric Traction Association

mileage book contract contains some exceptions on various roads, and this book would be more desirable if all its conditions could be made uniform.

The next step is the accounting for such interline tickets or freight bills. In some instances the auditor of an interurban line will object to entering into interline arrangements, giving as a reason for such objection that the work in his office would be greatly increased. Of course, it is true that any additional business transacted through the office will cause more work, but the amount of such work occasioned by interline accounting is quite often greatly magnified. If the office is properly organized along the same thorough lines followed for the local business, and the plans are outlined before the actual work starts, the anticipated difficulties will very largely disappear. In fact, the more interline business there is transacted through an office the less friction there is, inasmuch as it is possible to specialize more highly.

The interline accounts as now handled by the greater number of the member companies of the Central Electric Railway Association consist of tickets, baggage, mileage and freight. A number sell tickets over steam roads and boat lines and some also transact freight business with them.

The settlement of these accounts has been very greatly facilitated by the rules adopted by the Central Electric Accounting Conference, and by the periodical meetings at which various difficulties are cleared up.

Among the rules which have been of great benefit is the one prescribing uniform blanks for use in reporting to various companies. Prior to the adoption of this rule there were scarcely two roads using blanks of the same size or form. At present practically all reports from other lines may be filed together, being of one size.

It is the custom for the road issuing an interline ticket to require its agent to make a coupon for each line interested; a copy of the waybill covering interline freight shipments is also furnished each line transporting such freight. However, the matter of interline baggage has evidently not been considered of sufficient importance for the interested companies to require the line issuing revenue baggage checks to provide a copy for the intermediate road. The revenue from this source is comparatively small, but, nevertheless, an accurate account should be kept. This additional stub or copy of interline revenue baggage check was recommended in a paper presented at a meeting of the Central Electric Accounting Conference during the past year, but no definite action was taken.

The agreement as to manner of making settlement has been of great benefit, but has not been carried far enough to bring the best results as to final settlement. It provides that the issuing road shall render reports to the connecting lines for tickets sold over those lines and for revenue baggage forwarded; that the road receiving freight shall make reports to all lines interested; that the road accepting mileage not of its issue shall bill on the road issuing such mileage. These reports are to be made monthly, not later than the fifteenth day of the following month, and are to be accepted as rendered, adjustments to be taken up in the following month's account. Up to this point there is uniformity, but in making the final settlement there is a decided lack of uniformity. Some roads settle by drawing a check in favor of the other line for the entire amount to the credit of that road without making any deduction for debits and expecting in like manner a check for the amount due. Other lines settle by net balance, the debtor line issuing checks to cover, while another plan (followed by the largest companies) is to settle by balance by the use of drafts, the company to which this balance is due making no protest draft on the debtor company. The latter plan is especially satisfactory inasmuch as it enables the creditor company to collect the amount due any time after the agreed date (the twenty-fifth of the following month) and also has the further advantage that all interline drafts may be taken up through the cashier's account or petty cash and one voucher made each month to cover. The draft plan would be generally adopted but for the objection on the part of the executives of some of the lines

*Abstract of paper read at meeting of the Central Electric Railway Association, Columbus, Ohio, March 23, 1911.

interested, although I am at a loss to see any reason why the president of a company should object to settling accounts in this way or to any other accounting detail which is for the purpose of facilitating the transaction of the business in the auditor's office and has no bearing on public policy and causes no increase in expense. It would certainly be well to secure uniformity in this matter of settlement and thereby enable the auditor to handle interline accounts in the easiest manner possible.

In reviewing the steady development of interline accounting since 1906 and the many improvements which have been made in order to systematize it thoroughly we have every reason to congratulate ourselves that many of the obstacles which at first seemed insurmountable have been overcome. The advantages of such a system are bound to win favor with all those who give the matter due consideration, and we may feel reasonably assured that the plan will be constantly extended and found of great advantage to all lines entering into through passenger and freight business.

ASPHALTIC OILS AS ECONOMICAL WOOD PRESERVATIVES*

BY FRANK W. CHERRINGTON, WOOD PRESERVING DEPARTMENT, INDIAN REFINING COMPANY

This paper will be limited to a discussion on asphaltic oils and the effort now being made to establish their claims as economical, efficient and practical wood preservatives. Asphaltic oils were first tried as substitutes for creosote oil on account of the excessive cost of a high-grade creosote at interior points. In the spring of 1902 the Santa Fé Railroad placed in an experimental track in Texas ties treated with asphaltic crude oil. The conditions in this track were such that untreated loblolly pine ties would not last over 18 months, nor the long-lived long-leaf pine ties for much more than two years. The ties placed in this track were given all the asphaltic oil which they could absorb—some of them took as low as 8½ lb. per tie and others as high as 60 lb. per tie. In all cases this was the maximum quantity of oil the ties would absorb, being dependent, of course, upon the structure of the wood treated. These ties have been examined annually during the past nine years. The last report stated that all of the asphaltic-treated ties were found in a state of perfect preservation with no signs of decay. These ties have already lasted over four times the life of untreated ties and are still perfectly preserved. In several specimens examined the sap wood was filled with the oil clear to the heart wood and after nine years of constant service under abnormal conditions the heart wood was found to be as sound as the day the ties were treated. At the same time that these ties were inserted in this experimental track 196 untreated ties of white oak were placed in the track. Practically all of these were found rotten and removed after six years' service.

These tests were so encouraging that in 1908 the Santa Fé Railroad employed asphaltic oils exclusively on a large scale at its plant in Albuquerque, N. M. Since that time it has treated 750,000 ties annually with asphaltic oil. These facts conclusively prove the efficiency, value and practical application of asphaltic oils for wood preservation.

The asphaltic crude oils found in sections of the country other than California and New Mexico are highly inflammable and very volatile and, in their crude state, are not applicable for use as wood preservatives in any process. For these reasons it is necessary to refine the asphaltic oils appearing in such unlimited quantities in the central United States. By submitting the crude oils to refining, the residuum secured is very similar, and in most cases superior, to the oil used in the West for the preservation of ties. After years of exhaustive research Indian Timberasphalt has been placed on the market as a representative of what may be accomplished in the refining

*Abstract of a paper read at meeting of the Central Electric Railway Association, Columbus, Ohio, March 23, 1911.

of the asphaltic oils which are so plentiful in the central regions of the United States. It may be purchased at about 3 cents per gallon, f.o.b. refineries, in practically unlimited quantities. This is an approximate cost of less than one-half the purchase price of high-grade creosote and one-tenth the cost of other coal-tar products.

The crude asphaltic oils of the West are exceedingly viscous and hard to handle by either the pressure or the cheap open tank equipment, but the refined asphaltic oils of the central United States have been found to be most excellent for use in these ways. A plant was recently erected in Cincinnati consisting of two tanks equipped with steam coils and suitable lids for protection against inclement weather, a boiler and boiler pump, a stiff-leg derrick and derrick slings with which to handle ties in bunches of 25 at a lift. This plant has a capacity of 15,000 ties per month and did not cost more than \$3,000 complete.

The process used consists of immersing mixed oak, beech, elm, gum, maple, etc., in hot Indian Timberasphalt oil at a temperature of 215 deg. Fahr. for from 8 hours to 10 hours, dependent upon the previous seasoning of the timber. The steam is then shut off and the ties are allowed to cool in the asphaltic oil over night, when a drop in temperature of from 20 deg. to 30 deg. Fahr. is recorded. The long hot bath at 215 deg. Fahr. heats the tie throughout and has a tendency to kill any germ life which may be present in the untreated tie. It expands and expels any air which may be contained in the wood cells and it boils out the moisture and sap juices. As the oil cools over night the cellular spaces within the tie contract, forming a vacuum which draws the oil into the wood by means of atmospheric pressure. In this way the asphaltic oil takes the place of the air, moisture and sap which had previously been expelled in the boiling period.

The working tanks are carefully calibrated and readings of tank gages and tank temperatures are taken before the immersion and after the withdrawal of the ties. These readings are corrected to 60 deg. Fahr. As the number of ties and thus the number of cubic feet entering each charge are known, it is an easy matter to calculate the injection per tie or per cubic foot. This method of determining the injection of the preservative per cubic foot has heretofore been considered impossible with the open tank process. The checking of the results secured from the calibration of the tanks by weighing individual ties has resulted in actual proof of its success. The average injection secured by this process at the above plant has been found to range between 2 gal. and 2½ gal. per tie. The penetration secured on ties of mixed oak, beech, elm, gum and maple, etc., has been found to be most excellent on timber which has been air seasoned from 4 months to 6 months. The actual costs of operation of a plant of the above capacity and design are as follows:

COST TABLE, 500 TIES A DAY.		
Two and a quarter gal. of oil at.....	\$0.035	\$0.07875 per tie
Rental of ground.....		.003 per tie
One ton of coal at.....	2.50	.005 per tie
Labor and superintendence—		
Six men at \$1.75.....	10.50	
One superintendent	3.00	
One engineer.....	2.50	
Incidental .....	.75	
	\$16.75	.0335 per tie
Equaling a total of.....		\$0.12025 per tie

These figures are based on actual operations at the Cincinnati plant.

The first cost of construction of such a plant could be easily reduced by many electric traction companies to \$2,000 or \$2,500 by placing the treating tanks near their power house, from which exhaust or surplus steam could be utilized for heating the oil. In this way the expense of boiler installation would be saved, besides reducing the cost per tie for treating by the elimination of fuel. If it were desired to lower the capacity of the plant from 15,000 to 7500 ties per month, the first cost of erection could be reduced still further by eliminating one of the treating tanks.

Full-sized, No. 1, first-class ties of the species named may be secured along the right-of-way of any traction company, loaded on cars, at a maximum price of 30 cents each. In other words, by the erection of a plant costing approximately \$3,000, full-sized, No. 1, first-class treated ties, of mixed oak, beech, elm, gum or maple, may be secured at a total cost of 42 cents each, f.o.b. lines. Such ties would not have merely a superficial treatment, but would contain from 2 gal. to 2½ gal. of heavy asphaltic oil injected in a 24-hour treatment. This would prolong their life many years beyond the eight years which is now being obtained from untreated white oak ties, the average cost of which is 55 cents.

To sum up: Well-preserved railway ties, with a 24-hour treatment and containing a maximum injection of heavy asphaltic oil, in quantities of 2 gal. or 2½ gal. per tie, with a resultant life at least equivalent to that of white oak, may be secured at approximately four-fifths the cost of standard first-class white oak ties. These comparative figures are based on the actual costs of treated ties to individual traction companies who do their own treatment.

WHEEL TURNING*

BY H. S. WILLIAMS, ENGINEER, PETER SMITH HEATER COMPANY

It is quite usually considered that the greatest economy in steel wheels is obtained if the flange is not allowed to wear thin and is turned frequently. In fact, in the report of the Committee on Equipment of the American Electric Railway Association for 1909, the following statement is made in Vol. 1, page 161, regarding the subject: "It is very common practice for interurban companies to allow the flanges to run until they are dangerously sharp. This is false economy, as in this way so much metal has to be removed in turning again to bring the tread and flange to its proper shape that the loss of metal is much greater than would be necessary were the wheels turned at the proper time."

It is the object of this paper to controvert this statement and to prove from the standpoint of economy that more mileage may be obtained from a wheel if the flange be allowed to wear as thin as safety will permit than will be obtained by frequent turning. In other words, greater mileage can be obtained by few turnings with deep cuts than from frequent turnings with light cuts.

In wheel turning, the factor which usually determines the period when a wheel should be taken out and restored to its original section is flange wear. The matter of tread wear cannot be taken into account when discussing economical turning,

to be removed in order to obtain it. These restored flange sections are based on the A. E. R. A. standard. It will be readily seen by an inspection of this figure that the amount of steel worn from the flange becomes greater and greater for each succeeding 1/16 in. of wear until ¼ in. has been worn off, after which it remains nearly constant. It is fair to assume that the mileage varies according to the amount of steel worn from the flange, therefore, the last 1/16-in. wear will give greater mileage than the first 1/16-in. By noting the various amounts of steel taken from the tread to restore the original section, it will be seen that for each successive 1/16-in. flange

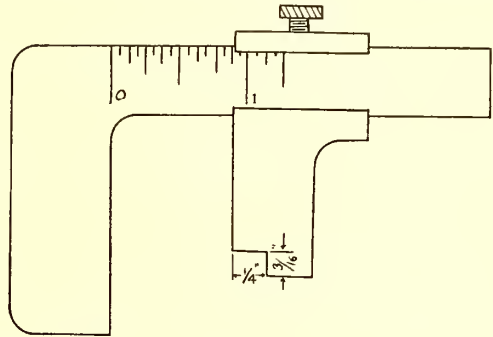
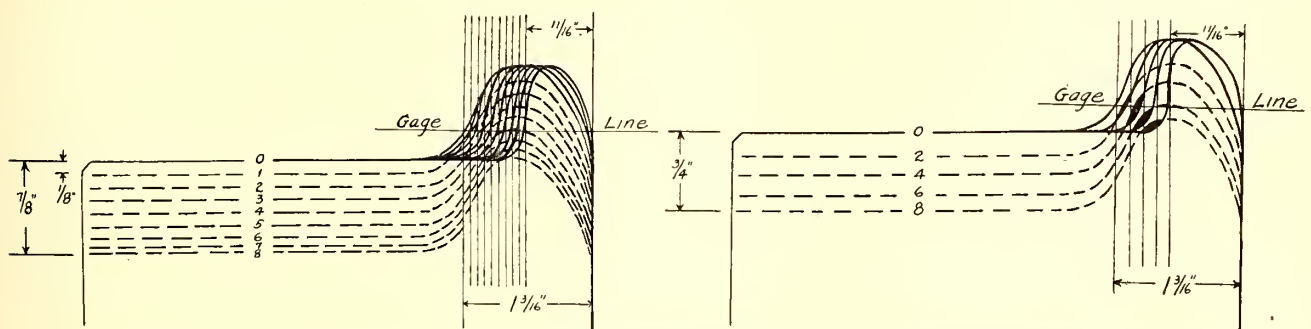


Fig. 3—Caliper Gage for Measuring Depth of Cut

wear the amount of tread turned off remains nearly constant until the tread is restored for 3/8 in. of flange wear, thereafter the amount gradually grows less until at a thickness of 5/8 in. no greater depth of cut is necessary to restore the complete flange. This is true because at approximately 5/8 in. a cut of 7/8 in., or the total depth of the flange, is necessary. So, if it were safe to wear a flange to a thickness of less than 5/8 in., a great deal of service could be obtained from the wheel and at no loss of metal except for tread wear.

To illustrate this point let us assume that each 1/16-in. wear which takes place on the flange as measured at the gage line represents 10,000 miles. Then, the restoration of the flange after the first 10,000 miles will require the removal of 1/8 in. of metal. For each succeeding 10,000 miles the additional depth of cut gradually grows less until at the point corresponding with 7/16 in. wear, or 70,000 miles, it will be necessary to turn off but 3/64 in. of metal to obtain another 10,000 miles of service. Compare this with the depth of cut taken off for the first 10,000 miles and the economy of this practice is apparent.

Therefore, the greater economy is obtained by allowing the



Figs. 1 and 2—Sections of Wheel After Successive Turnings—Usual and Proposed Practice

because tread wear will be practically constant and it is the position of the junction of the flange and tread that determines how deep a cut is necessary. The depth of cut is also dependent upon the shape of the flange and how thoroughly the flange is restored.

Fig. 1 shows a number of superimposed flange sections, which show characteristic wear. The amount of wear in each flange differs from the one next in size by 1/16 in. measured on the gage line. In the same figure is shown the restored section for each flange and the amount of steel which will have

flange to wear as thin as practicable. This has been regarded from the standpoint of the life of the wheel only, but the saving is all the more pronounced when the expense of frequent removal and turning together with the loss of equipment from service is taken into consideration.

It is common practice to leave a portion of the old groove in re-turning to show as a witness mark in the restored section. When the flange is worn thin the witness mark will naturally come quite high on the restored flange. Consequently advantage may be taken of this fact to save metal in turning and a relatively deep groove may be left with advantage. One benefit derived by leaving a deep witness mark is

*A paper read at meeting of the Central Electric Railway Association, Columbus, Ohio, March 23, 1911.

that it helps to keep the point of the flange round and so avoids sharp flanges. It is the writer's experience that a groove as deep as $1/16$ in. may be left at any point which is $3/8$ in. or more above the tread of the wheel.

The saving effected by this practice is illustrated in Fig. 2, which represents the same conditions as Fig. 1, but the flange wear is taken at depths of $1/8$ in. instead of $1/16$ in. for the sake of clearness. By this figure it is demonstrated that in restoring a flange after a wear of $1/2$ in., a cut of $7/8$ in. is necessary if the full section is restored while a $3/4$ -in. cut is needed if a $1/16$ -in. groove be left. Thus $1/8$ in. of the tread is saved.

In order to insure economical turning, to guard against taking deeper cuts than necessary and avoid making too light a cut (which would require a second), it is good practice to use a gage with which to caliper the flange and to determine exactly what depth of cut should be taken. A form of gage which has been used with success is shown in Fig. 3. In using this gage it is necessary to caliper the flange at several points about its circumference and to use the smallest measurement. Then by reference to a table which may be readily prepared, either by a graphic method or by experience, the exact cut may be immediately determined.

In the inspection of steel wheels a standard gage should be adopted similar to the M. C. B. wheel defect gage but modified to suit electric railway conditions. The use of such a gage takes away from the inspector any exercise of his own discretion and allows no excuse for permitting a flange to be worn below the limit. It will also settle any differences of opinion in case wheels of foreign line cars are thought to be unsafe.

The minimum thickness to which a flange may be worn with safety is a matter to be determined largely by local conditions. A sharp or vertical flange may be as dangerous as a thin flange. The wearing of flanges, aside from reducing the strength, also decreases the gaging distance between wheels and thereby introduces a liability to trouble. It has been the writer's privilege recently to see a number of cases of extremely thin flange wear. One road operating a 20-ton car at approximately 40 m.p.h. had a large number of wheels on which the flange was worn to a thickness of from $3/8$ in. to $1/2$ in. on the gage line. On another road a flange was completely stripped from the wheel, and the thickness of metal at the line of fracture was $1/4$ in. This wheel was taken from a 6-ton car, operating in city service. Several similar cases have been seen, which go to show the extremes to which a steel wheel may be subjected. It would seem good practice, however, to limit the wear on wheels in city service to $5/8$ in. and on interurban cars to $3/4$ in., and in some cases, where the cars are heavy and travel at high speed, to establish a limit of $7/8$ in.

The question of economical wheel turning and standard inspection practice has a large bearing on the practicability of the steel wheel. Unquestionably if right shop methods are employed the life of the wheel may be greatly prolonged.

CONFERENCES ON INTERURBAN OPERATION

The Indiana Railroad Commission held conferences with representatives of various interurban railroads during the week beginning on March 14. The purpose of the examination was to ascertain what steps the roads have taken regarding the recommendations contained in the circular of the commission issued on Jan. 27, of which an abstract was published in the issue of the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911.

The provisions of the new laws respecting the commission were also discussed briefly. The provision for separate compartments for motormen, according to the representatives of the companies, will entail considerable expense, since nearly all the cars will have to be remodeled or partitioned in a manner to comply with both the recommendation of the commission and the provision of the new law. Some representatives said they could partition a car for about \$22.50, while others thought the expense would average \$75 per car.

The block signal question will be taken up on April 18.

THE USE OF SAND ON INTERURBAN CARS*

BY WALTER H. EVANS, SUPERINTENDENT OF MOTIVE POWER INDIANA UNION TRACTION COMPANY

The use of sand was taken up originally by electric railways because of its long association with the operation of steam locomotives, but in interurban electric railway operation, where each axle is a driving axle, very little sand, if any, is really necessary to start an electric car. It is true that we sometimes see wheels slip or spin in starting, but this is usually an indication of an excess of power rather than of lack of sufficient adhesion between the wheels and the rail, and when the power is reduced the car starts in good shape. Hence a discussion of this subject becomes almost entirely a question of using sand as an auxiliary in retarding or stopping an interurban car rather than in accelerating it. It is consequently a braking proposition pure and simple, with particular reference to emergency stops to prevent accidents or personal injury.

The tests which have been conducted on brakes in steam railroad service have demonstrated the following points:

(1) The shortest reliable stops are made by a retarding power which is most quickly developed and is maintained to the highest possible limit during the entire stop, without skidding the wheels.

(2) The lengths of stops made when the air brakes were applied and the engine was reversed were longer than those made with the brakes alone and were extremely injurious to the tires, on which the skidding formed flat spots. These tests should show the inadvisability of using the reverse in conjunction with air brakes on electric cars.

(3) Sand is of assistance in braking if judiciously used, but if applied to the track after the wheels begin to skid will produce flat spots and will not unlock the wheels. A large amount of sand is not so effective as a moderate amount. In fact, in connection with one series of tests of passenger trains consisting of a locomotive and six coaches, one running at 50 m.p.h. and the other at 60 m.p.h., the report says: "The difference in the lengths of the stops with and without sand was inappreciable and no proof exists that the sand was markedly beneficial."

While it is hardly to be expected that these results will obtain to the same extent in the operation of interurban electric cars, they may serve to direct attention toward what may prove a very profitable line of investigation to electric railway service generally. Undoubtedly the satisfaction to be secured from the use of sand will depend very largely upon the efficiency of the sanding device itself and the character of material with which it is supplied. Owing to the restricted conditions on an interurban car it is usually very difficult to install the older types of mechanical gravity sanders with anything like a satisfactory arrangement. This difficulty is augmented by the very sharp curves and other track conditions which usually prevail on an interurban line. This has led to the general use of pneumatic sanders because they are more readily applied than gravity sanders and have the advantage of distributing the sand evenly and expeditiously at the proper point on the rail, directly ahead of where the front pair of wheels makes contact with the rails. The sand should be applied only in sufficient quantities to give maximum traction and braking power, and it is especially important that the application should be just previous to or at the time of the application of the brakes and before the braking power is high enough to skid the wheels. This condition applies particularly to emergency brake applications and is one of the especial points of advantage of the pneumatic type over any of the gravity sanders.

The pneumatic sander, however, requires very careful installation and arrangement of the piping connections to insure reliable and positive results under all conditions. It is also very necessary to use a device requiring the minimum amount of air and sand as well, as the tendency is to overload the com-

*Abstract of paper read at meeting of Central Electric Railway Association, Columbus, Ohio, March 23, 1911.

pressor with minor pneumatically operated devices, which were not taken into consideration when the capacity of the air compressor was determined. The flexible connections between the sand box, usually carried inside the car, and the discharge pipes attached to the trucks are generally sources of considerable trouble and require careful attention.

The type of sand valve should also be such as to avoid useless waste of air and it should be located conveniently near the brake valve so that the two operations of applying sand and setting the brakes can be done in emergencies at practically the same time.

The character of the sand is worthy of more important consideration than apparently it usually receives, as in some cases the sand is entirely lacking in essential qualities and has a tendency not only to defeat the object for which it is applied, but actually to create a more serious condition. The best material to use is good sharp quartz sand, thoroughly dried and screened so as to be free from dirt, soil or gumbo. Dirty sand is more susceptible to moisture and consequently the tendency to clog up the pipes is greater, aside from the harm it may do after reaching the rail. In this territory lake sand has been found quite satisfactory and is extensively used in pneumatic sanders on account of its fine even grain and freedom from foreign matter. It is also easily dried and screened and is generally economical.

The question of economy in the cost and use of sand is one that has apparently received but little consideration, although in some cases the amount of sand used on certain roads has been reduced one-half compared with the preceding year, although the same general operating conditions prevailed. Here is a splendid opportunity for educational work. It is not sufficient to leave matters of this character to the individual notion of every man to carry out as he sees fit, but the very best way should be determined and the men instructed accordingly.

THE DEVELOPMENT OF LONG-DISTANCE TRAVEL*

BY T. J. GORE, GENERAL AGENT INDIANAPOLIS INTERURBAN JOINT TICKET AGENCY

Long-distance travel over interurban lines has increased so rapidly within the past three years that its future development and the best methods of handling this business have become a most interesting subject. This problem has been presented and solved to a greater extent, I believe, at the Indianapolis Joint Ticket Agency than at any other interurban ticket office within the boundaries of this association. On July 1, 1905, the Indianapolis Joint Ticket Office was opened, with myself as agent, and one ticket seller. We were not in operation long, however, before, passengers began asking for tickets to points beyond our local lines, and this suggested the scope and future possibilities for interline business over interurban roads. At this time our issues consisted of only a few local card tickets and no fare sheets of connecting lines; therefore we were unable to sell through tickets. The demands for interline tickets were so numerous and persistent that the matter was taken up with the Terre Haute, Indianapolis & Eastern and the Indiana Union Traction companies relative to furnishing our office with a supply of Stromberg and skeleton tickets so that we could sell tickets to points beyond our local lines. These tickets were furnished, and later by writing to the general managers of several of the interurban lines in Indiana, Ohio and Michigan, requesting them to supply our office with copies of their local fare sheets and advising them of the intention of compiling a joint fare sheet which would enable us to sell tickets to points on their lines, prompt responses were received with copies of their local tariffs. From these tariffs I compiled joint fare sheet No. 1, which was the first joint tariff ever published by interurban lines. This was the beginning of the sale of interline tickets in our territory. As soon as the public learned that

through tickets could be purchased our long-distance travel began to increase.

At this time a charge of 25 cents was made for each piece of baggage handled, but all cars were not equipped for handling baggage. In fact, it was not the desire to handle baggage at all, but it did not take us long to discover that to secure business we must handle baggage free. The sales of interline tickets for the first year amounted to \$32,199, which was not a bad showing. Our interline sales, however, continued to increase. In 1907 the sales were \$48,390, an increase over 1906 of \$16,191. In 1908 the sales were \$72,865; in 1909 they were \$98,783, and in 1910 they were \$176,616. These amounts do not include the sales of the Central Electric Traffic Association mileage books, but purely interline business which the traction lines had not been getting before. The sales of the Central Electric Traffic Association mileage books at this office in 1910 amounted to \$30,500.

To handle this large increase in interline business at the Indianapolis joint ticket office we had to increase the number of ticket clerks and enlarge our ticket office. We have now six ticket sellers during the winter months and eight during the summer months. It was also found necessary to install an information bureau, so many were the public inquiries relative to time of cars, fares and connections to foreign lines. As an indication of the public interest in this regard, our average telephone calls for information over two 'phone systems will at times reach 2000 calls in 24 hours—besides the thousands of questions answered and connections looked up at our information window by the information clerk. This information is now found indispensable to our patrons.

Our ticket office has been enlarged to twice its original size. We now have a selling frontage extending 30 ft. and during the heavy summer travel all this space is necessary. In my opinion, we have the best equipped modern ticket office in the State, including any steam road ticket office. With all the help it requires to handle the business the office is maintained and operated at an expense of less than 1 per cent of the total sales. We have 34 different forms of interline tickets, which enables us to ticket a passenger to any point on traction or steam roads. We also have 403 destination local card tickets. Our local ticket case is most modern and convenient and is said to be the largest local case ever made for traction or steam lines. We are now selling tickets over 36 different interurban lines, four steam lines and three of the largest boat lines. We are selling tickets to St. Louis, Kansas City, Omaha, Des Moines, Buffalo, Cleveland, Detroit, Toledo and intermediate points—in fact, to any point to which a passenger may desire to go. We never allow a passenger to leave our ticket window for lack of the proper ticket, as we keep on hand a supply of the old reliable skeleton tickets with enough coupons attached to ticket a passenger to South Africa and return!

The interurban lines are keeping up with this great development of interline business and, I believe, realize the substantial revenue they are deriving from this source, and are providing through limited parlor cars to care for the accommodation of these passengers. Out of Indianapolis we now have daily eight through limited trains each way between Indianapolis and Ft. Wayne, distant 136 miles; six limited trains each way between Indianapolis and Louisville, distant 114 miles; three limited trains each way between Indianapolis and Dayton, distant 109 miles; two limited trains each way between Indianapolis and Goshen, distant 146 miles. These long-distance through runs are mentioned to illustrate the traffic arrangements which have been made for through service over foreign lines.

From my personal observation after six years of close contact with the traveling public I am convinced that the more long-distance runs established, with finely appointed cars, the greater the through travel is bound to become. The public seems to welcome such accommodation—and, in fact, demands it.

The Central Electric Traffic Association is the mainspring of all the development of the long-distance travel. Through this association our joint tariffs are compiled and placed in

*Abstract of paper read at meeting of the Central Electric Railway Association, Columbus, Ohio, March 23, 1911.

all ticket offices of companies that are members of the Central Electric Railway Association, throughout Indiana, Ohio, Illinois, Michigan and Kentucky. So great has the distribution of these tariffs become that copies have reached the Pacific Coast. Last September a ticket was sold by the San Pedro, Los Angeles and Salt Lake Railroad from Long Beach, Cal., to Louisville, Ky., routed via Chicago—Monon Railroad to Indianapolis, and via the Indianapolis, Columbus & Southern Traction Company from Indianapolis to Louisville. Another ticket was issued by a steam line from Los Angeles, Cal., to Indianapolis, routed via Chicago, then the C., C., C. & St. L. from Chicago to Peru, and the Indiana Union Traction Company from Peru to Indianapolis. The popularity of interurban travel is such that some passengers when purchasing tickets at steam road ticket offices request that they be routed via a traction line from the first junction point. The extent of new territory opened up for interurban business within the past two years has necessitated the revision of our present Joint Fare Sheet No. 3, and the Traffic Association will have a new joint tariff completed within the next two months which, in my opinion, will be the means of increasing our interline business fully 50 per cent. It would seem that no interurban road can afford to refrain from being a party to this tariff. The whole country is watching the development of the interurban lines, particularly in the Central States, the territory covered by this association. The interests of these various lines are mutual and, we may say, interdependent. Consequently, the more cordial their relations and their co-operation in building up through traffic the greater will be the prosperity to all.

NEW YORK MEETING OF COMMITTEE ON POWER GENERATION

A meeting of the committee on power generation, American Electric Railway Engineering Association, was held in New York on Tuesday, March 21, 1911. Those present were L. P. Crecelius, chairman, superintendent of power Cleveland Railway Company; H. G. Stott, superintendent of motive power Interborough Rapid Transit Company, New York; R. A. Dyer, Jr., assistant general manager and electrical engineer Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.; A. Wolff, superintendent of power United Railways & Electric Company of Baltimore; B. F. Wood, assistant engineer motive power department Pennsylvania Railroad, Altoona, Pa.; C. L. Gates, engineer of power stations Fonda, Johnstown & Gloversville Railroad, Tribes Hill, N. Y., and Norman Litchfield, secretary-treasurer of the association and engineer car equipment Interborough Rapid Transit Company, New York.

Chairman Crecelius brought up the question of forced draft and peak loads which had been carried over from the preceding year for further investigation. There was a general discussion as to what overload period could properly be defined as a peak load. Mr. Crecelius thought that the peak load problem might be attacked from the outside by the installation of current-checking devices on cars. His experience in Cleveland showed that the power consumption per car mile is less during the peak hours than at other times of the day. Mr. Stott said that the coasting recorders on the Interborough system were of greater benefit in reducing the kw-hours during the non-peak periods because the motorman could not do so much coasting when the trains were operated on the shortest possible headway. Mr. Stott added that the committee's report this year might consider the influence of substation arrangements, car-checking instruments and the like on reducing peak loads at the power station. This would be a supplement to the 1910 report, which had discussed only power station conditions.

Mr. Wood wanted data on the handling of several peaks of short duration. Mr. Dyer suggested that in some cases of this kind relief might be afforded by a slight rearrangement of car schedules. The subject of peak loads was then assigned to Mr. Wood and that of forced draft to Mr. Stott.

Mr. Wood brought up the question of stand-by losses. He suggested that the members assist Mr. Stott by investigating

the plants in their charge to note the hourly load curve characteristics and the amount of fuel used hour by hour so that a definite idea of efficiency per hour, day, week and month could be obtained.

Mr. Crecelius said he would take up one of the new subjects assigned by the executive committee, namely, the purchase of bituminous coal on the b.t.u. basis. This report will analyze the b.t.u. form of specification and the justification for certain penalties and premiums. Mr. Crecelius said that his experience in purchasing coal on a b.t.u. basis had taught him that his company had not been using the most economical coal in the past. Mr. Stott said that he had had a b.t.u. contract for nearly eight years. During the past year the average heat value had not varied more than 200 units from an average of 14,600 b.t.u.

Mr. Crecelius said that before buying on this basis the average heat value of the coal delivered in Cleveland was 11,879 b.t.u. The first year of the contract it averaged 12,742 b.t.u., the second year 12,763 b.t.u., the third year 12,780 b.t.u. There were bought 450,000 lb. of coal at a price which was 0.23 cent per ton less than the basic contract figure. This slight difference showed that the b.t.u. specification was entirely fair with regard to the premiums and penalties.

The next subjects were those of boiler sizes, insulated coverings for boilers, settings and baffling. Mr. Crecelius thought that larger boiler units might be advisable in view of their space-saving possibilities. Mr. Stott suggested a study of feed-water treatment. The report on boiler settings, sizes, baffling and arrangement of boilers with reference to the engine room (whether parallel or at right angles) was assigned to Mr. Wolff.

The subject of direct-current turbo-generators exceeding 500-kw capacity was assigned to Mr. Dyer for report.

Mr. Stott said it would be desirable to have some indicating means for knowing whether each boiler was taking its due share of the load just as one can tell what the separate units in the engine room and different substations are doing. On suggestion of Mr. Wood it was decided to formulate a standard boiler log sheet accompanied by suggestions concerning the apparatus which should be used to record boiler performance. This subject will be included in Mr. Stott's report.

It was determined to incorporate in the final report of the committee the opinions of the members on the most desirable voltage and frequency for turbo-generators from an operating standpoint. The subject of locating faults in high-tension cables will be referred to the power distribution committee of the Engineering Association. The meeting was then adjourned.

CONVENTION OF THE RAILWAY SIGNAL ASSOCIATION

The Railway Signal Association, comprising the signal engineers of the important steam railroads in the country, met at Congress Hall, Chicago, March 20. Owing to this meeting there were many exhibits of signal apparatus in the Coliseum, which also held the exhibits made in connection with the meeting of the American Railway Engineering & Maintenance of Way Association.

The program of the Railway Signal Association included the presentation of reports of several committees and two papers. The first report was that of committee No. 1 on "Signaling Practice and Standards," and consisted of a report of a sub-committee on "Standard Symbols." The report of committee No. 10 on "Electric Signaling for Electric Railroads" consisted of a report of sub-committee B, which submitted a progress report of detailed specifications on material used in electric signaling. Other committees reporting were those on mechanical interlocking, power interlocking and automatic blocks.

In addition to the committee reports A. H. McKeen, signal engineer Oregon-Washington Railroad & Navigation Company, read a paper on "Portable Storage Batteries as Applied to Automatic Signals on the Harriman Lines," and L. Frederick Howard read a paper on "Principles Governing the Selection of Alternating-Current Signal Apparatus for Railroads."

ECONOMICAL LIMITS FOR FLANGE WEAR ON STEEL-TIRED AND ROLLED-STEEL WHEELS*

BY JOHN SIBBALD, MASTER MECHANIC FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD

It is general practice to compare wheel performances on the basis of the number of miles obtained per sixteenth-inch reduction of the wheel rim. On the road both the tread and flange wear away. In the shop it is necessary to reduce the

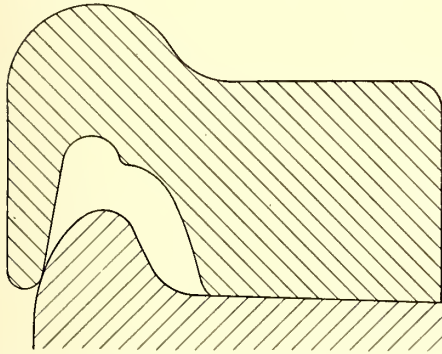
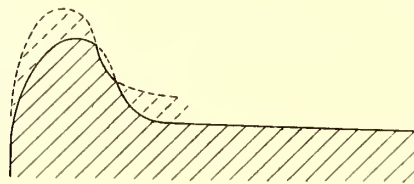


Fig. 1—Brakeshoe with Wide Flange Way



Figs. 2 and 3—High and Low Witness Marks

tread still more so as to obtain the original thickness of flange.

The greatest amount of flange wear is caused by the abrasive action of the brakeshoe. A "straight flange" as illustrated by Fig. 6 is characteristic of brakeshoe wear. The flange way of the shoe should be so large that no grinding action will occur at the fillet and it should be of such shape as to correct the

be easy-moving and side bearings should have clearance. The proper design of special work also has an important effect on flange wear.

When local conditions do not increase the effect of the factors just mentioned, the most important factor causing flange wear is the difference in diameter of wheels in the same pair. Through a difference in hardness of the wheels, or a difference in brakeshoe pressure or loading, one wheel of a pair of wheels generally wears faster than the other. The larger wheel tends to run ahead and crowd the flange of the smaller wheel against the rail. A difference of 1/16 in. in diameter has the same effect as a curve of 2400 ft. radius. Of course the coning of a new wheel lessens this effect, but this observation is directed against wheels whose treads have been worn flat. The relation between the difference in diameter and the number of miles "per sixteenth of flange wear" is shown by the curve,

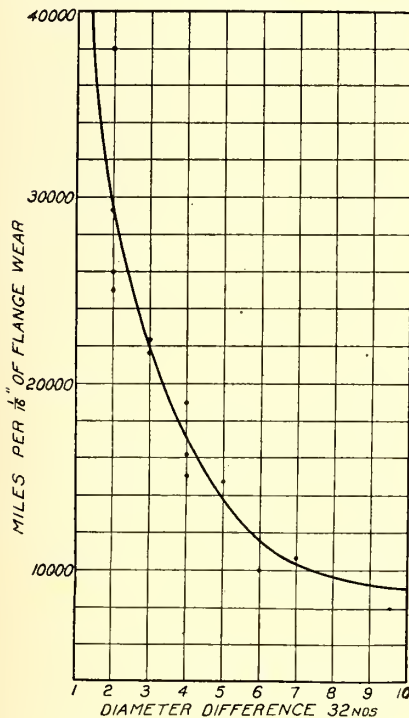


Fig. 4—Relation Between Flange Wear and Wheel Diameter

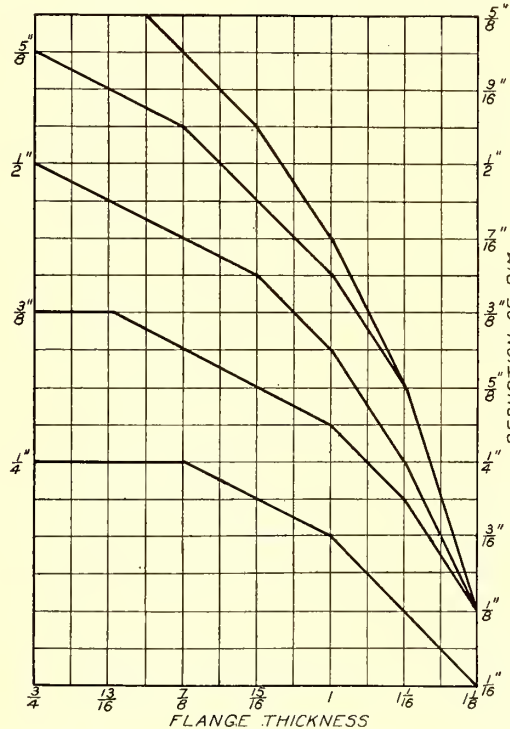


Fig. 5—Relation Between Thickness of Flange, Metal Removed and Height of Witness Mark

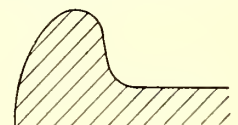


Fig. 6—"Straight Flange" Wear

tendency of the flange to form a sharp shoulder at the top. This is illustrated by Fig. 1. By the use of a brakeshoe having a wide flange way not only is flange wear reduced, but the average shape of the flange remains nearer the original standard.

Curve resistance also contributes to flange wear. It is of course a factor which cannot be eliminated, but it may be reduced by setting the curves at the proper elevation and having trucks in condition to swing freely. The center bearings should

depends upon two factors—first, the amount which has been worn from the flange, and, second, the amount of "witness mark" allowed. The expression "witness mark" may be illustrated by Figs. 2 and 3. In reshaping, a groove is frequently left as shown. Fig. 2 shows a witness mark extending down to 1/2 in. above the tread. Fig. 3 shows a witness mark 1/4 in. above the tread. The curves of Fig. 5 show the relation between the thickness of the flange and the metal removed for different heights of witness marks.

The rate of flange wear increases rapidly as the diameter

*Abstract of paper read at quarterly meeting of Street Railway Association of State of New York, Syracuse, March 22.

10. It prints the number of the register.
 11. It prints the number of each conductor and shows the time at which he takes and leaves the car.
 12. It prints the line number over which the car is run.
 13. It fixes the work and responsibility of each conductor and removes all occasion for dispute. From the register record it shows the various fares in detail which are collected upon interurban cars running over city lines. This register is so contrived that it is always locked until put in service and cannot be put in service until the conductor's number is printed on the statement in the register.
- The following instructions were issued to conductors for operation of the Ohmer system:

- them. Always see that the register cord is properly adjusted; in damp weather this cord shrinks, and must be loosened at the stop end, to permit the register to operate freely.
7. Always see that the pointers on the rod are set to the fare you have collected before you pull the cord.
 8. Conductor will not move the rod, or change the "fare indicator" until he has collected a different class of fare from the last one registered.
 9. Give the cord a steady pull until the bell rings. Never jerk it.

IMPORTANT

10. At the end of each half-trip first turn the passenger indicator wheels to zero; see that the knob drops back to orig-

W. Form 722 1M 1-10-11

KEY _____

Operated Register _____ Days Percentage _____ %

Name _____ Badge _____ Month _____ 191

DAY	REVENUE TICKETS		CASH 5C		CASH 3C		TRANSFERS		NON-REVENUE TICKETS		TOTAL ERRORS	TOTAL PASSENGERS	REMARKS
	OVER	SHORT	OVER	SHORT	OVER	SHORT	OVER	SHORT	OVER	SHORT			
1													
2													
3													
4													
5													

Fig. 2—Ohmer Register—Individual Conductor's Monthly Record

1. Before starting the car from the carhouse see that the time wheels (on left side of register) are properly set.
- Hour-wheel—First wheel next to register case on left side.
- Minute-wheel (Tens)—Second wheel from register case on left side.
- Minute-wheel (Units)—Third wheel from register case on left side. This wheel also shows a. m. and p. m.
- Use the star on center wheel for zero when necessary.
2. Conductors will use the numbers on the "day of month wheel," the first wheel next to register case on right side, to indicate the line over which the car is run, using the following line numbers: 1, Wolf and Valley; 2, Wolf and Salina; 3, Court and Salina; 4, Rockwell and Liverpool; 5, Midland and Butternut. Let the month-wheel stand as set by the inspector, who will see that the register record is properly dated at the opening and closing of each day's work.

- inal position. Turning to zero will lock your register and before it can be operated set the "time wheels" and see that the line number is set correct, then take an impression.
11. On changing lines, while using same car, take two impressions, the first impression to show your present line number; second impression to show the number of line to which you are changing.
 12. Count and record the amount of your change on trip sheet before going on duty. When through with your day's work, count your money, deduct the amount of change with which you commenced from the cash on hand and turn in the balance to the receiver, marking amount of day's collection on trip sheet. Turn in all tickets in envelope provided for that purpose, but do not count them. Transfer returns will be made as outlined in general order No. 698. On trip sheets fill in date, car number, run number, key number, conductor's and

W. Form 742 5C 1-21-11

1911

General Average for the Year _____

Name _____ Key _____ Badge _____

MONTHS	REVENUE TICKETS		CASH (5C)		CASH (3C)		TRANSFERS		NON-REV. TICKETS		TOTAL ERRORS	DAYS WORKED	PASSENGERS CARRIED	PERCENTAGE	NUMBER OF TIMES DISCIPLINED	REMARKS
	OVER	SHORT	OVER	SHORT	OVER	SHORT	OVER	SHORT	OVER	SHORT						
January																
February																
March																

Fig. 3—Ohmer Register—Individual Conductor's Yearly Report

3. See that the total passenger indicator wheels stand at zero, and that the "direction" flash indicates properly. This is set by pulling out the knob at the top of the register on right side, and turning to the right until it drops back into its original position.
4. Insert your "identification key" as far as it will go in the upper keyhole on the right side of the register, and do not remove it, except when relieved or at the end of run.
5. Take the impression key from the key holder, insert it in the bottom keyhole on the right side of register, then turn slowly to the right, one complete revolution, remove the impression key and return it to the key holder.
6. Register each fare separately as collected; never bunch

- motorman's name and badge number. Make a separate report for each regular or extra run.
13. You will keep no record of passengers carried, with the exception of policemen, firemen and badge employees. This information you will furnish, together with time and record of transfers issued, upon trip sheet.
 14. Your ability as a conductor will be judged by the accuracy of your turn-in, as compared with the register report. Each 5-cent fare, ticket, transfer, 3-cent fare and pass over or short will constitute an error.
 15. You must not correct errors in classification by registering fares in the wrong class. Report such errors to the office for correction.

16. Note: The register makes all records of fares collected, reducing your bookkeeping to a minimum, giving you more time for the operation of your car and the proper care of passengers.

RELIEF

It is necessary to take an impression when leaving or when being relieved, as well as at the time of taking the car. Always remove your identification key at the time of relief or at the end of a run, but never remove it at any other time. The succeeding conductor must observe the rules above.

Insert identification key, see that trip-wheels are at zero, and direction flash is correct, time wheels show correct time upon taking car, and line number is correct.

Thereafter observe rule No. 10.

On being relieved between terminals, conductor will set his leaving time, see that line number is correct, and take an impression, letting trip-wheels stand to cover the load, except Minoa cars, where trip-wheels will be turned to zero at East Syracuse, time wheels set, and line number changed. See rule No. 11.

The following classification will be observed in registering fares:

Five (5) cent fares under 5-cent denomination.

Revenue tickets under ticket denomination.

Transfers under transfer denomination.

Three (3) cent fares under 3-cent denomination.

Non-revenue tickets, which consist of coupon passes and employees' tickets, will be registered under pass.

Note:—If the register or operating device becomes impaired or inoperative, report the fact promptly to the office or inspector, making a note of same on trip-sheet.

UNREGISTERED FARES

You will note that the instructions require that the conductor shall count the amount of money in his possession before going on duty and when through with his day's work shall deduct an equal amount and turn the balance over to the company. This means that the conductor turns in not only all the fares registered, but also all the fares which through error were not registered. These unregistered fares, although belonging to the company, in this way reach the treasury, which they did not do under the old system of registration upon the so-called counting machines.

The radical change which this method brought about was something that our conductors could not quite understand at first, and it took them some time to recover from its effects. On account of three years' experience in not registering transfers it was quite easy for the conductors to forget to register this class of fare, and as a result the first few months' operation showed a decided overage in transfers.

The Ohmer system does not compel the dishonest conductor to register fares, but if the system is used as directed it can be stated with justice that it does get to the treasury of the company all of the money which belongs to it, with the exception that the company has to bear the loss that is occasioned by conductors returning too much change to passengers; by money being lost after being collected; or by conductors spending money after making collections and keeping no account of the expenditures. When making the turn-in, the amount of money with which the conductor started is deducted, without taking into account the payment of a bill, the loan of money to some one else, or the purchase of tobacco, sandwiches or other articles, but these discrepancies are usually disclosed by the register record.

It is not expected that conductors will not make mistakes in operating this type of register, or in making returns as directed by this system, and it is the practice of the superintendent to see every conductor personally who is 20 or more fares short in a day's work. Many times conductors remember that they spent some money on the day in question and others, who feel a proper interest in their work, upon their attention being called to a shortage, recognize the justice of the claims of the superintendent that they do not register the fares unless they collect them, and, if they collect them, they

are the property of the company and the company should receive the money.

Fig. 1, illustrated herewith, shows the report turned in to the superintendent's office each day, indicating the work of each conductor and the number of fares over or short in each classification. These reports are transferred to an individual conductor's record (see Fig. 2, published herewith), showing his work for each day of the month and the number of fares over or short. From this sheet is formulated the conductor's monthly record, showing the total number of errors, the number of days worked, number of passengers carried and the grade for the month.

This grade is ascertained by division of each conductor's errors by the number of days that the conductor worked, giving an average number of errors per day, which, deducted from 100, gives a balance which is taken as the conductor's grade. These grades are posted upon the bulletin boards at the end of each month for the purpose of creating among the conductors an honest rivalry in striving to reach the top of the list. This always appeals to the man who has an interest in his work, but has no effect upon the dishonest or careless man. This has been demonstrated very clearly to us by the fact that the same men are nearly always at the top of the list, and the same men are nearly always at the bottom of the list, as long as they remain in the service.

The general average grade of all conductors employed by the company gives an interesting result, showing that the conductors who are far below the general average are those who are careless and indifferent in the operation of this system.

The monthly records are transferred to a yearly record (published herewith, Fig. 3) of each conductor, showing the grade, the overs and shorts in each classification by months, so that each conductor's record folder contains a sheet showing his work for each day of the month and also a sheet showing his work for each month of the year, making it very easy to find the grade of any conductor for any desired period.

During the first few months of operation of this system it was very discouraging in view of the fact that the net differences for each month were shortages instead of overages as they should have been, provided the register company was correct in its claim that many fares which were the property of the railway company were being lost on account of conductors making the turn-in on the basis of the number of fares registered instead of the number of fares collected.

The net overage or shortage of each classification for each month is shown in Table I.

TABLE I.—NET OVERAGE OR SHORTAGE.

Month.	Revenue Tickets Short.	Cash 5 Cents Short.	Cash 3 Cents Short.	Transfers Over.	Non- Revenue Tickets Short.
March	1571	2310	242	509	1045
April	1100	1102	*31	1332	818
May	1101	866	*49	1955	932
June	1476	*110	*95	1400	525
July	2368	324	*134	657	107
August	2191	393	*272	1016	125
September	1478	776	*4	736	938
October	1766	*220	48	506	640
November	1649	*1972	49	444	559
December	1384	*2239	251	885	645
January	1082	*2296	106	597	741
February	1056	*1159	*6	953	515
*Over.					

Table II gives the month's general average, shortage or overage per man per day:

TABLE II.—NET RESULTS PER MAN PER DAY.

Month.	General Grade.	Number of Errors.	Net Short or Over.	Net Short or Over per Man per Day.
March	92.90	41,069	4659 short	.618 short
April	94.17	33,193	1657 "	.232 "
May	94.04	34,633	895 "	.128 "
June	93.83	36,596	396 "	.055 "
July	92.60	43,134	2008 "	.265 "
August	93.74	40,971	1421 "	.19 "
September	93.93	38,340	2452 "	.345 "
October	94.75	29,286	1128 "	.149 "
November	94.33	30,279	159 over	.02 over
December	94.59	31,290	844 "	.115 "
January	94.76	29,240	964 "	.133 "
February	94.87	25,835	547 "	.083 "

The first eight months' operation showed a net shortage for each month. In November a small average was shown, and

this has continued each month up to the present time. This is, no doubt, accounted for by the fact that the conductors had by this time become familiar with the operation of this register and system, and that the new men were taught by conductors who had had months of experience in its operation.

It is sometimes discouraging for the superintendent to call in to the office one of the conductors in whom he has explicit confidence and tell him that he is, according to the report, 20, 40 or 100 fares short, and receive for a reply, "I took out only the amount of money with which I started and turned in to the company the balance." Cases have happened wherein old and supposedly honest conductors have been as high as \$6 short in one day. One specific case may be cited where a half-dozen different conductors, who were very seldom short, were called to the office and charged with being from \$1 to \$6 short on a certain Saturday and the only conclusion that could be arrived at by the company was that a pickpocket had been at work. On one of the busy trips at night one of the conductors discovered a man with his hand in his pocket, extracting some of the money, and it was supposed that this man had made this his business on many busy trips during that day.

While there were many misgivings upon the part of conductors when this system was put into effect, most of the conductors at the present time are satisfied with the operation of this system and feel that no injustice is done them, because of the fact that they are sure that they have all the money that belongs to them and that they have turned in to the company its due, whether registered or not registered, and that there is no occasion for their being considered dishonest.

Where a man shows a low grade month after month, and this low grade is caused by shortage, it can be determined readily that this man is careless in the handling of the com-

TABLE III.

	Passengers Carried.		Passenger Earnings.	
	1909.	1910.	1909.	1910.
January	2,748,632	2,999,676	\$107,699.02	\$119,193.11
February	2,573,332	2,732,588	100,700.99	108,698.56
March	2,777,167	2,999,267	108,970.32	119,264.76
April	2,685,428	2,919,525	106,216.31	116,124.90
May	2,921,951	3,118,423	114,072.77	122,741.90
June	2,965,974	3,123,450	115,740.23	123,161.34
July	2,929,736	3,225,549	112,604.85	125,840.13
August	2,864,522	3,134,489	109,768.23	121,901.11
September	3,108,670	3,294,083	124,038.29	133,439.58
October	2,943,124	3,215,983	115,713.02	128,141.42
November	2,887,065	3,125,094	114,378.39	124,648.58
December	3,081,281	3,321,070	123,589.46	134,316.33
	34,486,882	37,209,197	\$1,353,491.88	\$1,477,471.72
Increase in passengers carried,		2,722,315	or 7.89 per cent.	
Increase in passenger earnings,		\$123,979.84	or 9.16 per cent.	

pany's money or that he is dishonest. In either case the company is better off without his services. It has been clearly demonstrated in this 12 months' experience that the conductors who have an interest in their work have very few errors. We have in mind some of the conductors on this system who have not fallen below a grade of 98 per cent in several months' operation of the register.

If a conductor through mistake turns in some of his own money and afterward discovers it and makes proper claim, the amount of money over is returned to him, provided the turn-in shows the amount over that he claims. Where a conductor shows a very low grade and this low grade is acquired by overage, he is called to the superintendent's office, the same as though it were shortage.

Mechanically, no trouble has been met and the maintenance service of the register company must be commended.

For the purpose of comparison Table III is submitted, showing the number of passengers carried during 1909 and 1910, and the amount of passenger earnings for the same period.

As a result of the merger of the Los Angeles-Pacific Railway and the Pacific Electric Railway, Los Angeles, Cal., it has been decided, for the sake of uniformity, to adopt as a standard color for all the cars of the consolidated company the vermilion in which all cars of the Pacific Electric Railway have been painted for some time. The cars of the Los Angeles-Pacific Company will be repainted in this color as the necessity arises for them to be sent to the shops to be overhauled.

BUILDING UP OF INTERURBAN TERRITORY, AND METHODS OF STIMULATING SUMMER TRAFFIC*

BY RAYMOND H. SMITH, GENERAL MANAGER ALBANY SOUTHERN RAILROAD.

Up to within a comparatively few years ago very little thought was given to the stimulation of traffic, the idea being that the business would grow with the population. Increase in the earnings of a property is now considered as great a field for effort as the reduction of operating expenses. This augurs well for the industry, the component parts of which must be developed with due relation to each other in order to attain the highest state of efficiency. It has been thoroughly demonstrated that every territory responds to intelligent efforts to increase its growth, the degree of response varying with the character of the country, the energy applied to the work and the methods adopted. One of the first steps in the building up of a territory is the preparation of the territory itself. In order to be attractive, it must have virtues which will be conducive to its growth, and if it is without virtue of any kind the situation is as hopeless as the predicament of the traveling man who is sent on the road with articles entirely devoid of merit. In persuading people to build or reside along an interurban railroad, the advantages claimed are usually twofold, i. e., advantages for the promotion of agricultural and manufacturing enterprises, and attractiveness from a residential viewpoint, which is brought about by scenic beauty, reasonableness of land values, adequacy of railway service, low fares and good sewerage, water and lighting facilities. The traffic man should interest himself in the development of the towns, villages and territory served, for the reason that success in building up these places depends largely upon the facilities provided for the comfort of the inhabitants. A locality with a good water supply, sewerage and street lighting systems, and properly maintained streets and sidewalks, within a reasonable commuting distance from a city or center of employment, is a situation which would fire the ambition of any traffic man, while a place without these advantages is handicapped and develops slowly.

Sites which could have been made beautiful by virtue of their natural location have frequently been spoiled forever through inattention to the matter of laying out the property. Farmers with real estate, having no regard for the esthetic, will boldly stake out building lots, establish streets and allow nondescript buildings to be erected at fantastic angles and without regard to building lines, never realizing that a few such dwellings forever depreciate the value and delay the sale of the remaining property. Such situations are inimical to the interests of the railroad, and at every opportunity the traffic man should endeavor to convince the property owner that the few dollars expended for properly laying out the site will be returned many times over. This is a field of work which is very often overlooked by railroads for the reason that the results are slow of achievement and frequently become apparent in the earnings of the company long after the party performing the work has left the property. It is quite natural to direct one's energy in the course which will bring the quickest results, but in the earnestness of this effort preparation for the future should not be neglected. If a community in its infancy pays little or no attention to laying out its streets, etc., that particular place, 10 or 15 years later, will not be as great an asset to the railroad company as the locality where greater thought has been given to such details.

It is this thought of paving the way for future prosperity that the traffic man should instil into those charged with the affairs of the communities along his road. Civic pride is dormant in most small localities simply because there is no one sufficiently interested to look beyond the range of his own personal benefits, and if a street lighting system in a certain locality will be an aid in the upbuilding of that place, then it is the plain duty of the railroad to see that the authorities are

*Abstract of paper read at quarterly meeting of the Street Railway Association of the State of New York, Syracuse, N. Y., March 22, 1911.

made to realize the benefits which would accrue from such an improvement.

Time should never be spent in inducing a person to leave the city and locate at a point on the line where the fare, on account of the distance, is perhaps greater than he can afford, or the time required to make the trip is too great to be spared without inconvenience, in fact, where he will eventually become an unhappy, disgruntled commuter. After learning something about the person's work, mode of living and resources, a proposition should be submitted which, if accepted, will prove to be an actual benefit to him.

Co-operation with real estate men is absolutely essential. The knowledge that your files are open to them without charge and that the company's interest in real estate is not competitive but primarily for the purpose of building up the territory and increasing traffic will do a great deal toward increasing their interest in the property. The general public should also be continually reminded that the company has complete information regarding places for sale, etc., which is free to all. Much time is often spent in inducing wealthy people to establish summer homes along a railroad. Business of this kind is of limited value for the reason that such people are patrons but a few months in the year, generally travel in automobiles, and are not of as much financial benefit to the company as the ordinary laborer, who travels on the road the year around. Undoubtedly the fine houses are attractions, and are desirable in that they improve the tone of a place, but too much time should not be spent in encouraging this particular class of building.

The traffic man must know his territory thoroughly, and if possible should personally inspect the places for sale or rent. In inspecting property a camera is most useful, as oftentimes a few photographs of a place for sale will do more toward interesting a person than a considerable amount of literature.

The rather natural inclination on the part of real estate owners to raise land values when it becomes apparent that their property is marketable is a barrier to the rapid growth of a community, and a situation difficult to combat. To prevent fictitious values upon property, it is necessary to get in actual contact with the people and instill into them the idea that the community will fail to grow unless each does his share toward the encouragement of building operations by offering property for sale at a price which is fair to both buyer and seller. It can also be explained, with telling effect, that the company is in a position to direct a great many people to property in the market, and that in doing this it naturally recommends only such places as in its judgment are held at reasonable prices.

PARK AND AMUSEMENT RESORTS

As the park season is approaching, those who are operating amusement resorts look about to see what the new year has brought in the way of attractions for places of this character, and are deeply concerned over the outlook. In view of the thousands of dollars made in the amusement business, it is astonishing that each year does not bring with it a new stock of original devices and sensations, yet it is most apparent that in spite of the marketability of these devices they are woefully lacking. To be of continuous interest to the public a park must be kept in a constant state of rotation as far as attractions are concerned. There is a pressing need for new devices costing from \$500 to \$3,000 which will be a temporary source of amusement and can be replaced without loss as soon as the novelty wears off. Many of the expensive devices which have been successful in the very large cities would be unprofitable in the average run of parks for the reason that they require greater patronage than the smaller parks enjoy.

The theatrical question at the parks this year is: Shall vaudeville be replaced by stock, minstrels, etc.? Apparently vaudeville is on the wane. The country has been fed with this class of entertainment for many years, faces have become familiar to devotees of playhouses, and the acts themselves are limited as to variety. The popularity of moving picture exhibitions, given as part of the main program, has decreased the call for high-class vaudeville performers, who are being taken

into the semi-legitimate field. Good stock companies showing in cities have had no difficulty in making money in summer, and there seems to be no reason why the success of such companies at amusement parks is not to be expected. On the property with which the writer is connected the program for the coming season will be largely stock, with a limited number of minstrel and vaudeville performances. It is also the intention to give occasional amateur acts in addition to the regular performance in order to stimulate local interest.

The propriety of giving Sunday theater performances is a subject for discussion. The location of the park and the class of patrons served have much to do with the determination of the question. Viewed from purely a business standpoint, Sunday performances should be given if profit can reasonably be expected. The writer is of the opinion that under ordinary conditions it is advisable to discontinue theatrical performances on Sunday and draw as many as possible with band concerts and other attractions which do not in themselves constitute a flagrant breaking of the Sabbath day.

A combination ticket, entitling the holder to the use of many park attractions at a reduced rate if used on certain days when the traffic is light, can be sold to advantage, and the gift of a small number of such tickets to the holders of certain seat checks in the theater on light evenings can also be made a factor in increasing the business on dull days.

To encourage the people to visit the park early in the season is most essential, particularly when changes have been made and attractions added. New features which it is believed will be popular should be exhibited early, so that the complimentary remarks, which have an advertising value, will reach others early enough in the season to be productive of business. In park business as well as in railroading the pleased patron is a great advertising agent, and it is of the utmost importance to get him in action early in the season, and that care be taken that his first report to his friends is not that the resort is the "same old place." First impressions being the most lasting, the park should be at its best when the opening gun of the season is fired.

Negotiations are now under way to have several companies of the New York State militia, together with a representation from the cavalry and ambulance branches of the service, camp at Electric Park for a few days this summer. It is believed that the daily drills, sham battles and exhibitions of horsemanship, etc., which will be given by these people and advertised as a military tournament will be of great interest. It is also expected that an Indian camp will be maintained in the park for several weeks, these Indians to give daily exhibitions of their native water sports, dancing, etc. A feature which is worn out and of little interest in one place will very often arouse considerable excitement where it has never been tried, and it is possible that a baby show may also be given this season. The program also includes an elaborate three days' carnival with fireworks, athletic contests, aquatic sports, water parades, etc. These special affairs are given as early in the season as possible, in order to work up enthusiasm for the place which will encourage people to continue their patronage. A number of tents will be rented by the company, erected upon its park lake property, and leased to camping parties for the summer. The purchase of a few portable houses is also under consideration.

ADVERTISING TO PROMOTE BUSINESS

Judicious advertising is a most important factor in the promotion of business. Cards hung in the car above the center aisle are most effective. The human mind when at leisure will dwell upon the most unimportant things and some snappy advertisement on such a card will catch the eye of travelers when they are in their most receptive mood. Very little attention is given generally by companies to the advertisement of their wares on their own cars and property. This is probably due to the fear that these advertisements will be seen largely by those who are already patrons of the company; however, many use the cars who are not regular patrons, and signs displayed in the cars and on the company's right-of-way are undoubtedly productive of great good. Signs located on the right-of-way

should be near stations and be illuminated at night with current from the trolley or third rail. Companies organize strenuous summer campaigns for business, send out solicitors, spend large sums of money in advertising, and obtain a great volume of business under high pressure, just when they are least prepared to handle it. While this is profitable business, the work of building up the territory should not cease with the closing of the park season, but the campaign should be vigorously pushed into the all-year-around field.

The average commuter is somewhat sensitive, and in writing car advertising great care should be taken to avoid stirring up old grievances and calling forth bitter sarcasm. Pleased patrons are the best advertising agents of a company and their complimentary remarks are worth more than full sheet advertisements. People who are kindly disposed toward the road should be induced to express their appreciation in the presence of others. In case certain persons have been benefited by a change of any kind, a letter addressed to them in proper language will induce them in many cases to become boosters and advertisers of the road.

Summer vacation plans are formulated early in the year, and the company which waits until July or August to advertise the advantages of its road is too late to obtain the best results. Money is well spent in attractively worded circulars in the winter and spring, telling that the files of the company concerning houses for sale or to rent, camp sites available, etc., are at the disposal of the public, and indicating some of the plans of the company to make its property more attractive and giving such information regarding rates and timetables as will be of interest. Advertising is largely a study of human nature. To send out circulars which do not give all the information the recipient will need at that time is of questionable value; for instance, a circular describing the beauties of the road is interesting reading, but there is nothing in it which leaves a great impression, whereas if a person is told briefly that country life is less expensive and healthier than city life, that he can arrive at his work on a convenient train, and can do this for a certain amount per day, he has something definite to think about.

While the excursion business is not particularly remunerative, due to the low rates necessary and to the fact that it is generally handled when the tax upon the company's equipment is greatest, it has the virtue of keeping the equipment and men busy at certain times when they would otherwise be idle. Great care should be taken to see that so much excursion business is not taken on big days as to interfere with the proper handling of the regular traffic.

In the enthusiasm of handling large summer crowds, extreme care should be taken to see that the regular patrons are not forgotten, as neglect in this respect will cause the best advertising agents (the contented regular patrons) to become dissatisfied, and a few grumbling persons can do incalculable harm in discouraging others from living along the road.

Satisfactory transportation facilities constitute a great stimulus in the development of territory, as the desirability of a suburban home depends very largely upon its accessibility. To adopt a generous policy in regard to service and not be extravagant is one of the problems of the management, but the effect of an inadequate service is so direct that any interurban line desiring to build up its territory should give just as liberal a service as it can afford, taking into full consideration that it is paying large sums of money for advertising and that good service is one of the best forms of advertising. Almost every company makes trips which are unprofitable in themselves but are necessary in order to give a continuous headway. Just how far a company should go in this direction is for each manager to decide according to the ultimate returns to be expected from this liberal policy. To advertise the advantages of living along a road is of little avail if the disadvantages are very apparent in the actual service rendered. The additional expense of a liberal policy in respect to train schedule, particularly at a stage in the history of a property where great attention is given its development, is in a certain sense

advertising, although, unfortunately for the transportation superintendent, he is unable to shift this cost to the general expense account.

THE JOINT USE OF POLES*

Your committee met on Feb. 13, at Utica, N. Y., and on Feb. 28, at Syracuse, N. Y. The first meeting was more or less preliminary. Considerable discussion was had as to how far the committee should go in the matter. At this meeting reference was made to several forms which are now in use, including one which has been put forth recently by a company operating in New York State, and it was the consensus of opinion of the committee that none of these agreements quite covered the situation or was quite broad enough. Certain articles were finally drawn up which may form the nucleus of an agreement. The request of the New York Telephone Company to have a representative present at such time as might be designated by your committee in order that it might discuss with us a satisfactory agreement for joint occupancy was considered, and it was decided that this privilege should be given to the New York Telephone Company or any other company requesting the same privilege, at such time as the preliminary matters were disposed of and not until such time as the committee was in a position to know how far it could go in the matter of drawing up an agreement.

At the second meeting a very spirited discussion developed in regard to the matter of joint ownership, which also brought up again the question of the amount of authority the committee had. In order that something definite might be put before the executive committee it was decided to present an outline giving the points which we believed should be covered in any agreement which might be developed. You will note that this outline is very broad and refers to the matter of joint occupancy, whether the ownership of the pole line is joint or whether the occupancy is on the rental basis. The question of ownership, therefore, is entirely open, and it is one on which your committee must have further instructions if it is to proceed with the work before it. The definite conclusions of your committee are as follows:

First—In answer to the question as to whether joint occupancy is feasible, your committee is unanimous in agreeing that it is.

Second—Your committee does not approve of such joint agreements as it has had occasion to examine and submits for your approval the following outline showing the points which we believe should be covered:

AGREEMENT COVERING THE JOINT USE OF STRUCTURES OR POLE LINES
Article 1.—Explanatory.

Par. 1. Should give definitions.

Par. 2. Should give reasons for entering into this agreement.

Par. 3. Should describe territory covered.

Article 2.—Franchise Rights.

Par. 1. Should show that parties must have franchise rights in order to become a party to this agreement.

Par. 2. Should state that no franchise rights would be surrendered by any party entering into this agreement.

Article 3.—Joint Privileges.

Par. 1. Should outline privileges to be accorded to the parties to this agreement.

Article 4.—Ownership.

Par. 1. Should show status of the ownership of the line.

Par. 2. Should designate the apportionment of the initial cost.
Article 5.—Installation.

Par. 1. Should apportion the expense of rearrangement of attachments and replacement of poles where same is changed for the sole convenience of any party.

Par. 2. Should cover the installing of apparatus and the apportionment of the attendant expenses.

Par. 3. Should show the apportionment of pole and the ar-

*Committee report presented at the thirteenth quarterly meeting of the Street Railway Association of the State of New York, held at Syracuse, March 22, 1911.

rangement of attachments. (Refer to specifications and drawings in appendix "B").

Par. 4. Should cover performance of work and maintenance of attachments.

Article 6.—Operation.

Par. 1. Rules covering the operation of jointly occupied pole lines.

Par. 2. Should cover the care of fixtures and appliances.

Par. 3. Should cover the right of access to pole and pole lines by employes of the parties to this agreement.

Par. 4. Should specify the operating condition of attachments regarding safety, etc.

Par. 5. Should provide for special construction.

Par. 6. Should cover the change of pole structure or its location, or the location of line due to any cause whatever.

Article 7.—Maintenance.

Par. 1. Should show responsibility for maintenance.

Par. 2. Should show apportionment of expense.

Par. 3. Should provide for notice of required renewals and repairs.

Article 8.—Reconstruction.

Par. 1. This should designate the method for carrying out reconstruction plans.

Article 9.—Removals.

Par. 1. Should provide for notice of removals.

Par. 2. Should provide for the reapportionment of remaining interests.

Article 10.—Payments.

Par. 1. Should cover all details regarding payments when occupancy is on a mutual basis.

Par. 2. Should cover all details regarding payments when occupancy is on a rental basis.

Note—Whichever basis is used in the agreement, the fixed charges, taxes, etc., should be considered, as well as other expenses.

Article 11.—Liability.

Par. 1. Should cover liability during construction.

Par. 2. Should cover liability during operation.

Par. 3. Should cover liability for maintenance.

Article 13.—Arbitration.

Par. 1. Should provide for arbitration in case of disagreement between parties.

Appendix "A"—Special.

Par. 1. Being a blank form providing for this agreement to supersede one or more previous agreements.

Par. 2. Being space to provide for fliers or inserts which may be required by local conditions, to be numbered with sub-letters of the articles to which they refer.

Appendix "B."

The necessary specifications and drawings showing clearances, apportionment of pole space, method of attachment, etc.

(The remarks about drawings and specifications refer to possible future documents.—Eds.)

THE NEW YORK SUBWAY PROPOSALS

Frank J. Sprague has made public a letter which he sent to George McAneny, chairman of the committee on rapid transit proposals of the Board of Estimate of New York, asking if the committee intended to consider the subway proposal submitted by himself and Oscar T. Crosby. Mr. Sprague concluded his letter as follows:

"In accordance with the tenor of our letter of Feb. 16, 1911, and the terms of our proposal of Jan. 25, 1911, we beg to notify you that we now withdraw the same as of the date of March 21, 1911. Should, however, the hopes of those now conducting rapid transit negotiations for any reason prove futile, we shall still be prepared to bid for the equipment and operation of any independent line which appeals to our judgment."

The members of the Public Service Commission and the officers of the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company are still considering in conference the proposals of these companies.

QUARTERLY MEETING OF NEW YORK ASSOCIATION

The thirteenth quarterly meeting of the Street Railway Association of the State of New York was held at the Onondaga Hotel, Syracuse, on Wednesday, March 22, 1911. There were over 60 delegates in attendance at both the morning and afternoon sessions.

THE DINNER

The meeting was preceded by a dinner at the Hotel Onondaga on the evening of March 21. After the completion of the dinner President John H. Pardee called attention to the successful work of the entertainment committee and expressed the thanks of the association and its officers to the committee and C. Loomis Allen.

C. Arthur Benjamin, of Syracuse, was then introduced as the toastmaster of the evening.

E. J. Page, in response to a toast, said there had been a change in the attitude of public service corporations and that the people familiar with their affairs now realized that the assets of these companies were of two kinds. The first class was represented by stock, bonds and other evidences of indebtedness issued for property and the skill required to create the property. The company was entitled to dividends and interest, a fair return on the money and skill invested. The second class was composed of intangible assets. On the assets composed of franchises the public was entitled to a return in the form of good and safe service at as low a rate as was consistent with returns on the money and skill invested in the property.

Robert M. Searle, vice-president Rochester Railway & Light Company, and Thomas W. Meacham, of Syracuse, responded to toasts.

Mr. Pardee said that the progress of railways had been hampered by laws passed by New York and other States which said in effect to the projectors of new enterprises: "Gentlemen, if you lose you can charge the amount to profit and loss; if you win you can earn as much as you would get on any safe, secured loan." The extreme legislative measures that had been passed had demonstrated to the people that railways should be fostered and needed assistance in order to be of the greatest value in the development of the country. Any man who invested in a new railway enterprise risked absolute failure and was entitled to a large return on his investment. If less than a large return was to be allowed on railway capital the same restrictive laws should be applied to all necessities of life. Mr. Pardee thought, however, that the radical movement had been so extreme that its very excess had caused a reaction, and that the pendulum was now swinging backward. He predicted that as the public received a knowledge of the benefits resulting from railway development its attitude would change and that greater prosperity would be realized in the future.

DISCUSSION ON STEEL WHEELS

The first order of business at the morning session was the presentation of a paper on "Economical Limit for Flange Wear on Steel-Tired and Rolled-Steel Wheels" by John Sibbald, master mechanic of the Fonda, Johnstown & Gloversville Railroad. This paper is published elsewhere in this issue.

The discussion on Mr. Sibbald's paper was opened by G. M. Cameron, master mechanic of the New York State Railways, who contributed the following notes:

"The question of determining the economical limits of flange wear of steel-tired and rolled-steel wheels is a very complicated one. One might make a careful study of the wheel and flange wear on a pair of wheels of a given truck and from this study develop a set of rules regarding the economical limits of wear, but the first exception to this rule would probably be found in the other pair of wheels belonging to the truck in question. As long as there are varying conditions which cause flange wear, there will be different economical limits to such wear. In fact, it is a question which calls continually for the exercise of good judgment. The number of turnings which a wheel or tire should have cannot, in my opinion, be predetermined if economy is to be obtained. Frequent turnings require lighter cuts, and undoubtedly result in cutting away less metal than

when but two or three turnings are made. The labor cost will be higher, however, for frequent turnings. It requires a careful consideration of each case, with a study of its own peculiar conditions to determine the proper number of turnings which will result in the greatest economy.

"The fact that flange wear is not uniform precludes the possibility of adopting any fixed rule regarding the economical limits of wear. The safe limit is not the same as the economical one. A flange can be worn pretty thin before it becomes unsafe, but when it is so worn it will require a deep cut in order to obtain a flange of the original dimensions. This will not prove economical. It is fortunate, however, that the economical limit comes ahead of the safety limit, as safety should have the first consideration and should never be sacrificed for the sake of economy.

"In determining the economical limits of flange wear the cost of getting wheels to and from the shop enters as an important factor. If cars are stored or housed near the shop, it would be more economical to have frequent turnings. If wheels have to be removed from trucks and shipped to the shop it would be more economical to have fewer turnings and wear the flanges thinner. Sometimes it proves to be a good policy to wye the trucks when the flanges of the leading wheels are found to be wearing thin. I do not believe this is a good policy unless wheels have to be shipped some distance for turning. It is better in most cases to watch carefully for signs of uneven wear, and when it appears take a light cut off all wheels so as to make them uniform.

"It is very important in turning that no excess metal be cut away. The man who does the turning is apt to estimate the depth of cut necessary to secure a flange of the proper dimensions. This estimate will, no doubt, be in excess of that required. The result will be a cutting down of the total mileage which the tire or wheel can make. The careful use of a flange gage will prevent cutting away an excessive amount of metal. Another good method consists of making a template of the tread and flange of a wheel or tire which is to be turned. This can be done by pounding a soft copper wire to the shape of the flange and tread. By the use of this wire a curve can be drawn which represents exactly the contour of the wheel or tire section. By taking another curve which represents the contour of a true or unworn wheel or tire section and placing it beneath the curve of the worn wheel in such a way that the two curves do not intersect, but are tangent at the point of greatest wear, the exact amount of metal to be cut away for securing a proper flange can be determined. This method is accurate, although somewhat tedious. We began using it some time ago in Rochester as a check on the machinist who turns the tires. If $1/16$ in. excess cut should be made it would show a considerable effect upon the life or mileage of the tire, as the following figures will indicate: Take a standard 34-in. tire with a $2\frac{1}{2}$ -in. rim, allow 1 in. thickness of rim when the tire is scrapped. If two turnings are properly made during the life of the tire, they will average about $\frac{3}{8}$ in. per turning, or a total of $\frac{3}{4}$ in. This leaves $\frac{3}{4}$ in. for actual wear. If a mileage of 100,000 be assumed for this tire, an actual wear of $1/16$ in. would represent a mileage of 8344, which is 8.3 per cent.

"Where steel tires are used the centers should be made of such a diameter as will permit wearing the tires to such a point that they must be discarded on account of lack of mechanical strength. This is dependent usually upon the proper motor clearance. Some roads are obtaining economical results with rolled-steel wheels by wearing them down to a certain size in interurban service and then transferring them to city service, where much more wear can be obtained. This is not practicable for the smaller systems.

"Rapid flange wear may be caused by mismated wheels. We have not experienced much trouble of this nature, but we make a practice of taping all tires before they are fitted to the centers. It may be caused by wheels varying in degree of hardness. This latter cause is found more frequently in rolled-steel wheels than in steel tires. The chief objection against rolled-steel wheels has been their softness after the first turn-

ing and the consequent rapid wear. I believe, however, that considerable advancement has been made recently in the manufacture of wheels and that they are now being rolled with a fairly uniform density of metal in the rims.

"Wheels should be properly placed on the axles in order to prevent unnecessary wear. It is not sufficient that they be spaced to the proper gage, but they should be spaced at equal distances from the center of the axle. Trucks should be kept square. We make a practice of checking up our trucks at the regular overhauling periods by the use of a special tram and gage. I might state, however, that we have not found many cases of trucks not being square. Another cause of rapid flange wear is the use of a flanged brakeshoe improperly set. It is not economical to wear away the flange for braking purposes. If a flanged shoe is used at all, care should be taken to secure the proper flange dimensions and see that the shoe is set so that it will not bind against the side of the flange. I believe that this is one of the most important items to watch when trying to secure economical flange wear."

Mr. Cameron was followed by F. J. Doyle, master mechanic of the Schenectady Railway. Mr. Doyle said that the taping and matching of steel wheels when first applied was an important feature in connection with flange wear. He had found a difference of $3/16$ in. to $1/4$ in. in a pair of wheels which had been mated and marked for the same axle. If these wheels had been applied excessive flange wear would have resulted. Even if the wheels were properly mated and mounted there was still another point to consider, namely, whether or not one wheel was a little softer than the other. The wheel manufacturers ought to look into both of these points.

R. A. Dyer, Jr., assistant general manager and electrical engineer of the Rochester, Syracuse & Eastern Railroad, said that it was not necessary to turn all the wheels on a car because one wheel had a sharp flange. He put single wheels back into the truck regardless of the diameter of the other wheels.

J. P. Barnes, electrical engineer, Syracuse Rapid Transit Railway, then read the following notes:

"The cost of turning wheels includes not only the cost of the operation in the lathe, but also the cost of removing the wheels and replacing them under the car. Obviously, the fewer times this expense is incurred, the greater will be the ultimate economy provided that the wheel mileage remains the same. We are operating rolled steel wheels under three distinct and different conditions:

"First, under 38-ton cars, in high-speed service, over an electrified steam road (between Syracuse and Utica); second, under 26-ton cars in high-speed interurban service (between Rome and Little Falls); third, under 20-ton cars in city and suburban service (in and around Utica).

"The first class uses 37-in. wheels, while the other two classes have 35-in. wheels. In the first class of service we obtain a mileage of 130,577 for the rolled-steel wheels; in the second class we obtain 176,214 miles; in city service the mileage is 106,829.

"Comparing the two classes of high-speed service, the total reduction of diameter before the wheels are scrapped is the same in both cases. The wheels are similarly handled in the shop, being turned in the same lathe and by the same workman. Why, then, do we get more mileage from the smaller wheel than from the larger? This seeming paradox must be explained by something outside of shop conditions. When we compare the two classes of service, we find the conditions to be as follows:

"The cars in the one class of service run through the city streets of Utica, while the cars in the other class of service run through the streets of Syracuse as well. The track work of the latter city was designed for the operation of city cars with chilled wheels. Therein lies the limiting condition of flange wear, and not at all in the consideration of ultimate economy. Danger of derailment sets the limit for flange thickness (or rather for flange thinness and sharpness) and renders it impossible to compare even these two neighboring roads on a common basis.

"Considering the matter of turning wheels, another interesting feature comes to light. The life of a wheel seems to be practically independent of the number of turnings given the wheel before it becomes too small for use. The following figures, taken from wheels in high-speed service under 38-ton cars, illustrate this very clearly.

"Wheels worn out after one turning made 139,898 miles (one pair).

"Wheels worn out after two turnings made 129,724 miles (one pair).

"Wheels worn out after three turnings made 131,829 miles (six pair).

"Wheels worn out after four turnings made 130,923 miles (seven pair).

"Wheels worn out after five turnings made 112,171 miles (one pair).

"It is noticeable that the wheels which wore out after three and four turnings respectively gave very close to the average mileage (130,577) of all wheels in this class of service; also that there was but 906 miles difference between these two groups of wheels. I am at a loss to explain this fact, and I should like to know if it is checked by observations on other roads. The matter of interdependence of flange limit and track conditions seems to me to be one of the salient points in considering the adaptability of the steel wheel for city service. This, together with the immunity from broken flanges on the one hand, and the noise in curves and flat wheel possibilities on the other, seems to open up an interesting chain of compromises. How far have these considerations controlled the fixing of flange limits in other localities?"

Mr. Dyer said that another kind of flange wear not mentioned was that due to the wear of the flange against the rail on curves. This wear varied, but seemed to be a factor of the speed more than anything else. On the Rochester, Syracuse & Eastern Railroad a great many of the thin flanges showed that the cutting and wear were apparently in radial lines as the wheel traveled along the rail. The wearing effect of the brakeshoe did not remove this appearance. Perhaps these lines were due to the low center of gravity of the truck, the weight of the truck and motors, the speed, etc.

Mr. Sibbald said that he had observed the radial lines on the wheels of his steam locomotives.

President Pardee asked about the relations between the swiveling of trucks and the wear of wheels. Would a roller-bearing bolster obviate some of this wear?

Mr. Sibbald stated that cars so equipped with roller bearings had shown an improvement in flange wear over other cars operating under the same conditions.

W. J. Harvie, chief engineer, Oneida Railway, said that the installation of ball-bearing center bearings had made a very material reduction in the flange wear. He found, however, that the ball-bearing side bearings were of comparatively little value. All the value was in the center bearing.

Mr. Doyle added that he had noted that the roller type center bearing reduced and also prevented flange wear.

R. E. Danforth, general manager Public Service Railway, Newark, N. J., remarked that a most noticeable improvement in flange wear was obtained by using ball-bearing center plates on short-wheel base trucks with outside-hung motors, as such trucks do not usually square to gage. Their tendency is to keep "nosing" all the time. The inequalities in the track caused a grinding action on the wheel flange, which was accentuated and exaggerated if the center plates were stiff. He had found in using a large number of center bearings that before long extensive repairs were necessary. He would therefore suggest to those who contemplated the use of ball-bearing center plates that they look into the matter of the life obtainable from the balls and ball race. Mr. Danforth inquired how the loading of the motors was affected where wheels of different diameters were used on the same car—for instance, if three motors drove 33-in. wheels and the fourth drove a 34-in. wheel, would not the single motor then be obliged to carry more than its share under full load conditions?

H. S. Williams, Peter Smith Heater Company, said that he had made observations on steel wheels similar to those recorded by Mr. Sibbald. Mr. Williams then presented a drawing of a wheel section enlarged sixfold and delivered a talk on the economy of permitting the flange to wear as thin as possible. Mr. Williams' arguments were similar to those contained in his paper on "Wheel Turning" presented to the Central Electric Railway Association on March 23 and published elsewhere in this issue.

Mr. Dyer suggested that the representatives of the steel wheel makers be invited to explain the differences in wheels furnished. He had had occasion recently to remove four pairs of wheels in making a trial with new gears and pinions. Two pairs had been turned twice on account of flange wear, one pair had been turned once, while the fourth pair, which had never been turned, proved to be in the best condition.

M. J. French, engineer maintenance of way, Utica & Mohawk Valley Railway, referring to Mr. Barnes' remarks, thought it would be interesting to compare the special work mileage in Utica and Syracuse to see whether it was proportional to flange wear.

Mr. Harvie alluded to Mr. Danforth's remarks and said that the use of short wheel-base trucks with outside-hung motors, as on some of the Syracuse cars, might account for the greater flange wear.

Mr. Danforth brought up the question of the most economical and efficient brakeshoe for use with steel wheels. Several of the delegates said that they had found the soft gray-iron shoes furnished by the truck builders to be far too short-lived for high-speed interurban service. Mr. Dyer pointed out that when an emergency braking application is made the heat generated is great enough to soften the hard shoe, thereby giving the required braking efficiency when it is most needed.

Mr. Danforth favored the one-wear wheel which had been advocated by H. A. Benedict, now mechanical engineer, Public Service Railway. If it is possible to get for light suburban service a wheel hard enough to give 60,000 to 70,000 miles without turning the railways could then afford to throw it away, assuming that it could be bought for something under \$10. On the other hand, could street railways afford at any price to use steel wheels on short wheel-base trucks in heavy city service, as compared with the cast-iron wheel? Under the latter conditions the flange wear of steel wheels was so excessive that they might cost twice as much as cast iron. Out of 100 steel wheels only 10 may prove tough enough for the service. Perhaps it would be possible to improve the cast-iron wheel by the addition of nickel or some other strengthening element. If this was done we might get something akin to steel and the problem of the one-wear wheel would be solved.

Mr. Collins said that in Amsterdam, where there are grades up to 14 per cent, the substitution of steel for chilled cast-iron wheels had greatly bettered the traction and braking conditions.

Mr. Dyer mentioned that he had asked the steel makers about the possibility of giving wheels a heat treatment similar to that for axles. This refinement of the metal and reduction of crystallization should have a favorable effect on wheel and flange wear. He was thinking seriously of having a set made for experiment.

Clark Prather, superintendent motive power, Buffalo, Lockport & Rochester Railway, said that the diameter of wheels was a factor in wear. In selecting a wheel one should use the largest diameter possible. The difference in the number of revolutions between a 34-in. and a 36-in. diameter wheel was 25 per mile, or 25,000 revolutions in 1000 miles. On a line with many curves such a difference meant appreciably greater flange wear. His company was now changing from 36-in. to 37-in. diameter wheels.

Mr. Harvie asked what was the permissible variation in diameter for wheels on the same axle and for different pairs of wheels under the same car. One delegate replied that in the first case it should not exceed 1/32 in. If it was more than this he used an emery shoe to reduce the variation. The wheels are gaged to 1/32 in. by raising and taping them.

Mr. Sibbald said he had formerly permitted a difference of 1/16 in. for wheels on the same axle, but after getting the data upon which his paper was based he went to 1/32 in.

Mr. Cameron said that he tapered his wheels, allowing 1/8-in. difference in circumference, which was equivalent to less than 1/16-in. difference in diameter.

The discussion was concluded by a suggestion from Mr. Dyer that the president invite representatives of the steel wheel makers to give their views of this subject at the next meeting.

JOINT USE OF POLES

As chairman of the committee on the joint use of poles, W. J. Harvie read the report printed elsewhere in this issue. He was followed by B. Penoyer, engineer maintenance of way, Schenectady Railway, who read the following comments on the report.

"Article 1.—Territory Covered.—It would seem that under this section local conditions would govern. It might be desirable to exclude certain sections or streets in the same city or town on account of one company desiring to use a certain type of pole or structure which would not be adapted to the use of other companies.

"Article 3.—Joint Privileges.—I believe that all companies should have equal privileges where any are accorded.

"Article 4.—Ownership and Initial Cost.—Where it might be desirable to enter into a joint ownership proposition in certain sections or in the event of new lines being installed I do not believe this should include all poles. As to apportionment of initial cost this would necessarily be determined by the terms of the agreement; that is, whether the line would be on a jointly owned or jointly occupied basis.

"Article 5.—Installation.—Should attachments be rearranged and poles replaced for the convenience of one party, such party should bear the entire expense of same. The other parties occupying pole or poles at the same time are to rearrange their attachments and apparatus, billing the party for whom the changes were made. Should the pole line be on a joint occupancy basis, pole replacements are to be made as the owner may elect. The arrangements of attachments are to conform to specifications which would be a part of the agreement.

"Article 6.—Operation.—Each party should care for its own fixtures and appliances, as per specifications attached. Each party shall have the right to pass over that part of pole or structure set aside for the use of the other party or parties. All attachments made on poles jointly used should be constructed, erected and maintained in accordance with the specifications and should be kept at all times in a safe condition and thorough repair.

"Article 8.—Reconstruction.—If at any time after the wires and fixtures are installed the said pole line shall require reconstruction throughout the work shall be done subject to mutual agreement of all parties hereto as to size of new poles and manner of doing work.

"Article 9.—Notice of Removal.—If any of the parties hereto shall at any time desire to discontinue and relinquish the use and occupancy of any of the said poles, they may notify the other parties hereto in writing to that effect, and shall at once remove its wires, fixtures and attachments from said joint pole or poles. All right of interest of such party so removing its wires, fixtures and attachments shall forthwith cease and it shall not be liable for the maintenance, operation, rental charges or taxes thereof incurred after such discontinuance or joint-occupancy basis. In the event that the owner shall remove its attachments opportunity to acquire ownership shall be given to the parties having next prior right to pole-line location.

"Article 10.—Payments.—As to (a) joint occupancy, taxes and regular maintenance shall be prorated and paid to the owner as follows: Taxes annually and maintenance monthly. As to (b) joint-ownership basis, all taxes and maintenance should be prorated. As to (c) rentals, the renter shall pay a yearly rental based on schedule shown on sheet No. . . according to record of approved count as of July 1. Payments to be made before . . .

"Article 11.—Liability.—Each party hereby agrees to indemnify

the joint occupants and to hold such party or parties harmless from any and all loss or damages either to persons or property caused by its negligence, either in respect to the construction, maintenance or operation of said joint occupancy of poles."

C. L. Cadle, chief engineer of the New York State Railways, contributed the following notes:

"The first method considered was for all parties to own the pole line jointly, and the second method was for one party to own the pole line and the remaining parties to rent such portion of the pole line as might be agreed upon. Both methods of ownership give all companies equal rights, but the latter is more specific in that it places the responsibility of the maintenance more particularly in the party owning the poles. Under this method, it would seem to me that the pole line, wherever possible, should be under the ownership of the railway companies, as they will probably have overhead wires in the streets long after all the other parties have their attachments placed in subways.

"In order to be perfectly fair to all the parties concerned, it would seem that the original occupant of a street with a pole line should be the owner of the poles under a joint agreement. In case this party should take off all its attachments and abandon the line, the ownership should fall to the next party owning prior rights and having been in the street the greatest number of years. Regardless of the method of ownership, some one party must be primarily responsible for the safe maintenance of the pole line. This responsibility should preferably be placed in the party owning the majority of the attachments, or that party which would be likely to have attachments on the poles the greatest number of years. Each party, of course, should maintain its own attachments and place sufficient guys wherever it subjects the poles to extraordinary strains on account of the running of lateral wires, etc.

"In an agreement which will cover all conditions of attachments, there should be a set of standard drawings showing the height and size of the pole, spacing of cross arms, clearance between wires on the arms and clearance between electric light, telephone and railway wires or cables. These drawings should specify the minimum operating and test voltages of insulators allowable for different line voltages which are now standard practice in this country for light and power purposes. The minimum size and specifications of all wires should also be given for a predetermined span and sag. A liberal factor of safety should be allowed in determining the size of the wires, whether they be telephone, electric light, power or high tension wire or cables.

"The subject of foreign cables and wires crossing a jointly occupied pole line has not been touched upon. I think this is a very important point and should receive as much consideration when an agreement is drawn up as the specifications covering the attachments on jointly occupied poles.

"From the standpoint of safety, would it not be better to have the high-tension transmission lines placed at the top of the pole, the electric light wires second, telephone wires third and railway cables fourth? Some companies prefer to have the telephone wires at the top of the pole, but this does not seem to me to be the best method, as in this case if a telephone wire breaks it is pretty sure to fall on an electric light wire, which usually carries a high potential. By placing the electric light wires at the top there would be less liability of accidents, as these wires are usually of heavier construction and of less number. Between the electric light and the telephone wires there should be a reasonable clearance to enable workmen to work on the telephone lines without endangering their lives by coming in contact with high-potential current. There should also be a reasonable clearance between all pole wires to enable the workmen to have free access up and down the pole in order to perform their duties with safety. This distance in no case should be less than 24 in. for telephone wire and for electric light and power cables not less than 30 in. Provision must be made on the poles for cable boxes, cable box seats, transformers, trolley brackets and street light fixtures when the

agreement covers telephone, electric light and railway attachments. All services to these attachments which run vertically should be properly protected by means of molding, conduit or other approved protection to guard against accidents caused by workmen coming in contact with high voltages or injuring the sheath of cables.

"There always comes a time when it is necessary to reconstruct a line throughout by putting in new poles, new cross arms or new guys, etc. This is a matter which should be left as open a question as possible in an agreement of this sort, as conditions change so much during the life of a pole that it is nearly impossible to predict what the standard construction will be at the end of, say, 15 years; also, it is often advisable on account of local conditions to change the location of the line or of individual poles. The main point to be considered in the use of jointly occupied poles is to have the line so constructed and so maintained that it will be as sightly as possible and provide for the maximum safety of the general public as well as the company's employees interested."

C. S. Stanton, electrical engineer, Otsego & Herkimer Railroad, suggested that all poles be labeled or stenciled so that linemen could tell what class of work they were to do.

E. F. Peck, general manager Schenectady Railway, said the report on the joint use of poles had been suggested by his experience in Schenectady. He had been asked to enter into a joint agreement with the telephone and lighting companies. The contract submitted had been prepared by the National Electric Light Association and the telephone companies, but while it contained many excellent features its authors had unfortunately overlooked the electric railways. He hoped that the work of the present committee would be continued and elaborated to safeguard the interests of the electric railways in future contracts of this nature.

C. Loomis Allen, general manager of the Utica & Mohawk Valley Railway, and Mr. Collins fully agreed with Mr. Peck's suggestion that the committee be continued. Mr. Allen said that no joint occupancy should be entertained unless all the users had franchise rights. The maintenance should be done by one party alone, while the others participated in the cost. As to liability in connection with workmen and public, the common law on liability should govern. He also thought it desirable that a representative of the Public Service Commission of the Second District should if necessary be asked to act as a mediator should the railway, lighting and telephone companies fail to agree on any points.

Mr. Dyer said that in the joint agreements drawn up by his legal department there was a clause which made each company liable for injuries to its own workmen, but not liable under other circumstances.

J. K. Choate, general manager Otsego & Herkimer Railroad, remarked that it was not always desirable to enter into a contract for the joint use of poles in communities where there was a strong sentiment for placing telephone wires and even lighting wires under ground.

E. F. Seixas, general manager Niagara, St. Catharines & Toronto Railway, said that in Ontario the conditions concerning high tension pole lines are decided by the government. Aside from this, the joint users of poles have simple contracts with the almost invariable clause that each company is liable for injury to its own men who work on the poles.

The meeting then passed Mr. Peck's motion that the committee be continued and that it take up this matter with the National Electric Light Association, the telephone companies and the legal representatives of the railways for report at the June meeting. It was understood that the proposed form of agreement would be broad enough to cover both rental and joint ownership bases.

DISCUSSION ON INTERURBAN RULES

J. K. Choate, Otsego & Herkimer Railroad, took up the question of interurban rules. He said there was no more important subject than the adoption of interurban rules. A large number of papers had been written on this subject and a great deal of work had been done in relation thereto. At

Cooperstown nine months ago it was suggested that this association should adopt a code, and a motion to that effect was passed by the association. At that time many companies had these rules set in type. There would have to be certain local rules necessary to adapt the code to local conditions. He thought that the Denver code, with possibly some revisions and changes in the numbering, should be placed in operation by the New York State railways, and suggested that a resolution on this subject should be passed by the association and sent to the Public Service Commission, so that a code should become standard for all railways in the State, whether in the association or not. He, therefore, moved the appointment of a committee of three to revise and recommend rules for adoption by interurban lines consisting of the rules adopted at the Denver convention and that the committee fix a date for placing the rules in operation on the New York State railways. No roads had adopted the code as passed at Denver. A positive date for adoption should be set.

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, said that a resolution for the adoption of rules now was scarcely necessary. Last June the association adopted the Denver code, but it developed at a recent conference at Syracuse that the rules had not been put into general use by the roads of the State. Many roads were still operating under the old code adopted at Kingston, N. Y., and he did not believe they would care to change. He had about made up his mind to wait on the action of the committee of the American Electric Railway Association. The American association had failed to make any recommendations last year, but the committee intended to go into the subject very thoroughly this year. The committee should consider the Denver code as the basis of a new code, and should give some attention to the renumbering of the rules to conform more closely to the American Railway Association code. He hoped that the committee would report a code that all roads, with the possible exception of roads operating under practically steam railroad conditions, could adopt. Those roads could use the American Railway Association code.

H. C. Donecker, secretary of the American Electric Railway Association, said that the committee on interurban rules of the association would meet on April 11 at Chicago, and he would assume the responsibility of suggesting that any committee which might be appointed by the New York State Association should meet with this committee.

C. Loomis Allen, general manager Syracuse Rapid Transit Railway, said that his idea was that some code should be adopted as a basis and changes could be made every year in that. The Denver code had been accepted by a majority. The reconciliation of the differences was absolutely impossible. He thought the strong point for which the association should strive was the perfection of a code that would be approved by the public service commissions of the country. The Indiana commission was the only one, he believed, which had approved a code, and its action had been of value.

Mr. Choate said that Mr. Allen had expressed exactly the ideas he wanted to convey ever since he had been connected with electric roads. He had been adopting codes and had never done anything with them.

J. P. Maloney, superintendent Albany & Southern Railroad, said that that company had about decided to go ahead and issue its code of rules.

John H. Pardee, New York, said that an attempt had been made to prepare a code to fit the conditions prevailing on every railroad. He did not believe it possible to prepare such a code. It was possible to prepare a code in which the important points should be covered. This code would meet with the general conditions, and amendments could be made by individual companies to fit the code to their conditions. The Public Service Commission wanted a decision on this subject and some definite code adopted.

The association then adjourned for lunch. After lunch the following resolutions, representing the ideas of Messrs. Allen and Choate, were adopted by the association:

"Resolved, that a committee of three be appointed by the chair to present the standard code of rules for interurban and city operation of this association to the Public Service Commission for the Second District of the State of New York for approval and to urge the adoption of the same and to ask that a date be fixed by the commission when such a code should be adopted and be in force by the electric railways under their direction."

STIMULATING SUMMER TRAFFIC

The paper by R. H. Smith, Albany Southern Railroad, on "Building Up of Interurban Territory and Best Method of Stimulating Summer Traffic" was then read by R. M. Colt. This paper is published elsewhere in this issue. After this paper was read C. E. Holmes discussed this subject.

C. E. Holmes, assistant general freight and passenger agent Otsego & Herkimer Railroad, said he was particularly interested in the statement of Mr. Smith that increasing revenue was considered as great a field for endeavor as the reduction of operating expenses, for it showed that the traffic department on electric roads must be recognized as an important factor in their development. On many of the electric roads in the State the question of development had become broader than that of catering to the commuter. The man interested in the development of the section in which he lived, either by the introduction of manufactures or by the upbuilding of its agricultural and commercial interests, was the man that was wanted. The commuter was bound by certain limitations which the other man did not know. He must live within a short ride from his business, consequently making the per capita fare very small. He required train service at peak-load periods and many times the adoption of a train service that could not be properly balanced to secure economical operation.

The interurban road needed the man who would establish shops and factories, build up and make better the stores and hotels of the cities and villages, increase and diversify the production of the farms, and by so doing bring into the territory men to carry on these increased activities who, with their families, would travel for business and pleasure, at the full tariff rates for long hauls. The upbuilding of the homes and business created a prosperity, Mr. Holmes said, that could not fail to draw others to the same location. The instilling of thoughts of active endeavor along commercial, manufacturing and agricultural lines, and co-operation with all these interests in the production of the best results, was the traffic man's field of labor and that which most increased the revenues of the interurban roads.

Mr. Holmes said that the territory reached by the road which he represented was principally a farming one, and an endeavor was made to keep in touch with all the farmers. He wanted to know the size of the farms, the number of cattle kept, the amount of crops produced and what was for sale. It was desired that the producer and buyer should consider the traffic department a ready reference in matters of this kind, and through this means it was believed that the upbuilding of the territory would be accomplished more easily. It was desired to accomplish the same results with merchants and manufacturers by bringing to them the consumers they were best qualified to serve and giving a freight and passenger service to place them on an equality with their competitors at other points.

In the stimulation of summer travel to the parks and amusement places found on nearly all electric lines, Mr. Holmes thought the vaudeville, minstrel and theatrical performances certainly had a great value, but the numerous performances of this kind in every city or village of any size had detracted somewhat from their usefulness in inducing people to visit the summer parks. He was of the belief that larger attractions of various kinds, such as the army maneuvers mentioned by Mr. Smith, athletic contests, field days under the auspices of fraternal and other organizations and, perhaps, an exhibition with a flying machine, were of greater value.

One of the best sources of summer business on interurban lines so situated as to offer the attraction, is the opportunity for camps; and full information as to the available camps,

rents and natural advantages should be in the hands of the traffic department, be printed in its folders and be included in the advertising matter sent out. On the line of the Otsego & Herkimer Railroad were two lakes, on the shores of which nearly 200 families camped. During the summer months the constant change of tenants, the visits of their friends and the numerous trips of the campers themselves formed a very satisfactory revenue and one that the company endeavored to increase by every means in its power.

Excursions worked up through some organization and scheduled on days when the natural or encouraged traffic was the lightest, were important sources of summer business. Mr. Holmes believed that one of the best methods of securing this business was a personal visit to the officers of the fraternal societies, superintendents of Sunday schools, and others in similar positions.

Mr. Holmes declared that rates did not always play an important part in securing this business. Many times the service offered or the ability to make attractive representation of picnic places would secure the business, even at a higher rate than that offered to other places. Advertising inside the local cars would certainly keep the regular patrons and some others informed as to the attractions offered, but he believed that a banner on the pilot or front of the car was better, supplemented by half or full-sheet posters and window cards and small dodgers for details. The best advertisement for increasing regular traffic on interurban roads was the service offered, taking into consideration not only an adequate number of cars, regular service, etc., but also the connections with other roads, cleanliness of cars and particularly the courtesy shown by employees.

R. M. Colt then discussed the paper by Mr. Smith. He said that in securing passenger business the policy of the company to its patrons and particularly the attitude of the traffic officials had a great influence upon the earnings. If their personality was agreeable and they were aggressive and secured confidence and retained it by never promising to do what they could not perform, patronage would follow. Business could be stimulated by the establishment of special events. Firemen's conventions, social meetings and dancing parties could be arranged between the people of different cities. He found that this additional business could be handled, as a rule, by the regular service. The community wanted pleasure parks, and company amusement resorts should be located near the center of the property in order to attract excursion business. Lower rates were also essential in this business. Excursion business should never be solicited on a rainy day. He expected to stimulate business this year by installing free attractions, such as baseball games by semi-professional teams. He did not think it desirable to have theatrical performances on Sunday. He believed in the use of large space for newspaper advertising.

J. Stanley Moore, general passenger agent Syracuse, Lake Shore & Northern Railroad, asked about winter resorts. He said that the public liked to be considered. It was important to have attractive advertising literature.

R. M. Colt, general passenger agent Fonda, Johnstown & Gloversville Railroad, said that he tried at one time to maintain an outdoor skating rink, but the fact that it was out of doors made it unsuccessful.

B. E. Wilson, general passenger agent New York State Railways, stated that skating should be advertised as an attraction in connection with city lines, but that it was a difficult matter to arrange successful winter resorts for interurban lines.

OHMER FARE REGISTER IN CITY SERVICE

W. C. Callaghan, Rochester, read the paper on "Ohmer Fare Registers in City Service," prepared by John E. Duffy, superintendent Syracuse Rapid Transit Railway. This paper is published elsewhere in this issue.

John F. Ohmer, of the Ohmer Fare Register Company, said that the report apparently carried out the distinction and results he had claimed during the years in which his company had been in business. Some managers claimed that his system was one that was peculiarly adapted to interurban properties, but he

had always maintained that the principles embodied in the register were just as important with 5-cent fares as with fares of higher denomination. He claimed that the transfer had its value. His proposition was merely a business one which began to account for the fare the moment it passed from the passenger to the conductor. In order to get a substantial foundation on which to build it was necessary to have a substantial basis in the collection of fares. Without that the collection was not much more than guesswork. The specifications for the registers adopted in Syracuse were peculiarly adapted to this local property. They had been made and carried out in accordance with what the Ohmer company believed would best serve the interests of the Syracuse company. Mr. Duffy had shown the gradual increase in the ratio of the moral worth of each conductor and how he was able to put his finger on any conductor who was derelict in duty or dishonest. The result was that better discipline prevailed than ever before and he believed the fact bore him out in the statement that the management had better control of its conductors than ever before. The company had charge of the accounting and the conductor was positively outside this branch of the business. With the old type of registers all values were registered together, and the management was, more or less, in the hands of the conductors. The old method had a tendency to divert conductors from the path of virtue.

W. C. Callaghan, superintendent New York State Railways, Rochester, asked Mr. Ohmer about the discipline of the conductors under the new system. Mr. Ohmer said that he understood that Mr. Duffy had said that the majority of his conductors were satisfied with the present operations. Mr. Ohmer believed in the brotherhood of man. If a man was employed as a conductor the presumption was that he was honest until proved otherwise.

Mr. Duffy said that by permitting results with the register to be made public Mr. Allen had done work of invaluable benefit to the fraternity and the association.

Mr. Ohmer said that to have the registers in the car meant the adoption of a mechanical bookkeeping system, which eliminated much clerical work at the office.

H. M. Beardsley, Elmira, asked whether the conditions on the system were the same now as when the system was introduced.

Mr. Duffy said that he was satisfied that the transfer regulations were lived up to better than last year. That was one reason for improvement.

Mr. Allen said that the information received had been very valuable. It had cost a great deal of money and it was an open question whether the company was warranted in the expense of securing the information and of having the necessary checking done.

CONCLUDING BUSINESS

Mr. Pardee said that there was a larger attendance at this meeting than at any other quarterly meeting of the association. More than 60 were present.

President Pardee appointed the following committee on inter-urban rules: J. K. Choate, Herkimer; W. H. Collins, Fonda, and T. C. Cherry, Utica.

The annual convention will be held June 27 and 28, 1911, at the Hotel O-Te-Sa-Ga, Cooperstown, N. Y., which was the meeting place last year.

MEETING OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION ON RATE CHECKING

The Central Electric Traffic Association held a four-day session beginning on March 13, 1911, during which the work of checking up rates for the revision of Joint Passenger Tariff No. 3 was completed. This will be published as soon as the copy can be prepared for the printer. Other routine business was transacted and the meeting adjourned on March 16. The next meeting will be held at Lima, Ohio, on April 12, 1911, at the Lima House.

POLES AND POLE ACCESSORIES PURCHASED IN 1909

The Bureau of the Census of the Department of Commerce and Labor has just issued Bulletin No. 8 on forest products. This gives the statistics of poles, cross-arms, brackets and insulator pins purchased in the year 1909. Data concerning cross-arms, brackets and insulator pins purchased were collected for the first time. Reports on these accessories were obtained from practically every concern which uses poles.

The total number of wooden poles purchased by pole consumers in the United States in 1909 was 3,738,740, which is the largest total ever reported. The gain over the number reported for 1908 was 489,586, or 15.1 per cent, and over that for 1907 455,472, or 13.9 per cent. For the poles purchased in 1909 the sum of \$7,073,826 was paid, which, although greater by \$1,145,002 than the expenditure reported in 1908, was less by \$1,007,942 than that in 1907, when the average cost of poles was greater than in other years. In 1909 the leading kinds of wood were cedar, chestnut, oak and pine, and poles made of these species formed 92.7 per cent of the total number purchased and represented 95 per cent of the total cost. As in previous years, cedar and chestnut were most important, supplying respectively 65.3 per cent and 16.3 per cent of all poles purchased in 1909.

The growing use of oak is notable. In 1907 only 76,450 oak poles were reported, while the number was 160,702 in 1908 and 236,842 in 1909. Other kinds of wood for which steady gains are shown since 1907 are juniper, tamarack, Douglas fir and osage orange. For cypress, on the other hand, annual decreases were reported. More redwood poles were purchased in 1909 than in 1908, but considerably fewer than in 1907. The telephone and telegraph companies purchased 2,916,005 poles, or 78 per cent of the total number reported. The electric railway and electric light and power companies bought 627,414 poles, or 16.8 per cent of all poles purchased in 1909, and the steam railroad companies, 195,321 poles, or a little more than 5 per cent. Since 1908 there has been an increase of 13.8 per cent in the number of poles purchased by the telephone and telegraph companies and an increase of 18 per cent in the number purchased by the electric railroad and electric light and power companies, while the largest gain, 25.7 per cent, is shown for the steam railroads. Among the poles purchased by the electric railway and electric light and power companies pine poles exceeded in number those of any other species except cedar and chestnut.

The average cost of all poles purchased was \$1.89 in 1909, as compared with \$1.82 in 1908 and \$2.46 in 1907. The somewhat high cost in 1907 is accounted for in part by the lack of complete statistics for that year as to the purchases of short poles, which, of course, have a low average value. The average cost of poles for the electric railway and electric light and power companies was \$3.89. An increase in average cost since 1908 is shown for each group of poles having a length of 30 ft. or over. On the other hand, poles under 20 ft. in length cost 56 cents per pole in 1909, as compared with 62 cents in 1908, and poles from 20 ft. to 25 ft. in length 82 cents in 1909, as compared with 84 cents in 1908, while for those from 25 ft. to 30 ft. in length the average cost was the same in both years.

By far the greater number of the poles reported as treated were made of those timbers which have a naturally long life and were given a light treatment, adding comparatively few years to the life of the pole. It follows, therefore, that the advance in pole preservation as measured by added length of service has been much less in the United States than would be inferred from the number of treated poles reported.

With regard to the number of poles which were treated by the open-tank process no statistics are available, but this practice is known to be increasing. Reports to the Forest Service from 62 commercial and private treating plants show that in 1909 about 1,123,000 linear ft. of pole timber, equivalent to 44,920 poles 25 ft. in length, were creosoted under pressure with from 8 lb. to 20 lb. of oil per cubic foot of timber, and that, in addition, several hundred thousand linear feet were given a

treatment with creosote oil and a zinc chloride solution combined. The plants reporting poles treated under pressure were all in the Southern States and the wood used was chiefly Southern yellow pine. No reports were received from three Southern plants which also treated poles by this method. Among the preservatives reported by the companies which purchased poles were creosote, coal tar, crude oil, various kinds of carbolineum and other patented preservatives.

Of the poles reported in 1909 576,631, or 15.4 per cent, received treatment before or after purchase. This represents an increase of about 232,000, or 67.4 per cent over the number reported as treated in 1908, and an increase of 180,432, or 45.5 per cent over the corresponding number in 1907. In 1908 treated poles formed 10.6 per cent of the total number of poles reported as purchased, and in 1907 12.1 per cent. Of the poles purchased by electric railroad and electric light and power companies in 1909 24.2 per cent were reported as treated, while in 1908 and 1907 treated poles formed respectively 14.7 per cent and 12.4 per cent of their purchases. These companies use poles of high average grade and value.

Treated cross-arms, brackets and pins are used by some companies, but to what extent is not known. According to reports from 62 treating plants 67,000 cross-arms were treated by them in 1909 with from 10 lb. to 14 lb. of creosote oil per cubic foot of wood. The majority of cross-arms are painted before use. The accompanying Table I shows the amounts and costs of cross-arms supplied to electric railway and electric light and power companies.

TABLE I.—CROSS-ARM STATISTICS.

Kind of Wood.	Number.	Cost.	Average Cost per Cross-Arm.
Douglas fir	422,198	\$155,960	\$0.37
Pine	689,664	238,139	0.35
Oak	26,040	7,565	0.29
Cypress	6,274	1,633	0.26
Spruce	62,325	21,275	0.34
Juniper	1,200	248	0.21
Cedar	5,710	1,122	0.25
Chestnut	5,820	2,360	0.41
Locust	4,047	1,193	0.29
All other.....	7,899	2,449	0.31
Total	1,231,177	\$432,244	\$0.35

Table II shows the number, cost and average cost of the brackets purchased by the electric railways and the lighting and power companies.

TABLE II.—BRACKET STATISTICS.

Kind of Wood.	Number.	Cost.	Average Cost per Bracket.
Oak	779,430	\$17,345	\$0.022
Locust	59,669	1,159	0.019
Pine	25,844	670	0.026
Douglas fir.....	4,910	128	0.026
All other	26,820	564	0.024
Total	886,673	\$19,866	\$0.022

The total number of brackets reported in 1909 was 6,167,795 and the amount paid for them was \$94,721. Oak was the principal kind of wood used, furnishing 95.2 per cent of the total number of brackets reported and contributing a high proportion of the total in the case of each class of consumers.

Table III shows the number, cost and average cost of insulator pin purchased by the electric railway, lighting and power companies.

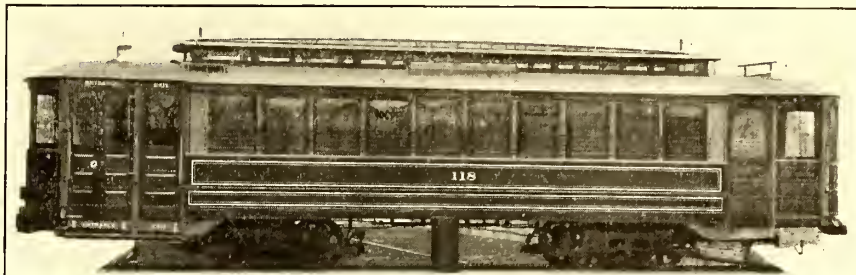
TABLE III.—INSULATOR PIN STATISTICS

Kind of Wood.	Number.	Cost.	Average Cost Per Pin.
Locust	3,231,009	\$56,416	\$0.017
Oak	614,091	11,314	0.018
Firm	31,625	800	0.016
Osage orange	115,651	1,839	0.016
All other	184,729	3,701	0.020
Total	4,177,087	\$73,761	\$0.018

Of the 18,463,041 insulator pins reported, 70.8 per cent were locust, 12 per cent oak and 11.9 per cent elm, these three kinds of wood furnishing nearly 95 per cent of the total number purchased in 1909.

PAY-AS-YOU-ENTER CARS FOR CHATTANOOGA, TENN.

The Chattanooga (Tenn.) Railway & Light Company has lately received 10 pay-as-you-enter cars from the G. C. Kuhlman Car Company, Cleveland, Ohio. The most striking feature is the arrangement of entrance and exit doors on the conductor's platform. The entrance side consists of a two-section hinged door which can be opened flat against the pipe rail or be folded between the door post and the end of the pipe rail. The exit has a swinging door which is arranged to close against the corner post of the car. This door has a combination handle and swing catch on the inside, but no provision is made for opening it from the outside. The exit side of the motorman's



Pay-As-You-Enter Car for the Chattanooga Railway & Light Company

platform is provided with the usual combination of single sliding door and folding step.

The new cars are 45 ft. long over the bumpers and 28 ft. 8 in. long over the end panels. The length of the platforms in the clear on the center line is 7 ft. 2 in. and the length of the vestibule over the dash 7 ft. 8 in. The width of the car over the posts is 8 ft. 8 in. and the height from the top of the rail to the top of the trolley plank 12 ft. 3 $\frac{3}{4}$ in. The side sills are of long-leaf yellow pine, reinforced with 3 $\frac{1}{2}$ -in. x 15-in. steel plate and angle irons. The end sills are of oak, reinforced with a 6-in. x 1 $\frac{1}{2}$ -in. plate which is extended the entire length and bent at right angles at each end for bolting to the side sills. The cross sills and braces are of white oak. The body framing, belt rails and window rails are of ash, but all long rails are of long-leaf yellow pine.

The platforms are supported by two 6-in. x 3 $\frac{1}{2}$ -in. x 3 $\frac{1}{2}$ in. x 9/16-in. Z-bars, on each side of which are riveted 4-ft. 3-in. x 7-in. x 5/8-in. reinforcing steel plates. Each platform is provided with a Brill angle-iron bumper which is covered with a sheet-steel bumper shield. The roof has 10 ventilator sash on each side and three transom lights at each end. Side ventilators are hinged and are equipped with Ætna bronze ventilator openers, five to each side. The wood roof rafters are of ash, one located at each post and two between posts. This structure is reinforced with steel roof rafters at each post.

The inside finish of the cars is of clear cherry to match the doors, window sash, moldings, panels, etc. They are provided with 16 transverse seats, 33 in. long, eight on each side, and also a transverse seat for one person at each corner of the car. This seating arrangement permits an aisle width of 24 $\frac{1}{4}$ in. Among the specialties used on these cars are Brill No. 22 special trucks, having a wheel base of 4 ft. 6 in.; "Acme" window fixtures; "Universal" safety treads for the platform steps; Crouse-Hinds "Imperial" arc headlights and Dressel electric headlights for each end of the car; "Dumpit" sand boxes and Ohmer fare registers. The car painting was done throughout with Murphey's paints and varnishes.

By vote of the City Council of Gary, Ind., on March 13, the Mayor of the city was directed to request the removal of the overhead wires and cables of the Chicago, Lake Shore & South Bend Railway Company within the city limits. This company, operating a single-phase alternating-current railway system, employs a transmission voltage of 33,000 and a trolley voltage of 6600. The officials of that city consider that the high-potential wires are dangerous.

CIRCUIT CONTROLLER FOR RAILROAD SIGNALING

The Union Switch & Signal Company has had on the market for some time the circuit controller shown in the accompanying cut. This device is used in connection with railroad signaling and is the development of a wide experience and a large number of experiments. It has been named the "Universal" switch circuit controller because it can be applied to every situation and equipped in a great variety of contacts. These contacts are four in number and any one or more of them may be equipped with a front contact, a back contact or both. Also by the interchange of cams any of the contacts may be made "three-position" in which the front contact is closed at the extreme normal position and the back contact at the extreme reverse position of the switch and both are open at all intermediate points. The interior of the box is



Circuit Controller for Railroad Signaling

thoroughly protected from dust, water, etc. by a gasketed cover and the crank and the wire inlet cap may be placed on either side. Accessibility of the parts is one of its many valuable features. All current-carrying parts are mounted on blocks of insulating material to dispense with the many troubles incident to mounting them on and insulating them from metal frames.

CONFERENCE ON THE CONSERVATION AND UTILIZATION OF WATER-POWER

A public conference will be held in the United Engineering Building, New York, on Saturday, April 8, under the auspices of the Power Transmission Section of the National Electric Light Association, to consider the important subject of the relation of the national and State governments to the conservation and utilization of water-powers. Two sessions will be held, afternoon and evening, and papers and addresses will be delivered by several well-known men. Invitations to the conference are being sent to members of engineering societies as far east as the Mississippi River, and the meeting has the hearty co-operation of national engineering bodies. The topics for discussion include a great variety of subjects, such as whether the federal government or individual States shall control the water-power sites, the rentals to be charged, etc.

EXHIBITS AT THE MAINTENANCE OF WAY AND SIGNAL CONVENTION

In connection with the conventions this week of the American Railway Engineering and Maintenance of Way Association and of the Railway Signal Association in Chicago, an elaborate exhibition of railroad apparatus was made at the Coliseum. The following is a brief list of the exhibits of most interest to electric railway companies:

Adams & Westlake Company, Chicago, Ill.—Signal lamps, lanterns, railway specialties.

Alexander Crossing Company, Clinton, Ill.—Continuous-rail non-pounding crossings.

American Concrete Pile & Pipe Company, Chicago, Ill.—Concrete culvert pipes and piles.

American Guard Rail Fastener Company, Philadelphia, Pa.—Anchor guard rail clamps, tie-plate guard-rail fasteners and Vaughan automatic rail anchors.

American Hoist & Derrick Company, St. Paul, Minn.—Complete life-size "American Railroad Ditcher," mounted on flat car.

American Railway Steel Tie Company, Harrisburg, Pa.—Section of track with its steel ties.

American Steel & Wire Company, Chicago, Ill.—Right-of-way fencing, gates, signal wire, rail bonds, tie-marking nails.

American Valve & Meter Company, Cincinnati, Ohio.—Economy switch stands, Anderson interlocking switch stands and safety switch locks for main line switches, track devices.

American Vulcanized Fiber Company, Wilmington, Del.—Original vulcanized fiber for rail joint insulation, steel tie insulation, mechanical use.

Asbestos Protected Metal Company, Canton, Mass.—Two sheets of asbestos protected metal.

Barrett Manufacturing Company, New York, N. Y.—Roofing, floor protection particularly adapted for wooden floors in repair shops and freight houses, bridge waterproofing, waterproofing and damp-proofing for masonry.

Bausch & Lomb Optical Company, Rochester, N. Y.—Engineering and surveying instruments, transits and levels, etc.

Beaver Dam Malleable Iron Company, Beaver Dam, Wis.—Tie plates and rail braces.

Blocki-Brennan Refining Company, Chicago, Ill.—Carboxide elastic metal preserver and some of the by-products.

Bossert Manufacturing Company, W. F., Utica, N. Y.—Simplex and Duplex track drills.

Bowser & Company, Incorporated, S. F., Fort Wayne, Ind.—Oil storage systems, self-measuring pumps for handling oils, gasoline, varnishes, etc.

Buda Company, Chicago, Ill.—Railroad motor cars and velocipedes, track drills, drill grinders, switch stands, ratchet jacks, ball-bearing jacks, adjustable switch rods, solid manganese crossings, replacers, electric crossing gates.

Burroughs Railway Nut Lock Company, Jacksonville, Fla.—Positive railway nut lock.

Cambria Steel Company, Johnstown, Pa.—Rails, 100 per cent splice bars, Morrison guard rails, "Coffin Process" axles.

Carey Company, Philip, Cincinnati, Ohio.—Roofing, asbestos and magnesia products, insulating materials.

Carnegie Steel Company, Pittsburg, Pa.—Section of railroad track, constructed with steel cross ties and Duquesne joints, with various types of fastenings, including insulated wedge fastening; steel cross ties which have been in track since 1904, with information showing weight, service, etc.; light ties for portable track; assortment of Duquesne rail joints; large display of nickel-plated samples, showing representative shapes rolled by Carnegie Steel Company; bolt and spike tests; steel freight car, passenger car and street car wheels; bolt and spike kegs, showing steel hoops.

Carpenter & Company, George B., Chicago, Ill.—Cordage, cotton duck, tackle blocks, rubber goods, switch ropes, track tools.

Chicago Pneumatic Tool Company, Chicago, Ill.—Section motor cars, pneumatic and electric tools.

Chicago Steel Tape Company, Chicago, Ill.—Implements

for field surveys such as steel tapes, leveling rods, lining poles, marking pins, stadia rods, targets and repairing devices.

Cleveland Frog & Crossing Company, Cleveland, Ohio.—“Hard Service” manganese frogs and crossings, improved spring rail clamps, interlocking switch appliances, etc.

Collins & Company, W. P., Chicago, Ill.—Lubricating oils and greases, Kapak (Elaterite) paint, ready roofing, Lardolene cutting compound.

Concrete Form and Engine Company, Detroit, Mich.—Collapsible steel form for building concrete culverts, conduits, sewers, etc.

Conley Frog & Switch Company, Memphis, Tenn.—Conley patent frogs, manganese frogs, railway track appliances.

Continuous Frog & Crossing Company, Reinforced Rail Joint Company, St. Louis, Mo.—Railroad frogs and rail joints.

Cook's Standard Tool Company, Kalamazoo, Mich.—Standard bonding drills, Standard track and car jacks, Climax track drills, Magic tool grinders, Magic chucks and high-speed bits.

Detroit Graphite Company, Detroit, Mich.—Paint for bridges, buildings, structural steel, etc.

Detroit Steel Products Company, Detroit, Mich.—Solid steel Detroit-Fenestra windows.

Eugene Dietzgen Company, Chicago, Ill.—A complete line of modern surveying instruments, leveling rods, ranging poles, tapes, rail profile machines and other supplies which are used by engineers both in the office and in the field.

Dilworth, Porter & Co., Limited, Pittsburgh, Pa.—Railroad spikes and tie plates.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Dixon's Silica-Graphite Paint, Graphite productions.

Dressel Railway Lamp Works, New York, N. Y.—Switch, semaphore, tower, station, tail-maker, lamps, oil pots, long-time and standard railroad lamp burners, etc.

Drouvé Company, G., Bridgeport, Conn.—“Anti-Pluvius” puttyless skylights and the “Lovell” and “Straight-Push” sash operators.

Duplex Metals Company, Chester, Pa.—Miniature pole line showing results from heavy snowstorm; samples of all kinds of copper-clad steel wire and products, such as nails, cotter pins and bolts.

Economy Separable Switch Point Company, Incorporated, Louisville, Ky.—“Economy” separable switch points, positive rail anchors, positive rail anchor-tie plate combination, positive malleable tie plates.

Electric Storage Battery Company, Philadelphia, Pa.—“Chloride Accumulator” batteries.

Fairbanks, Morse & Company, Chicago, Ill.—Motor cars for section work and inspection; gasoline pumping engines, steam pumps, gasoline and gas engine generating sets, motors and dynamos, track and bonding drills, ratchet, ball-bearing and hydraulic jacks, scales.

Frank M. Foster, Columbus, Ohio.—Foster interlocking switch stands.

Franklin Manufacturing Company, Franklin, Pa.—Asbestos corrugated roofing and siding; special journal box packing; wool and cotton waste.

General Electric Company, Schenectady, N. Y.—Railway signal and accessory and supply devices, including an alternating-current and a direct-current signal in operation; four-cycle, 25-kw gas engine and generator; mercury arc rectifier; transformers; motor generators, etc.

General Railway Signal Company, Rochester, N. Y.—Electric interlocking machines, Model 2A, electric motor signals for automatic block and interlocking systems, relays and other devices.

Gifford-Wood Company, Hudson, N. Y.—Ice cutters and ice tools.

Goheen Manufacturing Company, Canton, Ohio.—Preservative coatings for iron and steel and galvanized iron.

Goldie, William, Pittsburgh, Pa.—Steel railroad tie, method of surfacing track and tie plugs.

Gray & Sons, Peter, Boston, Mass.—Signal lamps and lanterns.

Greenlee Brothers & Company, Chicago, Ill.—Railroad

tie machinery, automatic tie adzing and boring machines, screw spike driving machines, tie dowelling machines.

Grip Nut Company, Chicago, Ill.—Grip nuts.

Hall Signal Company, New York, N. Y.—Automatic signal appliances.

Handlan-Buck Manufacturing Company, St. Louis, Mo.—Handlan Special lanterns, McPartland rail clutches, track tools, metallic track and train flags.

Harry Brothers Company, New Orleans, La.—Corrugated metal culverts, corrugated iron tanks, knockdown portable galvanized iron houses.

Hart Steel Company, Elyria, Ohio.—Tie plates and spikes.

Hayes Track Appliance Company, Geneva, N. Y.—Hayes derails and attachments.

Heath & Milligan Manufacturing Company, Chicago, Ill.—Mindura, an iron and steel preservative.

Hobart-Allfree Company, Chicago, Ill.—Smyth derailleurs, Freeland derailleurs, Newton car replacers and Newton divided car replacers.

Hoskins Rail Joint Company, Chicago, Ill.—The continuous girder rail joint.

Hubbard & Company, Pittsburgh, Pa.—Railroad track tools, shovels and scoops, bolts, nuts and washers, pole-line hardware.

Hunt Company, C. W., West New Brighton, New York, N. Y.—Models of automatic railway; conveyor; grab bucket, wheel and axle car with wheel and axle on it; curve, straight track and switch; shop car.

Ideal Concrete Machinery Company, South Bend, Ind.—Concrete block machines, concrete block power tamper, concrete brick machine, concrete stone products.

Indianapolis Switch & Frog Company, Springfield, Ohio.—Manganese frogs, crossings, switches, etc.; a special showing of Indianapolis Switch & Frog Company model R-N-R manganese frogs and crossings and tests.

Interlocking Nut and Belt Company, Pittsburgh, Pa.—The Clark nut lock.

Johns-Manville Company, H. W., New York, N. Y.—Asbestos and magnesia materials, electrical supplies, roofings.

Jordan Company, O. F., The., Chicago, Ill.—Steel constructed Jordan spreader and snow plows.

Joyce-Cridland Company, Dayton, O.—Railway jacks.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.—Manufacturers of hand, push and velocipede cars, improved track drills, jacks, pressed steel wheels, track appliances.

Kellogg Switchboard & Supply Company, Chicago, Ill.—Railway telephone equipment, including train-dispatching sets, various types of portable telephones, siding telephones and ordinary telephones for use on both steam and electric roads.

Kennicott Company, Chicago, Ill.—Steel cars, steel underframes, general steel-plate construction.

Kerite Insulated Wire and Cable Company, New York, N. Y.—Kerite insulated wires and cables.

Kerlin Automatic Post Machine Company, Delphi, Ind.—Concrete fence post machine, reinforcements for concrete posts; lineal concrete railway tie.

Kernchen Ventilator Company, Chicago, Ill.—Ventilators for passenger coaches.

Keuffel & Esser Company, New York, N. Y.—Drawing materials, mathematical and surveying instruments, measuring tapes.

King Fifth Wheel Company, Philadelphia, Pa.—Interlocking roller-bearing car pivot.

Lackawanna Steel Company, Buffalo, N. Y.—Rails, rail joints, structural and bridge material, reinforced concrete bars and track supplies, special alloy steels, including Ferro, Titanium, Bessemer rail steel.

Lansing Wheelbarrow Company, Lansing, Mich.—Trucks and track barrows.

Lehon Company, Chicago, Ill.—Waterproofed canvas for passenger cars, Lehon's car roofing, car sill covering.

Link-Belt Company, Chicago, Ill.—Elevating and conveying specialties.

Lorain Steel Company, Johnstown, Pa.—Track Material—Solid manganese crossing; built-up crossing, 3-rail type; solid manganese frog; 4-rail manganese center frog; 6-rail manganese center frog; manganese wing rail frog; expan-

sion joint; manganese split-switch point; Tadpole tongue switch; guard-rail clamp; heavy pattern cast steel combination joint; samples of electrically welded joints; sections of deep tee and M. C. B. guard rails; track skate.

Lufkin Rule Company, Saginaw, Mich.—Measuring tapes of all descriptions, steel rules, etc.

Lupton's Sons Company, David, Philadelphia, Pa.—Lupton steel sash. Lupton rolled steel skylight, Pond continuous sash, Pond operating device, details and large photographs of shop construction.

Luther Grinder Manufacturing Company, Milwaukee, Wis.—Hand and foot power tool grinders, grinders of all descriptions, with special attachments for sharpening chisels and twist drills.

Manning, Maxwell & Moore, Incorporated, New York, N. Y.—Railway and machinists' tools and supplies, electric traveling cranes, Schmidt hack saw machine.

C. F. Massey Company, Chicago, Ill.—Illuminated signals for highway crossings, reinforced concrete culvert pipe, rubber-covered insulated wire, roofing material.

Matthews & Brother, W. N., St. Louis, Mo.—Matthews guy anchors, cable clamps, cable-splicing joints, lamp guards, guy clamps.

Matthews & Rothermel, Chicago, Ill.—Steel sash for railway cars.

Merillat Culvert Core Company, Winfield, Ia.—Adjustable collapsible cores for making concrete culverts.

Alexander Milburn Company, Baltimore, Md.—Portable acetylene lights up to 10,000 cp for railroad construction, wrecking and inspection work.

Morden Frog & Crossing Works, Chicago, Ill.—Manganese frogs and crossings, Unity stand with facing point lock and distant signal, G. L. M. automatic switch stand, compromise joints, facing point lock for Mansfield stands, guard rail, clamps, switch adjustments, rods and plates.

Mudge & Company, Burton W., Chicago, Ill.—Adams motor car.

Municipal Engineering & Contracting Company, Chicago, Ill.—Concrete mixing machinery, Chicago improved cube concrete mixer.

Nachod Signal Company, Philadelphia, Pa.—Electric railway track model operating actual signals, high-speed trolley contractors, signal relay.

National Corrugated Culvert Company, Warren, Pa.—American ingot iron corrugated culverts.

National Lock Washer Company, Newark, N. J.—Exhibiting nut locks and special testing apparatus showing power exerted by spring washers under compression and toughness of steel structure.

National Surface Guard Company, Chicago, Ill.—Surface cattle guards, track wrench, lock washers.

Nichols & Brother, George P., Chicago, Ill.—Electric turntable tractor.

Okonite Company, New York, N. Y.—Okonite wires; aerial, underground and submarine cables for all kinds and conditions of electrical service; potheads; cable joints; Okonite and Manson tapes; samples of crude rubber.

Paterson Nut Lock Company, Philadelphia, Pa.—Paterson nut lock.

Pennsylvania Steel Company, Steelton, Pa., and **Maryland Steel Company**, Sparrows Point, Md.—Solid Manard frogs, Manard anvil face frogs and other Manard special work built for various steam railroads, switch stands, rail joints, compromise joints, etc.

Pittsburgh Metal Products Company, Pittsburgh, Pa.—American ingot iron, plates, stack iron, sheets.

Pneumatic Jack Company, Louisville, Ky.—Pneumatic lifting jacks and accessories.

Pocket List of Railroad Officials, New York, N. Y.—Pocket list of steam railroad officials.

P. & M. Company, Chicago, Ill.—P. & M. anti-rail creepers.

Q. & C. Company, New York, N. Y.—Q. & C. Bozano joints, rolled steel step joints, cast-steel step joints; Bozano insulated joints, anti-rail creepers; rail benders; portable rail saws; guard rail clamps, rail braces, track-relaying machines; Kimball concrete tie.

Rail Joint Company, New York, N. Y.—Continuous,

Weber and Wolhaupter types, base-supporting rail joints.

Railroad Supply Company, Chicago, Ill.—Tie plates, derailers, signals.

Railway Age Gazette (Maintenance of Way Daily) and **The Signal Engineer**, New York, N. Y.—Copies of papers and bound volumes.

Railway & Engineering Review, Chicago, Ill.—Copies of publications.

Ramapo Iron Works, Hillburn, N. Y.—Automatic safety switch stands; manganese pointed switches, manganese center frogs, solid manganese reinforced frogs, rolled manganese steel rail, guard rail, rail clamps, etc.

Robinson & Company, George M., Dubuque, Ia.—Metallic railway tie and fastenings.

Sandwich Electric Company, Sandwich, Ill.—Selective telephone and signal apparatus.

Scherzer Rolling Lift Bridge Company, Chicago, Ill.—Models, photographs, designs, plans, drawings and literature.

Sellers Manufacturing Company, Chicago, Ill.—Tie plates, angle bars, Sellers Anchor Bottom tie plate.

Spencer Otis Company, Chicago, Ill.—Economy tie plates and American Kron scale.

Standard Paint Company, New York, N. Y.—Ruberoid roofing, Ruberoid car roofing, insulating papers, railway equipment and bridge paints.

Standard Scale & Supply Company, Chicago, Ill.—The Standard scales, freight and warehouse trucks, Eclipse low-charging concrete mixer.

Standard Underground Cable Company, New York, N. Y.—Bare and insulated copper wires, bare and insulated copper-clad wires.

Sterling Varnish Company, Pittsburgh, Pa.—Sterling iron enamel paints.

Strait Scale Company, Kansas City, Mo.—Heavy special track scales, other scales used by railroads.

Taylor Lock Nut Company, Salt Lake City, Utah.—Lock nuts, showing their application to track and car work.

Templeton, Kenly & Company, Limited, Chicago, Ill.—Simple track and car jacks.

Union Switch & Signal Company, Swissvale, Pa.—Interlocking and signaling apparatus for steam and electric railways, including electro-pneumatic, electric and electro-mechanical interlockings in operation; signals, relays and other apparatus for a. c. or d. c. automatic block signaling; staff system for use on steam and electric railways of the "Operator" and "No-operator" type; electric crossing gates and bells, Keystone insulated rail joints, mechanical interlocking derails, etc.

United States Electric Company, New York, N. Y.—The Gill selector, railway signals and electrical devices.

U. S. Metal & Manufacturing Company, New York, N. Y.—Diamond tapered steel poles; Wolfe automatic rail joint lock; Columbia lock nuts, St. Louis surfacer paints and target enamels.

Universal Metallic Tie Company, Salt Lake City, Utah.—Steel cross-tie.

Verona Tool Works, Pittsburgh, Pa.—Track tools, track jacks, track gages, nut locks.

Weir Frog Company, Cincinnati, Ohio.—Railway frog, switch stands, guard-rail clamp, manganese frog.

Weir & Craig Manufacturing Company, Chicago, Ill.—Electric turntable tractors, compressed air turntable tractors, pneumatic and hydraulic drop-pit tables, transfer tables, electric portable hoists, compressed-air portable hoists.

Weissel Nut Lock Company, Chicago, Ill.—Nut-lock.

Western Electric Company, New York, N. Y.—Railway telephones for train dispatching, siding telephones, portable telephones for train crews and all telephone apparatus, arc lamps, installation material; Buffalo grips, Mazda lamps, bells and buzzers.

Wm. Wharton, Jr., & Company, Incorporated, Philadelphia, Pa.—Manganese steel switches, frogs, crossings and movable points; switch stands, guard-rail clamps, anti-creepers, models, photographs, etc.

Whitehead, Jos., Farmington, Ill.—Composite tie, metal and concrete railway tie.

Winan's Improved Patent Rail Joint Company, Portland, Ore.—A base-supported rail-joint.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

California.—Municipal Corporations—Powers—Acquisition of Public Utilities.

The State may empower municipalities to acquire and operate any such necessary public utility as is generally owned and operated in a city by public service corporations, such as waterworks, gas or electric light plants, street railways, etc.

That money appropriated by a municipality to construct a street railroad has not been expended for that purpose does not show want of authority to issue bonds for that purpose, in the absence of a showing that the funds are still available.

In construing a complaint against acquisition of a street railroad under San Francisco Charter of 1907, Art. 12, Sec. 14, approved by the Legislature November 28, 1907 (St. Ex. Sess. 1907, p. 37), on the ground that the road would parallel an existing road for more than ten blocks, a franchise granted in 1878 will be presumed to have expired, in the absence of allegation to the contrary.

San Francisco Charter, Art. 2, Ch. 2, Sec. 1, subd. 27, as amended February 5, 1903 (St. 1903, p. 586), precluding authorization of the joint use by two or more street railways of more than ten blocks, means "ten consecutive blocks." (Platt v. City and County of San Francisco et al., 110 Pac. Rep., 304.)

Illinois.—Public Improvements—Additional Servitude—Funds—Availability.

Mueller Law 1903 (Laws 1903, p. 285), Sec. 1, authorizing cities to own, operate or lease street railways, applies to underground and elevated, as well as surface, street railways.

Street railways may be constructed either on the surface of the streets or at an elevation above them.

Since the primary use of streets is to accommodate travel and since street railways afford increased facilities therefor, their use of streets does not impose any additional servitude.

Under Mueller Law 1903 (Laws 1903, p. 285), Sec. 1, authorizing cities to own, operate or lease street railways, the City of Chicago can acquire or build street railway subways.

The traction ordinances of the City of Chicago, adopted February 11, 1907, are not invalid, because they provide that the city will not permit any other street car company to use the tracks in proposed subways leased to existing companies.

The City of Chicago can use the funds provided for by traction ordinance Feb. 11, 1907, Sec. 24, comprising a percentage of the net earnings of the traction companies or any other available corporate funds, to purchase or construct subways in the streets or to do necessary preliminary work to enable the city to determine whether such construction is advisable. (Barsaloux et al. v. City of Chicago et al., 92 N. E. Rep., 525.)

Michigan.—Workingmen's Tickets — Ordinances — What Constitutes Extensions—Reduced Fares.

An ordinance was passed providing that a street railroad company should furnish workingmen's tickets at a reduced rate, good over any of its lines in the city, which ordinance was accepted by the railway, and the same ordinance gave the railway a right to extend its tracks to the easterly limits of the city. Subsequently the railway franchise was assigned to a united company, which thereafter purchased a suburban line wholly without the limits of the city. The city then extended its limits to cover a portion of the territory in which the purchased railroad was. Held, that since there were two methods of extending a street railway, one by construction and the other by purchase under Comp. Laws 1897, Sec. 6448, the purchase of the suburban railway by the united company was an "extension," and hence the company was bound by the ordinance, regardless of the franchise of the suburban railroad.

Held, also, that the ordinance would be construed to cover future extensions of the city limits, since it was reasonably in the contemplation of the original parties that the limits would be extended and hence the company was bound to

give such reduced fares on its purchased line. (People v. Detroit United Ry., 125 N. W. Rep., 700.)

Nebraska.—Interstate Carriers—Regulation of Street Railroads.

Act Cong. Feb. 4, 1887, Ch. 104, 24 Stat. 379 (U. S. Comp. St. 1901, p. 3154), or its amendments (act June 29, 1906, Ch. 3591, 34 Stat. 584 [U. S. Comp. St., Supp. 1909, p. 1149]), being acts to regulate commerce, do not apply to street railway companies engaged in the transportation of passengers between cities in different states. (Omaha & C. B. St. Ry. Co. et al. v. Interstate Commerce Commission, 179 Fed. Rep., 243.)

New York.—Municipal Corporations—Failure to Exercise Franchise—Forfeiture.

A franchise for operating a railroad through public streets is disconnected from the corporate franchise of the corporation to which it is granted, and may be forfeited for failure to exercise it. (People v. Bleecker St. & F. R. Co., 124 N. Y. Sup., 782.)

New York.—Lease —Transfer by Lessee—Rights Passing.

Where a street railroad company had the right under its lease to charge an additional fare to a certain point, a sublease or an assignment of the lease would carry with it the same right.

In spite of Railroad Law (Laws 1884, Ch. 252, Sec. 13, as amended by Laws 1890, Ch. 505, Sec. 101, and Laws 1892, Ch. 676, Sec. 101), providing that no corporation constructing a railroad under that act shall charge more than five cents for one continuous ride from one point on the road, or on any road, line, or branch operated by it and under its control, to another or to a point on any connecting line within the limits of any incorporated city or village, the Nassau Electric Company may charge a second five-cent fare for the ride in its trains from its own terminus at Coney Island over the tracks of the Brooklyn Heights Railroad Company. (Enton v. Nassau Electric R. Co., Same v. Brooklyn, Q. C. & S. R. Co., 124 N. Y. Sup., 555.)

Oregon.—Constitutional Law—Taking Property—Due Process of Law—Condemnation by City.

Where a municipal corporation without statutory authority was attempting to condemn complainant's property for a street, it was thereby attempting to deprive complainant of its property without due process of law, in violation of the fourteenth amendment of the federal Constitution.

Where a city had only general charter power to open, lay out, establish, widen, alter, extend, vacate or close streets, and to appropriate and condemn private property therefor, it had no power to condemn a part of a railroad's right of way to construct a street longitudinally along the same, especially where there was no provision for joint use of the property by the railroad company and the public. (Portland Ry., Light & Power Co. v. City of Portland et al., 181 Fed. Rep., 632.)

Pennsylvania.—Specific Performance—Pavements.

A borough may maintain a bill in equity against a street railway company for specific performance of a contract, for laying additional track on a street and for repairing the pavement of the street in a particular manner, in consideration of the borough's consent to the laying of the track on the street. (Patton Tp. v. Monongahela St. Ry. Co. et al., 75 Atl. Rep., 589.)

Texas.—Franchises—Liquidated Damages.

A deposit of \$2,500 with a city under a street railway franchise to be forfeited as liquidated damages on the grantees' failure to have cars in operation and the road completed within specified times, etc., is properly retained by the city as damages on failure to construct the road. (Whitcomb v. City of Houston, 130 S. W. Rep., 215.)

Wisconsin.—Eminent Domain—Condemnation of Street Railroad Right-of-Way.

Under St. 1898, Sec. 1863a (Sanborn's St.:Supp. 1906, Sec. 1863a), conditioning the power of a street railway to condemn rights within a street or other public place on the existence of a franchise granting the use of such street, this is a condition precedent, and goes both to the jurisdiction of the corporation to seek condemnation and of the court to grant it. (Milwaukee Light, Heat & Traction Co. v. Burlington Electric Light & Power Co., 125 N. W. Rep., 932.)

LIABILITY FOR NEGLIGENCE

Alabama.—Rights in Street—Care Required—Wanton Negligence.

The public and a street railroad company each have the right to use the street so that one traveling in a vehicle on or near a street car track was not a trespasser per se.

The degree of care required to prevent negligent injuries must be commensurate with the danger, and since an electric street car moves more rapidly than a horse car and cannot be as readily stopped, a greater degree of care is required by both the motorman and the persons driving near the track.

The act done or omitted must be done or omitted with the certain consciousness that injury will probably result in order to constitute wanton negligence, and such knowledge cannot be implied from knowledge of the dangerous situation, but there must be a design to do a wrong or reckless indifference or disregard of the natural consequences of the act done.

Since more or less danger of collision always attends the movement of street cars and vehicles in the street, the motorman is not bound to stop the car whenever there is danger of collision unless such danger be imminent.

That a motorman sees one on the track in a vehicle does not require him to stop unless he knows that the driver is unaware of the danger. (*Merrill v. Sheffield Co. et al.*, 53 S. Rep., 219.)

California.—Negligence—Driver and Occupant of Private Vehicle.

The rule of imputed contributory negligence does not apply to a passenger in a public conveyance or to one invited to ride in a private conveyance, and neither is chargeable with the negligence of the driver.

The rule against imputed contributory negligence does not absolve a passenger or guest from using ordinary care for his own safety, as no one can be allowed to shut his eyes to danger in blind reliance on the unaided care of another without assuming the consequences. (*Fujise et al. v. Los Angeles Ry. Co.*, 107 Pac. Rep., 317.)

Delaware.—Passengers—Injuries—Accidents.

Accidental injuries are not actionable; so that, if a street car collision was accidental, a passenger could not recover for injuries received in jumping to avoid injury, however imminent the danger when he jumped. (*Eaton v. Wilmington City Ry. Co.*, 75 At. Rep., 369.)

Georgia.—Persons Near Tracks—Duty of Motorman.

A motorman in charge of an electric car who observes or in the exercise of reasonable care could observe a vehicle containing several occupants near the track, and that the animals pulling the vehicle are frightened at the approach of the car and are acting in such manner as to lead a person with ordinary prudence to apprehend danger of a collision between the car and the vehicle, is bound to bring the car under such control that it can be stopped, if necessary, to prevent a collision or injury to the occupants of the vehicle. (*Dabbs v. Rome Ry. & Light Co.*, *Rome Ry. & Light Co. v. Dabbs*, 69 S. E. Rep., 38.)

Indiana.—Injury to Passenger—Existence of Relation—Sufficiency of Evidence—Instructions.

In an action against a street railroad for injuries to a passenger alighting from a car, an instruction that a carrier of passengers, while not an insurer, must exercise the highest degree of care, and is liable to a passenger who is himself without fault for an injury resulting from failure to exercise such care, that it is the duty of the carrier to provide for the safe receiving and discharging of its passengers and to exercise the strictest vigilance, not only to carry passengers to their destination, but also to set them down safely, was not erroneous as ignoring the rule that the high degree of care required of a carrier toward its passengers must be consistent with the mode of conveyance.

In an action against a street railroad for injury to plaintiff while alighting from a car, an instruction that if plaintiff entered the car with the intention of becoming a passenger, and paying the usual fare, and was able and willing to do so, and that no fare was at any time demanded of him, and no place was provided in the car for the purpose of depositing the fare, he was entitled to receive from defendant the highest degree of care, was not misleading as ignoring the factor of good faith on plaintiff's part. (*In-*

diana Union Traction Co. v. Smalley (No. 6497), 88 N. E. Rep., 867.)

Massachusetts.—Trespassers on Car—Duty Owed by Company.

That plaintiff was technically a trespasser in getting on the steps leading by the left-hand door to the rear vestibule of defendant's street car, when by its rule that door was kept locked, and entrance could be had only by the right-hand door, did not relieve it of the duty to exercise proper care not to injure her unnecessarily; but it was bound to use reasonable care till at least she had an opportunity safely to step down. (*Yancy v. Boston Elevated Ry. Co.*, 91 N. E. Rep., 202.)

Michigan.—Carriers—Passengers—Actions—Jury Question—Negligence—Burden of Proof—Instructions.

In a street car passenger's action for injuries received in a derailment, whether defendant was negligent held a jury question.

In a street car passenger's action for injuries received in a derailment, the court instructed that the burden was upon plaintiff to prove his case by a preponderance of the evidence, but, upon proving the derailment and resulting injuries, he made a prima facie case, and the burden then shifted to defendant to show that the derailment was not caused by its negligence. Held, that the charge was erroneous. (*Niedzinski v. Bay City Traction & Electric Co.*, 125 N. W. Rep., 409.)

New York.—Carriers—Injuries to Passengers—Acts of Carrier's Servant—Special Officer—Justification.

A special officer, appointed at the request of a carrier to maintain order at station platforms, whose shield and cap were paid for by the carrier, and whose wages were paid by it, was its employee, for whose acts toward a passenger the carrier is liable.

Where a special officer warned plaintiff, a passenger waiting on the station platform, not to push or he would smash his head, plaintiff's reply, "Go ahead and do it," did not as matter of law justify an assault by the officer. (*Brewster v. Interborough Rapid Transit Co.*, 123 N. Y. Sup., 992.)

Pennsylvania.—Injury to Passenger—Presumption of Negligence—Burden of Proof.

Where a passenger in a crowded summer car by a sudden movement of the car is thrown beyond the guard rail and his head is struck by a car on the other track but there is no injury to the car in which the passenger is riding, no presumption of negligence on the part of the company arises from the mere happening of the accident.

In an action for injuries to a passenger on a street car, the burden is on plaintiff to prove negligence, which he may do sufficiently to carry the case to the jury by showing that the car was unsafely run in passing over a curve which threw the passenger's head beyond the guard rail, so that it struck a car passing on another track. (*Cline v. Pittsburgh Rys. Co.*, 75 Atlan. Rep., 850.)

South Carolina.—Injuries—Negligence—Violating Speed Ordinance—Instructions.

Running a street car at a greater rate of speed than allowed by ordinance shows negligence per se in an action for injuries.

In an action for injuries by being struck by a street car, the court charged that if the jury found that decedent did "what an ordinary woman would have done, and she exercised the care that an ordinary woman would have done—in other words, that she was not negligent"—they should determine whether defendant was negligent. The court elsewhere charged that decedent was held to the standard of care which the law denominated ordinary, reasonable care, which standard the jury must fix from their knowledge of themselves, their fellow men, and from the circumstances and peril surrounding plaintiff when she approached the street car, and if she fell short of the conduct required by an ordinary person in what she did, and that contributed to her injuries, the jury should find for defendant. Held, that the charge, when the quoted part was considered with the remainder thereof, was not erroneous in making the standard of care required of decedent the conduct of an ordinary woman, instead of that of one of ordinary care and prudence. (*Martin v. Columbia Electric St. Ry., Light & Power Co.*, 66 S. E. Rep., 993.)

News of Electric Railways

Mayor Whitlock on the Toledo Franchise Extension

Brand Whitlock, Mayor of Toledo, Ohio, issued a long statement on March 17, 1911, relative to the franchise situation and the course he believes should be pursued to settle the problem promptly. This is the first public utterance made by the Mayor since last December, when he was taken sick. Previous to the Mayor's illness City Solicitor Schreiber completed the draft of an ordinance renewing the grant to the Toledo Railways & Light Company, but nothing has been done regarding it. The administration is pledged to a 3-cent fare, said the Mayor in his statement, and this pledge must be considered as inviolable. He discussed the course to be taken in securing data to show the cost of carrying a passenger and finally said that, in case it was found impossible to operate at three cents with the right kind of service and fair returns upon the investment, the people must decide the rate of fare. Under the agreement with the company, however, the question of fare must be left for discussion until the last, since all the data upon which to base a determination will then be at hand. The Mayor also suggested a sliding scale of fare that will change automatically under certain conditions affecting the payment of dividends and interest on bonds. Mayor Whitlock said in part:

"In the first place I think the street railway problem should be settled promptly and I know of no reason why this cannot be done. This administration is pledged to 3-cent fares. To get 3-cent fares, however, it is necessary to do something more than merely talk about them or make speeches extolling them. To get them we shall have to make a critical and exhaustive examination of the whole subject, with the advice and assistance of able experts, committed to the people's side of this conflict with special privilege. We have already had such advice and assistance in making a study and analysis of the company's books, its receipts, expenditures, etc. We shall be compelled to have similar assistance in making the valuation of the company's property. We are confident that with these data 3-cent fares will be shown to be practicable. But, whatever the result, the question must go to the people for determination.

"If the result should show that 3-cent fares, literally, are impossible, even then, with the issue undetermined, excellent results would have been obtained. In order, however, to open the negotiations, to approach the subject with open minds, the administration determined to avoid as many points of irritation as possible, and so determined to leave the discussion of the fare for the last thing, when, and when only, it could be discussed intelligently in the light of all the data and the facts elicited.

"I wish to state again what I have said so often in public discussion during the last 10 years, that I think this question never will be settled rightly until we have municipal ownership. I believe that municipal ownership is coming, for as democracies grow they develop new necessities, and in that evolution they develop the functions necessary to meet these needs.

"The city, under the present law, is compelled to provide this service by means of a contract with a private corporation, and its first care should be to see that the people get adequate service, and, secondly, that it costs the citizens only what is required to furnish it. This includes, of course, a fair return upon actual investments, but it does not include a return upon speculative values or upon the water in stocks and bonds. The era of that sort of speculation is over and the time approaches when stocks or bonds of a municipal utility will be similar in return to the securities of the municipality itself. They are, in fact, based upon the faith of the city; and as the city is a permanent thing, as its population is to increase in size and importance, stock in a street railway enterprise is as secure an investment as could be imagined. It has altogether lost that speculative element it once had before the permanence of the city was assured.

"Therefore, it is probable that in the future stock in street railways in our cities will be limited in its return to an amount not very much, if any, in excess of that derived from municipal bonds. It has been suggested by some well-

meaning persons that a solution of the problem may be found in the proposal that the company be required to pay a part of its receipts into the city treasury. I am aware that such an arrangement is attractive to many citizens. And the fact that it is attractive shows how complaisant the people have been with street railways in this country and, indeed, how powerless they have been before them, how utterly in their political and economic grasp.

"The people have been so used to having nothing from their public service corporations, not even public service, that some of them are almost pathetically grateful for the slightest consideration.

"The traction magnate knows that the era of extravagant and irresponsible exploitations of public franchises, watered stock, profits for promoters through inflated bond issues, and all that, is over, and that we are now entering upon that period in which corporations enjoying under license or franchise a monopoly of the profits of public necessities are to be regulated by the public, in an effort to have them operated not for private profit alone, but really, and at last, for public service.

"The traction magnate knows, too, that the day is past when a man will have to pay more for a street car ride than it is worth; that is to say, he knows that the time has come when street car service must be provided at cost. Now, when I have said cost, I hasten to add that cost, of course, implies a reasonable return upon the actual investment, but it does not include an inflated and unearned profit.

"That is to say, it is proposed by this system to compel the workingman who rides downtown on a street car at 6 o'clock in the morning to pay the taxes of the man who rides downtown in a limousine at 10 o'clock in the morning. Of course, passengers on street cars ought to pay their taxes, but they ought to pay them at the court house, not on the street car, to the treasurer, not to the conductor, and surely they ought not to be made to pay their own taxes and then be made to pay somebody else's taxes too.

"The members of the Council have studied and read on this subject, many of them have gone to other cities to see what was being done there, and thus far I think they have treated the whole subject in a most intelligent, unselfish, non-partisan way. Their conclusion is that under the present laws the businesslike thing to do is to find out just what it costs to carry a passenger and then to fix the fare at that point, allowing, of course, for interest and taxes, for the betterment and extension of lines and for a reasonable return upon actual investments. This is the meaning of the demand for 3-cent fare, for it is believed that an analysis of the problem will show that all this can be done at that rate.

"These discussions will not proceed far until the question of valuation is reached. That is the key to the whole problem. And it seems to me that we might as well attack that problem at once and dispose of it. The task is one of no small difficulty, but it has to be performed, and it should be undertaken immediately. It will take weeks of earnest study and patient, drudging toil. But when it is done, when we have the value of the investment already made and of the investment necessary to rehabilitate the lines and provide the service that is required, with the analysis of receipts and expenditures that we now have, we will know just what it costs to carry a passenger, and then we can find whether it is not possible still further to decrease this cost by operating cars in a manner perhaps differing from that now employed, by doing away with parallel lines or lines that seem to duplicate others, perhaps by having fewer cars run in those hours when not many people are riding and by having more cars run in the early morning and evening when many people are riding, the hours when the cars are overcrowded and the rush is on. This is the way to 3-cent fares.

"Every obstacle possible will, of course, be thrown in the way. There will be criticism and innuendo and misstatement. Efforts will be made in behalf, not of the people, but of political interests and ambitions and those privileged interests that are in league with them and are served by them. Attempts will be made to divide those

whom the people have chosen to represent them in this matter; attempts will be made to divide the people themselves. Personal ambitions, interests, jealousies, all those human elements that complicate any problem under consideration by a large number of men, will be made the most of. But I hope that in this hour everybody concerned—and everybody in town is concerned—will rise to the best and highest that is in him and will put away every personal, selfish consideration and give his noblest efforts to settling this vexed question. He who does his best will best serve his town and his time, and in the end, himself."

Improvements in Kansas City

The letter in regard to improvements in Kansas City addressed to Darius Brown, Mayor of the city, by John M. Egan, president of the Metropolitan Street Railway, was followed by a conference at the city hall, Kansas City, on March 13, 1911, between Mr. Egan, Frank Hagerman, vice-president of the company; Mayor Brown, John G. Park, city counselor, and Clyde Taylor, counsel to the Public Utilities Commission of Kansas City. At this conference an agreement is said to have been reached between the company and the city by which the company will proceed with the construction of the new line on Chestnut Avenue if certain changes are made in the ordinance and will improve the service in other directions as rapidly as can reasonably be expected. Following the conference Mr. Park said:

"The company will build the crosstown line from Fifteenth Street north to Lexington Avenue at once. At the earliest possible moment the city will build a trafficway through North Terrace Park on the north side of Chestnut Street from Lexington Avenue to connect with a viaduct to be built by the Terminal Company over the Chicago & Alton and Missouri Pacific tracks. This will give a direct connection with the East Bottoms by a crosstown line. The representatives of the Metropolitan Street Railway preferred an ordinance for the Chestnut Street line similar to the one requiring the construction of a line on Woodland Avenue, and that the city gladly will give.

"They also had some suggestions to offer about the drafting of an ordinance providing for a contract regarding the Twelfth Street trafficway. After some pencil changes of the city's draft they took the form of it under consideration. We had an oral understanding months ago with President Egan, Mr. Dunham and Mr. Hagerman that the company was to pay one-third the cost of the improvement—\$200,000 to be paid in cash within 10 days after the disposition of motions for a new trial in the condemnation cases; the remainder to be paid in one, two, three and four years. If the company paid the cash and notes within the time specified the city was to agree not to operate cars over the Twelfth Street viaduct, nor to grant to any one else a right to operate such cars unless advancements made by the Metropolitan Street Railway were returned to it."

After taking up in turn each of the clauses in the Mayor's letter of March 4, 1911, Mr. Egan concluded his letter of March 11, 1911, to the Mayor, in part as follows:

"The company appreciates its franchise obligations and the necessity of living up to them. This it will do. It expects the city will not, by unreasonable actions or harassing annoyances, prevent it from so doing. Because we cannot agree upon the present necessity for some particular line is no reason why unreasonable or harassing demands in other directions should be made to coerce the building of the lines.

"I reluctantly took charge of the property about one year ago with the idea that I might improve the property and the public service, being first assured by many leading citizens that my efforts in that direction would be appreciated, my previous experience in Kansas City warranting the belief that the people here did not demand anything but fair and just treatment. To meet the pressing situation which I found when I assumed my duties \$863,223.56 in excess of the receipts was expended during the year ended Dec. 31, 1910.

"Recognizing the earnestness of your desire for the Chestnut Street line and the obligations which you thought you were under to build it, I agreed to waive the right legally to object thereto if any contractor could be found who would

build it for bonds. A very reasonable suggestion was made that the Utilities Commission would probably want to know how the company intended permanently to deal with the question of additions to the property. This led to a 10 days' effort on our part in the East to interest someone in financing all future improvements, with the result that Lee, Higginson & Company, Boston, expressed a willingness to furnish the money if a security was created practically like that which you proposed in the plan as to Twelfth Street. The suggestion was rejected by you, and then came the publication of your letter.

"Your first demand is that we 'immediately accept the ordinance requiring the building of the Chestnut Street extension.' No such acceptance will be made, for you know as well as I do that under the franchise you cannot require the acceptance of any such ordinance. The most the city can do is to order an extension where it is reasonably necessary. Whether the line is an extension and reasonably necessary is for the court to decide. Until such decision the company is not in default.

"Personally, rather than lose the good will of the Kansas City people, I would prefer to sever my connections with the company and resume a peaceful farm life, which I was induced to leave by having my interest aroused in helping to solve the street car problem, by giving good service, building up the property and refunding the bonds maturing in 1913. If any effort in this direction is to be met with public abuse, I might as well quit. I have borrowed large sums for the company from Kansas City banks. It would not be fair to them or the people who are financially interested in the property for me to permit the Metropolitan Street Railway to be attacked by the city without going as far as I can to avoid it. A persistent, continued and concerted attack by public officials will prevent me from rendering any service to the public, and would ultimately drive any public service company into disrepute, bankruptcy, or out of existence.

"I feel that the company's first obligation should be to the majority of its patrons, and, situated as we are financially, our first thought should be expenditures for the above purposes. As to the service and the furnishing of sufficient street car facilities, it must not be overlooked that the company placed in service upon its lines last year 50 additional cars, and contracts have recently been closed whereby the company purchased 25 more cars of the latest and most approved design, delivery of which has been promised for July, and which will be placed in service immediately upon receipt. The company has been compelled to purchase these cars by making payments for same one-eighth cash, one-eighth six months, one-fourth each the next one, two and three years. The company will co-operate in every way possible with the Utilities Commission and adopt each and every reasonable and logical suggestion which will in any way improve the service. We have stood ready to do this any time during my management and will continue to do so. The company is not seeking a quarrel of any kind with the city, but if come it must, no effort will be left undone to assert and maintain our rights as we construe them."

Committee to Consider Electrification at Chicago

A commission of 17 Chicago business men, city officials and railroad executives has been created by the Association of Commerce of Chicago, Ill., to investigate the electrification of the railroads operating into Chicago. The personnel of the commission as announced on March 20, 1911, follows:

City's representatives—Paul P. Bird, chief smoke inspector; T. E. Donnelley, chairman of the city smoke commission; Dr. W. A. Evans, commissioner of health; Milton J. Foreman, chairman of the local transportation committee of the City Council.

Railroad representatives—W. A. Gardner, president of the Chicago & Northwestern Railroad; H. G. Hetzler, president of the Chicago & Western Indiana Railroad; Darius Miller, president of the Chicago, Burlington & Quincy Railroad; C. E. Schaff, vice-president of the New York Central Lines.

Associates at large—W. F. M. Goss, dean of the College of Engineering, University of Illinois; E. R. Graham, of

D. H. Burnham & Company; Richard C. Hall, president of the Duck Brand Company; Jesse Holdom, attorney at law; Harrison B. Riley, president of the Chicago Title & Trust Company; John W. Scott, Carson, Pirie, Scott & Company; Francis T. Simmons, Francis T. Simmons & Company; Mason B. Starring, president of the Northwestern Elevated Railroad; Frederick H. Rawson, president of the Union Trust Company.

The railroads have agreed to pay all of the expenses of the investigation. The four representatives of the city participate, it is announced, not by virtue of their present public offices, but because of qualifications and experience that equip them to deal with the problem of electrification in the capacity of public representatives, and all have agreed to serve upon the commission to the conclusion of the investigation.

A meeting preliminary to the formal organization of the commission was held on March 18, 1911, at the La Salle Hotel. At this meeting committees were appointed to nominate a permanent chairman, vice-chairman and secretary, to recommend the scope of the work to be undertaken, to choose a chief engineer and to select headquarters. Mr. Scott, Mr. Donnelley and Mr. Gardner were delegated as a committee to nominate the permanent officers and to select a date for the regular meetings of the commission. Mr. Foreman, Mr. Gardner and Mr. Riley were named to consider the scope of the project. Dean Goss, Mr. Graham and E. H. Lee, chief engineer of the Chicago & Western Indiana Railroad, who attended the meeting in the absence of Mr. Hetzler, were called upon to select the chief engineer.

Suggested Changes in the Cleveland Grant

At a meeting of the special street railway committee of the Cleveland Chamber of Commerce on March 14 Attorney Andrew Squire, of Squire, Sanders & Dempsey, representing the Cleveland Railway, presented a list of changes which he said the company would like to have made in the Tayler grant to enable the company to carry out its financing more easily. Mr. Squire suggested that the committee secure an opinion in regard to franchise requirements from a man prepared to invest \$3,000,000 or so at a time. The conditions of the grant must finally meet the approval of such investors, and it would be advisable to have an authoritative expression of opinion before definite action was taken. This would prevent further complications. The company requested to be allowed to sell bonds on a 6 per cent basis without the consent of the Council. The best rate possible would always be secured, but such a change would allow more freedom in negotiations. Another change suggested would provide that the surplus from the operating fund be transferred to the interest fund once a year, instead of every six months. This would allow the company to average its operating fund through the year and make up increased expenses from the surplus produced during the months when the expenses are light.

Mr. Squire also suggested that the company be permitted to maintain the extensions and betterments at 100 per cent of their reproductive value. The original property should be maintained at its standard. This was fixed in the ordinance as 70 per cent of its reproductive value. Investors believed that all new work and betterments should be maintained at full value. Another suggestion was that 5 cents and 1 cent for transfer should be fixed as the maximum fare with such rates between the present fare and the maximum as the city may establish. Interests able to furnish money had even suggested that no maximum be named, as the fixed dividends would govern the matter. The company saw safety in financing in a 5-cent fare and 1 cent for transfer. The city had the right to renew the franchise and prevent the company from enjoying the maximum fare for the last 15 years of the grant.

The changes suggested in the manner of fixing the valuation of the property in case the city should decide to purchase the property at the expiration of the franchise would compel the city to pay par for the stock and 10 per cent additional instead of the appraised value plus 10 per cent. Since the stock was reduced in the settlement under the

Tayler grant and in the future must be sold at par, the company believed that the city should stand by its bargain if it purchased the property. Mr. Squire saw no objection to the city taking an option on the property for a year after the expiration of the grant in case no decision had been made at the time. A sinking fund to make up the 30 per cent deducted from the full valuation of the property in the Tayler grant was suggested, so that the property and stock would be at full value when the grant expired.

G. H. Dahl, street railway commissioner, suggested six changes in the grant. The first would require the company to expend at least \$1,000,000 each year in betterments, extensions and improvements. The second provided that when securities are sold above par the surplus shall be used in betterments. The third gave the city the right to initiate improvements, extensions and betterments. The fourth gave the city the right to take part in wage arbitrations. The fifth asked that the company accept a city grant for operation in any suburb after Dec. 18, 1909. The sixth provided that the interest fund of the company be invested in "safe" securities.

Attorney Squire said the company would accept the suggestion to require the expenditure of \$1,000,000 a year for extensions and betterments provided that this condition was not made to apply to the last 15 years of the grant. He could see no objection to the city taking part in wage arbitrations, but J. J. Stanley, president of the company, objected to the provision that the city grant should be extended to suburbs when they are admitted. Mr. Dahl's suggestion would include Collinwood, which, although a part of the city, is now paying a fare of 5 cents.

F. H. Goff, chairman of the committee, favored a sliding scale of dividends, like the gas plan in Boston, so that by good management the company might increase its dividends above a fixed limit. This would be an incentive to good management. George B. Siddall, a member of the committee, would like to see the Boston plan adopted.

On March 15 Mr. Dahl stated that he was opposed to an increase in the maximum rate of fare. He felt that it was unnecessary to secure funds. He was also opposed to a sliding rate of dividends where the dividends increase as the rate of fare decreases and decrease as the rate of fare increases. Mr. Stanley doubted whether such a plan could be put into successful operation in Cleveland. Mr. Goff, however, adhered to the idea and said he believed it necessary to make the Tayler plan a success.

Service and Improvements in Jacksonville, Fla.

The Jacksonville (Fla.) Electric Company has replied at length to the joint committee composed of members of the City Council and prominent citizens of Jacksonville which was appointed recently to take up with the company the question of extensions, improvements and service in Jacksonville. The committee requested the company to furnish it with the schedules in force and a statement of the number of cars in use on the various lines daily. This the company did in detail. It also furnished a table giving the name of each line, the receipts per line for 1910, the percentage of the receipts of each line to the total receipts and the average receipts per day, and a similar table in which the receipts per car per day were given and the number of cars operated per line.

A statement was also submitted which showed the number of trainmen in the employ of the company and the length of time they have been in the service of the company. In all 176 trainmen are employed by the company and more than 35 per cent of them have been in the service longer than one year. The average pay of these men is from \$60 to \$65 a month. The qualifications necessary for an applicant to secure employment by the company as a trainman were set forth in detail, particular stress being laid on the exacting physical examination to which each man is subjected.

The following is a complete list of the new work to be done by the Jacksonville Electric Company, with the cost thereof during the year 1911 as contained in the statement of the company:

1. New power station, 2,400 kw capacity.....	\$525,000
2. Ten new cars.....	50,000
3. Double-track Oak Street from Copeland to King Street.....	19,200
4. Double-track Church Street from Georgia to Parker Street.....	22,948
5. Double-track Highway Avenue from Palm Street to city limits.....	40,588
6. Rebuild and pave Beaver Street from Davis and Corning.....	3,030
7. Rebuild and pave Corning Street from Beaver and Cleveland.....	4,604
8. Rebuild and pave Enterprise Street, Cleveland to Myrtle Avenue.....	7,865
9. Rebuild and pave Church Street, Johnson to Stewart.....	3,225
10. Repave West Bay Street from Main to Market.....	7,590
11. Repave West Bay Street from Main to Bridge.....	25,515
12. Rebuild and pave Davis Street from Kings Road to Eighth.....	24,355
13. Rebuild and pave State Street, Main to Kings Road.....	18,922
14. Pave Washington Street and May Street.....	1,350
15. Pave Bay Street from Cleveland to Myrtle Avenue.....	2,200
16. Addition to carhouse.....	25,000
17. Railway feeder.....	10,000
18. Miscellaneous items.....	32,000

\$824,412

The reasons for each of these expenditures were given at length in the statement of the company. In concluding the statement, Hardy Croom, general manager of the company, said in part:

"The manager of the Jacksonville Electric Company will be glad to present to the committee the merits of each of these items. He feels that they will undoubtedly be for the good of the greatest number and that the benefits from certain suggested extensions that might come to a few real estate dealers and to a portion of a community which is, comparatively speaking, very sparsely settled fade into insignificance so far as the importance to the greatest number of citizens of Jacksonville and the city taken as a whole is concerned.

"The management further says to this committee that it is an interesting fact that many thousand dollars more than the net receipts each year of the Jacksonville Electric Company for the last five years have been placed directly back into actual physical betterments.

"In view of the amount of improvements and betterments, all of which are to be completed during 1911, the management respectfully requests this committee to stop and consider before it recommends the expenditure of any more money for improvements by the Jacksonville Electric Company.

"Having taken the necessary steps to meet every complaint, having complied with the request of the committee in its resolution, and having shown to the committee the actual work contemplated by the company for 1911, the company requests that the committee give it a favorable report in the premises. The officers of this company present will be glad to answer any question that may be expedient in the premises."

Progress of Negotiations in Montreal

Progress is reported in the negotiations between the Montreal (Que.) Street Railway and the Board of Control of Montreal which have for their object the modification of the terms under which the company operates. A number of conferences have been held since the letter of E. A. Robert, president of the company, was presented to the city, as noted in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911, page 390, and it was announced at a recent meeting of the special committee of the Council appointed to confer with the officials of the company that the comptrollers have formulated terms upon which an agreement is likely to be arranged whereby the company will be granted an extension of its franchise. The report of the committee, however, merely indicates the terms upon which the company would be willing to accept an extension of its agreement with the city. The most important consideration to be arranged is the terms which cover the percentage of earnings from traffic within defined limits of the city to be paid by the company to the city. Under the present agreement the company pays 4 per cent on earnings up to \$1,000,000, 6 per cent on additional \$500,000 up to \$1,500,000, 8 per cent on \$500,000 up to \$2,000,000, 10 per cent on \$500,000 up to \$2,500,000, 12 per cent on \$500,000 up to \$3,000,000 and 15 per cent on all earnings over and above \$3,000,000.

It is unofficially stated that the company has proposed to substitute for this sliding scale a fixed rate of 6 per cent on all its earnings without distinction as to the source of the traffic revenue. The company is said to have expressed itself as willing to change the number of workingmen's tickets from 8 to 10 for 25 cents, and children's tickets from

10 to 12 for the same sum, and to have agreed to charge one fare to and from all recently annexed municipalities, the reduced fares to be applicable in these places. However, exception is made in the case of Bordeaux and Ahuntsic, where it is desired to maintain a 5-cent straight fare, with transfer to any part of the city. The company, moreover, is said to have asked for an extension of franchise for 38 years instead of 30 years, so as to make the contract expire 50 years from date.

The other points upon which as a basis the company is said to be willing to enter into an agreement with the city are the following:

(1) To pay two-thirds cost of snow removal on streets where it has or may in future have lines in operation, instead of one-half of the cost.

(2) To pave its right-of-way as well as a space of 18 in. on either side of its tracks.

(3) To make additional routes in the newly annexed wards and to provide a service therein equal to that furnished within the limits of the more densely populated sections of the city.

(4) If the city is willing to provide police officers to prevent overcrowding of the cars at transfer points, to do everything in its power to accommodate every passenger with a seat.

(5) To do a certain portion of street watering in the thoroughfares on which it has lines.

Date Set for Public Hearings in Investigation of First District Commission of New York

John N. Carlisle, Watertown, N. Y., formerly a member of the Public Service Commission of the Second District of New York, who was appointed by Governor Dix of New York recently to investigate the affairs of the Public Service Commission of the First District of New York, conferred with the Governor at Albany on March 20. Mr. Carlisle said that he had begun preliminary investigation and expected to hold public hearings in New York within a few weeks. He desired to learn the probable date of adjournment of the Legislature to ascertain if it will be possible to report his findings before the legislative session ends. In a statement made on Feb. 20, 1911, Mr. Carlisle is reported to have said:

"The investigation of the Public Service Commission, First District, is already under way and an itemized monthly statement of all expenditures made by the commission since its organization has been asked for, together with a list of all its employees, with a statement of their salaries and duties.

"It is intended to investigate carefully each bureau of the commission, with the idea of finding out the work undertaken, the work actually accomplished and the cost thereof, and to get in personal touch with the character of the work of each bureau and the men in charge thereof.

"Public hearings will be held at the Engineering Societies Building, 29 West Thirty-ninth Street, in New York, commencing April 4, at 10 a. m., at which time all parties who desire can appear and present any matters they may wish in connection with the work of the commission. My headquarters will be at the Hotel Belmont, New York, and all communications may be addressed to me at that place."

Meeting of Illinois Electric Railways Association.—The meeting of the Illinois Electric Railways Association which was arranged to be held at Bloomington, Ill., on March 17, 1911, has been postponed until March 24, 1911, at Bloomington.

A. E. R. A. Data Sheet.—H. C. Donecker, secretary of the American Electric Railway Association, New York, N. Y., sent to member companies under date of March 14, 1911, data sheet No. 69, requesting information in regard to the wages of employees other than trainmen.

Cleveland Underground Railway.—At its meeting on the evening of March 13, 1911, the City Council refused to suspend the rules and vote upon the amendments to the grant made to the Cleveland Underground Rapid Transit Company, as recommended by the Cleveland Chamber of Commerce. The amendments are intended to provide for the inspection of the company's books by the city; to provide

tubes in the downtown free district large enough to accommodate surface cars, and to strengthen the clause giving the city the right to purchase the property or nominate a purchaser.

Detroit Franchise Question.—It is probable that the question of revising the city charter of Detroit in order to introduce the municipal ownership amendment will be brought before the Common Council within a short time. A committee has been considering the subject for some time and one of the members has promised to report it out, whether recommended or not. Alderman McCarty, author of the resolution, is anxious that it should be acted upon so that the question can be submitted to the people. Amendments to the home rule law looking to the same end are pending in the Legislature at Lansing.

Electrification of Lines at Pasadena.—It is stated that as a result of the conference held recently in Pasadena, Cal., between E. H. Calvin, vice-president and general manager of the Southern Pacific Company; H. V. Platt, general superintendent of the company; P. Sheedy, superintendent of motive power, and W. H. Whalen, superintendent of the southern district of the company, the question is being considered of electrifying the steam lines running into Pasadena and making the present depot of the Southern Pacific Company at Broadway and Colorado Street the Pasadena terminal of the Los Angeles-Pasadena lines.

Winnipeg Property Offered to the City.—Sir William Mackenzie, president of the Winnipeg (Man.) Electric Railway, has made the following alternative proposals to the Mayor and other representatives of the city to sell the property of the company to the city as a means of settling the questions in dispute between the company and the city, in connection with the electric railway and commercial lighting matters: (1) The company will sell its street railway, gas, power and electric light outfit to the city as a going concern; or (2) the company will purchase from the city 15,000 hp as soon as the city and municipal plant is in a position to deliver it at a price which will pay the interest on the city's entire investment in the municipal plant at Point Du Bois Falls, on condition that the company shall be permitted the exclusive right to engage in commercial lighting. The basis on which control is offered is said to be \$250 a share, whereas the present market quotation is \$190. On this basis the city would pay upward of \$15,000,000 for the property. The Mayor will call a meeting of the special committee of the City Council which has power to deal with the case.

Congress of Technology at Boston.—The fiftieth anniversary of the founding of the Massachusetts Institute of Technology is to be celebrated by a "Congress of Technology" at Boston, Mass., on April 10 and 11, 1911. Papers of engineering, economic and industrial interest are to be read by the faculty and graduates of the institute, among them the following: "The Field of Scientific Management in Railroad Work," by S. M. Felton, president of the Chicago Great Western Railroad, Chicago; "The Reliability of Materials," by Walter C. Fish, manager of the Lynn works of the General Electric Company; "The Scientific Thought as Applied to Railroad Problems," by Benjamin S. Hinckley, engineer of tests of the New York, New Haven & Hartford Railroad, Boston; "Coal Combustion Recorders," by Prof. A. H. Gill, of the Massachusetts Institute of Technology, Boston; "The Chemist in the Service of the Railroad," by H. E. Smith, chemist and engineer of tests of the Lake Shore & Michigan Southern Railroad, Collinwood, Ohio; "Thirty Years' Experience in Boiler Testing," by George H. Barrus, expert and consulting steam engineer, Boston; "Analysis of Losses in Efficiency in a Large Producer Gas Engine Plant," by John G. Callan, electrical engineer with Arthur D. Little, Incorporated, Boston; "Power Plant Betterment," by H. H. Hunt, of the Stone & Webster Management Association, Boston; "The Engineer and Architect Unite," by L. S. Cowles, of the Boston Elevated Railway, Boston; "The Causes of Failure in Metals," by Henry Fay, professor of analytical chemistry at the Massachusetts Institute of Technology, Boston; "Research as a Financial Asset," by Willis R. Whitney, director of the research laboratory of the General Electric Company, Schenectady, N. Y.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CALIFORNIA

Senate Bill 466, introduced in the California Legislature, was passed on March 11 by the Senate. This bill relates to the acquisition, construction and operation of public utilities by municipal corporations. It provides that any municipal corporation may acquire, construct, own, operate or lease any public utility for supplying water, light, heat or power, affording transportation of persons or property or means of communication, or promoting the convenience of the public. Under this law San Francisco will be enabled to lease the Geary Street, Park & Ocean Railroad to private parties for operation. One section reads: "No lease of any public utility shall be valid for a period of more than 15 years, and all such leases shall be let to the highest bidder at a public auction."

Assembly Bill 992, the purpose of which is to permit the people of Alameda County to decide whether a tunnel shall be constructed under the Oakland estuary, was passed March 6 by the Senate and goes to the Governor. The series of bills known as the conservation measures have been passed. The bills call for an appropriation of \$150,000. One hundred thousand dollars is to be used to take an inventory of the natural resources of the State. The other \$50,000 is to be used to carry out the section of one of the bills which provides for a board to have control of the water power within the State.

Governor Johnson has signed the bill to permit San Francisco to operate a municipal railway over East Street.

CONNECTICUT

The judiciary committee completed its hearing on the public utilities bills on March 10. E. C. Terry, New Haven, opposed the passage of any utilities bill on the ground that such a measure would entail considerable expense to the railroads and that a utility commission was not needed. Peter O'Hern for the railroad trainmen also opposed the measure. S. T. Bowers, Bridgeport, who appeared at the request of Mr. Terry, confined his remarks largely to the sins of omission of the Public Service Commissions in New York. The House has passed a bill to require electric railways to screen arc headlights when approaching vehicles. The penalty for failing to comply with this law is fixed at \$7 for each offense. The hearing has been closed on the bill to require the Connecticut Company to establish a fare of 10 cents between South Glastonbury and Hartford with transfer privileges.

DELAWARE

The bill introduced by Senator Monaghan to create a public utility board for Wilmington has passed the Senate. The measure provides that the Governor shall appoint three citizens of Delaware to constitute a commission, the appointees to serve for two years, four years and six years respectively. At the end of that time successors are to be appointed to serve six years. The jurisdiction of the board is to extend to all street railways, railroads, express companies, gas companies, electric light companies, etc. All leases, mergers and consolidations are to be approved by the board.

ILLINOIS

Another hearing was held before the committee on municipal corporations of the House on March 15 on the pending public utilities bill. The bill as drafted gives the State Railroad & Warehouse Commission appointed by the Governor sole control over all public utilities in Illinois outside of Chicago. H. E. Chubbuck, vice-president executive of the Illinois Traction System, asked what objection there could be to a perpetual franchise under the terms of the bill provided that the corporations lived up to the mandates of the Railroad & Warehouse Commission and gave good service at fair rates. Representatives of the Illinois Mayors' Association contended that the bill was un-American and opposed to the principle of home rule. According to them the measure was also antagonistic to the principle of democracy. Representative Raleigh, Freeport, who introduced the bill, spoke at length. Another hearing on the measure was set for March 22. A bill has been introduced in the House to require the street railways in Chicago to equip their cars with gates.

MASSACHUSETTS

The committee on street railways has sent in an adverse report on House Bill 520, accompanying the petition of Alexander Sheldon for legislation to require street railways to pay damages to abutting property owners by reason of the location of tracks in front of estates. The committees on railroads and street railways, sitting jointly, have reported leave to withdraw House Bill 512, which provides that railroads and street railways shall double-track all extensions hereafter constructed. The committee has also reported adversely on the Brennan bill to provide for the free transportation of United States letter carriers on railroad and street railway cars. The adverse report of the committee on street railways upon House Bill 771 to require street cars to be equipped with lifting jacks has been given a second reading in the Senate. The committee has sent in an adverse report on the bill, Senate 261, which provides that the authority of street railways to issue preferred stock should be enlarged. The committees on railroads and street railways, sitting jointly, have reported leave to withdraw House Bill 1360, to provide for a determination of the value of shares of stock of consolidated railroads and street railways. An adverse report has also been sent in on House Bill 511 to require an examination of the mental capacity of transportation employees.

MINNESOTA

Governor Eberhart has vetoed the bill to amend the anti-pass law so as to exempt street railways from its provisions and permit them to transport policemen and firemen in uniform free. He said that if policemen and firemen did not receive sufficient pay to enable them to pay their own fares the remedy lay in an increase in their salaries by the city or cities which employed them, and that it would be invalid to exempt them from the provisions of the anti-pass law. The committee on telephones and telegraphs of the House still has before it the public utilities bill. At a recent hearing W. E. Kerr, who was formerly identified with the Railroad Commission of Wisconsin, favored the proposed bill in Minnesota.

NEW HAMPSHIRE

Robert P. Bass, Governor of New Hampshire, has sent to the Legislature a special message in which he said in part: "The session is now drawing to a close. Bills have been introduced for the purpose of enacting into law the promises made to the people. These bills are in various stages on their way toward final adoption or rejection by the General Court, but none of the laws which the people of New Hampshire have demanded has yet been passed. The only one of these measures finally acted upon was defeated. I refer to the bill to ratify the proposed amendment of the Constitution of the United States authorizing Congress to impose a tax on incomes. There is no doubt that the people of New Hampshire want the platform pledges redeemed. Therefore I urge upon you to pass the platform measures. The bills which are platform measures and which the General Court is under peculiar obligation to enact are the following. I give the legislative status of each bill: a. A bill to establish a public service commission. The House has passed this bill and it is now in the Senate before the judiciary committee. b. A bill to create a permanent tax commission to replace the present board of equalization. The purpose of this bill is to equalize taxation throughout the State and to provide effectively that public service companies and others shall bear their just and fair share of the public burden of taxation. This bill was passed in the House and is now before the finance committee of the Senate.

NEW JERSEY

The Edge employers' liability bill has passed the Senate. This measure was introduced by Senator Edge at the instance of the special committee named a year ago by Governor Fort to consider this subject. On March 14 the House, which is Democratic, passed the Egan public utility bill, which provides for a new commission of three members at salaries of \$7,500 a year each with power to regulate rates and service of electric railway, gas, electric light, telephone, telegraph, water and other companies. It is understood that the program of the Senate, which is Republican, was to amend the present public utilities bill and confer rate-making powers on the commission. A bill has been introduced by Senator Lewis to require the consent and

approval of the Board of Public Utility Commissioners for the establishment of any public utility service by any municipality.

OHIO

The Geleerd municipal ownership bill was defeated on March 15 in the House. When the bill came up for consideration figures and arguments were introduced to prove that municipal ownership in European cities was far from satisfactory. City Solicitor Schreiber, of Toledo, has prepared another bill which provides that a rival company, under grant of the city council, may condemn its way over the tracks of the existing company. At present the law provides that a company may condemn an amount of track equal to one-eighth of the track it actually has in operation at the time. The House passed a bill on March 15 which requires street railways to pave the street six feet each way from the center of a single track and three feet on each side of a double track with material prescribed by the city council. Another bill passed by the House requires that all interurban cars on routes more than 10 miles long shall be provided with toilet rooms, which must be closed within the boundaries of municipalities. A bill introduced by Senator Shaffer would give interurban railways and railroads the right to condemn trees which obstruct their operation. Both urban and interurban railways will be subject to the steam railroad laws governing the abolition of grade crossings if the Kennedy bill, passed by the House, is acted upon favorably by the Senate.

PENNSYLVANIA

Up to March 18, 1911, 1,677 bills had been introduced into the Senate and House, 1,144 in the House and 533 in the Senate. Attorney General Bell and his assistants have completed the draft of the administration public utilities bill and the measure was considered by the Governor and a number of Legislators prior to submission to the Legislature. The bill provides for a commission of five, to be appointed by the Governor, who is also given authority to designate the chairman. The commission will have a general counsel, secretary, marshal and other officers. By the terms of the new measure the present State Railroad Commission is legislated out of office. The Public Utilities Commission would have headquarters in Harrisburg and branch offices in Philadelphia and Pittsburgh. The new bill gives the commission control of railways, street railways, express companies, car companies, sleeping car companies, freight companies, electric companies, telephone and telegraph companies, water companies, etc. The utilities are required to file with the commission schedule of rates, fares and charges and must also file copies of contracts, arrangements or agreements with other corporations. Rates, fares and charges are to be fixed by the commission. Consent of the commission must be obtained for the transfer of stock or franchises or to start the construction of street railroads or extensions.

Senator McNichol, of Philadelphia, has introduced a bill which provides for the merger and consolidation of motor power and street railway companies. In explanation of his action in introducing the bill the Senator said: "The bill was prepared at the suggestion of A. Merritt Taylor, president of the Philadelphia & West Chester Traction Company. It seems that there are certain companies supplying power to electric railways that are separate from the control of the actual operating corporation. It was Mr. Taylor's suggestion that there should be a bill that will make it possible for the power house corporations to consolidate with the car company." The Senate has passed the bill abolishing the offices of superintendent and assistant superintendent of the Bureau of Railways in the Department of Internal Affairs and creating a chief of the Bureau of Railways at an annual salary of \$2,500 and an assistant chief at \$1,800. The municipal corporations committee of the House has reported favorably the bill to limit public utility franchises to 30 years.

Representative Hunter introduced a bill making deliberate train wrecking a capital offence.

UTAH

The public utility commission measure which was introduced by Senator Badger, of Salt Lake, as noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, was killed by a vote of 6 to 12 when it came before the Senate recently.

Financial and Corporate

New York Stock and Money Markets

March 21, 1911.

There was a brief moment of activity in the stock market yesterday when it became known that the decisions in the trust cases would not be handed down, but the flurry had no material effect upon the apathetic condition of Wall Street.

The bond market continues to be very satisfactory and money rates easy. Quotations to-day were: Call, 2@2½ per cent; 90 days, 2¾ per cent.

Other Markets

Traction shares have been uncommonly dull in Philadelphia. The settlement of the refinancing plans seems to have eliminated all desire to trade. Prices have remained practically unchanged.

There was some desultory trading in the shares of the Metropolitan Elevated on the Chicago Exchange during the past week, but otherwise tractions were neglected. Prices for the common remained at former figures, while the preferred was a trifle stronger.

Boston Elevated and Massachusetts Electric are the only tractions which have been in evidence in the Boston market during the week. Prices are inclined to recede.

In the Baltimore market there has been rather active dealing in the shares of the United Railways at slightly higher figures. The bonds of the same company have also been fairly active at former prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	March 14.	March 21.
American Light & Traction Company (common).....	a290	a293
American Light & Traction Company (preferred).....	a106	a106
American Railways Company.....	a44	43¾
Aurora, Elgin & Chicago Railroad (common).....	a44	a44
Aurora, Elgin & Chicago Railroad (preferred).....	a85¾	a88
Boston Elevated Railway.....	a128½	a129
Boston Suburban Electric Companies (common).....	15½	15½
Boston Suburban Electric Companies (preferred).....	72	a75
Boston & Worcester Electric Companies (common).....	a9	8½
Boston & Worcester Electric Companies (preferred).....	41	41
Brooklyn Rapid Transit Company.....	77¾	77¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84	84
Capital Traction Company, Washington.....	a128	a126¾
Chicago City Railway.....	185	a185
Chicago & Oak Park Elevated Railroad (common).....	*3¼	½
Chicago & Oak Park Elevated Railroad (preferred).....	*7¼	6
Chicago Railways, ptcptg., ctf. 1.....	a02½	a02½
Chicago Railways, ptcptg., ctf. 2.....	a24½	a25
Chicago Railways, ptcptg., ctf. 3.....	a9½	a9
Chicago Railways, ptcptg., ctf. 4.....	a5	a5
Cincinnati Street Railway.....	a132	*132
Cleveland Railway.....	95	92½
Columbus Railway & Light Company.....	40½	*40½
Columbus Railway (common).....	a96	*96
Columbus Railway (preferred).....	100½	*100½
Consolidated Traction of New Jersey.....	a76½	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a105	a105
Detroit United Railway.....	a75	a70
General Electric Company.....	150	149½
Georgia Railway & Electric Company (common).....	a133	a134
Georgia Railway & Electric Company (preferred).....	a92	a91
Interborough Metropolitan Company (common).....	19¾	19¾
Interborough Metropolitan Company (preferred).....	52¾	53¾
Interborough Metropolitan Company (4½s).....	78½	78¾
Kansas City Railway & Light Company (common).....	a25	a24¾
Kansas City Railway & Light Company (preferred).....	a70	a70
Manhattan Railway.....	138¾	a140
Massachusetts Electric Companies (common).....	a17¾	a17¾
Massachusetts Electric Companies (preferred).....	a88	a87
Metropolitan West Side, Chicago (common).....	a23½	a23½
Metropolitan West Side, Chicago (preferred).....	a68½	a69¾
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	71	*72½
Northern Ohio Light & Traction Company.....	43¼	43¼
Northwestern Elevated Railroad (common).....	a23	a23
Northwestern Elevated Railroad (preferred).....	a63½	a65
Philadelphia Company, Pittsburgh (common).....	a53½	a54½
Philadelphia Company, Pittsburgh (preferred).....	a43½	a43
Philadelphia Rapid Transit Company.....	a20¾	a20
Philadelphia Traction Company.....	a84	*a84¾
Public Service Corporation, 5 per cent col. notes (1913).....	100¼	*100¼
Public Service Corporation, ctf. 5.....	a105½	a106
Seattle Electric Company (common).....	a109½	a109½
Seattle Electric Company (preferred).....	a99½	a100
South Side Elevated Railroad (Chicago).....	a70	a70
Third Avenue Railroad, New York.....	a93¼	10¾
Toledo Railways & Light Company.....	a8½	a8½
Twin City Rapid Transit, Minneapolis (common).....	a110	a109
Union Traction Company, Philadelphia.....	a47½	a47½
United Rys. & Electric Company, Baltimore.....	17¾	17¾
United Rys. Inv. Co. (common).....	46	47½
United Rys. Inv. Co. (preferred).....	73	74¾
Washington Ry. & Electric Company (common).....	a35¼	a36¼
Washington Ry. & Electric Company (preferred).....	a87½	a89
West End Street Railway, Boston (common).....	91	92½
West End Street Railway, Boston (preferred).....	a102½	103
Westinghouse Elec. & Mfg. Co.....	67	67
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a120¾	a120¾

aAsked. *Last sale.

Annual Report of Cleveland, Painesville & Ashtabula Railroad

Earnings and expenses of the Cleveland, Painesville & Ashtabula Railroad for the calendar years 1910 and 1909 compare as follows:

	1910.	1909.
Earnings.		
Passenger revenue.....	\$114,275	\$106,871
Special car revenue.....	430	596
Express revenue.....	2,529	1,573
Milk revenue.....	2,260	1,782
Station and car privilege.....	138	141
Rent of equipment.....	13,649	14,491
Rent of buildings.....	2,957	9
Power.....	2,957	1,604
Miscellaneous.....	35	35
Total.....	\$136,273	\$127,102
Expenses.		
Maintenance of way and structures.....	\$13,918	\$11,041
Maintenance of equipment.....	12,124	12,549
Conducting transportation.....	48,593	45,209
General.....	18,472	17,252
Total.....	\$93,107	\$86,051
Net earnings.....	\$43,166	\$41,051
Interest and taxes.....	56,510	55,358
Deficit.....	\$13,344	\$14,307
Per cent. of operation.....	68.32	67.70

E. W. Moore, the president, refers to the following improvements made during the year: A siding and track connection, east of Geneva, with the New York, Chicago & St. Louis Railroad for receiving cinders and slag for ballast. A new station siding was constructed at Perry for handling carload shipments and to provide a meeting point for cars. A second trolley was strung from Ashtabula to Painesville, giving a double trolley the entire length of road. A passenger and express station was built at Perry to better conditions for handling traffic at that point.

Operating statistics for the two years compare as follows:

	1910.	1909.
Car miles.....	472,326	463,503
Income per car mile (cents).....	28.85	27.42
Operating expenses per car mile (cents).....	19.71	18.56
Net earnings per car mile (cents).....	9.14	8.86
Passengers carried.....	708,425	684,803
Earnings per passenger (cents).....	16.13	15.66

Calumet & South Chicago Railway, Chicago, Ill.—T. E. Mitten, F. D. Hoffman and J. L. Matson have been elected directors of the Calumet & South Chicago Railway to succeed G. E. Plumb, F. G. Murray and S. R. Jenkins. Officers were elected as follows: T. E. Mitten, president; J. L. Matson, vice-president; F. D. Hoffman, secretary and treasurer; W. W. Hill, auditor.

Camaguey Company, Ltd., Camaguey, Cuba.—Gross earnings in 1910 were \$142,893 as compared with \$133,667 in 1909. Operating expenses were \$78,904 as compared with \$75,174 in the preceding year. Net earnings were \$63,989 in 1910 as compared with \$58,493 in 1909. Charges for interest and sinking fund were \$35,816 in 1910 as compared with \$30,000 in 1909. The surplus was \$28,173 in 1910 and \$28,493 in 1909.

Chicago (Ill.) City Railway.—The annual meeting of the stockholders of the Chicago City Railway was held on March 16, 1911. James A. Spoor, chairman of the board of directors of the company; Edward Morris, P. A. Valentine and Honoré Palmer all resigned as directors of the company, and Ira M. Cobe, Harrison B. Riley, R. B. Hamilton and L. A. Busby were elected to succeed them. Mr. Cobe has been made chairman of the board. The report of the company for the year ended Jan. 31, 1911, as presented by T. E. Mitten, president of the company, showed gross earnings of \$10,105,443, as compared with \$9,094,047 for the previous year, and a surplus of \$185.43 for the year ended Jan. 31, 1911, as compared with \$618,440 for the previous year. The increase in the amount paid as dividends for the year ended Jan. 31, 1911, as compared with the previous year, however, was \$720,000.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—Ladenburg, Thalmann & Company, New York, N. Y., and A. B. Leach & Company, New York, N. Y., have purchased the balance of the 4½ per cent bonds of the Fonda, Johnstown & Gloversville Railroad, due 1952, unissued under the first consolidated general refunding mortgage. The company was recently authorized by the Public Service Commission of the Second District to issue \$380,000 of these bonds at not less than 85, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, page 182.

Indiana Union Traction Company, Anderson, Ind.—The annual report for the year ended Dec. 31, 1910, shows gross earnings of \$2,364,627 as compared with \$2,103,018 for the preceding year. Of the total for 1910 the gross earnings of properties leased after June 15, 1904, were \$180,118 and the gross earnings of all other properties were \$2,184,509. Operating expenses of all the properties were \$1,239,314 as compared with \$1,113,428 in 1909. From the net earnings of \$1,125,314 there was deducted \$733,933 for taxes and underlying bond interest, leaving a net income in excess of taxes and interest on bonds of underlying and subsidiary companies of \$391,381. Dividends on stocks of the Union Traction Company of Indiana and the Munsey, Hartford & Fort Wayne Railway and interest on the Indiana Union Traction Company bonds amounted to \$289,641, leaving a surplus for the year of \$101,740. This surplus compares with a surplus of \$40,834 in the preceding year.

Lehigh Valley Transit Company, Allentown, Pa.—Charles M. Schwab, president of the Bethlehem Steel Company, has been elected a director of the Lehigh Valley Transit Company to succeed Tom L. Johnson.

Lexington & Interurban Railways, Lexington, Ky.—The Guaranty Trust & Safe Deposit Company, Philadelphia, Pa., trustee under the indenture of the Lexington & Interurban Railways, dated Feb. 2, 1906, will on April 7, 1911, sell at public auction at the Bourse Building, Philadelphia, the securities deposited under the indenture. The purpose of the sale is to liquidate the company and to turn over its assets to the Kentucky Securities Company, the plans of which were referred to in the *ELECTRIC RAILWAY JOURNAL* of Feb. 11, 1911.

Manistee Light & Traction Company, Manistee, Mich.—The sale of the property of the Manistee Light & Traction Company, under foreclosure, fixed for March 15, 1911, has been postponed until April 12, 1911, by order of the United States District Court.

Maysville Street Railway & Transfer Company, Maysville, Ky.—The property of the Maysville Street Railway & Transfer Company has been taken over by the Maysville Public Service Corporation, which has been incorporated with a capital stock of \$150,000.

Metropolitan Street Railway, New York, N. Y.—The Central Trust Company, New York, N. Y., for itself and in behalf of Kuhn, Loeb & Company, the Farmers' Loan & Trust Company and the Guaranty Trust Company, has purchased \$6,250,000 of 5 per cent receivers' certificates of the Metropolitan Street Railway, to be issued to take up a like amount of receivers' certificates which mature March 15, 1911.

Public Service Corporation of New Jersey, Newark, N. J.—The Public Service Corporation of New Jersey has sold \$13,850,000 of its 5 per cent general mortgage bonds to J. P. Morgan & Company, New York, N. Y., and Drexel & Company, Philadelphia, Pa. The proceeds will be used for improvements and betterments during the next two years and to redeem \$4,000,000 of collateral trust gold notes due Oct. 1, 1913. The bankers are offering the bonds at 94 and interest.

Quakertown (Pa.) Traction Company.—The Lehigh Valley Transit Company has renewed its offer to purchase the first mortgage 5 per cent bonds of the Quakertown Traction Company. The new time limit for deposit is March 25, 1911. The renewal of the offer was due to a letter addressed to the Lehigh Valley Transit Company on March 4, 1911, by Lawrence Barnum & Company, Bioren & Company, William H. Sheldermine and the Independence Trust Company, in which they advised the Lehigh Valley Transit Company that they represented the holders of about \$225,000 of the entire issue of \$300,000 of first mortgage 5 per cent bonds of the Quakertown Traction Company, and that they believe they can secure such an additional amount of bonds as will justify the Lehigh Valley Transit Company in purchasing the amount secured.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The property of the Washington, Baltimore & Annapolis Electric Railway was sold for \$2,501,000 at Annapolis Junction on March 20, 1911, to G. A. Craig, representing the reorganization committee, under decree of the United States Court to satisfy the first mortgage for \$3,000,000 and the second mortgage for \$1,000,000. The de-

tails of the plan of the committee representing the bondholders for the reorganization of the company were referred to in the *ELECTRIC RAILWAY JOURNAL* of Nov. 19, 1910, page 1044, and Nov. 26, 1910, page 1078.

Watsonville (Cal.) Transportation Company.—The property of the Watsonville Transportation Company, which consists of rolling stock, power plant, four miles of track between Watsonville and Monterey Bay, and a franchise and realty, has been sold by Edward White, receiver, to J. W. Forgeus, San Francisco, for \$22,000.

Dividends Declared

Bangor Railway & Electric Company, Bangor, Maine, quarterly, $1\frac{3}{4}$ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, $1\frac{3}{4}$ per cent, preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, $1\frac{1}{4}$ per cent, preferred; quarterly, $\frac{3}{4}$ of 1 per cent, common.

City Railway, Dayton, Ohio, quarterly, $1\frac{1}{2}$ per cent, preferred; quarterly, $1\frac{3}{4}$ per cent, common.

Cleveland (Ohio) Railway, quarterly, $1\frac{1}{2}$ per cent.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, \$4.50.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, $1\frac{1}{2}$ per cent, first preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, $1\frac{1}{4}$ per cent.

New York State Railways, Rochester, N. Y., quarterly, $1\frac{1}{4}$ per cent, preferred; quarterly, $1\frac{1}{2}$ per cent, common.

Norfolk & Portsmouth Traction Company, Norfolk, Va., quarterly, $1\frac{1}{4}$ per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, $1\frac{1}{4}$ per cent, preferred; quarterly, 1 per cent, common.

Portland (Maine) Railroad, 2 per cent.

Seattle (Wash.) Electric Company, 3 per cent, preferred; quarterly, $1\frac{3}{4}$ per cent, common; 2 per cent, common (extra).

Stark Electric Railroad, Alliance, Ohio, quarterly, $\frac{3}{4}$ of 1 per cent.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, $1\frac{1}{2}$ per cent, preferred.

Union Traction Company of Indiana, Anderson, Ind., $2\frac{1}{2}$ per cent, preferred.

Winnipeg (Man.) Electric Company, quarterly, $2\frac{1}{2}$ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY.									
Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.		Net Income.	
1m., Jan.	'11		\$45,176	*\$22,260	\$22,916	\$12,116		\$10,800	
1 " "	'10		42,868	*20,743	22,125	11,704		10,421	
7 " "	'11		355,508	*157,860	197,648	84,206		113,442	
7 " "	'10		343,500	*152,847	190,653	82,190		108,463	
CHATTANOOGA RAILWAY & LIGHT COMPANY.									
1m., Jan.	'11		\$73,533	*\$42,809	\$30,724	\$19,113		\$11,611	
1 " "	'10		65,946	*40,676	25,270	17,926		7,344	
GRAND RAPIDS RAILWAY.									
1m., Jan.	'11		\$92,067	*\$51,035	\$41,032	\$15,102		\$25,930	
1 " "	'10		86,352	*49,066	37,286	16,048		21,238	
KANSAS RAILWAY & LIGHT COMPANY.									
1m., Feb.	'11		\$599,951	\$321,764	\$278,187	\$190,263		\$87,924	
1 " "	'10		553,543	286,728	266,815	164,810		102,005	
9 " "	'11		5,770,148	3,378,428	2,391,720	1,701,579		690,141	
9 " "	'10		5,339,159	3,007,383	2,331,775	1,543,564		788,211	
MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.									
1m., Feb.	'11		\$382,026	\$201,168	\$180,858	\$115,644		\$65,214	
1 " "	'10		353,964	188,508	165,456	106,487		58,969	
2 " "	'11		800,453	419,096	380,457	235,126		145,332	
2 " "	'10		740,680	407,937	332,743	217,861		114,882	
MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.									
1m., Feb.	'11		\$116,819	\$35,118	\$81,701	\$68,350		\$13,351	
1 " "	'10		110,182	31,535	78,646	66,803		11,754	
2 " "	'11		238,085	71,889	166,196	137,472		28,724	
2 " "	'10		222,664	67,950	154,715	134,171		20,543	
MONTREAL STREET RAILWAY.									
1m., Jan.	'11		\$370,125	\$239,983	\$130,142	\$39,155		\$90,987	
1 " "	'10		325,621	205,060	120,561	35,600		84,871	
4 " "	'11		1,500,185	908,384	591,801	140,809		450,992	
4 " "	'10		1,352,062	791,939	560,124	132,035		428,088	
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.									
1m., Jan.	'11		\$90,987	*\$51,225	\$39,762	\$19,292		\$20,470	
1 " "	'10		89,308	*51,006	38,302	17,918		20,384	
UNION RAILWAY, GAS & ELECTRIC COMPANY.									
1m., Jan.	'11		\$276,382	*\$162,373	\$114,009	\$59,395		\$54,614	
1 " "	'10		263,875	*163,499	100,376	58,268		42,108	

Traffic and Transportation

Recommendations of the Trenton Street Railway

The Board of Public Utilities Commissioners of New Jersey has made certain recommendations to the Trenton Street Railway for improvements to its physical property as a result of the investigation which the board made recently at the request of the Common Council of Trenton. The Council, in the complaint to the commission, requested that the company be required to reconstruct certain portions of its roadbed, reconstruct part of its overhead system and provide all its cars with air brakes. The hearings by the board were conducted at Trenton and the members of the board and its engineers inspected the physical property of the company.

The board has suggested that the company substitute for the rail joint now in use a joint of the girder or of the continuous type to be supported on two ties instead of one, and that the ballast be improved so as to prevent further settling of the rails at the joints. It is recommended that part of the work covered by the order of the commission shall be begun before April 5, 1911, and be completed during 1911, and that the other work designated in the finding shall be begun and completed during 1912. The repairs to the joints as suggested by the commission are to be made wherever track reconstruction is carried out. The board says that the overhead work of the company has been subject to special attention within a comparatively recent time and that the inspection of the overhead work disclosed it to be in good condition.

All the cars which are operated by the company through the city to nearby municipalities are equipped with air brakes. The other cars of the company, including 10 prepayment cars, are equipped with hand brakes, but as there are no steep grades in the city and the speed maintained for urban traffic is normal the board considers the hand-brake equipment sufficient. The board has further ordered the company to equip each car operated by it, and not already so equipped, with an approved type of sand box.

The expenditures for the work recommended by the board are to be made out of the earnings of the company, the payment to be made from a depreciation account so far as practical. The board has recommended that hereafter such a sum be set aside annually to the credit of the depreciation fund as will suffice to maintain the physical property in good condition. The Hamilton Avenue line of the company is single track with turnouts, and the board has recommended the company to begin proceedings to enable it to construct an additional track on Hamilton Avenue from South Clinton Avenue to Chambers Street.

Service in Atlanta

The Railroad Commission of Georgia has handed down its finding as a result of the inquiry which it conducted recently into the service furnished by the Georgia Railway & Electric Company, Atlanta, Ga. One of the principal points in the memorandum submitted to the commission by the petitioners was a request to the commission to order the company to establish an all-night service. Hearings were held by the commission in Atlanta, and the answer filed by P. S. Arkwright, president of the company, to the petition was referred to in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911, page 396. Mr. Arkwright referred at length in his answer to the question of all-night service and said that for a number of years the company had operated a limited all-night service which it felt met the needs of the public adequately. The Railroad Commission has agreed with the company that the all-night service now given is sufficient. In regard to the other questions brought up in the petition it has made the following suggestions:

The first cars in the morning on all lines should reach the center of the city not later than 5:30 a. m. The last cars on all lines should leave the city as late as 12:15 a. m., preferably 2:30 a. m. A tentative schedule should be submitted looking to these improvements. A 5-minute schedule should be established on the Washington Street line instead of the present 10-minute schedule. Two cars

should be run every 10 minutes on Luckie Street instead of one car every 10 minutes, until it becomes possible to run a 5-minute headway schedule.

On Marietta Street a schedule of two cars every 10 minutes should be established as follows: Leave corner Marietta and Broad every morning at 6:15, 6:25, 6:35, 6:45. This system of running two cars every 10 minutes should continue until Oct. 1, 1911, when larger cars are to be put on.

Magnolia and West Mitchell Streets should have a 10-minute schedule during rush hours.

All the 28-seat cars on Peachtree and Whitehall Streets should be replaced by 36-seat cars or larger within the next 30 days. The 5-minute schedule should be continued on these streets.

Ten-minute schedules instead of 15 should be operated on Piedmont and Central Avenues after April 1.

A 10-minute schedule should be instituted on West Peachtree Street beyond Sixth Street as far as Peachtree Road.

Changes in Transfers in Chattanooga

The Chattanooga Railway & Light Company, Chattanooga, Tenn., has recently modified its transfer regulations principally to prevent passengers from looping. The company has instructed conductors to give passengers transfers punched with the transfer point and the final destination, and has also instructed conductors who receive transfers tendered by passengers not to issue other transfers unless the final destination is indicated on the slip which is presented. If more than two points are punched on a transfer when it is presented by a passenger who requests another transfer the conductor is instructed to punch the final destination. Conductors have also been instructed to turn in transfers and tickets collected during each round trip at the end of the trip. A placard addressed to passengers which has been posted in the cars of the company reads as follows:

"Passengers will please ask for transfers when paying fare and will see that the same are properly punched, as the company will not be responsible for errors in punching."

The following bulletin in regard to transfers was posted recently for the benefit of conductors:

"Transfers will be accepted only when properly punched and offered for ride by persons to whom transfers are issued at designated point within the time limit punched on transfer.

"Transfers must not be issued on transfers unless the final destination of the passenger is punched on the original transfer.

"When a passenger refuses to pay fare or presents a defective transfer or ticket, upon which in the judgment of the conductor the passenger is not entitled to ride, conductor must retain such defective transfer or ticket and secure the names of as many witnesses to the fact as is possible, whereupon the car must be stopped and the passenger requested to leave. If the passenger fails to comply with such request the facts in the case must be brought to the attention of the first inspector, dispatcher or official of the company who is met and the conductor must act according to the instructions received from such inspector, dispatcher or official.

"In all cases the passenger must be given the benefit of any doubt. When a passenger who refuses to pay fare requests to be allowed to leave the car the car must be stopped and the passenger permitted to alight."

"The Booster."—The Louisville & Northern Railway & Lighting Company, New Albany, Ind., has begun the publication of a four-page paper, *The Booster*, devoted to the interests of its employees. The first issue was dated March 1, 1911, and the purpose of the publication was stated as follows: "A publication for the employees of the North Side public utilities, in the interest of them both, as well as that of the communities they serve."

Complaint About Service Out of Buffalo.—The Public Service Commission of the Second District of New York has received a complaint about the irregularity of the service furnished by the International Railway between Buffalo, Tonawanda, North Tonawanda, Lockport, La Salle and Niagara Falls. The complaint alleges that the service is

irregular because the cars operated on the line between Buffalo and Niagara Falls are used in Buffalo to carry local passengers.

Baggage on the Western Ohio Railroad.—Baggage and the rules governing its transportation are defined as follows in the time-table of the Western Ohio Railroad, Lima, Ohio: "Baggage not exceeding 150 lb. in weight checked free on one full ticket and 75 lb. on one half ticket. No baggage will be checked free where the one-way fare is less than 25 cents. Where the fare is less than 25 cents, agents will check baggage under the rule by collecting the difference between the ticket fare and 25 cents. No single piece of baggage weighing over 250 lb. will be checked. Baggage consists of wearing apparel or personal effects necessary for use and comfort of passengers, and may be checked in trunks, valises, satchels, suit cases, boxes roped with handles. Sample cases, tool chests, packs and whip cases are not baggage, and when checked it is done as a matter of courtesy, and this company will not be responsible for any loss or damage to contents, reserving the right to refer such passengers to the express companies."

Subway Ticket Sales in Brooklyn.—A statement has been issued by the Public Service Commission of the First District of New York showing the extent of business done on the Brooklyn extension of the Interborough Rapid Transit Company's subway line since it was opened, in January, 1908. The statement gives the number of tickets sold at each station on the Brooklyn extension for each month from the opening up to December, 1910. Borough Hall station, which was opened first, began business in January, 1908. Other stations were opened in May, 1908. The grand total sales of tickets for all stations on the Brooklyn extension, from January, 1908, to and including December, 1910, were 85,211,798. The total traffic of the entire subway for the same period was 747,981,683. Brooklyn sales were therefore 11.3 per cent of the sales of the entire system. For 1910 Brooklyn sales were 33,378,518. For the same year total sales on the entire system were 270,221,490. The Brooklyn proportion of this total was in the neighborhood of 12.4 per cent.

Excursion Business at Los Angeles.—The Pacific Electric Railway, Los Angeles, Cal., has announced that excursions over its lines to points of interest near Los Angeles, operated in the past by private companies, will hereafter be handled by the company itself. The Balloon Route excursion over the lines of the Los Angeles-Pacific Company will retain the name by which it has been known for many years. T. M. Pierce, manager of the Balloon Route, has been made manager of the electric railway trips of the Los Angeles-Pacific Company and the Pacific Electric Railway. He will have as assistant M. J. Demster. The trips formerly conducted by George F. Tilton, manager of the Tilton's Trolley Trips, will hereafter be known as the Mission trolley trips. No charge in the routing has been made and the special sight-seeing cars over the lines of the Pacific Electric Railway will visit Los Angeles harbor, Long Beach, Miramar, San Gabriel Mission, Cawston's ostrich farm, Pasadena and other points of interest. The excursion department will, of course, come under the general supervision of D. W. Pontius, traffic manager of consolidated lines.

Suggestions for Relieving Congestion in Los Angeles.—In order to relieve traffic in congested districts and systematically to handle passenger and freight traffic in Greater Los Angeles, Theodore B. Comstock, engineer of the Board of Public Utility Commissioners of Los Angeles, has suggested that the traffic focus should be located in the vicinity of Santa Barbara Avenue and Alameda Street, where a union station could be constructed to accommodate both transcontinental lines and all rapid transit interurban railways and from which point local street railway lines could radiate to all parts of the city; that street viaducts should be constructed over the main trunk steam lines along the Los Angeles River bed with a possible depression of these particular lines at some points, and that all rapid transit interurban electric railways enter the traffic focus or union station by means of either elevated tracks or subways, and that grade crossings be eliminated. Mr. Comstock is also reported to have said: "I firmly believe that the city itself must finally assume control of the local distribution of

freight. The construction of the municipal railway, if wisely planned as to terminals, will very largely provide the means of accomplishing this purpose as regards its initial stages."

Advertisement on Preventing Accidents.—The Portland Railway, Light & Power Company, Portland, Ore., carried a full-page advertisement in the recent fiftieth anniversary number of the Portland *Oregonian* devoted to the subject of street-car accidents. Four line engravings, each entitled "How It Might Happen," were used to illustrate the advertisement. They showed the consequences likely to follow when a passenger alights from a moving car, when a passenger crosses behind a car without looking to see if a car is coming in the opposite direction, when a child darts heedlessly into the street in play, and when a boy jumps from a car on which he has been stealing a ride. Each of these illustrations and the text which accompanied it occupied a space 6½ in. by 7 in. Two illustrations were arranged on either side of the page, with this message down the center of the page between the illustrations: "The Portland Railway, Light & Power Company, in its effort to prevent accidents, has inaugurated a campaign among our schools. It has engaged the services of a gentleman who devotes his entire time in going from one school to another and delivering lectures to the students and their teachers on 'The Prevention of Accidents.' He has, within less than one year, talked to all the school children and teachers of our city on two different occasions. This work the company intends to continue. This is not all this company is doing to prevent accidents in our city. It has set aside a large auditourium in its fine new office building at Seventh and Alder Streets, where weekly lectures are delivered to the trainmen on 'The Prevention of Accidents.' But the public must do its part if accidents are to be prevented altogether. Persons who ride in the cars, who traverse the streets on foot or in vehicles, passengers boarding and leaving cars must be careful. They must keep their eyes open. They must keep their wits about them. When they do this the number of street-car accidents will be largely reduced."

Damage by Storm at Los Angeles.—A storm which swept over Southern California early in March did a great deal of damage and affected the railroads and the electric railways, particularly the lines in and about Los Angeles. The Los Angeles *Examiner* in its issue of March 11, 1911, in referring to the destruction of railway property by the rising of the rivers said in part: "The floods have thrown railroad transportation to and from Los Angeles into temporary confusion. All the steam railroads have suffered severely and nearly all the interurban electric railways are being operated in the face of great difficulties. On the Whittier line of the Pacific Electric Railway 12 bents of the bridge across the San Gabriel and 120 ft. of embankment approach have been washed out. Passengers yesterday walked across a sort of suspension bridge, consisting of rails and ties. The breach in the embankment east of the Puente Largo, the big cement bridge across the San Gabriel on the Glendora line, has been widened from 50 ft. to 300 ft., and workmen are attempting valiantly to prevent a further widening of the breach. On the Glendora line 75 ft. of bridge and 120 ft. of embankment at the approaches have been washed out in Lexington wash. Cars on this line are being operated only as far as Puente Largo, about 21 miles from Los Angeles. No car communication is to be had with Glendora. The bridge over the San Gabriel on the Santa Ana line has been weakened and about 100 ft. of embankment washed out. Cars on the Covina line of the Pacific Electric Railway are being operated only as far as Rosemead. Three small washouts have put the Huntington Beach line, extending from Santa Ana, out of commission temporarily. The Verdugo bridge on the Glendale line was weakened so that traffic was held up for several hours yesterday morning. The scenic line of the Los Angeles-Pacific Railway extending north of Santa Monica along the Palisades has been washed out. It will be several days, perhaps, before it is again put into operating condition. During the forenoon yesterday half a mile of track on the Colegrove line of the Los Angeles-Pacific Railway below Hollywood was under water. At noon the company was able, however, to operate cars over the flooded line."

Personal Mention.

Mr. H. S. Hyde has resigned as storekeeper of the Chicago & Milwaukee Electric Railroad, Highwood, Ill.

Mr. J. L. Matson has been elected vice-president of the Calumet & South Chicago Railway, Chicago, Ill., to succeed Mr. W. W. Crawford.

Mr. F. D. Hoffman has been elected secretary and treasurer of the Calumet & South Chicago Railway, Chicago, Ill., to succeed Mr. F. G. Murray.

Mr. J. H. Lahrmer, superintendent of transportation of the Columbus, Delaware & Marion Railway, Columbus, Ohio, has been given the title of superintendent of the company.

Mr. W. H. Crabbe has resigned as master mechanic of the Joliet & Southern Traction Company, Joliet, Ill., and has accepted a position with the Illinois Construction Company.

Mr. Ira M. Cobe was elected chairman of the board of directors of the Chicago (Ill.) City Railway at the annual meeting of the company on March 16, 1911, to succeed Mr. James A. Spoor.

Mr. John A. Shackelford, formerly a Supreme Court judge in Washington, has been appointed counsel for the Tacoma Railway & Power Company, Tacoma, Wash., to succeed Mr. B. S. Grosscup, resigned.

Mr. Wayne P. Hendricks has resigned as purchasing agent of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. Mr. Hendricks was formerly superintendent of the Sterling, Dixon & Eastern Electric Railway, Dixon, Ill.

Mr. Frank K. Shuff has resigned from the Iowa State College as assistant superintendent of fires, lights and incidentals to become superintendent of the Boone (Ia.) Electric Company, which operates the electric railway and electric light properties in Boone.

Mr. T. E. Mitten, president of the Chicago (Ill.) City Railway, has been elected president of the Calumet & South Chicago Railway, Chicago, Ill., which is operated by the Chicago City Railway. Mr. Mitten succeeds Mr. Ira M. Cobe as president of the company.

Mr. E. H. Vivian, whose resignation as claim agent and traffic manager of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., was announced in the *ELECTRIC RAILWAY JOURNAL* March 18, 1911, has been appointed traffic manager and claim agent of the Michigan United Railway, Lansing, Mich., and has entered upon his duties with that company.

Mr. John H. Pardee, operating manager of J. G. White & Company, Inc., was elected on March 14 vice-president of the Augusta Railway & Electric Company and the Augusta & Aiken Railway, Augusta, Ga. Control of these companies has been acquired recently by a syndicate in which Redmond & Company and J. G. White & Company, Inc., are interested.

Mr. Fred Hume has been appointed superintendent of machinery of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., in charge of the locomotive and car department, power house, substations, overhead and all matters pertaining to the operation and maintenance of the electrical and mechanical equipment. The master mechanic, chief engineer of power house, general line foreman and substation attendants will all report to Mr. Hume.

Mr. J. C. McPherson has been appointed assistant superintendent of the northern division of the Pacific Electric Railway, Los Angeles, Cal., in charge of the lines in Pasadena. Mr. McPherson resided in Pasadena until he was appointed superintendent of what was known as the city division of the Pacific Electric Railway with headquarters in Los Angeles. He has been with the company for 15 years in various capacities and previous to that was with the Santa Fé Railroad for 12 years.

Mr. F. F. Barbour has been appointed assistant to the president of the Pacific Gas & Electric Company, San Francisco, Cal., in which capacity he will manage the railway system of the Sacramento Electric Gas & Railway Company, Sacramento, Cal., and the commercial department of the Pacific Gas & Electric Company. Mr. Barbour was

formerly assistant to the president of the Portland Railway, Light & Power Company, Portland, Ore., and was at one time special agent of the General Electric Company at San Francisco.

Mr. John H. Smith has resigned as chief draftsman of the mechanical department of the Twin City Rapid Transit Company, Minneapolis, Minn., in which capacity he served for four years under Mr. W. J. Smith, master mechanic. Mr. John H. Smith has had extensive experience in railroad work, having served an apprenticeship in the shops of the Philadelphia & Reading Railway for which he subsequently was machinist, foreman, locomotive and car draftsman and designer. He was also designer for the American Locomotive Company.

Mr. H. L. Weber has resigned as chief engineer of the Columbus, Marion & Bucyrus Railway, Marion, Ohio, to become chief engineer of the Utah & Grand Canyon Railroad, Cedar City, Utah. Mr. Weber was formerly chief engineer of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind. Mr. Weber was also city engineer of Bucyrus and city engineer of Richmond, Ind. While acting as city engineer at Richmond Mr. Weber served as consulting and bridge engineer of the Chicago, Cincinnati & Louisville Railroad.

Mr. J. A. Doane has been appointed superintendent of transportation of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. Mr. Doane was formerly chief clerk to Mr. E. J. Bock, who has been appointed general superintendent of the company. Before becoming connected with the Chicago & Milwaukee Electric Railroad Mr. Doane was superintendent of the Elgin & Belvidere Electric Company. At one time he was connected with the Board of Supervising Engineers, Chicago Traction, and before that was chief dispatcher of the Aurora, Elgin & Chicago Railroad, Chicago, Ill.

Mr. J. P. Clark, vice-president and general manager of the Greenville, Spartanburg & Anderson Railway, Greenville, S. C., who has been acting as electric railway expert and consulting engineer to Mr. J. B. Duke, the president of the company, in connection with the developments being carried out by Mr. Duke and his associates in North and South Carolina, will continue to act in the capacity of consulting engineer in this connection. Mr. Clark is also managing director of the North Carolina Public Service Company, Greensboro, N. C., and retains his connection with the Michigan United Railways, Lansing, Mich., as vice-president.

Mr. E. J. Bock has been appointed general superintendent of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. Mr. Bock has been superintendent of transportation of the Chicago & Milwaukee Electric Railroad for two years. Now that Mr. W. O. Johnson has been appointed operating receiver of the company with offices in Chicago and the position of general manager has been abolished, all operating heads will report to Mr. Bock at Highwood. As general superintendent Mr. Bock will take charge of the traffic department. Previous to his connection with the Chicago & Milwaukee Electric Railroad Mr. Bock was chief dispatcher of the Metropolitan West Side Elevated Railway, Chicago, Ill., for 12 years, and previous to that he was with the operating department of the Canadian Pacific Railway.

Mr. Frederic W. Hild has been appointed general manager of the Portland Railway, Light & Power Company, Portland, Ore., in charge of railway, light and power operating departments. Mr. Hild was formerly assistant general manager and chief engineer of the Havana (Cuba) Electric Railway. He was graduated as an electrical and civil engineer from Union College, at Schenectady, N. Y., in the class of 1898, and was for a time connected with the General Electric Company. While in the employ of this company Mr. Hild assisted in the important rehabilitation work carried out by the Twin Cities Rapid Transit Company, the Kansas City Railway & Light Company and the Chicago Edison Company. Mr. Hild assumed his duties with the Portland Railway, Light & Power Company on March 15, 1911.

Mr. H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company, New York, N. Y., was tendered a dinner at the Hotel Ansonia recently by the

members of his staff in recognition of his services during the 10 years he has been with the company. There were in attendance in addition to his present staff these former members: Messrs. R. D. Tomlinson, the Allis-Chalmers Company, Milwaukee, Wis.; H. W. Butler, with J. G. White & Company, Inc.; W. S. Finlay, Jr., and M. Serating, assistant engineer with the Public Service Commission. Telegrams and cablegrams of regret were read from Messrs. C. W. Ricker, of Havana Electric Railway; W. N. Ryerson, general manager of the Great Northern Power Company; G. F. Chellis, with J. G. White & Company; L. L. Gaillard, general manager of the New England Engineering Company; L. R. Parker, electrical engineer with the New England Engineering Company.

Mr. Robert W. Rockwell has been appointed superintendent of the Charleston Interurban Railroad, Charleston-Kanawha, W. Va., to succeed Mr. J. C. Rockwell, whose appointment to the operating staff of the Manila Electric Railroad & Light Company, Manila, P. I., with the title of superintendent of transportation or general superintendent was noted in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911. Mr. Robert W. Rockwell was formerly connected with the Interborough Rapid Transit Company, New York, N. Y., as foreman on the construction of the new steel cars for the subway. Prior to that he worked for the Brooklyn (N. Y.) Rapid Transit Company for two years. Before becoming connected with the Brooklyn Rapid Transit Company Mr. Rockwell was connected with the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., for a year and a half. Mr. Rockwell is a son of Mr. W. B. Rockwell, manager of the Eastern Pennsylvania Railways, Pottsville, Pa.

Mr. N. M. Argabrite has resigned as manager of the Public Service Operating Company, Belvidere, Ill., to become connected with the American Gas & Electric Company in charge of the Hartford City (Ind.) Lighting Company. Mr. Argabrite began his electrical career in 1898 with the Ashland Electric Light & Power Company and Ashland & Catlettsburg Street Railway, Ashland, Ky. Later he was connected with the Camden Interstate Railway, Huntington, W. Va., in charge of its branch at Ashland, Ky. Following this he was with the Ohio Valley Electric Company, which succeeded the Camden Interstate Railway. Mr. Argabrite next became superintendent of railways for the Winona Railway & Light Company, Winona, Minn., and later was appointed general superintendent and then manager of the same company. In 1909 Mr. Argabrite accepted the position of manager of the Public Service Operating Company Belvidere, Ill., which operates electric light, gas and heating plants.

Mr. C. L. Murray, whose appointment as general manager of the Northwestern Railways Company, Meadville, Pa., was noted in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911, page 481, was formerly general manager of the Schuylkill Railway, Girardville, Pa. Mr. Murray has had an extended experience in managing electric railway properties. He was assistant superintendent of the Philadelphia & Bristol Passenger Railway, Philadelphia, Pa., for three years, assistant superintendent of the Buffalo & Depew Railway, Buffalo, N. Y., for two years and general manager of the Elmira & Seneca Lake Railway, Elmira, N. Y., for three years. All of these properties were controlled by the Railways Company General. Mr. Murray was also assistant superintendent of construction for J. G. White & Company, Incorporated, New York, N. Y., for two years and was assistant to Mr. D. A. Hegarty, general manager of the Little Rock Railway & Electric Company, Little Rock, Ark., for two years.

Mr. W. S. Lee, chief engineer of the Southern Power Company, Rock Hill, S. C., has been elected vice-president and chief engineer of the Greenville, Spartanburg & Anderson Railway, Greenville, S. C. Mr. Lee was born in 1872, in Lancaster, S. C., and was educated in the common schools of Anderson County and at the South Carolina Military Academy, from which he was graduated in 1894. For a short time he was an instructor in the graded schools in Anderson. Later he took up engineering work and was promoted from transit man to resident engineer of the Pickens Railway. He then became resident engineer of the Anderson Water, Light & Power Company in charge of the construction of the Portman-Shoals hydroelectric

installation on the Seneca River. In October, 1898, Mr. Lee became resident engineer of the Columbus (Ga.) Power Company. This company's dam on the Chattahoochee River was completed late in 1900, and was subsequently carried away. Following the reconstruction of the dam Mr. Lee became chief engineer of the Catawba Power Company, with a dam at India Hook Shoals near Rock Hill, S. C. The output of this company was soon absorbed and the Southern Power Company was formed and purchased the property of the Catawba Power Company and acquired water power rights on the Catawba and Broad Rivers. Mr. Lee was made chief engineer of this company. Mr. Lee is a member of the American Institute of Electrical Engineers, American Society of Civil Engineers and the American Society of Mechanical Engineers.

Mr. J. R. Harrigan has resigned as general manager of the Columbus, Delaware & Marion Railway, Columbus, Ohio, to accept the position of vice-president of the Des



J. R. Harrigan

Moines (Ia.) City Railway and the Interurban Railway, Des Moines, Ia., in charge of the properties. For the last 10 years Mr. Harrigan has been connected with the electric railways in the vicinity of Columbus. He was formerly general manager of the Chippewa Valley Electric Railroad, Eau Claire, Wis., and before that for a year, in 1901, was general superintendent of the Dayton, Springfield & Urbana Railway, under Mr. A. E. Appleyard. In 1902 he became general manager of the Columbus, Buckeye Lake & Newark Traction Company and the Columbus, Newark & Zanesville Railway, and remained in that capacity four years, until the roads were purchased by the so-called Widener-Elkins syndicate. In 1906 he assumed the management of the Canton-Akron Railway, another Tucker-Anthony property, and was general manager of the company until it was absorbed by the Northern Ohio Traction & Light Company. In January, 1907, Mr. Harrigan was appointed assistant general manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y. Before he left Columbus for Des Moines Mr. Harrigan was visited by the officers and heads of departments of the Columbus, Delaware & Marion Railway and presented with a silver pitcher service as a token of esteem.

OBITUARY

Le Grand W. Perce, formerly president of the Union Elevated Railroad, Chicago, Ill., is dead. Mr. Perce was born in Buffalo in 1836 and was a lawyer by profession.

Mr. Edmund Hitchins, chairman of the street railway committee of the City Council of Cleveland, Ohio, died suddenly at his home in Cleveland on March 16, 1911. Mr. Hitchins took a prominent part in the traction negotiations during the Johnson administrations, and of late had charge of the legislation to allow the company to dispose of bonds.

John B. McDonald, who took the contract to build the present New York subway, died in New York on March 17, 1911. This contract was subsequently transferred to the Rapid Transit Subway Construction Company. Mr. McDonald was born in Fernoy, Ireland, in 1844, and was educated in New York City. He began his career as a clerk with the register of deeds, but resigned from this position to become a foreman of construction in connection with a large engineering contract. Later he went into the contracting business as a member of the firm of Dillon, Clyde & Company. He built the belt line tunnel in Baltimore and became president of the South Baltimore Car Works and the Eastern Ohio Railroad. He also constructed the Jerome Park reservoir. Mr. McDonald was a director of the Rapid Transit Subway Construction Company and the Interborough Rapid Transit Company, but resigned from these companies to become connected with the Metropolitan Street Railway.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Rockford City Traction Company, Rockford, Ill.**—Incorporated in Illinois to build an electric railway in Rockford. Capital stock, \$10,000. Incorporators: A. A. Anderson, Warren Partridge and P. B. Warren.

***Milwaukee, Peoria & St. Louis Railway, Springfield, Ill.**—Chartered in Illinois to build an electric railway from Peoria to Rockford, via the Counties of Tazewell, Woodford, Marshall, Putnam, Bureau, Lee, Ogle and Winnebago. This line will be part of a system to extend from Milwaukee to St. Louis, via Rockford and Peoria. Directors: Eugene C. Morton, Frank B. Reed, Frederick C. Vehmeyer, John H. O'Neil and Frank H. Gardiner, all of Chicago.

Indianapolis & Delphi Traction Company, Indianapolis, Ind.—Incorporated in Indiana to build an electric railway from Carmel to Delphi, via Sheridan, Hortonville, Westfield, Kirkland, Frankfort, Forest, Kempton, Russiaville, Burlington, Bingham and Flora. At Carmel connection will be made with the Logansport division of the Indiana Union Traction Company. The company has obtained franchises in all the towns through which it proposes to operate. Most of the right-of-way has been secured and grading will begin as soon as the weather permits. The first section of the line to be built will be from Carmel to Sheridan, a distance of 15 miles. Capital stock, \$100,000. Headquarters: Indianapolis. Incorporators: Henry L. Smith, Indianapolis; Edward Thistlewaite, Sheridan; Morris E. Cox, Milton C. Beals, Robert E. Johnson and W. M. Mendenhall, of Westfield. [E. R. J., March 18, '11.]

***Vincennes-Interstate Traction Company, Vincennes, Ind.**—Application for a charter has been made by this company to build urban and interurban railways in Indiana. Capital stock, \$10,000. Directors: J. L. Keymeyer, C. A. Benhain, C. E. Seeds, H. M. Lukens, C. W. Battin, A. W. Funkhouser and A. F. Funkhouser.

***Louisiana Company, New Orleans, La.**—Application for a charter has been made in Louisiana by this company to build electric and steam railways in Louisiana. The first line to be built will be from New Iberia to Berwick Bay, via Jeanerette, Franklin and Patterson. Capital stock, \$1,000,000. Officers: George W. Dallas, president; John R. Taylor, vice-president, and V. J. Smith, secretary and treasurer.

***Muskogee & Fort Gibson Interurban Railway, Muskogee, Okla.**—Application for a charter has been made in Oklahoma by this company to build a 10-mile electric railway from Muskogee to Fort Gibson. The line will be extended ultimately to Tahlequah, 35 miles southeast, and to Tulsa, 50 miles northwest. The company expects to build a bridge across the Arkansas River, for which it will be necessary to procure a special act of Congress for permission to build. Preliminary surveys are now being made. Capital stock, \$200,000. Directors: C. N. Haskell, W. N. Patterson, Thomas H. Owen, Thomas P. Smith, all of Muskogee; O. L. Hayes, Webber Falls.

***United Railways, Humbert, Pa.**—Chartered in Pennsylvania to build a 7-mile electric railway to connect Humbert and Barronsvale. Capital stock, \$70,000. Incorporators: I. W. Seamans, Uniontown, president, and T. B. Palmer, B. A. Smith, L. W. Fogg, J. H. Palmer, D. D. Johnson and Harold W. Seaman, Uniontown.

FRANCHISES

Haywards, Cal.—I. B. Parsons has received a franchise from the Town Trustees to build a four-mile electric railway over certain streets in Hayward. By the terms of the franchise work must begin within three months. [E. R. J., Dec. 3, '10.]

Los Angeles, Cal.—Dr. W. F. McBurney has asked the City Council for a franchise to build a cross-town railway in Los Angeles, on Vermont Avenue, from Fourth Street to Vernon Avenue.

Los Angeles, Cal.—The Los Angeles-Pacific Railway has asked the City Council for a franchise to construct a double-track line connecting the Sixth Street line of the Pacific Electric Railway with the Hill Street line of the Los Angeles-Pacific Railway, at the intersection of Hill Street and Sixth Street.

Oakland, Cal.—The Southern Pacific Railroad, San Francisco, has accepted the franchise granted it by the Council to build its tracks on Seventh Street from Fallon Street to Bay Street, in Oakland.

Marseilles, Ill.—The Chicago, Ottawa & Peoria Railway, La Salle, has asked the City Council for a franchise to build its tracks through Marseilles.

South Bend, Ind.—The South Bend & Logansport Traction Company has asked the County Commissioners for a six months' extension of time of its franchise to build its tracks to Plymouth.

St. Vital, Man.—The Manitoba Rural Railways has received permission from the Council to build its railway through St. Vital. This proposed 5-mile electric railway will connect Winnipeg, St. Boniface, St. Vital and Emerson. Charles E. Lewis, Minneapolis, Minn., president. [E. R. J., Oct. 8, '10.]

Ionia, Mich.—The Detroit, Lansing & Grand Rapids Electric Railroad, Detroit, have asked the Common Council for a franchise to extend its tracks in Ionia. [E. R. J., March 11, '11.]

Burgoon, Ohio.—The Fostoria & Fremont Railway has received a franchise from the Council to build its tracks through Burgoon.

Ottawa, Ont.—A bill granting provincial rights has been received by the People's Railway from the Railway Committee to build its railway from Arthur to Flesherton and Collingwood, from Owen Sound to Collingwood and Midland, from Woodstock to Sarnia via London, from Watford to Hagersville, from Ottaville to Tillsonburg, from Stratford to Goderich, from St. Thomas to a point in Grey County, and to connect with several other short lines.

Medford, Ore.—J. F. Reddy, Medford, will ask the City Council for a franchise to build an electric railway through Medford.

Salem, Ore.—The Oregon Electric Railway, Portland, has received a franchise from the City Council to build its tracks in the southern part of Salem. This means the expenditure of \$370,000 by this company, and in addition a connecting link with Albany, Eugene and intermediate towns.

Erie, Pa.—The Buffalo & Lake Erie Traction Company, Buffalo, has asked the City Council for franchises to double-track several of its lines in Erie.

Johnstown, Pa.—The Johnstown Traction Company has received the approval of the State authorities to build its extension to Southmont.

Lock Haven, Pa.—The Lock Haven & Jersey Shore Railroad has asked the City Council for a franchise to build its tracks through Lock Haven. It will connect Lockport, Dunnstable, Pine Creek, Charlton, Woolrich and Avis. Rights-of-way have been secured in Dunnstable, Pine Creek and Avis. The commissioners of Clinton County have granted the company permission to cross the Susquehanna River between Lockport and Lock Haven. Among those interested are L. M. Patterson, Pittsburgh; C. E. Covert and W. H. Baker, Harrisburg, and A. Hoagland and R. S. Walton, Williamsport. [E. R. J., March 18, '11.]

***Saskatoon, Sask.**—This city is prepared to give a franchise to any company building a street railway in Saskatoon.

Corpus Christi, Tex.—The Corpus Christi Street & Interurban Railway has received a franchise from the County Commissioners to extend its railway to Epworth.

***Lynchburg, Va.**—L. W. Rush, Brookneal, has asked the City Council for a franchise to build an electric railway in Lynchburg from the Norfolk & Western Railway station to the Virginia Railway station.

Vancouver, Wash.—The Mount Hood Railway & Power Company, Portland, has received a 50-year franchise from the City Council to build its tracks through Vancouver.

Vancouver, Wash.—The Vancouver Traction Company has received a 50-year franchise from the City Council to extend its tracks in Vancouver.

Tacoma, Wash.—The Tacoma Railway & Power Company will ask for a 25-year franchise from the Municipal Commission to build its Bismarck line.

TRACK AND ROADWAY

Helena Street & Interurban Railroad, Helena, Ark.—This company will soon begin the extension of its tracks to the southern end of Helena.

Los Angeles-Pacific Railway, Los Angeles, Cal.—Palmer, McBride & Quayle Company has been awarded the contract by this company for the construction of a 10-mile extension from Hollywood to Lankershim, thence 5 miles west to Kester. Work is to begin at once.

Pacific Electric Railway, Los Angeles, Cal.—According to a contract between this company and the city of Long Beach, this company guarantees to build within 60 days a railway from the municipal docks to connect with its line on Riverside.

Los Angeles & Redondo Railway, Redondo Beach, Cal.—This company has begun the work of standardizing its railway. More than 25,000 narrow-gage ties will be replaced with standard-length ties.

Owens River Valley Electric Railway, San Francisco, Cal.—This company is making preliminary arrangements and surveys are being made between Bishop and Laws, for building its proposed electric railway through the Owens River Valley. H. N. Beard, general manager. [E. R. J., Dec. 3, '10.]

San José (Cal.) Railways.—This company will spend \$400,000 in standardizing its railway and paving between its tracks. The Ransome-Crummy Paving Company has the contract for the paving.

Santa Monica, Cal.—C. D. Middlekauf and associates are said to be promoting the building of a railway from Los Angeles to Santa Monica.

Bridgeport & Danbury Electric Railway, Bridgeport, Conn.—This company has awarded the contract to the Aetna Construction Company, New Haven, Conn., for building its proposed 20-mile railway to connect Bridgeport and Danbury via Trumbull, Monroe, Newton and Bethel. Preliminary arrangements have been made, rails, ties and copper wire have been purchased and work will begin at once. One steel bridge 400 ft. long and several small bridges will be a part of the line. Morton Plant, New London, is interested. [E. R. J., July 9, '10.]

Augusta (Ga.) Railway & Electric Company.—This company is considering plans for many improvements of its lines. The east-bound track of its Monte Sano line will be entirely rebuilt and curves will be eliminated on Monte Sano and Central Avenues. It will also build its tracks from Center Street to Third Street.

Beach Grove Traction Company, Indianapolis, Ind.—This company has completed and placed in operation its railway between Indianapolis and Beach Grove.

Indianapolis & Seymour Traction Company, Indianapolis, Ind.—This company is being organized to build an electric railway between Indianapolis and Seymour via Southport, Greenwood, Whiteland, Franklin, Amity, Edinburg, Taylorsville, Columbus and Reddington. It will parallel the Indianapolis, Columbus & Southern Railway. Among those interested are: M. L. Clawson, Indianapolis; J. B. Dill, A. G. Kelly and W. T. Todd, of Greenwood.

Kansas City, Lawrence & Topeka Railroad, Kansas City, Kan.—This company is considering plans for building an extension from its present terminal in Zarah to Bonner Springs, a distance of 6 miles.

Cincinnati, Louisville, Lexington & Maysville Traction Company, Dry Ridge, Ky.—This company is surveying for its proposed electric railway between Owenton and Dry Ridge. It will connect Cincinnati, Ohio, and Lexington, Ky., also Maysville and Louisville with a connecting line to Dry Ridge. W. T. Blackburn, president. [E. R. J., Oct. 1, '10.]

Portland, Me.—A company has been organized to build an electric railway at Peaks Island. Officers: Edgar E.

Rounds, president; Arthur H. Moulton, treasurer, and W. C. Whelden, clerk.

Towson & Cockeysville Electric Railway, Cockeysville, Md.—The Public Service Commission has approved the plans of this company to build an electric railway from Towson to Cockeysville, via Lutherville, Timonium, Texas and Marble Hill. The officers are: J. Alexis Shriver, president; William H. Wright, vice-president; James S. Nussear, secretary and treasurer.

Big Fork, Mont.—The business men of Big Fork and Columbia Falls have subscribed \$100,000, which with Eastern money will be used to build a 55-mile electric railroad on the Flathead reservation.

Nipton & Searchlight Transportation Company, Searchlight, Nev.—This company proposes to construct a 23-mile electric railway between Nipton and Searchlight.

New York & Stamford Railway, Port Chester, N. Y.—The Public Service Commission, Second District, has ordered this company to construct on or before July 1 such turnouts or switches in Mamaroneck as may be necessary for the operation of its railway and to secure a 10-minute headway for its cars used in the summer season.

New York, Westchester & Boston, New York, N. Y.—This company has ordered 5,600 tons of rails from the Pennsylvania Steel Company.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—This company has awarded to the Lackawanna Steel Company the contract for the necessary rails for the double-tracking of a 5-mile section of its line from a point a mile west of Rochester to Gillette station near South Greene.

Piedmont & Northern Railway, Charlotte, N. C.—This company has awarded the contract to W. J. Oliver, Knoxville, Tenn., for the grading and building of bridges from Greenville to Spartanburg, via Hodges, Donalds, Honea Path, Belton, Williamstown, Pelzer, Piedmont and Gantt, a distance of 90 miles. The contract for the remaining section of this proposed electric railway from Spartanburg to King's Mountain, a distance of about 35 miles, will be let in the near future. This line will eventually connect Greenwood and Charlotte. W. S. Lee, chief engineer. [E. R. J., Mar. 18, '11.]

Cobourg, Ont.—It is said that citizens of Campbellford and Warkworth are negotiating for the building of an electric railway through Northumberland County.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—This company will rebuild a number of its lines in Hamilton in the near future.

United Railways, Portland, Ore.—This company has completed and placed in operation its extension from Burlington to North Plains, 12 miles.

Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa.—This company has begun the work on its extension from Portland to Delaware Water Gap. This stretch is the last link of a through line from Philadelphia to Delaware Water Gap, via Willow Grove, Doylestown, and Easton, or Chestnut Hill, Lansdale, Allentown and Nazareth. A. A. Holbrook, Wilkes-Barre, general manager.

Wilkes-Barre & Lucerne Street Railway, Wilkes-Barre, Pa.—This company increased its capital stock from \$6,000 to \$300,000. The company will build an electric railway in Wilkes-Barre and Kingston. E. L. Hessler, president. [E. R. J., Oct. 1, '11.]

Quebec Railway, Light & Power Company, Quebec, Que.—This company is receiving bids for the construction of about 4 miles of double-track from Beauport to Kent House Park. C. E. A. Carr, general manager.

Seattle, Wash.—An issue of \$800,000 of bonds will be sold in Seattle for the construction of a municipal railway in that city.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company will begin work in the spring on its new carhouse and freight yards in Marysville, at the rear of Armory Hall. The Armory Hall will be made into a passenger station for this company.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company is preparing plans for the erec-

tion of stations to be built in Fresno, Kingsburg and Sanger. The Fresno building will also be the main office building of the company. It will be a 2-story structure of brick construction. The cost is estimated to be about \$50,000. The structures at Kingsburg and Sanger will serve as the terminal offices of the company.

Southern Pacific Railroad, Los Angeles, Cal.—This company has completed and is now using its new car house at Alameda. It has awarded the contract to McKnight & Company, Beaumont, Tex., for building its new passenger station in Los Angeles. The structure will be 88 ft. x 38 ft. and of brick construction. The cost is estimated to be about \$20,000.

United Railways of San Francisco, San Francisco, Cal.—This company is receiving bids for the construction of a complete shop building and car house in San Francisco on Geneva Street, opposite the present brick structure which is now used as a division headquarters.

Vallejo & Northern Railway, Vallejo, Cal.—This company has purchased 15 acres in the extreme northern end of Vallejo as a site for a car house and switch yards.

People's Railway, Wilmington, Del.—This company has built a new station in Wilmington.

Illinois Valley Gas & Electric Company, Streator, Ill.—This company has awarded the contract to Phillip Schlacter, Streator, for building a sub-station at Dwight.

Indiana Union Traction Company, Anderson, Ind.—This company has awarded the contract to David Eshelman & Son, Anderson, for building a freight house at Anderson. The structure will be 1-story, 27 ft x 140 ft. Work has been begun.

Chicago, Aurora & De Kalb Railroad, Aurora, Ind.—This company is considering plans for building a car house in De Kalb.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company will build a transformer station in South Omaha. The cost will be \$12,000.

Ohio Electric Railway, Cincinnati, Ohio.—This company is considering plans for building stations in Newark, Zanesville and London.

Valley Traction Company, Lemoyne, Pa.—This company is considering plans for building an office building at the west end of the bridge connecting Harrisburg and Wormleysburg.

Parkersburg, Mariette & Interurban Railway, Parkersburg, W. Va.—This company will build a new passenger and freight station in the lower part of the business section of Marietta.

POWER HOUSES AND SUBSTATIONS

Phoenix (Ariz.) Railway.—The New State Electric Supply & Fixture Company has been awarded the contract for building this company's new substation at Orangewood. The structure will be 22 ft. x 32 ft., of brick construction. A 100-kw generating set will be installed.

Pacific Electric Railway, Los Angeles, Cal.—The roof of the power substation at Luguna, on the Whittier-La Habra line of this company, was destroyed by fire on March 14. None of the machinery was injured and the damage was slight.

Southern Pacific Railroad, Los Angeles, Cal.—This company is ready to award the contract for building its new substation in Berkeley. The work will be executed in reinforced concrete and will be similar to the station built in Oakland at the beginning of the pier by this company.

Augusta (Ga.) Railway & Electric Company.—This company has ordered a steam turbine and electric generator of 4000 hp to be installed in an extension to one of its plants. John A. Adams, chief engineer.

Springfield (Mass.) Street Railway.—The American Ship Windlass Company is now installing new smoke-consuming stokers at this company's power plant at Springfield.

Pan Handle Traction Company, Wheeling, W. Va.—This company is considering plans for building a power plant on the Priest River, in Northern Idaho. It will have a capacity of 30,000 hp. A. J. Smith, general manager.

Manufactures & Supplies

ROLLING STOCK

Stroudsburg (Pa.) Passenger Railway expects to purchase a closed car.

Cincinnati (Ohio) Traction Company, it is reported, is in the market for 50 cars.

Ferrocarril Umbano de Coloma, Coloma, Mex., expects to purchase six small open cars and six small closed cars.

New York State Railways, Rochester N. Y., is in the market for 15 30-ft. 11-in. car bodies, of the prepayment type.

Bush Terminal Railroad, New York, N. Y., has purchased a 40-ton locomotive from the General Electric Company.

Duluth (Minn.) Street Railway is building 16 cars in the shops of the Twin City Rapid Transit Company, Minneapolis, Minn.

Utica & Mohawk Valley Railway, Utica, N. Y., has ordered four pay-as-you-enter cars from the G. C. Kuhlman Car Company.

Freeport Railway & Light Company, Freeport, Ill., has ordered four single-truck motor car bodies from the Danville Car Company.

Asheville & East Tennessee Railway, Asheville, Tenn., has ordered one 14-bench center-aisle open car from The J. G. Brill Company.

Portland Railway, Light & Power Company, Portland, Ore., has ordered 100 22-E special trucks from Pierson, Roeding & Company.

Greenville Railway & Light Company, Greenville, Tex., has ordered seven single-truck closed cars from the Cincinnati Car Company.

South Covington & Cincinnati Street Railway, Covington, Ky., has ordered three 12-bench open car bodies from the American Car Company.

Boise (Idaho) Railroad has ordered two 30-ft. 8-in. closed motor car bodies mounted on Brill 27-G-1 trucks from Pierson, Roeding & Company.

Ackley Brake Company, New York, N. Y., has made a shipment of 70 Ackley adjustable brakes to the Nagoya Electric Railways, Nagoya, Japan.

Texas Traction Company, Dallas, Tex., expects to purchase three 60-ft., high-speed interurban cars, to be equipped with four GE-73 motors and 36-in. wheels.

Philadelphia Rapid Transit Company, Philadelphia, Pa., has ordered from The J. G. Brill Company two 33-ft. 6-in. ash motor car bodies and two 33-ft. 6-in. steel underframes.

Pittsburg, McKeesport & Westmoreland Railway, McKeesport, Pa., noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911, as being in the market for two open cars, has ordered these cars from the Cincinnati Car Company.

Corregidor Island (P. I.) Railroad, noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 21, 1911, as expecting to purchase four electric passenger cars and four electric freight cars, through M. Gray Zalonski, Deputy Quartermaster General, U. S. A., has ordered these cars from The J. G. Brill Company.

City Railway, Dayton, Ohio, noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 25, 1911, as having ordered 10 cars from the Cincinnati Car Company, has specified the following details for these cars:

Type of car	closed	Curtain fixtures ...	Forsythe
Bolster centers ..	23 ft. 6¼ in.	Curtain material...	Pantasote
Length of body...	32 ft. ¾ in.	Gongs	12-in. foot gongs
Over vestibule ..	5 ft.	Hand brakes	Peacock
Width over sills..	7 ft. 10½ in.	Heating system...	hot water
Over posts at belt.....	8 ft.	Motors	West.
Sill to trolley base..	8 ft. 6 in.	Push button signal...	Cons.
Body	wood	Roofs	turtle-back
Interior trim	cherry	Sanders	O.-B.
Underframe	composite	Sash fixtures	Dayton
Air brakes	National	Seats	Hey. Bro. & W.
Bumpers,	5/16-in. x 6-in. steel plate	Seating material	wood
Car trimmings	bronze	Trolley wheels	Standard

South Covington & Cincinnati Street Railway, Covington, Ky., noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 11, 1911, as having ordered 15 semi-convertible car bodies from the Cincinnati Car Company, has specified the following details for these cars:

Type of car.....closed	Curtain fixtures ....Forsythe
Length of body.....21 ft.	Curtain material...Pantasote
Over vestibule.....30 ft. 6 in.	Destination signs....Hunter
Width over sills...7 ft. 11 3/4 in.	Fenders .....Hunter
Over posts at belt...8 ft. 2 in.	Gongs.....12-in. foot gongs
Sill to trolley base...9 ft. 3 in.	Heating system....electric
Body,	Headlights...U. S. inc'd'cent
composite wood & metal	Motors.....2 West. No. 49
Interior trim.....mahogany	Roofs .....Monitor
Underframe .....composite	Sanders..Cin. Car Co. type
Bumpers,	Seating material,
1/2-in x 6-in. steel plate	wood slat seats
Car trimmings .....bronze	Step treads.....Stanwood
Couplers .....Van Dorn	Varnish .....Murphy

TRADE NOTES

Commercial Electrical Supply Company, St. Louis, Mo., has appointed Louis S. Hunt sales manager.

Wigmore Brothers Company, Los Angeles, Cal., announces that the name of the company has been changed and it will hereafter be known as Alphonso A. Wigmore.

McCord & Company, Chicago, Ill., have appointed H. E. Creer, mechanical expert of the company, to succeed D. J. McCoscar, deceased. Mr. Creer was formerly general car foreman of the Missouri Pacific Railroad.

Electric Service Supplies Company, Philadelphia, Pa., has announced that on account of the renumbering of buildings in Chicago, Ill., the new number after April 1, 1911, will be 417 South Dearborn Street, instead of 303 Dearborn Street.

The J. G. Brill Company, Philadelphia, Pa., has recently shipped to the Bilbao Tramways, Spain, two 22-E trucks, to the Ikaho Electric Railway, Japan, one 21-E truck and to the Nagoya Electric Railway, Japan, six 21-E trucks.

Richardson-Phenix Company, Milwaukee, Wis., has recently opened a branch office in the Keystone Building, 324 Fourth Avenue, Pittsburgh, Pa., under the management of H. M. Laughlin, who has been with the company for several years.

Crocker-Wheeler Company, Ampere, N. J., has appointed Clarence E. Delafield district manager of the company, with headquarters in the Boston Safe and Trust Building, 201 Devonshire Street, Boston, Mass., to succeed R. N. C. Barnes, resigned.

Whipple Supply Company, New York, N. Y., has recently elected T. W. Williams vice-president of the company. Mr. Williams has been connected with the General Electric Company for 18 years, the last four of which he has been connected with the gear and pinion department.

National Carbon Company, Cleveland, Ohio, has had at a recent meeting of the governing committee of the Chicago Stock Exchange \$4,500,000 preferred stock and \$5,500,000 common stock admitted to the regular trading list. This action was in the nature of a readmission, the stocks having been excluded last December on account of the action of the directors in declaring a dividend without any previous notification to the stockholders. This dividend, which was \$15 per share, was declared without any warning at all to the governing committee of the exchange.

Electric Storage Battery Company, Philadelphia, Pa., had from 1910 operations \$1,120,012 available for dividends, equivalent to 6.9 per cent on the \$16,249,425 outstanding in common and preferred stock. After paying 1 per cent quarterly or 4 per cent on both common and preferred stock amounting to \$649,964, a net surplus remained of \$470,048. With this total surplus on Dec. 31, 1910, was \$2,771,042, an equity of 17 per cent on the outstanding stock. Besides this the company has accumulated a reserve account of \$351,746. Nominally the company has issued \$18,000,000 in stock, of which \$17,814,600 is common stock and \$185,400 is 1 per cent cumulative preferred stock. Of the common stock \$1,750,575 is held in the treasury as treasury stock. The report shows a working capital at the end of 1910 of \$2,576,630. During the year the com-

pany acquired all the patents and rights of the Westinghouse Storage Battery Company, including ownership of the rights of the General Storage Battery Company and the storage battery and patents of the Westinghouse Machine Company. Last year the company also perfected a new vehicle battery having greatly increased storage capacity. This battery has since been placed on the market.

McLeer Electric & Manufacturing Company, Brooklyn, N. Y., states that the growth of its business since its organization two years ago has necessitated an increase in its capital stock from \$20,000 to \$200,000, \$100,000 preferred stock and \$100,000 common stock. All of its preferred stock has been subscribed for and paid in by the board of directors. The directors and officers of the company are: John F. O'Ryan, president and treasurer; Henry H. Rogers, first vice-president; Joseph F. McLeer, second vice-president; Edward McLeer, Jr., secretary, and Chas. B. McLeer, chief engineer. The company will specialize on electric railway repair work, in the manufacture of vacuum dried and impregnated field and armature coils, rewinding of armatures and rehabilitating electrical machinery of all kinds. For this class of work it has exceptional facilities. The latest type of vacuum drying and impregnating apparatus has been installed and there is a well-equipped machine shop. The company will also continue to manufacture electrical machinery. During the last two years the company has manufactured under contract a large number of motors for the electric lighting of steam passenger cars, and it is still engaged in this class of work. A great deal of experimental work has also been done in perfecting patents on electrical machinery.

ADVERTISING LITERATURE

W. N. Matthews & Brother, St. Louis, Mo., have issued a post card describing the Matthews two-bolt guy clamp.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1042, illustrating and describing the Allis-Chalmers "A B C" engines.

Industrial Instrument Company, Foxboro, Mass., has issued Catalog No. 40, devoted to the complete line of Dr. Horn tachometers and tachographs.

Railway Improvement Company, New York, N. Y., has issued a folder entitled "95% Ambitious," which shows how the coasting time recorder will help ambitious motormen.

Wendell & MacDuffie Company, New York, N. Y., has issued a very attractive folder, announcing that the company has assumed the Eastern sales territory of the St. Louis Car Company.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Circular No. 1190, describing type "E" engine-driven, alternating current generators from 50 to 1100 kva, for operating on 60-cycle, 240 to 2400-volt circuits.

Milwaukee Locomotive Manufacturing Company, Milwaukee, Wis., has issued Bulletin No. 101, on gas-driven Milwaukee locomotives for mines, tunnels, contractors' service, industrial plants, industrial railways and cement works.

W. R. Kerschner, New York, N. Y., has issued several circulars calling attention to a large amount of rolling stock and apparatus that he has for sale, among which are 36 nine-bench Laclede car bodies and 14 K-14 controllers.

H. W. Johns-Manville Company, New York, N. Y., has published the "J-M Roofing Salesman," for March, 1911. The issue contains several interesting articles and a number of illustrations which show buildings roofed with J-M asbestos.

American Rolling Mill Company, Middletown, Ohio, has issued a booklet entitled "The Proof—American Ingot Iron Rust-Resisting." The booklet describes and illustrates different styles of American ingot iron and also contains tables on sheet metal work, black and galvanized sheets, roofing and culvert information.

Prepayment Car Sales Company, New York, N. Y., is distributing in pamphlet form a reprint of its advertisement that appeared in the *ELECTRIC RAILWAY JOURNAL* of March 11, 1911. The pamphlet is printed in two colors and contains a list of patents of the Prepayment Car Sales Company and the benefits that result from the merging of the Pay-As-You-Enter Car Corporation and the Pay-Within Car Company.

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CONTENTS.

Inspecting Air Brakes.....	545
A Revival of the Park Idea.....	545
The Use of Sand.....	546
The Syracuse Shops.....	546
Pits and Trestles.....	546
Maintenance in Chicago.....	547
Efficiency Organization at Boston.....	548
Piece Work and Lost Motion.....	549
Maintenance Shops of the Syracuse and Oneida Railways.....	550
New Shops of the Chicago Railways Company.....	565
New South Bend Shops of Mudock Lines.....	574
Sand Blast for Cleaning Steel Cars.....	578
New Pay-Within Cars at Boston.....	579
Extension of the London, Brighton & South Coast Railway.....	582
Abbreviating Car Painting Methods.....	583
Sliding Portable Crossover of the Detroit United Railway.....	584
Air Brake and Compressor Department of the Brooklyn Rapid Transit System.....	586
Press for Armature Bearings.....	587
New Shops for the United Railroads of San Francisco.....	588
Aluminum Car Signs in New York.....	588
Pit and Trestle Construction for Car Maintenance.....	589
Rehabilitating Motors of the Metropolitan Street Railway, New York.....	589
New Coal Storage Pits of the Illinois Traction System.....	590
A Convention Without a Collective Exhibit.....	592
Recent Waiting Stations in Vienna.....	592
Annual Meeting of the New England Street Railway Club.....	593
March Meeting Illinois Electric Railway Association.....	594
March Meeting Central Electric Railway Association.....	595
Coöperative Efficiency Work at Boston.....	597
Chicago Meeting of Joint Committee on Block Signals.....	599
The Nine-Hour in Eleven Bill in Massachusetts.....	602
Track and Rolling Stock Changes in Scranton, Pa.....	603
Meeting of the Committee on Convention Location.....	604
London Letter.....	606
News of Electric Railways.....	607
Financial and Corporate.....	611
Traffic and Transportation.....	614
Personal Mention.....	616
Construction News.....	618
Manufactures and Supplies.....	621

Inspecting Air Brakes

The record of train delays for 1910 on a large Eastern system operating multiple-unit cars in trains shows that 25 per cent of the total delays were due to air brake defects while control failures caused only 20 per cent of the delays and motors but 6 per cent. These figures emphasize the importance of inspection and maintenance of the brakes as well as the electrical equipment on the cars. The perfunctory test of applying and releasing the brakes from one or both ends of a train is not always an assurance that all of the apparatus on each car is in good operating condition. Dirt carried into the pipes through the compressor intake probably causes the most trouble, due to valves sticking or failing to close properly. A clogged inlet strainer may result in the compressor fuse blowing. Worn or rotten brake hose cause long delays on the road when they burst and leaky pipes or defective couplings and gaskets may result in the brakes applying and dragging the train while running. The action of the pump governors, brake valves, feed valves and triple valves should be carefully inspected, but the repair or cleaning of these delicate and complicated parts should never be intrusted to the inspectors or depot repairmen. Since each part is a separate unit which can easily be taken off and replaced it is a good plan to keep a small stock of one or more duplicate parts at each inspection point and to have all defective ones removed and sent to an expert in the main shop for such repairs, adjustment or cleaning as may be necessary.

A Revival of the Park Idea

There will probably never be unanimity of opinion as to whether it is desirable for a street railway company to establish and maintain a park. In fact, there is every reason why there should be a difference of thought on this subject, because while the plan might be profitable on some lines it would certainly be unprofitable on others. Some five years ago an expression of opinion on the subject of parks at the electric railway convention of that year was generally in favor of parks; but there has been a reversion of ideas and a great many companies which are now conducting parks are doing so because they can see no easy way of getting rid of them without serious loss on their original investment. The discussion on the subject of parks at the Syracuse convention last week is, therefore, of especial interest because it was on the whole favorable to the park idea, and showed that some managers at least are as enthusiastic on the traffic-yielding properties of parks as at any time in the history of electric railways. In this connection it is interesting to note that in the recent annual report of the Lehigh Valley Transit Company R. P. Stevens, president of that company, said that the development of the

park which that company controls midway between Allentown and Bethlehem had been the cause of a part of the increased passenger receipts. The park operated by this company caters to an estimated population of 100,000 people within a 5-cent fare zone, and the establishment of a good comic-opera company in the park last year proved successful.

The Use of Sand

At the Central Electric Railway Association meeting in Columbus last week the paper on the most commonplace subject, sand, brought forth a very animated discussion. Much to the surprise of no doubt the majority of the audience, the representatives of three roads told of their success in operating cars without the use of any sand on their cars, and the service given by these three roads ranged from that of 40-ton inter-urban cars and four-car freight trains to that of suburban and small city cars. Thus actual experiences were available to fortify the claim of the author of the paper, who said that ideal conditions would prevail if cars could be operated without the use of sand. A strong argument advanced in favor of this plan was that accidents might result from inoperative sanders; that is, a motorman, relying on sand which ordinarily would be available, might try to make a stop within a certain distance and find that no sand was available, whereas if he knew that sand could not be used he would have his car under better control. Arguments in favor of the use of sand centered around the desirability of having it available for making quick and unexpected stops to avoid accidents. To these the reply was advanced by the superintendent of one high-speed third-rail road that he had operated freight trains and passenger cars satisfactorily for six years without sand. In closing the discussion on his paper Mr. Evans rightly regretted the absence of reliable data on the subject. He thought that the general opinion in courts that sand was necessary for a perfect stop was not well founded and he rightfully voiced the statement that no fair-minded jury of technical men or of a court would refuse to change preconceived ideas on the use of sand if a representative association should place its approval upon a comprehensive series of tests that showed the inadvisability of using sand. These tests, we believe, should be made under the jurisdiction of some representative electric railway association.

The Syracuse Shops

The repair shops of the Syracuse Rapid Transit Company and the Oneida Railway, described in this issue, are interesting from several operating and constructional points of view, but perhaps their most striking feature is that they are used for the upkeep of rolling stock employed in two distinct kinds of service. The Syracuse company's cars are of the common city types, whereas those of the Oneida Railway are used exclusively for the high-speed service given over the electrified division of the West Shore Railroad between Utica and Syracuse. The comparative overhaul mileage standards quoted in the article show very clearly that while the equipments themselves differ materially the gap between them is not so great as to demand radical differences in the layout and apparatus of the shop. One of the commendable operating points is the use of forecast schedules in planning the maintenance program for groups of cars as they enter the shop. On the one hand, this gives the management exact information as to when cars will be available for transportation; on the other hand, it eliminates much guesswork when an attempt is made to estimate the

most economical time or mileage basis on which the work should be done. The systematic progress from track to track of a car under repair is another feature which tends to secure the most satisfactory use of the shop. The storekeeping and scrap-reclaiming methods in vogue are also different from common practice as regards the storage of supplies and their distribution and collection by a traveling storekeeper in order to keep the men at their assigned tasks. A great deal might be said in praise of the elaborate crane hoist and jacking equipment at this installation. The true worth of these facilities appears most in shops where their absence demands that men spend time in tugging, pulling and lifting rather than in the exercise of the special skill on which their wage rates are based. The shop building itself is quite as interesting in design as are the methods practised in it. Besides approved partitions, doors and stand-pipe systems, the fireproof construction is made a reality by an absolute rule forbidding the storage of combustibles in large quantities, whether as new material or as waste. The liberal lighting system is also worthy of attention inasmuch as it is so closely related to the well-being of the employees and to the quality of their work.

PITS AND TRESTLES

Mr. Prather's article in this issue on "Pit and Trestle Construction" recalls to mind some of the interesting developments which have taken place in this department of car maintenance. As the name still indicates, the original pit was merely an excavation which was dug in the dirt floor of the old horse car buildings. In some of the early electric railway structures an endeavor was made to avoid the cramped quarters of a pit by an absolutely open construction. This consisted of raising the cars on trestles about 4 ft. above the car floor, but the principle proved unsatisfactory owing to the loss of time in moving about in a place incumbered with low piers and breast-high tracks. All objection to the open type of pit has been obviated, however, by building up the devil strips either of iron checker plates or of reinforced concrete.

The first construction, that of checker plates, as developed in Buffalo, has the merit of permitting convenient side working simply by the removal of those checker plates which are nearest the truck. The second intertrack construction, as typified in the new Syracuse shops, is not so flexible, but it is more durable and safer for heavy work. Still another variety is the use, as at Baltimore, of pits having between them depressed aisles sloping to a depth of 18 in. below the head of the rail. This is an unusual design, but has been found especially convenient for the drawing down of the pedestal bolts of certain types of trucks.

Even at this date it is clear to those who have had the opportunity of looking over the pits in some recently built car-houses and repair shops that the designers of these buildings have not always had the guidance, or perhaps they have not followed the advice, of men who were familiar with the practical conditions of car inspection and repair. It is found that many closed pits are indifferently lighted and heated, that they are poorly drained and that they are often of insufficient depth to permit the pitman to stand erect when working under the trucks and motors. The rails of such pits are usually flush with the devil strip or else are only a few inches higher, so that the workmen must get on their knees whenever there is

anything to be done on the outer side of the trucks. Naturally, working conditions of this kind are very unsatisfactory to the men, and besides it becomes easier for them to shirk their labors because the foreman cannot readily see what is going on under the cars. These considerations should tend to make open pits with covered devil strips more generally used even if the first cost of such construction is higher. Pits of this design are not only lighter, but permit greater freedom of movement than the closed or excavated pits. They are also drained more readily, since the entire floor can be pitched toward the drains under the center line of the devil strip instead of having the gutters and drains in the pit itself. The satisfactory heating of open pits has been difficult in many places, but this condition frequently can be bettered if the track doors are kept open no longer than is absolutely necessary. At the worst, a cold pit is far from being as unhealthful and uncomfortable to the shopmen as a wet one.

There is something very attractive about the use of trestles, particularly for inspection, in view of the fact that the trucks and motors can be handled by men who stand in full daylight and whose every movement is under the eye of the shop foreman. Where trestles are used the work on car bodies is usually done from a suspended gangway. Mr. Prather does not consider the trestle practicable for wheel changing where the motors are of 75-hp or greater capacity. Nevertheless, some railways have overcome this handicap by building the trestle with removable portions on which wheel sets or trucks can be lowered to another track which is flush with the floor of the shop. This method is in successful use by the Mobile Light & Railroad Company for the medium sizes of motors standard on its system. The Hudson & Manhattan Railroad of New York does all inspection and maintenance on a trestle, although its motors are of 160-hp capacity each. In general, those who are intrusted with the design of pits and trestles should bear in mind that comfortable laboring conditions for the workmen form the best basis upon which a successful maintenance policy can be built.

MAINTENANCE IN CHICAGO

Two provisions in the ordinances under which the Chicago surface street railways operate have assumed new importance recently. Periods of three years from the acceptance of the ordinances were allowed for rehabilitation. This period expired on April 15, 1910, for the Chicago City Railway and on Jan. 28, 1911, for the Chicago Railways Company. During this period 70 per cent of the gross receipts was set aside in accordance with the ordinance to be used "so far as required" for "operating expenses, including maintenance and repairs," while the residue of this percentage was to be applied to the cost of renewals. All expenditures for renewals during this period in excess of the residue were charged to the capital account.

At the expiration of this period new conditions arose. The companies are now required by the ordinance to maintain the property in first-class condition and to this end (1) to expend for "maintenance and repairs" 6 per cent of the gross receipts annually, or set aside the unexpended balance, and (2) to set aside 8 per cent of the gross receipts each month to constitute a reserve fund for "renewals and depreciation." Upon the Board of Supervising Engineers, Chicago Traction, the respon-

sibility rests of authorizing all payments from the latter fund. Renewals are defined in the ordinance to be the replacement of any "principal part" and the board is required to determine by classifications made from time to time what items shall be considered renewals and what shall be considered as maintenance and repairs. As the percentages named, however, do not limit the obligation of the companies to maintain the systems in first-class condition, they are concerned as much as the city in the introduction of such methods as will best meet the requirements of the ordinances in this respect.

By virtue of the authority given in the ordinances, the board has passed rules defining renewals. The rulings have been accepted by the companies and were published in full in the issue of the *ELECTRIC RAILWAY JOURNAL* for March 4, 1911, page 374. They differentiate between property that has been rehabilitated and property that has not been rehabilitated and, in order not to draw the line too arbitrarily, define property that has been semi-rehabilitated. As the capital investment of the companies has been about doubled, these definitions touch some of the leading questions involved. While the value of the property of the Chicago City Railway was fixed at \$21,000,000 as of June 30, 1906, this has been increased by rehabilitation expenditures to over \$41,000,000. The value of the Chicago Railways property was fixed as \$29,000,000 on the same date, but this had been increased to \$57,000,000 on Jan. 31, 1910, and is greater now. In the case of property which has not been rehabilitated the traction valuation commission value shall be taken as the original cost; that is the value at which such property stands in the accounts and the ordinances. With rehabilitated property it appears that the amount of the new investment, not the new plus the old, is to be taken as original cost. Where the work of rehabilitation has been complete the cost of the work would probably represent substantially the value of the property. Where the rehabilitation work has been slight the larger part of the value would be the original value allotted by the valuation commission.

The board has also ruled that a limit of \$200 shall be fixed as the minimum charge of capital or renewals. This amount has been adopted by the Interstate Commerce Commission in its classification of expenditures for additions and betterment of steam railways. The interstate commission, however, provides that if the total amount chargeable is less than \$200 for any improvement considered as a whole it is optional with the carrier whether the charge is made to operating expenses or to the appropriate account in the classification of expenditures for additions and betterments. The option permits the charge of many small items to accounts in either classification and affords a flexibility that may be useful.

Except in special instances no addition is to be made to capital account in case of the "replacement of existing property by new property of similar general character and construction." The qualifying phrase may limit the application of this rule. If the board does not allow exceptions and the companies are obliged to pay higher prices for renewals than the "original costs," they will not be able to capitalize the increased expenditure made necessary by higher levels of cost.

It may be said concerning this subject that the words that are used to express the different elements of maintenance are of much less importance than the principle concerned. Good maintenance in its true sense comprises repairs and renewals and cannot ignore the obligation to conserve the property in

satisfactory operating condition. Repairs of parts must be succeeded, after natural wear and tear have done their utmost, by renewals of parts and finally, in turn, by the renewal of the whole. Although the "maintenance of the property" is an all-inclusive term which represents the obligation to conserve the investment, in actual practice there are various and somewhat conflicting uses of the words which denote the different elements of maintenance.

Repairs keep the different elements of property in operable condition. The renewal of a part of a machine, however, may be called properly the repair of the machine. Renewals are made for the purpose of restoring elements of property in the place of those which have been worn out in service or for other reasons are no longer in a condition in which they may be continued satisfactorily as part of the operable property. Whether the policy is to make good the ravages of depreciation through current repairs and renewals as far as possible or by the creation of a reserve fund for a part of the earnings, maintenance is an operating expense and should be so treated.

In the policy followed by a company in the repair of parts obvious opportunities lie for present economy and for ultimate saving. A low operating ratio to-day may imply nothing more than a short-sighted policy whose evil result will be seen when the charges for deferred maintenance can be deferred no longer. If repairs have to be made the question that should be considered is not how long they can be deferred, but how they can be made promptly at the lowest expense and before the excessive wear of a part in need of repair has gone so far that the expense will be double what it ought to be under normal conditions. The policy of a company respecting renewals is one that concerns the capital account partly because of the fact that betterments may be involved in replacements. The policy should be, however, to make pure renewals of property, in cost if not in kind, through the appropriate operating expense accounts.

It should also be the policy to keep the property account as near as possible to the fair value of the tangible and admissible intangible elements. With many companies the practice of the past has been to regard repairs as the single or the principal element of maintenance whose cost was chargeable to operating expenses and to consider renewals involving heavy cost as a sort of extraordinary maintenance, containing some element of betterment to the property, but chargeable in whole or in large part to the capital account. A wiser policy of treating the real maintenance costs as operating expenses will strengthen the position of a company in its own accounts, as a borrower and in its capability to deal successfully with the question of franchise relations where it operates.

As an immediate loss occurs in the realizable value of any item of property when it is used and as no going property, therefore, can be maintained at 100 per cent of its value, the best that any company can do is to maintain a fair average working condition of, say, 70 per cent. The ultimate economy will be conserved by the maintenance of the property in as good a condition as can reasonably be attained. The Chicago companies are fortunate in having definite conditions prescribed under which they must operate, but one of the critical tests of the effectiveness of the settlement ordinances lies in the conditions governing the various elements of maintenance which are herein discussed.

EFFICIENCY ORGANIZATION AT BOSTON

The recent inauguration of special efficiency organizations by the Boston Elevated Railway Company furnishes a suggestive example of the tendencies of large electric traction systems to turn to account every legitimate means of increasing the margin between the gross receipts and the cost of operation. In another column are given the essential features of the plans of campaign against waste to be followed by the efficiency club and committee of department heads in Boston. With respect to the former there is, of course, nothing particularly new in the periodical meeting of responsible employees and heads of departments to discuss problems of a distinctly economic character, but the project is none the less meritorious, and it is noteworthy that the Boston Elevated was one of the first to attack the problem of preventable losses by systematic methods of recording and analyzing failures of equipment in service and of improving the work of the rank and file of the transportation force. If the present plan of presenting a paper of value each month from the point of view of economic constructive criticism is followed there is no question that important gains in the efficiency of the company's business transactions will result. The opportunities for informal and free discussion of problems often overlooked in the mobile activity of department heads ought to be unexcelled, since the ordinary sources of their delayed consideration between heads of different branches of the service are eliminated at the meetings of the club. It is not easy to exaggerate the improved esprit de corps which results from the friendly association of groups of responsible employees at such meetings, divested as they are of the atmosphere of stress and strain so inseparable from usual business hours.

The work of the new efficiency committee at Boston carries with it unique interest. Composed of a small group of men having keen and highly specialized knowledge of department activities and having the widest range of discussion and recommendation, the possibilities in the line of economic progress appear most attractive. The committee's functions are advisory and are primarily designed to secure improved efficiency by the investigations and recommendations which the committee brings to the higher executive officers of the company. Not only is a large amount of detail work thus taken from the desks of the latter, but it appears that it can be handled without sacrificing the detailed consideration which is necessary to a correct disposal of each matter. The plan of forming the committee of men thoroughly familiar with the relation of various departments as well as with the conduct of affairs in each branch of the company's service is thoroughly commendable. It suggests also that in most large public service corporations it is possible to utilize combinations of ability inside the organization no less than to derive benefit from expert advisers retained on the outside. To some managers the amount of time expended in the work of the committee may appear formidable, but it must be remembered that in a large and complex system the opportunities for introducing economies are most attractive if the opportunity is given to carry forward adequate investigations.

Not the least advantage of the efficiency work at Boston is its influence upon the general character of service rendered by the company. Money legitimately saved at one point means that improved service can be given to the public for a fixed ex-

penditure at another, and while the public at large may not be directly interested in attempts to keep expenses down to the limit consistent with first-class transportation facilities, it is destined to be closely concerned with the results of such a campaign. A fixed fare unit means nothing else, and it is significant that none of the economies sought by the company is desired at the expense of good service.

PIECE WORK AND LOST MOTION

Much has been said recently about the work of efficiency engineers and the savings which have resulted in many industrial plants through the adoption of the methods proposed by them. While the efficiency engineer concerns himself with both men and material, there are greater possibilities in getting more and better work out of the men than in saving a little here and there in the cost of material. In every office and factory, in every industry where men work with their hands, there is a vast amount of lost motion and wasted time. Few men know how to work to the best advantage and those that do know seldom have sufficient incentive to make them exert themselves to the limit of their strength and endurance. The development of motion study as suggested by F. W. Taylor, the pioneer efficiency engineer, and the practical application of piece work and bonus systems in many lines of work have demonstrated in a large measure the claims that have been made that the average shop working on a day rate basis is less than 50 per cent efficient. An efficiency of 85 per cent or even higher is possible and practicable, yet there are very few shops in which this rate is even approached.

Certain operations, of course, are more susceptible than others to the methods proposed by efficiency engineers. The ideal conditions for introducing piece work or bonus systems and eliminating all waste of time and physical exertion are where the operations consist of precisely the same movements repeated in regular sequence. Winding armature coils, for example, is a class of work to which a piece rate or a bonus rate can be applied with little difficulty. The incentive to make more money by increasing the daily output under the piece rate plan leads the workers to follow unconsciously the fundamental theories of motion study. The time and exertion required for each movement are reduced to the minimum as the result of practice and trial. Sometimes, however, the most skilled operators fail to see many little ways of saving time or exertion in their work which are apparent to a careful observer who analyzes the complete cycle of the operations involved. Whether the work is done by piece rate or day rate, there are innumerable opportunities in every shop for studying and correcting lost motion with a consequent saving of time and money.

There are some valid objections to piece work and bonus systems which have deterred many companies from putting them into effect. The first and most important objection is frequently the real or expected antagonism of the men themselves, based in many instances on the establishment of piece rates which were too high and were afterward cut to a point where a man's earnings approximated the old day rate even though his output had greatly increased. Another is the difficulty and expense of determining fair piece rates for many operations, and a third objection is the lack of sufficient work of any one class to keep one or more men continuously engaged on it. Needless to say, no piece rate should be established

without the most careful study of existing methods and output under the day rates. The probable increase in output should be estimated and proper allowance made for it in the beginning and not after the workman has earned his higher pay by developing for himself some economical short cut. The determination of fair piece rates is largely a matter of observation and records, leavened with fairness in distributing the profit between the workman and the company.

The lack of sufficient work of any one class to keep one man engaged continuously on it is the cause of more waste time in a shop than anything else. Piece work tends to produce workmen skilled in but one operation, but there is no reason why any man cannot acquire reasonable speed on two or more kinds of work. Thus a machinist after some practice ought to be able to turn a pair of wheels or bore out a bearing with equal skill or a painter to apply a coat of varnish as well as a coat of color paint. There always must be some time lost in changing from one kind of work to another, but careful planning can cut this waste to the minimum. Under the day rate plan there is no inducement to hurry from one job to the next or prepare in advance for the next operation. The completion of one job is the signal for taking a little rest, gathering up tools, having a few minutes' conversation and moving on to the next job to look it over before getting down to work again. Or if the new job is not quite ready to begin on a wait ensues at the company's expense. But if the waiting time is at the men's expense a premium is placed on advance preparation.

Some of the classes of work into which it seems most difficult to introduce piece rate or bonus systems are those which are most in need of some acceleration. No class of workmen know how to putter along quite so well as carpenters. They cut and try and cut and try, take up and put down one tool after another and seemingly cannot be hurried. Yet a carpenter's work is no more accurate than a machinist's, nor does it require more dexterity than many other trades. Most of the carpenter shop operations are susceptible of standardization and rating.

The proper inspection of the finished work under a piece rate or bonus plan involves no new or difficult problems nor should it be an unduly expensive adjunct. Under day rate working the foreman is required to inspect both the performance of the men and, superficially at least, the quality of their work. With a piece rate system it is no concern of the company how fast or how steadily a man works. The inspection can be confined strictly to the finished product, which can be rejected if not up to a fixed standard. Instead of costing more the inspection should cost less and be more productive of uniformly good work.

We have pointed out above some of the advantages of piece work and bonus systems in eliminating waste time and improving shop efficiency. There are similar ways of accomplishing the same end under day work. The competitive spirit can be fostered in individuals or gangs working on the same job, and careful supervision of the shop as a whole with reference to the work carried on by each department will save much lost motion. After all it is primarily a matter of the management of men, of systematic study of conditions and of planning the work in advance. A capable shop superintendent can produce results under any system of paying the men if he has tact and patience in dealing with them as one of them.

Maintenance Shops of the Syracuse and Oneida Railways

The Operating Methods of a Combined City and Interurban Installation

IN the fall of 1909 the Syracuse Rapid Transit Company and the Oneida Railway completed a car repair shop on Wolf Street, Syracuse. The structure is located at the northeastern end of the city opposite a large carhouse of the city railway and accessible for the cars of the Oneida Railway, which operates the electrified division of the West Shore Railroad between Utica and Syracuse. The general structural features of this layout were fully described in the *ELECTRIC RAILWAY JOURNAL* of Nov. 6, 1909. Hence the present article will be confined principally to the facilities available and the methods which are applied to maintain the rolling stock of both companies.

The Oneida Railway Company and the Syracuse Rapid Transit Railway Company, which use this shop jointly, are under the management of Vice-president and General Manager C. Loomis Allen and the electrical and mechanical departments are under Chief Engineer W. J. Harvie, under whose direction these shops were laid out and built. As assistants on the work were J. P. Barnes, electrical engineer, now in charge of the operation of the shop, and H. G. Throop, engineer of construction for the above-mentioned companies.

RÉSUMÉ OF LAYOUT AND CONSTRUCTIONAL FEATURES

The general dimensions and principal divisions of this instal-

but the north table is separated from them by a strip 74 ft. wide. This strip was left for extensions, but is in constant use for the shifting and temporary storage of cars.

While Fig. 2 presents the general arrangement of the several maintenance departments, it does not show how the natural slope of the ground has been adapted to use different floor levels. On the main level slightly below Wolf Street are located the general truck repair, carpentry and paint shops. The lower level, which is flush with Free Street, comprises a still unused basement under the paint shop; a storage space under the mill room, sash and door room and carpenter shop, which are arranged in an ascending level leading to the ground floor of the storeroom and which are accessible through the storeroom only. This makes these areas available for storage of apparatus under the control of the storekeeper. This lower level is traversed by a supply track which is carried from Free Street to the end of the general repair shop and beneath the level of the repair pits in that section.

The buildings are of fireproof construction throughout and, furthermore, are protected by hydrants, standpipes, fire extinguishers (in the paint shop) and sand pails. Twenty watchmen's alarm boxes are installed throughout the property. The general layout of the fire-protection and water system is



Fig. 1—Syracuse Shops—General View Looking Along Southern Transfer Table and the Wolf Street Side

lation are shown on the accompanying plan, Fig. 2. The plot on which the shops are erected slopes downward from Wolf Street toward Free Street so that a retaining wall of rubble concrete had to be built about the property. Entrance to the building via transfer tables is had either through Fifth or Sixth North Street, from either track on Wolf Street, as indicated by the track layout in the plan, Fig. 2. There is also a supply track connection from the New York Central & Hudson River Railroad on the Free Street side. Each transfer table extends the entire width of the installation and is 55 ft. wide in order to give room for the accommodation of the long cars of the Oneida Railway.

When the shops were designed it was feared that snow and ice might hamper transfer table operation more than special work. Therefore the pits were made 2 ft. deeper than the table runways so that a small amount of snow would not prove a hindrance. The experience of two winters has shown that the tables are perfectly reliable despite the fact that the operating current is taken from third rails in the pits. The shops cover an area of 381 ft. 9 in. x 176 ft. 8 in. between the two transfer tables. The south transfer table directly abuts the buildings,

shown in Fig. 3. The range and overlaps of the standpipes are indicated on this drawing by the segments of circles, which are of 50-ft. radius. Oil, paint, varnishes and other highly inflammable material are kept in an isolated building, the construction and equipment of which will be described later in this article.

The water supply for these shops is brought from two independent mains on Free Street and Wolf Street respectively. These sources are tapped at diagonally opposite corners and are interconnected by a valve in the 6-in. pipe line nearest to Wolf Street. Valves can be manipulated to cut off either source of supply in order to use the other exclusively. A rather interesting feature in connection with the water supply is the installation of enameled drinking fountains throughout the shop. These fountains are a convenience for the men and economize their time appreciably. All water used on these premises except for the fire lines is metered so that wastefulness in this direction can be easily checked.

In general, the shops are constructed of the following materials: Concrete for foundation walls up to the level of the main floor and for shop floors and exterior trimmings; brick

walls and partitions 12 in. thick; reinforced concrete for the roof, galleries and devil strips. All fire walls are extended about 3½ ft. above the roof. The partitions between the several departments, as clearly outlined in Fig. 2, indicate the

in the partitions that separate the several maintenance shops.

A departure in the natural lighting of buildings of this character is the use of a number of small "Anti-Pluvius" skylights extending transversely across the bays instead of having

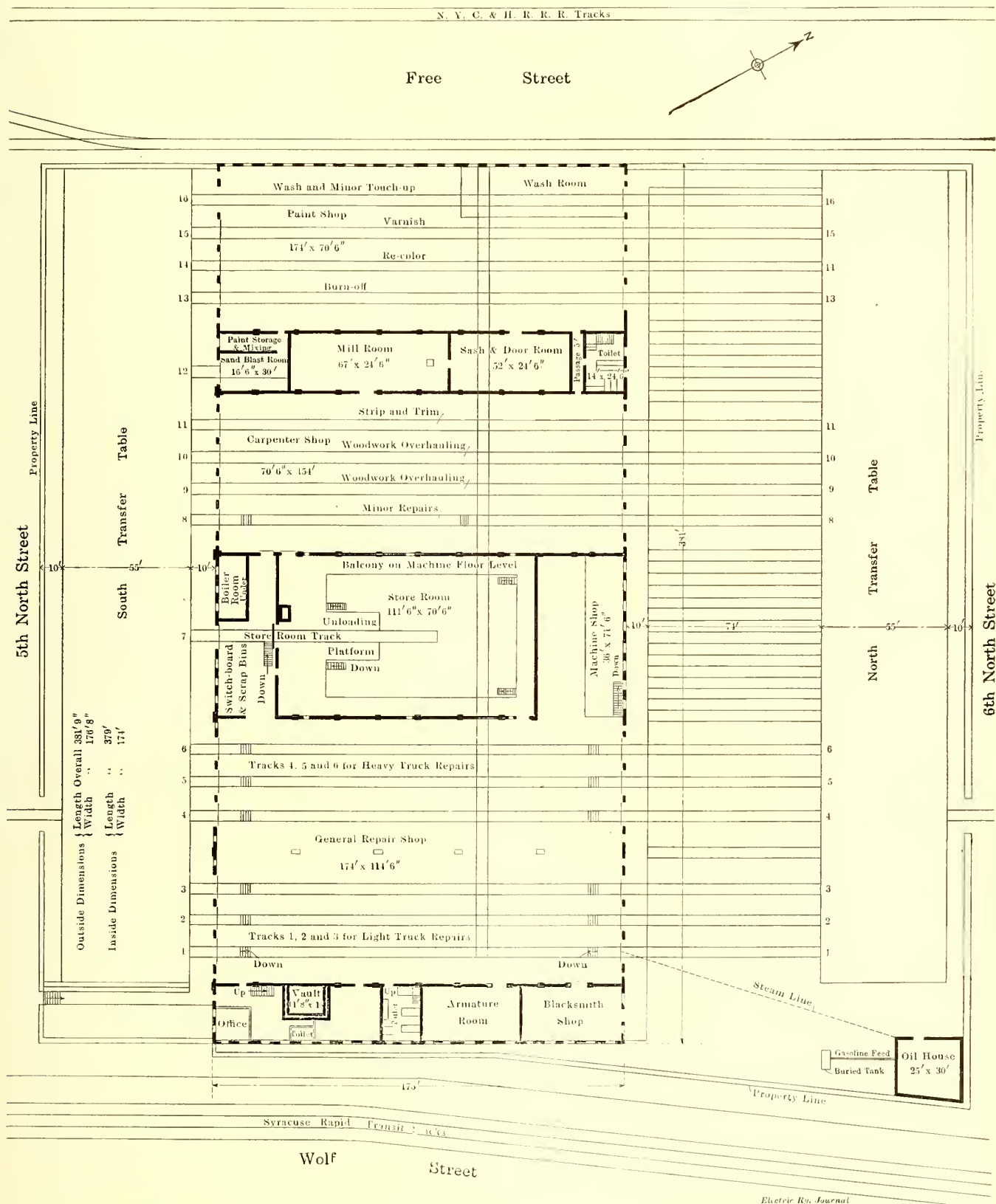


Fig. 2—Syracuse Shops—General Plan, Showing the Relative Location of the Several Departments and the Order of Overhauling Work on Successive Tracks

care taken to isolate such danger spots as the paint-mixing room, millroom and the sash and door rooms. All of the track openings are protected by Kinnear motor-operated steel rolling doors. Standard gravity fire doors cover all openings

long skylights parallel to the tracks. There is about 1 sq. ft. of skylight for every 6 sq. ft. of floor in all the shops. The efficiency of this lighting may be judged by examining the accompanying half-tones, which were made from non-flashlight photo-

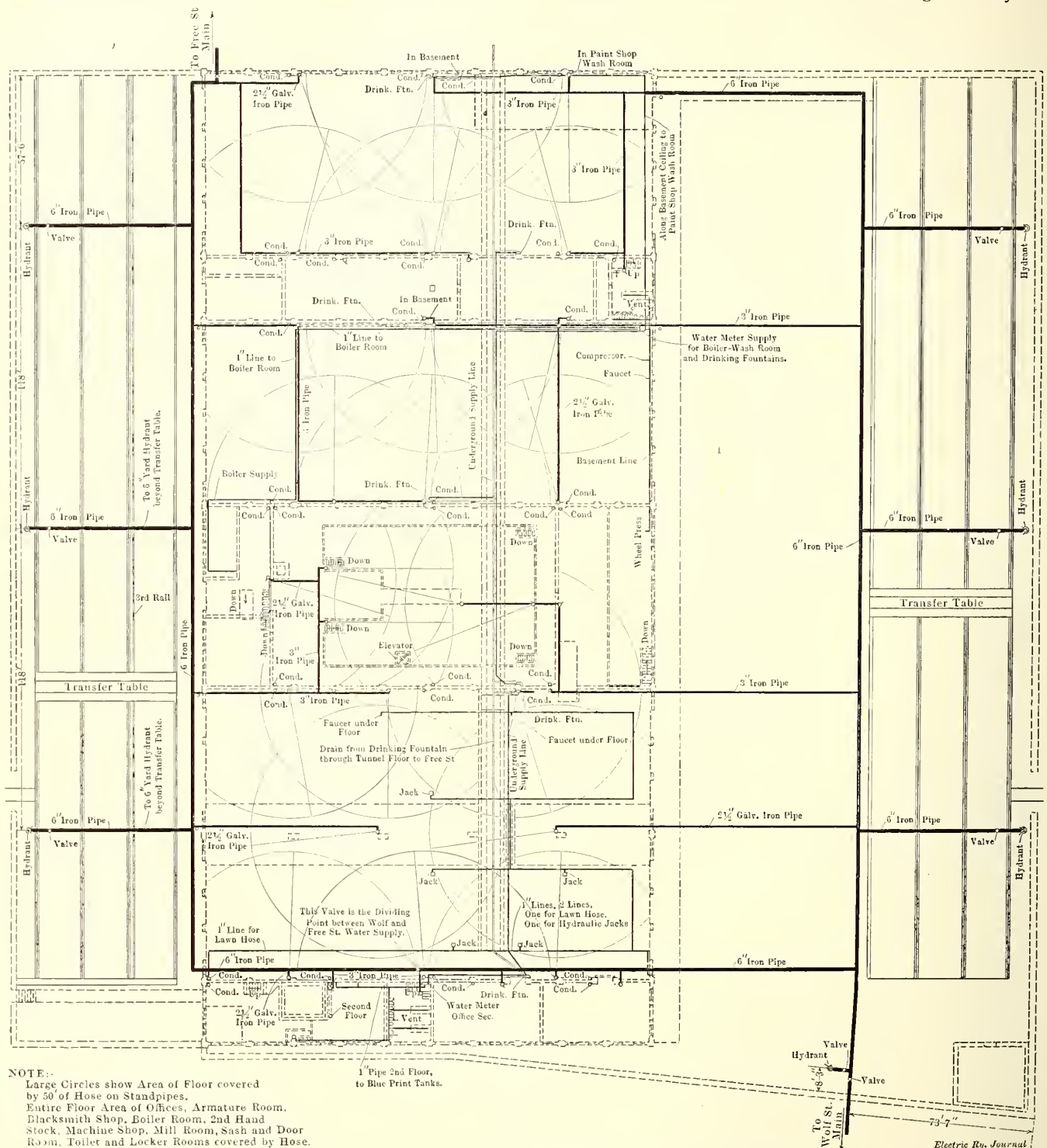
graphs. Artificial illumination is furnished principally by Cooper Hewitt mercury-vapor lamps, which have proved entirely satisfactory and safe even in the paint shop. Some flexibly suspended incandescent lamps are also installed in the paint shop in order to give extra illumination for striping and lettering.

After the shops were placed in operation it was found desirable to add pit lights in the truck overhauling section. This

cold air can enter in large quantities. Direct steam heating is employed either through pipes carried along the wall or through radiators. The steam for this service is generated in a boiler plant, which will be described hereinafter.

STANDARD SCHEDULES FOR CAR OVERHAULING

Before describing the mechanical and electrical features of these shops, it is desirable to refer at length to the standard schedule which is followed in the overhauling of every car



addition presented no difficulty as it had been foreseen and provided for by a conduit runway in the concrete filler between the inner web of the pit rails and the adjacent channel of the devil strip. This pit lighting conduit construction is illustrated in Fig. 4.

The heating of these shops has not presented any troubles. In a measure this may be ascribed to the use of motor-operated track doors, which greatly diminish the periods during which

with regard both to the time required and to the order of the work. Every car brought in for attention is listed on a sheet, Fig. 5, which is ruled and marked to show the number of the car, the class of overhaul required and the kinds of maintenance work. When certain cars are due for overhauling the several foremen are promptly notified and are asked to estimate the dates on which they could release the equipment specified. The schedule of work on cars is based upon the paint

shop work. This labor is laid out first, so that some of the cars may be drying while other cars are undergoing other operations. The work in the other shops is then laid out to conform with the paint shop schedule.

The way this scheme works out appears in Fig. 5, previously noted. Thus, car No. 516, brought in for light overhaul on Jan. 2, was to be stripped on Jan. 3, washed on Jan. 4, sent to the carpentry shop on Jan. 6, ordered to the paint shop on Jan. 10, trimmed on Jan. 28, returned to the truck shop on Jan. 30, touched up on Feb. 1 and tried out on Feb. 2. The foremen have become so familiar

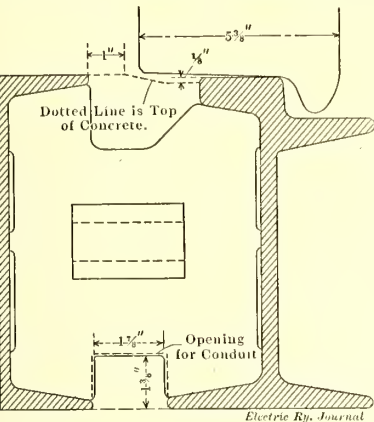


Fig. 4—Syracuse Shops—Section Through Pit Rail and Channel

with this routine that variations from the preliminary layout are rare exceptions. This practice has two conspicuous merits: The shop labor forces can be disposed to the best advantage and the transportation department can be advised to a day when given rolling stock will be available for service. Once the car has entered the shop it is moved from track to track in accordance with a definite program. By referring again to Fig. 2 it will be seen that there are 16 shop tracks in

- Track 12, sand blast room.
- Track 13, burn off.
- Track 14, re-color.
- Track 15, varnish.
- Track 16, wash and minor touch-up.

A car brought in for overhauling is placed on track 5 or 6; idle trucks are put under the body and the trucks removed and shifted to track 4. Then the car body is sent to track 11 for strip and trim. After this it goes to track 16 for washing. When washing is completed the car is placed on track 9 or 10 according to the class of woodwork overhauling, the heavier jobs going to track 9. Following this the car is passed on to track 13, 14 or 15 in the paint shops according to the class of work required. Next the car is sent back to track 11 for trim, after which it goes back to track 5 or 6 for the return of its own trucks. It is then taken on the road for a trial run and finally is placed on track 16 for the last touch-up and clean-

Old No.	New No.	Class of Overhaul	Truck Shop	Strip	Wash	Carp. Shop	Paint Shop	Trim	Truck Shop	Touch Up	Try-out
	516	Light Overhaul	Jan 2	Jan 3	Jan 4	Jan 6	Jan 10	Jan 28	Jan 30	Feb 1	Feb 2
	729	Complete Overhaul	Jan 4	Jan 5	Jan 6	Jan 7	Jan 13	Feb 2	Feb 6	Feb 8	Feb 9
	724	Varnish	Jan 5	Jan 6	Jan 7	Jan 9	Jan 12	Jan 23	Jan 26	Jan 27	Jan 28

Fig. 5—Syracuse Shops—Forecast of Progress of Cars in for Overhauling

ing preliminary to its return to service. The progress of cars through the shop is laid out to have the direction of movement always the same for the work on a given track, so that as the work progresses a car approaches the transfer table on which its next shift is to be made. Most of the car shifting is done before 7 a. m.

THE TRUCK SHOP

The truck shop is located in the second bay from Wolf

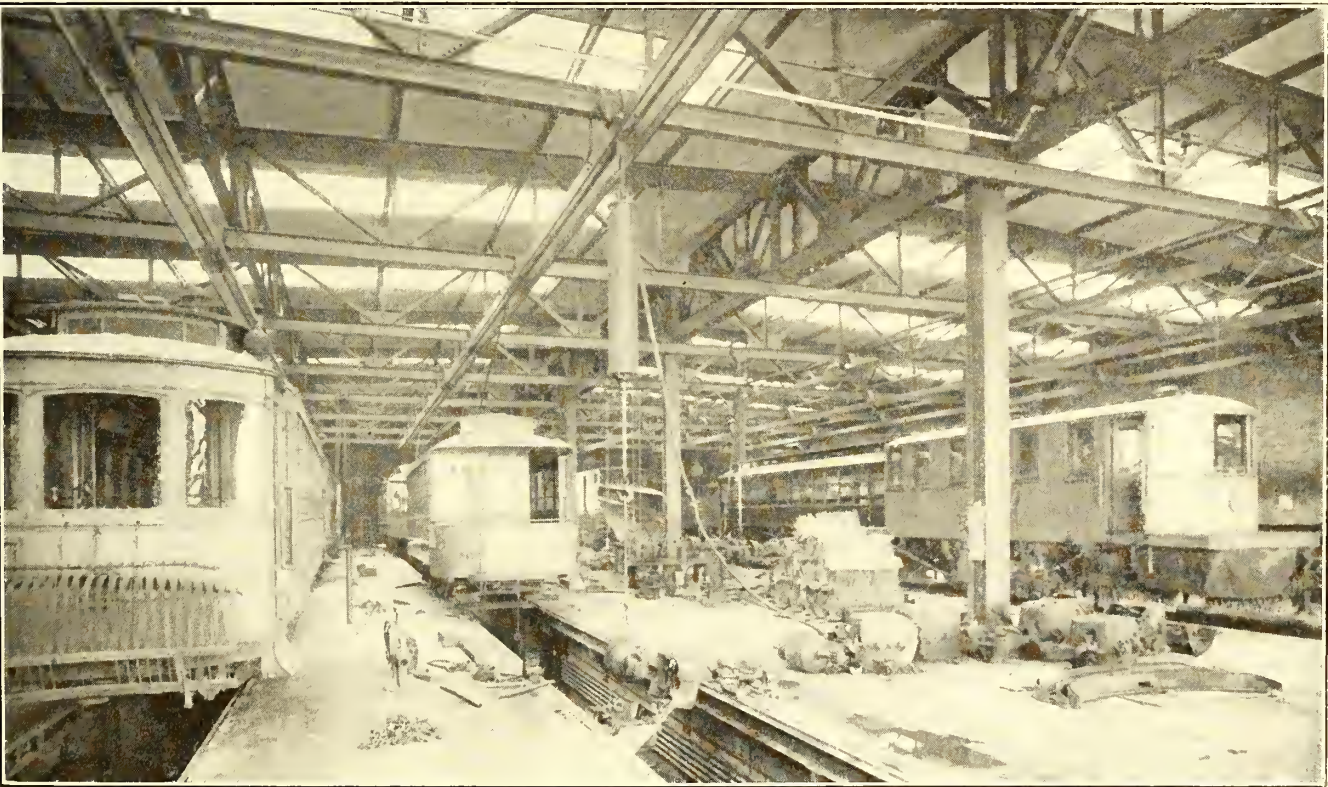


Fig. 6—Syracuse Shops—View in Truck Shop, Showing the Storage Aisle Between the Light and Heavy Overhauling Sections

all, 14 of which are used for some car overhauling purpose, as indicated on the drawing as follows:

- Tracks 1, 2 and 3, light truck shop repairs.
- Tracks 4, 5 and 6, heavy truck shop repairs.
- Track 7, storeroom track.
- Track 8, minor carpentry repairs.
- Tracks 9 and 10, woodwork overhauling.
- Track 11, strip and trim.

Street. It is 114 ft. 6 in. wide and contains six tracks. Tracks 1, 2 and 3 are for light overhauling, while tracks 4, 5 and 6 are for heavy work. The two groups are separated for the entire depth of the shop by an aisle floor space 25 ft. wide, as shown in Fig. 6. This area is used for overhaul of air equipment and affords a convenient place for the storage of parts

taken from trucks in progress of overhaul. The pipe fitters' bench is also located in this space and controllers, resistances, fenders, sweeper brooms, etc., which have been repaired and are ready to be placed on cars are stored here where they are readily accessible to the repairmen. The tracks in each group are spaced 14 ft. center to center to allow ample room for work

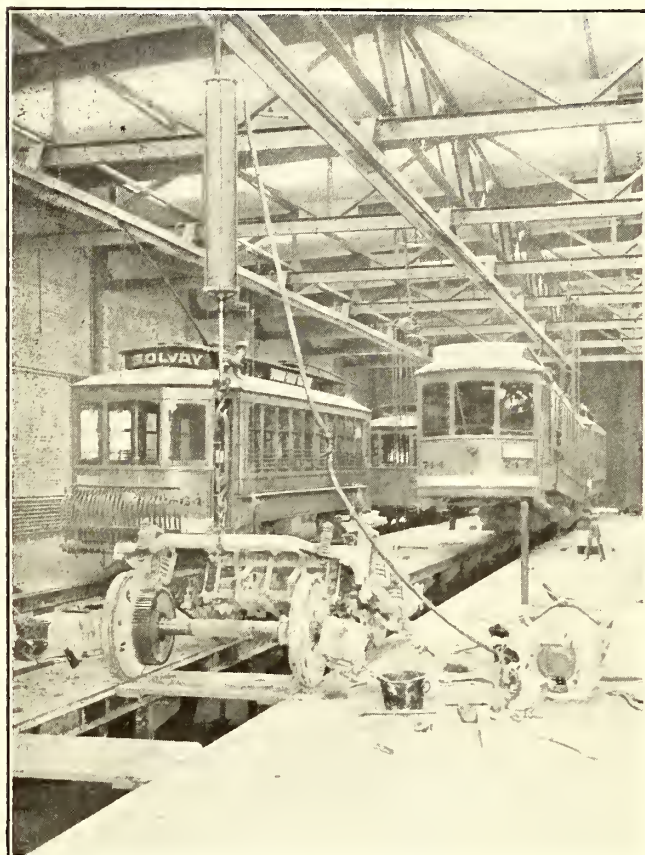


Fig. 7—Syracuse Shops—Air Hoist and Car Sling on Light Overhaul Tracks

on the sides of the cars. Room for work benches and light tools is provided by 10-ft. strips along both walls.

The pits of all the tracks are of the open type with reinforced concrete devil strips. The pit rails are of 9-in. girder section and are carried on offset brackets which are riveted to the sides of the pit posts. The extra pit width gained by these offsets is a great convenience in handling the larger size motors. The pits are sloped toward gutters under the devil strips and consequently are kept dry and comfortable at all times.

A T-iron overhead conductor is used for moving the cars in all the shop sections. A section of this conductor and its wooden trough is shown in Fig. 8. All screw holes in this trough are countersunk to avoid insulation trouble. The same drawing also shows a break in the trough to allow for the passage of the air hoist. This break occurs at each truss chord, the trusses themselves being designed so that the lower chord is an "I" beam in section and carries an ordinary "I" beam trolley. Supporting columns at the middle of the roof trusses are offset to allow the passage of these "I" beam travelers so that the load may be transferred from one track in the shop to any of the others without removal from the hoist.

Probably the most striking point about the truck shop and the adjacent departments is the elaborate system of hoisting and conveying work, comprising hand and hydraulic jacks, chain-block car slings, screw car lifts, pneumatic hoists and a jib crane. The transverse pit with its supply track is also an important aid in the conveyance of truck and electrical material from or to the lower level of this installation.

Typical chain blocks and Q M S pneumatic hoist equipments in service on the light overhauling tracks are shown in Fig. 7. The hoists are five in number, of 2 tons capacity each, and are carried directly from the lower chord to the roof trusses. Provision has been made for continuing the runways into the armature and blacksmith shops, but up to the present time it has not been found necessary to do this and the travel of the trolley ends at the doors of the armature and blacksmith shops. The hydraulic pit jacks are operated by a pipe line which carries city water at 70 lb. pressure.

The tracks marked 5 and 6 are furnished with motor-operated screw lifts, as shown in Fig. 11, to raise both ends of a

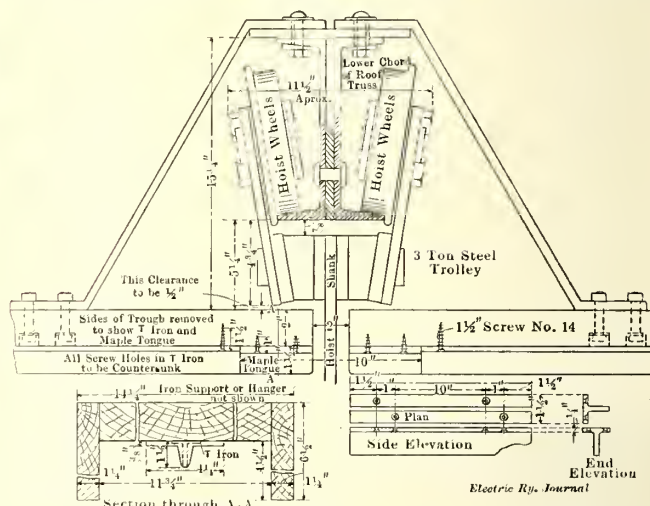


Fig. 8—Syracuse Shops—Overhead Trolley Track and Passing Device for Traveling Hoist

car body at the same time. Fig. 11 also presents one view of the 2-ton Q M S jib crane. It sweeps over an arc of 230 deg., extending all the way from the transverse pit to the machine shop, which is located in the rear of the third bay. The jib crane is arranged so as conveniently to handle wheels and

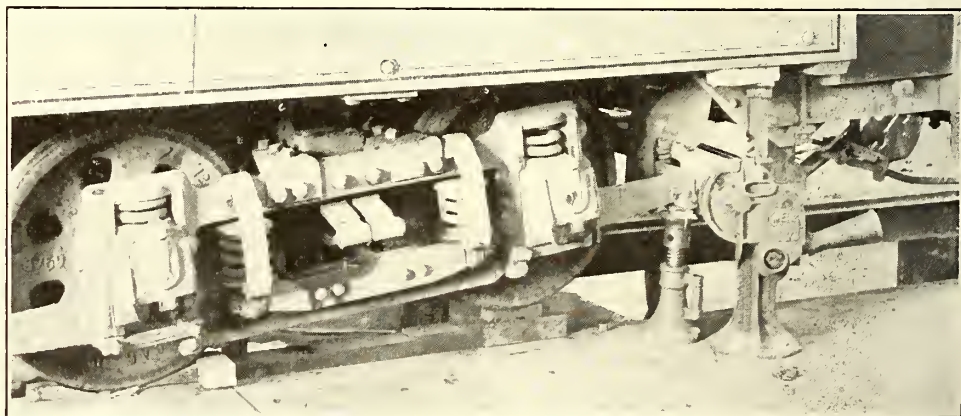


Fig. 9—Syracuse Shops—Grinding Out a Flat Spot by Spinning Wheel Against an Emery Block

other equipment from or to the transverse pit after raising a trap door alongside of track No. 6. It also serves the lower level of the machine shop floor, in which the wheel, press and tire-turning lathe are located. This crane is also of material assistance in dismantling trucks on tracks Nos. 5 and 6 within the radius of its movement. Fig. 10 shows the crane delivering a wheel set directly to a wheel press on the main floor of the

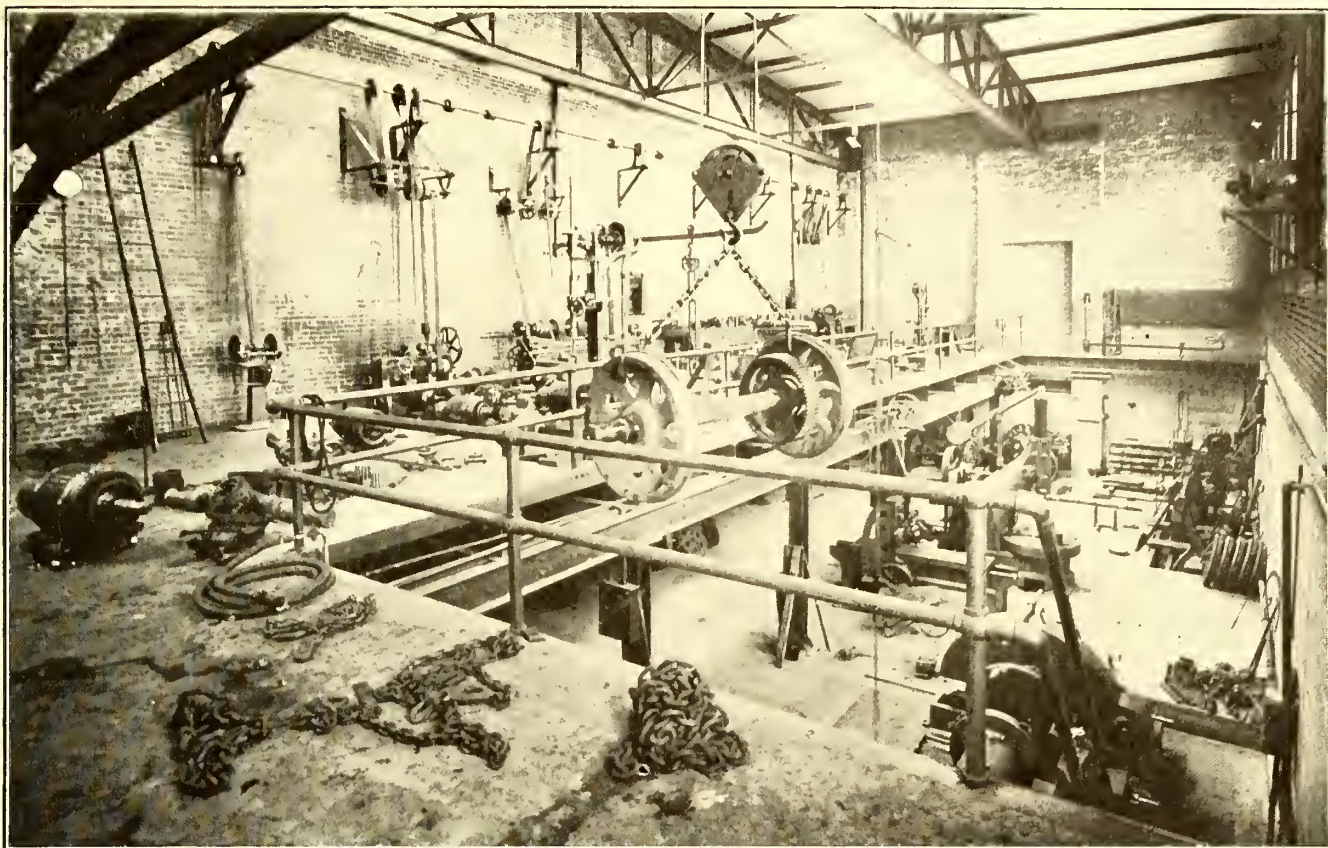


Fig. 10—Syracuse Shops—General View of Machine Shop and of Jib Crane Delivering a Wheel Set to Heavy Tool Department

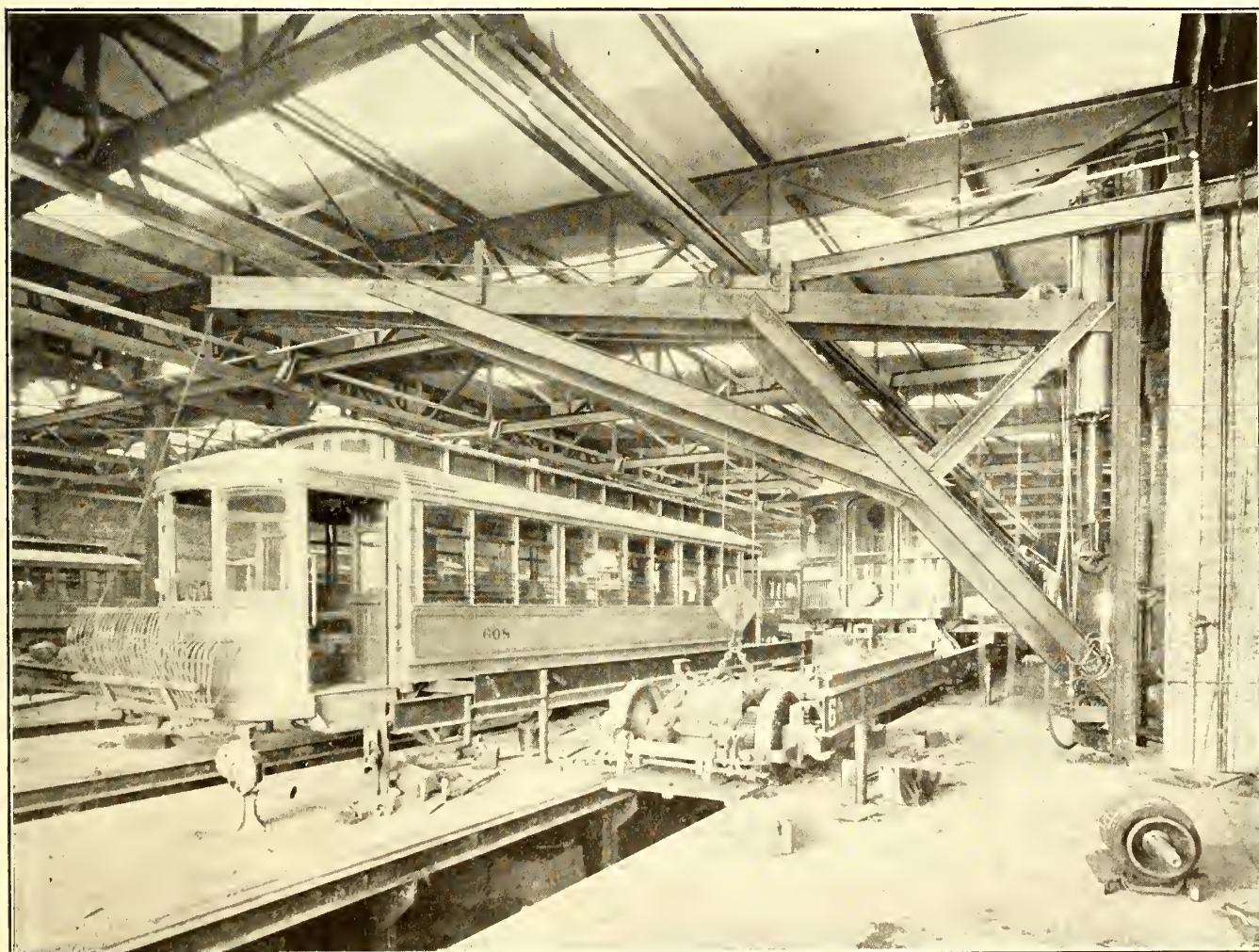


Fig. 11—Syracuse Shop—Jib Crane in Overhauling Section

machine shop. Such excellent transportation means as those described naturally foster thorough maintenance practice. To insure the inspection of every part trucks are entirely dismantled when wheel sets are exchanged.

A simple method for grinding out flats on wheels is illustrated in Fig. 9. One end of the car is jacked up so that while one set of wheels is blocked the other pair is lifted freely to be

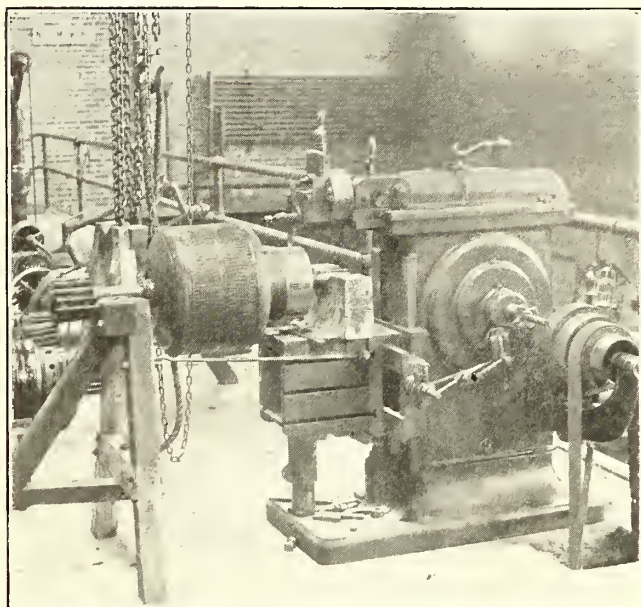


Fig. 12—Syracuse Shops—Slotting a Commutator on a Shaper

revolved by one motor. The flatted wheel is revolved against an emery block which is set under the wheel, as shown. Flats are also removed by spinning the wheel against emery brake shoes. The cooling water used during the grinding process is furnished through a pipe line from the pit.

It may be noted in passing that no welding is done in these shops, as there are not enough breakages of motor cases, etc., to warrant the employment of an expert. From time to time work of this character is sent to the Goldschmidt Thermit Company and the Davis-Bournonville Company for thermit and oxy-acetylene welding respectively.

ELECTRICAL AND BLACKSMITH SHOPS

The armature room and blacksmith shops are in the rear of the first bay; both are 23 ft. 6 in. x 42 ft. in size. These shops have side doors which open to the truck department alongside. In addition the blacksmith shop has a door at the rear. The armature-handling equipment includes an overhead track with chain hoist, two Columbia stands and one bander. Soldering is done very effectively with a combination gas and air torch. The air for this purpose is taken from the main 80-lb. air line through a small globe valve.

The management has not made any striking changes in its motor practice lately except to replace four-turn coils in the GE-800 motors by three-turn coils in order to increase the motor speed. The standard motor brush is the National Carbon Company's No. 15, but Le Carbone brushes are used in some of the motors. On the city cars the brush tension varies from 2½ lb. to 4 lb. per square inch on account of differences in the construction of the brush holders. All of the motors, in-

cluding even the oldest types, are being slotted. All motors have benefited materially from this treatment, and on the whole the combination of slotting commutators and soft brushes has eliminated all need for the keeping of flash-over records. Up to the present time it has not been found necessary to slot the commutators of compressor armatures.

The equipment of the blacksmith shop comprises one slitting shear with a capacity up to ⅛-in. plate; one 150-lb. trip hammer; two open forges and one combination gas and air furnace for babbitt metal. All work done in this shop is strictly car maintenance business in conformity with the management's policy to refrain from carrying out jobs which can be secured for a lower net charge from outsiders.

THE MACHINE SHOP

The machine shop occupies an area of 36 ft depth x 71 ft. 6 in. width behind the storeroom. It has two levels, as shown in Fig. 10. The upper level or gallery, which is flush with the truck shop, extends out for about one-half the width of the machine shop. This gallery carries the lighter machine tools, all of which are set parallel to the rear wall of the storeroom. The lower level of the machine shop is 8 ft. below the truck shop. The open section contains all the heavy tools, the space under the gallery being used for wheel and axle storage. A ramp from this storage leads directly into the open pits of the truck shop tracks.

The tools mounted in the gallery of the machine shop comprise the following: Two 18-in. x 24-in. engine lathes; one bolt cutter; one emery stand with 14-in. wheels; two drill presses; one power hack saw and one shaper. All of these tools are driven from one motor, the group nearest the storeroom being driven from an overhead countershaft carried on the wall and those near the edge of the balcony being driven from a countershaft under the floor, from which the axle lathe and plane on the lower floor are also driven. Work is brought to these tools by means of a pneumatic hoist runway which extends the entire length of the gallery. Fig. 12 shows the shaper as adapted for slotting commutators of various sizes by the ad-

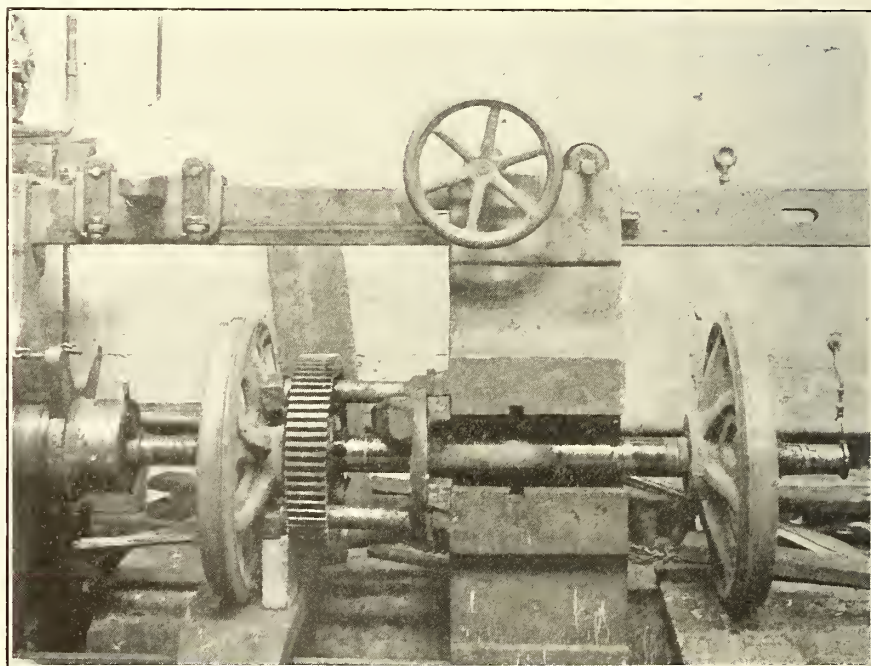


Fig. 13—Syracuse Shops—Pressing Off a Car Wheel Without Disturbing the Gear

dition of a stand. Armatures are brought to the shaper from a nearby lathe by means of a small swinging crane which is equipped with a Yale & Towne chain hoist.

All the heavy machine tools except the planer are separately driven by 220-volt, three-phase motors. They comprise the following: One 300-ton wheel press made by the E. R. Caldwell Company, Bradford, Pa.; one 36-in. engine lathe for axle

work and occasional wheel boring; one planer; one 42-in. Niles boring mill; one Pond tire-turning lathe. The planer and 36-in. lathe are driven from the light-tool countershaft.

Fig. 13 shows a method developed for pressing off a car wheel without interfering with the gear wheel. The extra apparatus required for this purpose comprises a yoke, which is integral with two bars, and a pair of curved wrought-iron blocks which fit over the spokes of the car wheel at a distance of 7 in. to 8 in. from the center-line of the car axle. A car wheel is pressed off in the following manner: By means of suitable spacing blocks the yoke is made to bear against the tail block of the wheel press and the yoke bars are passed through the gear to bear against the blocks which are fitted over the spokes of the car wheel. The operation of the press pushes the wheel off the axle but leaves the gear in its original position.

THE STOREROOM

The storeroom occupies most of the third bay, or 111 ft. 6 in. x 70 ft. 6 in. It is ideally located with reference to the shops which it serves and for receiving material. Like the machine shop it is built on two levels, as shown in Fig. 14. The upper level is an 8-ft., four-sided gallery on the same grade as the truck and carpenter shop floors and the machine shop gallery. This level has a track which is served by the southern transfer table and which extends over half way into the storeroom for the delivery of supplies for either level. The main floor is served by the transverse supply track which runs from Free Street under the paint and carpenter shop, through the storeroom and thence through the truck shop as a supply pit at right angles to the overhauling tracks. The transverse supply track running from Free Street under the

in bins. The means provided for transferring supplies from one part of the storeroom to another include the small elevator shown in Fig. 14, chain hoists and stock ladders which can be wheeled along the tracks in front of the bins. A chute is also provided for sliding brake shoes from the unload-

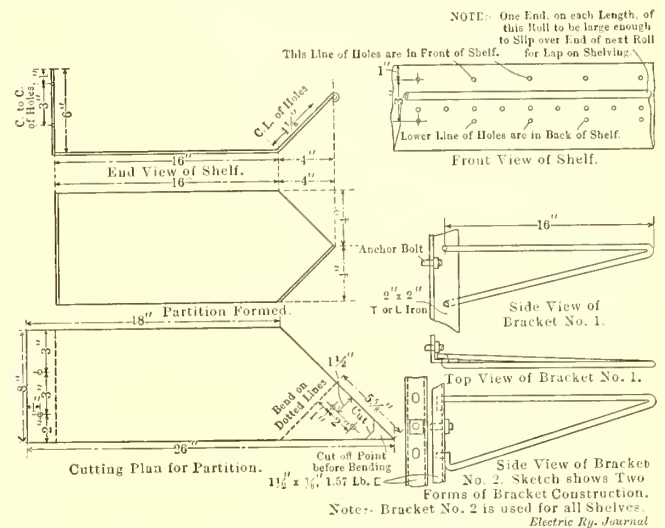


Fig. 15—Syracuse Shops—Details of Movable Bin Construction

ing platform to the storage under the gallery. The galleries are strong enough to carry racks and other suspended constructions on which are conveniently stored such articles as

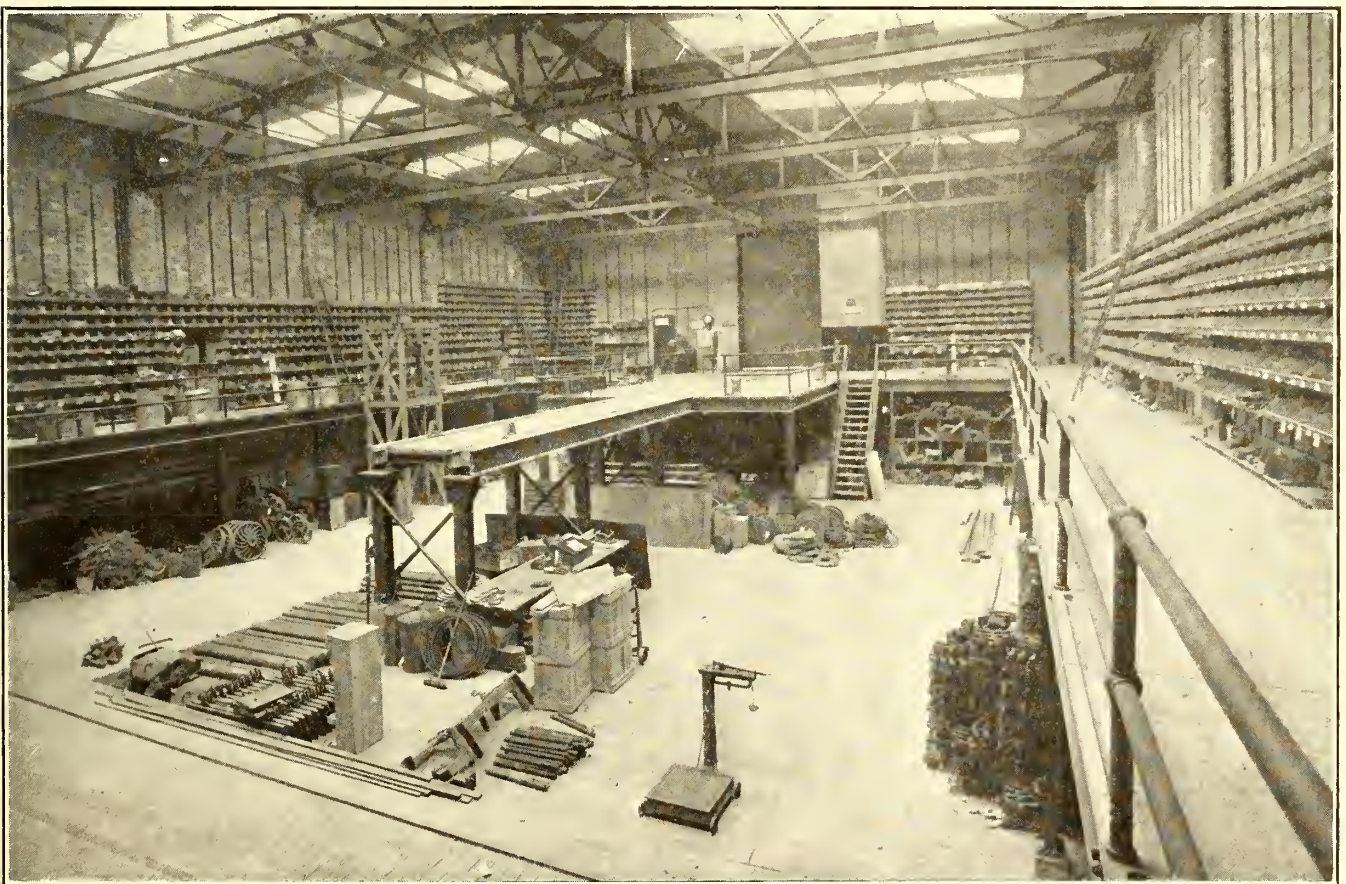


Fig. 14—Syracuse Shops—General View of Storeroom When Facing Forward, Showing Shelving on Gallery, Supply Tracks on Two Levels, Etc.

paint and carpenter shops is also used for the delivery of stock by horse-drawn wagons which may enter the storeroom proper along the supply track.

The storage scheme is to use the lower level for heavy material and the gallery floor for smaller articles which are placed

pipes, journal boxes, car signs and lead treads. These treads, by the way, are made from scrap metal. Such articles as gears, pinions, truck castings, reels of wire, brake shoes, lumber, etc., are stored on the lower floor.

The design of the storage bins and shelving merits special

attention because of the simple means provided to change at will the size of individual bins and the spacing between the shelves in accordance with changes in the character of the material stored. These bins are of galvanized iron and are built up as follows: Carrying channels are bolted vertically to the wall at 26-in. centers and are perforated for the insertion of the shelf brackets at any desirable intervals. The shelving consists of horizontal sections 12 ft. long which have a series of holes 4 in. apart so that the vertical partitions can be riveted to the shelf at intervals of 4 in. or multiples thereof.



Fig. 16—Syracuse Shops—Galvanized-Iron Bins

The general construction details of the bins and brackets are presented in Fig. 15, which also shows how the front edge of the shelving is rolled up for lapping over the next 12 ft. length to secure an unbroken construction. A view of the completed bins is shown in Fig. 16. Each bin carries a holder with a printed card which gives the bin number, the name of the article and the catalog number.

As previously noted, the storeroom is centrally located with reference to all the shops which require its supplies. To secure the maximum benefit from this arrangement the materials on the gallery floor are stored in proximity to the shop which uses them. Three storeroom windows open to the truck shop, three to the carpenter shop and one to the machine shop gallery. Large articles may be passed out through fire doors at diagonally opposite corners of the storeroom. The paint shop has a small special storeroom for daily supplies. All articles are received by the traveling storekeeper, who delivers the supplies to the men who have submitted formal requisitions for them.

The subject of storeroom practice is intimately associated with the economical use of material and particularly as regards the reclamation of scrap. It is the duty of one man to collect all scrap and sort out that which could be made available for use again by re-threading, retapping, cutting or adjustment. This work done, the second-hand articles are placed in special bins which are reserved respectively for equipment parts of the Oneida and Syracuse Railway systems. These supplies are kept in front of the storeroom and may be taken without

formal requisition. In order that the workman may procure new stock it is necessary for him to consult the traveling storekeeper, tating to him what articles are needed. The storekeeper, after getting the approval of the forman upon the formal requisition, obtains the articles from the storeroom and delivers them to the workman who is to use them. By specializing the supply department in this manner much laxity is eliminated and important economies are effected in the time of the men.

CARPENTER AND PAINT SHOP PRACTICE

The carpenter shop occupies the fourth bay, which has an area of 174 ft. x 70 ft. 6 in. It contains four tracks, the uses of which are indicated on the general plan, Fig. 2. Only the track for minor repairs is furnished with a pit and this is of the closed type. The tracks are spaced 14 ft. centers and, furthermore, the entire bay is absolutely free from incumbering heavy machinery or supplies. Seating and car lumber supplies are stored in the basement, access to which, as mentioned above, may be had only through the storekeeper. This basement also contains the Ingersoll-Rand compressor of 300 cu. ft. capacity, which supplies compressed air to the entire installation.

The bay next to the carpenter shop is 24 ft. 6 in. It is divided by fire walls into the following sections for the purposes named: Sand blast room, 30 ft. x 16 ft. 6 in., with a track opening to south transfer table; paint-mixing room, 30 ft. x 7 ft., opening to the paint shop; mill room, 67 ft. x 24 ft. 6 in., opening to the carpenter shop; sash and door room, 52 ft. x 24 ft. 6 in., opening to the paint shop; fire-door protected hallway, 5 ft. wide, and employees' two-floor toilet and recreation room, 16 ft. x 24 ft. 6 in.

The sand-blast room is used for sanding glass and for cleaning the metal parts of cars, either loose or on cars brought part way into the room. Fig. 17 shows the two methods em-

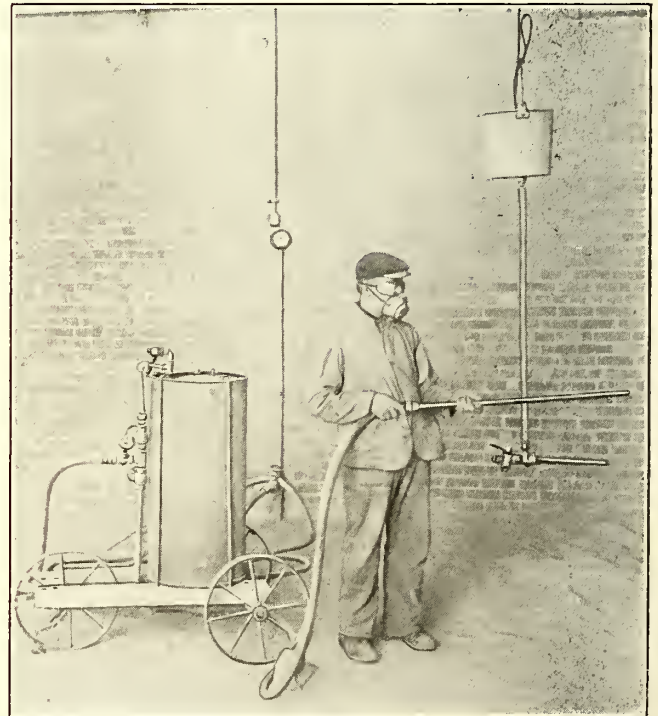


Fig. 17—Syracuse Shops—Two Equipments for Sand-Blasting Glass

ployed in this room for sand-blasting. The simpler method, which is applied to smaller jobs, calls for the use of a pail of sand and an air-line connection. The pail is suspended from the roof trusses. The sand flows through a hole in the bottom of the pail to the sand-blast pipe, where its momentum is accelerated by an 80-lb. air-line connection as illustrated. The operator has nothing more to do than to steady the pipe and manipulate the valve which controls the flow of compressed air.

The same view also shows the portable tank used for sand-

blasting. This first was operated on the injector principle alone. It was found necessary, however, to add an air line at the top of the tank in order to force the sand down toward the injector. There are three valves on this tank; the top valve controls the air which enters the top; the left-hand valve controls the injector action, and the bottom valve regulates the flow of sand.

To minimize the danger from fire the paint-mixing room carries only enough stock to last for one day, or in any event only the smallest package of each article. The main stock of oils, paints and varnishes is kept in an isolated building. The man in charge of the mixing room is notified in advance by the paint shop foreman what materials will be required for the day so that no time is lost by the painters in waiting for materials. As this storekeeper also prepares all painting mixtures more uniform results are assured than when each painter does this work. The men cannot get new paint or brushes unless they return the emptied cans and worn brushes.

The mill room equipment is driven from countershafting by a 10-hp, 220-volt, three-phase motor. It embraces the following tools, which were furnished by the American Woodworking Machinery Company: Variety saw, planer, joiner, two-spindle shaper, hollow chisel mortiser, band saw, jig saw, tenoner lathe, emery wheel and drill. The sash and door room contains several interesting devices for cleaning and varnishing sash, doors and signs, as well as for frosting glass and baking lacquers. A revolving table for handling sash is shown on the right in Fig. 19. The square top of this table is perforated with holes into which four rubber-tipped plugs are inserted at the distances required by the dimensions of the sash. The rubber tips of the plugs prevent the glass from sliding about. A revolving stand for handling panels and doors up to 30 in. width is shown on the left in Fig. 19. The top of this stand has holes to take the pegs of differently sized supports for door and sash. The illustration of the door stand shows two styles of these removable supports. Of course, in practice those pieces must be of the same length and inclination. Fig. 18 shows one of the door and sash racks.

Fig. 21 is a view of the galvanized-iron gas oven used for baking lacquer and frosting glass. The gas burner is set at the bottom under an asbestos shelf. When glass is to be frosted a door at the top of the oven is opened to keep the temperature below 110 deg. Fahr. The glass is carried on five pairs

ing oven. The glue will begin to flake off immediately, taking particles of glass along. The resultant pattern depends upon the coarseness of the sand blast and the thickness of the glue.

The following method is applied to make a frosted glass panel with a plain border and a bevel corner effect: With ordinary stationer's mucilage a piece of paper is pasted over the portion to be left plain (Fig. 20), but a diagonal slit is left between the corresponding corners of the plain and frosted areas to obtain the desired bevel effect. Then all of the exposed glass is sand-blasted and the glue and soda solution

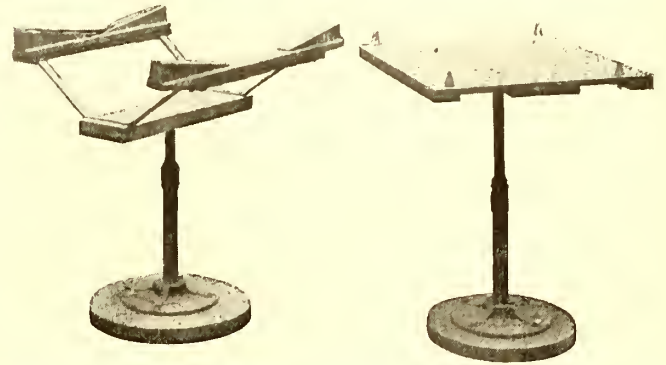


Fig. 19—Syracuse Shops—Revolving Stands for Sash and Door Work

applied over the same. Upon this the glass is placed in the oven and the job completed by immersion in a vat of water to soak off the paper.

The paint shop occupies the last bay, which covers an area of 174 ft. x 70 ft. 6 in. and contains four tracks respectively for burn-off, recolor, varnishing and washing and minor touch-ups, as indicated on the drawing, Fig. 2. An interesting feature is the isolation of the car-washing section (69 ft. 5 in.) of the last track by the erection of a glass partition. This partition

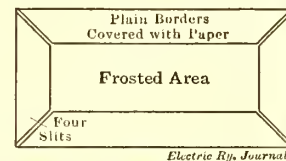


Fig. 20—Frosting Glass

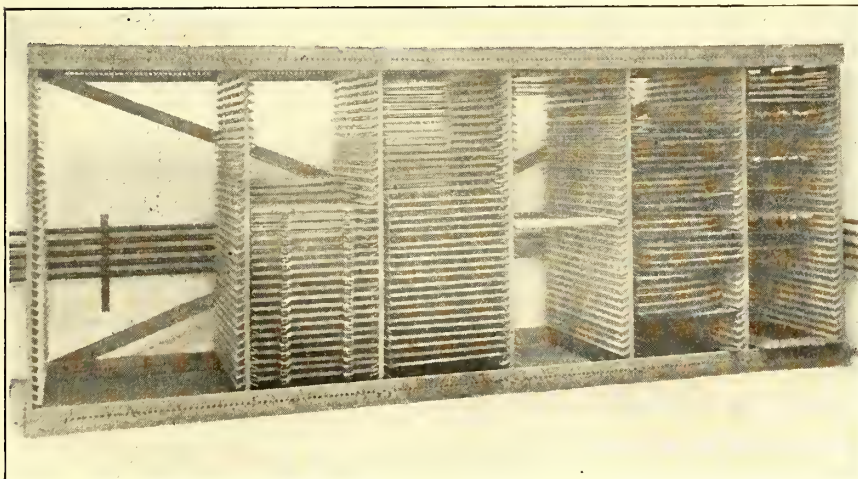


Fig. 18—Syracuse Shops—Sash Racks in the Painting Department

of crosspieces which are adjustable for any pane within the limits of the oven. As shown in the illustration the crosspieces have barriers formed of reversed nails.

Glass is frosted in the following manner: First, the glass is sand-blasted to get a ground surface and then the grounded side is covered with a solution of glue and soda. The soda is added in very small quantities to shorten the glue, that is, to take out its elasticity. After the glue has set so hard that it cannot be punctured by fingernails the glass is set in the dry-

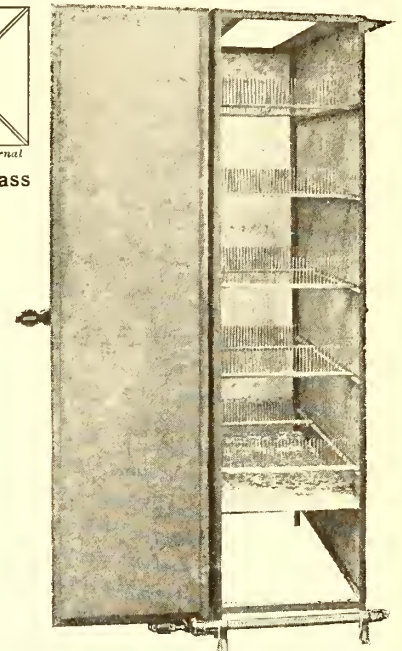


Fig. 21—Galvanized-Iron Oven with the Gas Burner Removed

is made up of 12-in. x 18-in. panes and extends from the lower chords of the roof trusses to the top of the 3½-ft. concrete wall which carries it. This partition makes it possible to use a hose in car washing without splattering water on freshly varnished cars near by. The washroom is supplied with gas for heating water.

The concrete wall on which the glass partition is supported also carries a group of steam pipes on the side adjacent to the varnishing track. During cold weather every effort is made to

maintain a proper uniform temperature in the paint shop. The ideal temperature is set at 68 deg. and it usually varies from 65 deg. to 70 deg. The night watchmen take temperature readings every hour.

The accompanying illustration, Fig. 22, is a view taken along one side of the paint shop. It shows the steam piping, part of a fire-hose reel and adjustable pipe racks for carrying seats and other fittings of various lengths. The lower rows of pipe brackets serve as convenient supports for painting long strips. The same illustration also shows a portable air-gasoline tank

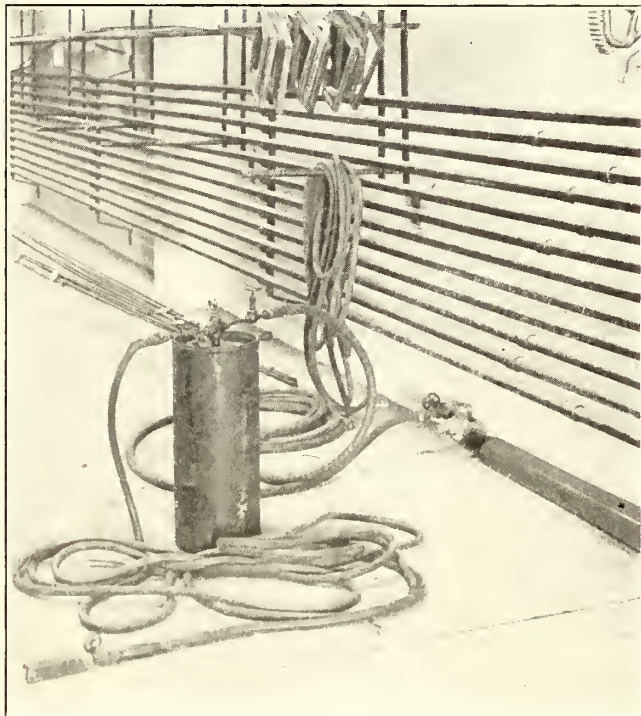


Fig. 22—Syracuse Shops—Combined Gasoline and Compressed Air Outfit for Burn-off Work

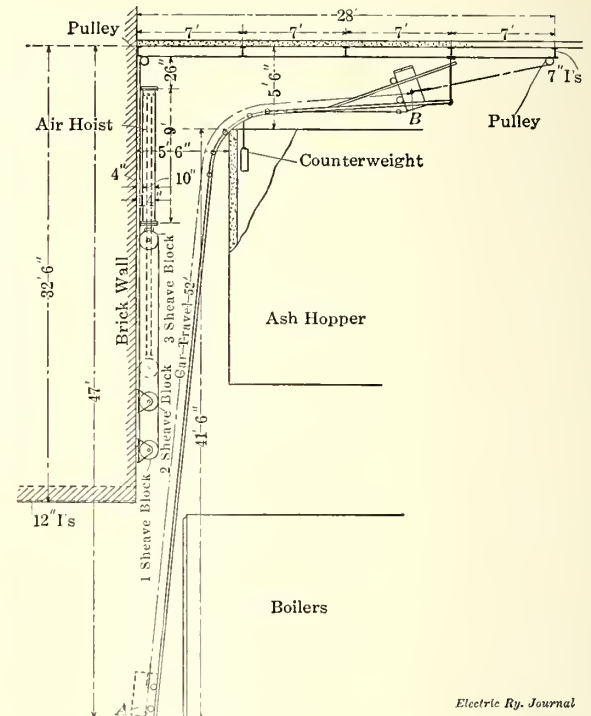
and burners. To one side of this tank there is connected an air line with a pressure ranging from 30 lb. to 100 lb. The air line is carried to within about 1 in. from the bottom of the tank, where the air is released through small holes in the pipe and allowed to bubble up through the gasoline so as to go to the nozzles in the form of a combustible mixture of air and gasoline vapor, the supply of which can be regulated at will by a valve at the nozzle. One and even two side valves or taps can be taken, so that three burners at various places may be supplied from one tank. There is no possibility of causing trouble by reversing the coupling connections, because the air line which fits into the top has a 3/4-in. connection, whereas all the nozzles have a 1/4-in. connection.

The work of the paint shop has been systematized by preparing schedules up to and including the year 1915 on which are reported the dates when certain cars are to be brought into the shop for burn-off, varnishing, cutting in, recolor or other attention. A portion of the schedule for the year 1911 is reproduced in Fig. 24. The basic theory of this schedule is that there should be 14 months between varnishings and 18 months between re-colorings. In practice, however, the averages are respectively 15½ months and 20 months, owing to the fact that after re-varnishing a car is allowed to run 18 months before re-coloring. The trucks and electrical equipment are overhauled at the time the car is shopped for paint or varnish. The schedule is also affected by local conditions, such as the State Fair, which make it necessary to have the maximum amount of rolling stock in service.

It will be noted in the schedule that a column has been left for the carpenter shop. This space was left so that the class of body overhaul to be undertaken at the time of shopping may be determined and noted in advance. The cars marked "no record" are those shopped prior to November, 1908, when no painting chronicle was kept. This practice of forecasting the amount and kinds of painting required over several years is working out very satisfactorily.

MOTOR, LIGHTING AND HEATING EQUIPMENT

The power for operating the motors in the several shops



Electric Ry. Journal

Fig. 23—Syracuse Shops—Operating Details of Ash Hoist and Dump

and for the lighting system is taken from an 11,000-volt, three-phase, 60-cycle circuit. The current for the motors is stepped down to 220 volts by transformers. A motor-generator set furnishes 550-volt direct current for the lamp circuits. The apparatus, which is controlled from equipment on a Crouse-Hinds slate switchboard, is placed in the third bay in front of the storeroom and adjacent to the bins for second-hand mate-

	JANUARY				FEBRUARY				MARCH			
	Car No.	Paint Shop		Carp't Shop	Car No.	Paint Shop		Carp't Shop	Car No.	Paint Shop		Carp't Shop
		This Month	Last Shopping			This Month	Last Shopping			This Month	Last Shopping	
1	516	Var.	Cut in		705	Re-color	B. O.		730	Var.	New	
2	368	B. O.	No. Record		806	Var.	B. O.		371	B. O.	No. Record	
3	323	B. O.	No. Record		626	B. O.	Re-color		502	Var.	Cut in	
4	729	B. O.	Var.		514	Re-color	Var.		624	Var.	B. O.	

Electric Ry. Journal

Fig. 24—Syracuse Shops—Part of Painting Schedule, Showing Heavy Numbers for the Syracuse and Light Numbers for the Oneida Cars

rial. For two important reasons this converter equipment was chosen in preference to tapping the railway circuit. The location of the shops at the extreme end of a feeder line would otherwise have required the erection of another feeder to insure good regulation; it was more desirable to operate the machine tools by three-phase instead of direct-current motors.

The shop heating plant is located in the basement in front of the storeroom. This installation is entirely surrounded by fire walls. The steam generating equipment consists of two 125-hp Ames return tubular boilers which supply steam on the

gravity return system at 10 lb. to 12 lb. pressure. The coal is delivered to the boiler room by gravity through a boiler-plate chute to a concrete hopper under the floor of the section in front of the storeroom.

The ashes from this plant are conveyed to an overhead bunker which is high enough to permit the contents to be dumped by gravity into ash cars brought in on the transfer table. The apparatus for raising the boiler room ash car,

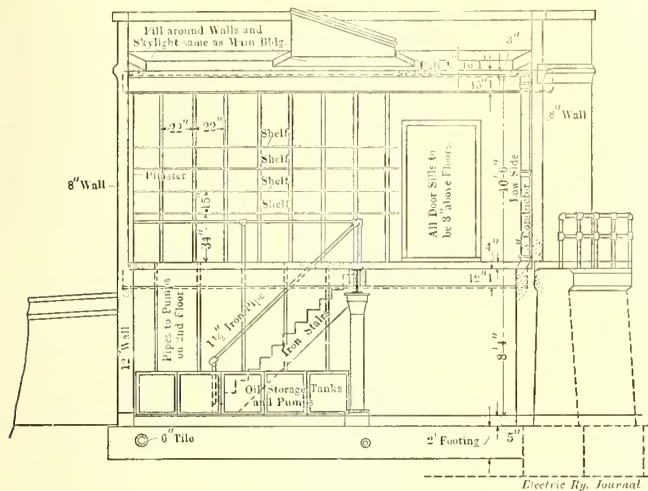


Fig. 25—Syracuse Shops—Cross-Section Taken Through the Paint and Oil House

dumping it automatically and returning it to the floor is very ingenious and effective. As shown in the accompanying drawing, Fig. 23, the ash runway is a ladder which rises almost perpendicularly to a height of 41 ft. 6 in. and then runs hori-

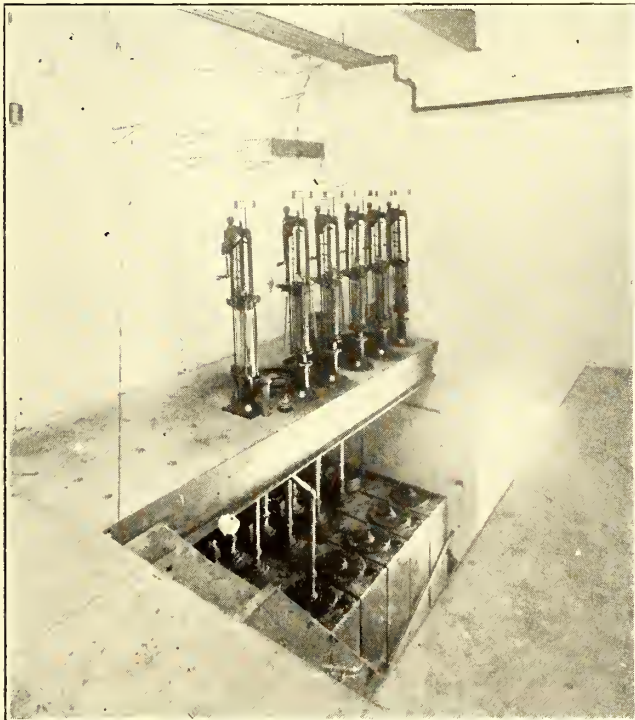


Fig. 26—Syracuse Shops—Oil Pumps and Tanks in the Oil House

zontally to a branch-off over the hopper. The ash car has two pairs of wheels of different gages. The front wheels take the inner track and the rear wheels the outer track formed by the sides of the ladder. On reaching the branch-off over the ash hopper the leading wheels follow the narrow-gage track, which continues on the level, while the rear wheels move up on the wide-gage track. The car is so constructed that this tipping causes the dumping of the ashes. The car is pulled up the

ladder by means of an air hoist and differential sheaves. It will remain over the hopper as long as the air valve in front of the hoist is not cut off. On reaching the top of the vertical run the car hooks onto a counterweight to prevent speeding up. This hook automatically guides the car after it has rounded

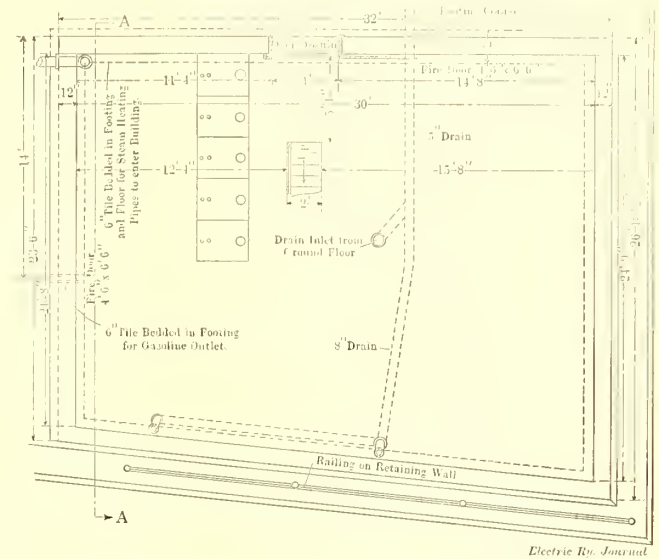


Fig. 27—Syracuse Shops—Plan of First Floor of Paint and Oil House

the curve, but releases it after the car has started to return. The ash car weighs 100 lb. empty and 500 lb. when filled.

GENERAL OFFICES

The general offices of the engineering and shop departments are located in the second-story section parallel to Wolf Street, which constitutes the first bay. The lower floor contains the office of the assistant electrical engineer and his staff; also thoroughly equipped toilet rooms and lockers. The second floor is divided into rooms for the record and drafting forces.

The records are stored on the first floor of a two-story vault. The second story of this vault is reserved for maps, tracings

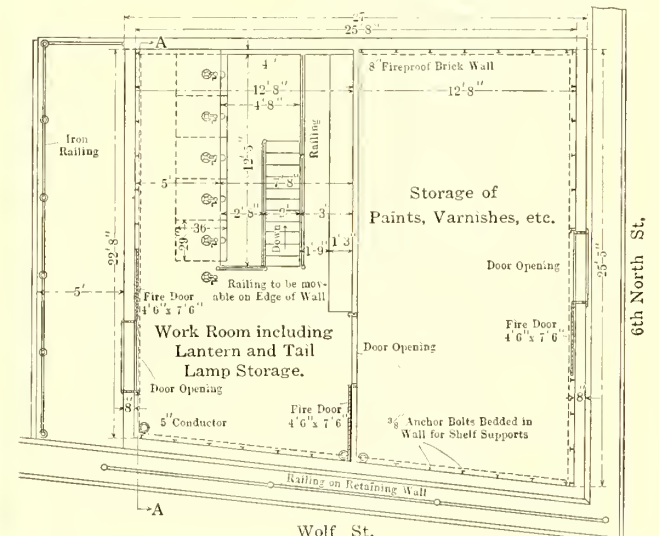


Fig. 28—Syracuse Shops—Plan of Second Floor of Paint and Oil House

and shop drawings. The facilities for filing drawings and for making blue prints are thoroughly modern. Tracings are filed in a cabinet in which they hang in small groups from horizontal rods supported on brackets, with engaging tabs, spaced at varying distances from the center. A pair of corresponding movable tabs is carried on the cabinet door, which is hinged at the bottom. The movable tabs may be set at any desired distance from the center by sliding a pointer at one side of the

case, connected to the cards controlling the movable tabs, and traveling over an index. When this block is set the cabinet door is opened and all groups of tracings back as far as the one desired are pulled down with the cabinet door so that the tracing desired is on the top when the door reaches a horizontal position, in which position it is supported by a horizontal leg attached to the face of the door.

The tank in the blue-print room is fitted with a pair of rollers, like those of a wash ringer, to aid in drying the prints rapidly. The prints are hung over rods which are carried on angle irons set in the walls of a closet. Electric heaters are used for drying the prints placed in this closet. The blue-printing machine is of the Buckeye arc-lamp type.

THE OIL AND PAINT STORAGE

The fire risk of the installation as a whole has been greatly reduced by storing the bulk of all highly inflammable material in a separate structure about 150 ft. from the main building. This house is two stories high and covers an area of 33 ft. x 26 ft. 10 in. The walls are of brick and the floors of concrete, all framed with I-beams. The general interior view, Fig. 25, was taken during construction and shows a wooden stairway and some temporary light wiring on the wall. When the oil house is completed this wooden stairway will be replaced by an iron stairway. The general interior view, Fig. 26, does show a wooden stairway, but this, as well as the wires on the wall, was but temporary. Coburn fire doors protect the entrance on the ground floor and also the two doors, whose position is indicated on the plan of the second floor, Fig. 28. The building is well lighted by wire-glass skylights, of the same type as those used in the shop buildings. In addition there is a single 4-ft. x 7-ft. 6-in. door on the north side in the paint and varnish storage room. The south side has a 4-ft. x 7-ft. 6-in. door which leads to a railed concrete platform for handling stock. The view of the interior shows a portion of the steam heating piping which is supplied by means of underground duct lines from the boiler plant previously described. The drainage is carried off through tile ducts, as shown in the first-floor plan, Fig. 27. Ample provision also has been made for ventilation.

The ground floor is used principally for the storage tanks, which contain kerosene and different lubricating oils. The gasoline tank is placed underground at some distance from the oil house, so that the possibility of an explosion from this material causing great damage is remote. As shown in Fig. 25, the several tanks are controlled by six Bowser oil pumps which are located directly overhead. These pumps measure quantities from 1 pint to 1 gal. inclusive. Each pump carries a card showing the tank number and the kind of oil stored.

The second floor is divided into two sections by an 8-in. brick wall, as indicated in Fig. 28. Approximately one-half of this area is devoted to a room for the storage of paints and varnish. The doors of this room are locked, access being possible only to the authorized storekeeper. The rest of the upper floor has been fitted with shelves for tail lamps, signal lanterns, etc. The shelf brackets are adjustable for different sizes of supplies, as they are set in wall channels which are perforated at short distances like the channels installed in the main storeroom and the paint shop. Shelves of this type are also used in the paint and varnish room.

THE RECORD SYSTEM

All of the line, power and car maintenance records of the Syracuse Rapid Transit Company, the Oneida Railway and Utica & Mohawk Valley Railway are kept at the Wolf Street shops. The record forms of each company are of the same type, but to distinguish them from one another the Syracuse records are blue, the Oneida records pink and the Utica & Mohawk Valley records yellow.

Fig. 29 is a copy of the lineman's daily report as used on the Syracuse and on the Utica & Mohawk Valley systems. The form is used to show the work done either by individuals or wagon gangs. It will be noted that to each section are given a number and a letter in accordance with the job order system carried out by these companies. The letter signifies the class of work done. In this case, for example, the "D" means "over-

head trolley." The name or description of the work is written in only when it is not covered by a letter. These reports show exactly what material was used, the nature of the repairs and the names of the men employed. A report of this kind must be

signed by the superintendent of overhead lines before it can be transmitted to the general office.

Fig. 33 is a facsimile of a typical line trouble report. Such reports are made out by the emergency man answering calls and are intended to cover emergencies only, such as broken wires, limbs of trees down and fire calls near the lines of the company. They are not intended to include a record of work done, but simply to tell when the trouble was reported, when the crew arrived, when the line was cleared and when the crew returned.

Fig. 29—Syracuse Shops—Lineman's Daily Report

The description of shop forms used in connection with car maintenance properly begins with the daily shop report, Fig. 30. This form summarizes the work done in each department of the shop on different cars, the nature of the work done, which of the cars remained unavailable for service at 1:30 p. m. and other data. The necessary detail for minor repairs on a given

Fig. 30—Syracuse Shops—Part of Daily Shop Report

car is recorded on a shop tag form, Fig. 31. One side of this shop tag gives the number of the car, when it was brought in and the trouble. That side of the tag which is reproduced shows what repairs were made and also gives the initials of the men who did each class of work shown.

The general daily report previously referred to is made up from the "cars changed" slips, Fig. 32, in addition to using the shop tags. The upper part of the "cars changed" slips showing the number of the car pulled off is made out by the dispatcher of the line, who forwards it to the carhouse foreman. The lower part of this form shows the number of the replacing car and under "Remarks" recites the trouble which was found

on the car pulled in. It should be understood that this form is used only for a record of car shifting in the car houses. If the trouble cannot be corrected at the carhouse the car must be sent to the shop, as noted on the "Cars Changed" slip.

The mileage of all cars is kept by the auditing department, which transmits this information to the shop. Mileage records are kept of wheels and axles, gears, pinions and armatures. It is also planned to keep truck records. The card record,

KEEP CLEAN

Shop Tag—Repairs

Car No. 730

REPAIRS MADE	BY
12 Armature Shimmied	
2 Axles & 1 New field axle bearings changed	M. H.
#1 Controller Repaired	H. H. P.
Brake inspected	St. H.

Complete 10 A.M. 1/16/1911 P. R. Foreman

Fig. 31—Armature Report Tag (Front)

CARS CHANGED.

Jan 13 1911

Pull off Car No. 744

Line Dudley

Time due 7:02 P.M. at Long Dudley

Reason for Change Overload Switch

Signed John Bonney

Notice Received 6:40 P.M.

Put out Car No. 774

Remarks Blowing heater No. 2 Arm Shing Band off Inspected by J. Briggs sent to Shop

Signed [Signature] Foreman

Fig. 32—Shifter's Report on Pull-Offs

Fig. 34, shows the record of an armature, giving the dates when it was taken on and off different cars and trucks and what the nature of the trouble was in each case. This record does not show the mileage, but this can be obtained from the monthly mileage sheets prepared by the auditing department.

LINE TROUBLE REPORT									
LOCATION	RECORDED		Time	TROUBLE	TIME			REMARKS	Cleared by
	By	To			Arrived	Line Clear	Returned		
Salma & Union	Brant	Riley	11:35 A	Broken Trolley	11:45		12:00		Riley
Burnet Ave	Dot	Riley	12:25 P	" "	12:45	12:50	1:30		Riley
Portland Ave	Leo	Southard	6:30 P	Broken Span	6:45		7:10		Southard
Fayette St	St. Bern	Southard	9:15 P	Car Off	9:25		9:55		Southard

Fig. 33—Syracuse Shops—Inspector's Report of Line Troubles

The mechanical inspection sheet, Fig. 35, checked daily by the mileage clerk, shows the numbers of the cars due for inspection, oiling, etc. On this sheet the carhouse foreman must check off the numbers of all cars which have been in-

shops. If a car on the line is carrying one or more materials on tests its mileage is reckoned on a blue card.

All equipment is maintained on the mileage basis, but different intervals are in use according to the character of the apparatus. The carhouse inspection periods for the Syracuse Rapid Transit cars carrying Westinghouse 101 B equipments are as follows: 500 miles for controller, brakes, trolleys and general inspection; 1500 miles for oiling motors; 1000 miles for air equipment; 7000 miles for Whittemore gear lubrication; 25,000 miles for repacking bearings.

The following standards are in practice on cars of the Oneida Railway carrying GE-73 equipment: 1000 miles for general controller brake and miscellaneous inspection; 2000 miles for oiling motors and journals; 7000 miles for gears and pinions.

SYRACUSE RAPID TRANSIT RAILWAY CO.

Mechanical Inspection Sheet

INSPECTION DATE 1911

USE "X" TO CALL ATTENTION TO REMARKS ON BACK OF THIS CARD

53	636	710	752	829	867
66	638	711	754	830	869
315	640	712	756	831	871
319	642	713	758	832	873
321	644	714	760	833	874
630	707	736	824	862	
632	708	748	826	863	
634	709	750	828	865	

INSPECTOR FOREMAN

Fig. 35—Syracuse Shops—Mechanical Inspection Sheet

It should be mentioned here that no attempt is made to keep the packing of the journals on a mileage basis so far as the Oneida Railway is concerned. The journals on this company's heavy electric high-speed cars are always repacked whenever the wheels are changed and any other time when necessary.

Armature MILEAGE RECORD

TYPE 101 B NO. 496518 MAKE

IN	OUT	CAR	TRUCK	MILEAGE	TROUBLE
1/22/11	4/20/11	717	1-2		Flat Commutator
5/1/11	10/6/11	267	1-2		Grounded
10/31/11	11/13/11	267	2-3		Overhaul
4/12/11		714	2-3		

Fig. 34—Syracuse Shops—Armature Record

spected by his staff. Fig. 36 shows part of a record which has a line for each day of the month showing the mileage made by a given car and check marks indicating the work done.

One of the shop clerks keeps before him a series of cards, each accounting for a car which is in the shop or under special observation. Red cards are used for the cars in the different

Car No. 646 Month JAN 1911

	Mileage	General Inspection	Oil Motors	Oil Journals	Repack Bearings	Air and Controller	Test Breaker	Gears
1	1751	X	X		2182.2	X	X	5494.2
2	185.9							
3	183.9							
4	182.9	X	X			X		
5	184.2							
6	183.9							
7	182.9	X	X			X	X	
Total	760.2							

Fig. 36—Syracuse Shops—Inspection and Mileage Sheet

purely local conditions. The average life in 1909 for 540-lb. wheels was 25,760 miles, and 27,000 miles for 425-lb. wheels.

During the same year the average life of several types of gears was 84,800 miles, and of pinions, 25,800 miles. The gear and pinion records covering the period of Jan. 1, 1908, to June 30, 1910, will give better aggregate averages than the fore-

going figures because they apply to equipments which were installed after a general overhauling of the system. The following table covers the records of Van Dorn & Dutton gears and pinions, as exclusively applied to the motors in the table:

Motor.	Gear Mileage.	Pinion Mileage.
Westinghouse 101	181,000	39,300
GE-1000	176,600	28,870
GE-67	144,900	24,740
GE-800	47,100	10,890
GE-54	34,500	21,210
Balanced average	102,000	24,230

A striking point in the foregoing table is the shorter life of most of the old equipments due to the fact that they were usually operated under overload conditions.

From July 1, 1910, to Oct. 1, 1910, all new gears and pinions, except the General Electric Company equipment for the GE-73 motors, were of Bliss manufacture. The Syracuse Rapid Transit Company now has made a contract with the Tool Steel Gear & Pinion Company, of Cincinnati, Ohio, to purchase gears and pinions on a mileage basis.

ONEIDA RAILWAY COMPANY Auditor's Office Copy

JOB ORDER

10-6-10 191

Mr. J. P. Barnes, A.E.E.

Please do the following work: Charge labor and material to Job Number 4318

Car #650 Overhaul trucks, air and electrical equipment

Overhaul body (light) strip and trim

Preparatory work, touch up and varnish.

W. J. Harvie, Chief Eng'r.
B.

Fig. 37a—Syracuse Shops—Original Job Order

ONEIDA RAILWAY COMPANY Job Order Clerk Copy

JOB ORDER

10-6-10 191

Mr. J. P. Barnes, A.E.E.

Please do the following work: Charge labor and material to Job Number 4318

Car #650 Overhaul trucks, air and electrical equipment

Overhaul body (light) strip and trim

Preparatory work, touch up and varnish.

W. J. Harvie, Chief Eng'r.
B.

	DATE IN	DATE OUT
Truck Shop		
Carpenter Shop		
Paint Shop		
Service		

Fig. 37b—Duplicate of Job Order for Job Order Clerk

The average life of trolley wheels on the Syracuse Rapid Transit System was 3500 miles during the year 1909. The wheels were of the Lumen "Ideal" type, 4-in. diameter. Some of the new wheels are 6-in. diameter and were furnished by the Star Brass Company. The usual trolley base tension of the Syracuse cars is about 25 lb. The Oneida Railway, which requires trolley wheels only when operating over connecting lines, uses 6-in. Lumen wheels at 40-lb. tension.

The Syracuse Rapid Transit System uses gray iron brake-shoes exclusively, whereas steel-back shoes made by the American Brake Shoe & Foundry Company are standard on the Oneida system.

The following table shows the average daily mileage of different classes of cars of the Syracuse Rapid Transit System for the year 1909:

Number of Cars.	Type.	July, Aug. and Sept.	Rest of the Year.
75	D. T. Closed	138	138
2	D. T. Open	63	0
34	S. T. Open	73	0
28	S. T. Closed, Brill	36	105
22-26	S. T. Closed, Barney & Smith	75	53

With regard to the foregoing table it should be stated that single-truck cars are used only for tripper service so far as possible. The Syracuse company has recently added 23 double-truck pay-as-you-enter cars in addition to the 75 double-truck cars mentioned in the table.

JOB-ORDER SYSTEM

The job-order system is used by these companies on all shop orders except straight maintenance which exceed \$5 in value for labor and material. Job orders are used to cover all overhauling, painting, varnishing, etc. Thus all repairs on a job order will be charged against the number of the order as the car goes through the shop. Departmental work is kept separate by letters, as is the practice in the forms of the line department; thus, job No. 4318-A means carpentry work; 4318-B, trucks and brakes; 4318-C, air equipment; 4318-D, electrical equipment; 4318-E, strip and trim; 4318-F, preparatory work such as getting the car ready for painting; 4318-G, painting and varnishing; 4318-H, clean off brass. The job order which describes

ONEIDA RAILWAY COMPANY

JOB ORDER

10-6-10 191

Mr. J. P. Barnes, A.E.E.

Please do the following work: Charge labor and material to Job Number 4318

Car #650 Overhaul trucks, air and electrical equipment

Overhaul body (light) strip and trim

Preparatory work, touch up and varnish

W. J. Harvie, Chief Eng'r.
B.

Date in 191 Date out 191

Description of work done

Note—As soon as the work called for on this order is completed it is to be properly filled out with detailed statement of work, signed and turned in to office.

Fig. 37c—Triplicate of Job Order for Foreman Doing Work

SYRACUSE RAPID TRANSIT RAILWAY COMPANY.

LABOR PERFORMED AND MATERIAL USED AT SHOPS ON SPECIAL JOB ORDERS.

November - 1910. 11 Mos. Ended Nov. 30 - 10. Year to Date.

JOB NO.	forward	LABOR	MATERIAL	LABOR	MATERIAL	TOTAL.
		789 88	24806 05	3007 64	151964.44	154972.00
4218A Reps. to Body Car #650	7 96	7 01	14 40	8 28	22 68	
B " " Trucks	88		15 65	16 43	31 08	
C " " Air System	2 74	11 77	2 74	11 77	14 51	
D " " Elec. Equip.	11 40	8 61	55 64	29 76	65 40	
E Strip and Trim	9 17		10 62	10 62	20 79	
F Preparatory Work			34	4 75	5 09	
G Paint and Varnish	30	1 02	32 04	24 75	56 79	
4319 Reps. to Body Car #860	2 10	3 18	13 44	7 13	20 57	
B " " Trucks	2 69	27	11 53	23 63	36 16	
D " " Elec. Equip.	10 02	53 44	20 88	108 96	129 84	
E Strip and Trim	5 18		5 71	5 71	10 89	
F Preparatory Work			61	2 01	2 52	
G Paint and Varnish	12		22 36	9 58	31 94	

Fig. 38—Syracuse Shops—Monthly Summary of Job Orders

the work is made out in triplicate. The original copy, Fig. 37-a, goes to the auditor's office; the second sheet, Fig. 37-b, goes to the job-order clerk and is printed to show the name of the shops where the work is begun and completed. The third copy, Fig. 37-c, which goes to the foreman whose shop is to do the work, has space for the description of the work done when the foreman returns his slip to the job-order clerk. Each foreman gets a separate job-order slip so that no two descriptions are on the same sheet. The job-order clerk assembles the information shown on the several slips to close the job order on the books. The slips are then filed for reference.

The work on a given job order is entered in a monthly job-order book, which consolidates all labor and material items. The character of this record is shown by the accompanying reproduction of the costs of different classes of work done on job orders Nos. 4318 and 4319, Fig. 38. The completed jobs are listed separately in this book according to months. It is not necessary to give any more information than this, as any further details can be found by referring to the original slips.

New Shops of the Chicago Railways Company

These Shops Cover a Ground Area of More Than 6½ Acres and in Considerable Part Were Built During 1910

IN the last issue of this paper an account was published of the general plan and purpose of the new shop equipment of the Chicago Railways Company. A short description was also given of the carpenter and paint shop building and of the mill and erecting shop building. Particulars follow of the other departments with some details of the shop practice of the company.

SHOP EQUIPMENT AND PRACTICE

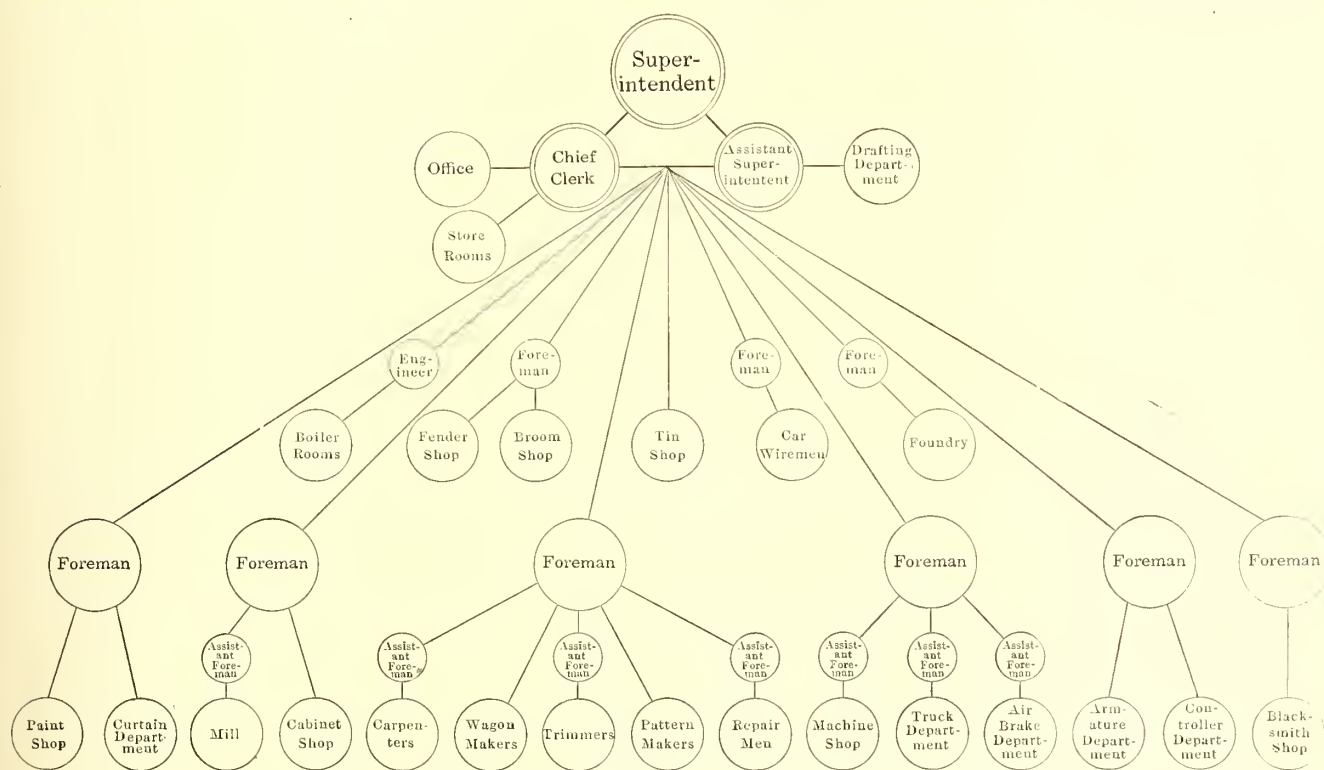
The new shops of the Chicago Railways Company have a most complete equipment of tools and shop fittings. During the past year more than 100 motor-driven machine tools have been purchased and installed in the machine and wood shops. Also, the shop forces have applied independent motor drive with push-button control to all of the older tools that were used

bay, and this is served by a 10-ton cage-operated Whiting crane and a 5-ton General Pneumatic Tool Company crane.

To systematize the repair work the floor space of the truck repair shop is subdivided about as follows: One-third storage and heavy running gear repairs, one-third wheel repairs, one-sixth truck repairs and reconstruction, one-twelfth motor repairs and one-twelfth air-brake repairs. The work is so arranged that parts may be handled progressively and, as completed, may quickly be delivered to the service track leading to the carpenter and erecting shop.

REBUILDING TRUCKS

In addition to regular maintenance work the truck and machine shops are completing the rebuilding of the trucks for 328 reconstructed double-truck cars. At present three trucks



Chicago Railways Shops—Diagram of Organization of Car Shops

Electric Ry. Journal

previous to the reconstruction period. The great variety of work which these shops are prepared to do not only in maintenance but in car construction makes a description of the shop equipment and practice of particular interest. Each of the important shop sections and its special equipment will be described.

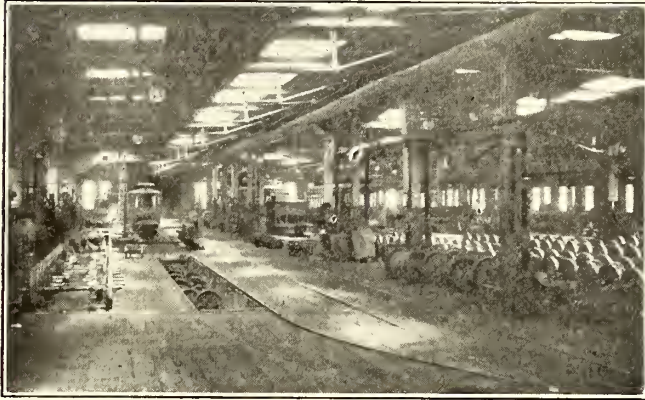
TRUCK AND WHEEL SHOP PRACTICE

The truck repair shop is 332 ft. long, inclosing nine tracks extending from end to end of the building. All tracks are served by a transfer table at the middle of the shop. This transfer table passes beneath the runways for overhead traveling cranes.

Motors and trucks for rebuilding and repairing are received on the transfer table and then are distributed by electric cranes. The motor and truck bay has three cranes, two of Niles manufacture of 10-ton capacity each and one of Case manufacture, with two independent 5-ton trolley hoists. The Niles cranes are cage-operated. Wheel work is done in the center

are being rebuilt each day. This work of reconstruction includes the placing of new truck side frames of heavier design, new or reworked transom bars, new end bars and new brake beams and rigging. The old journal boxes are replaced with Symington boxes and the center bearings with the Symington ball-bearing centerplates, which are standard for this road. Carnegie rolled-steel wheels, 34 in. in diameter and weighing 525 lb., are standard for the Chicago Railways and are placed on the axles of the rebuilt trucks. Solid gears manufactured by the Tool Steel Gear & Pinion Company also are used on all new and rebuilt cars. Each week, as a part of its regular maintenance work, the truck shop repairs and strengthens eight trucks of the Pullman 150 type. This work includes the replacement of the wheel pieces with parts of heavier design, the replacement of the transom wearing pieces, installation of Symington ball-bearing center bearings, new bolster pins, new axle collars and the replacement of trussed brake beams with flat-brake beams and new hangers and springs.

The portable equipment of the shop includes three rivet heaters. Each heater comprises an oil furnace mounted on a two-wheel carriage carrying a 10-gal. fuel-oil storage tank. Air-hose connection is provided. The truck department uses three Keller air hammers for chipping and three Thor No. 9 air riveters. A row of stock bins 300 ft. long has been built along the wall of this shop, near the track repair pits. These bins hold stocks of small castings; bolts and other minor parts of the running gear are kept ready for use by the truck repair men near by. Two 16-in. twin-wheel Ransom grinders, each



Chicago Railways Shops—Wheel Shop

driven by a 5-hp motor, have been installed at opposite ends of the truck shop to facilitate fitting truck castings and other parts.

CLEANING MOTORS

The motors on the trucks of the cars which are being rebuilt are given a most complete overhauling. They are the GE-70 and GE-80 types. The motor shells are entirely stripped and are cleaned with scrapers, steel brushes and kerosene. All cracked or worn-out parts are filled in with new steel applied by the oxy-acetylene process by the Chicago Welding Com-

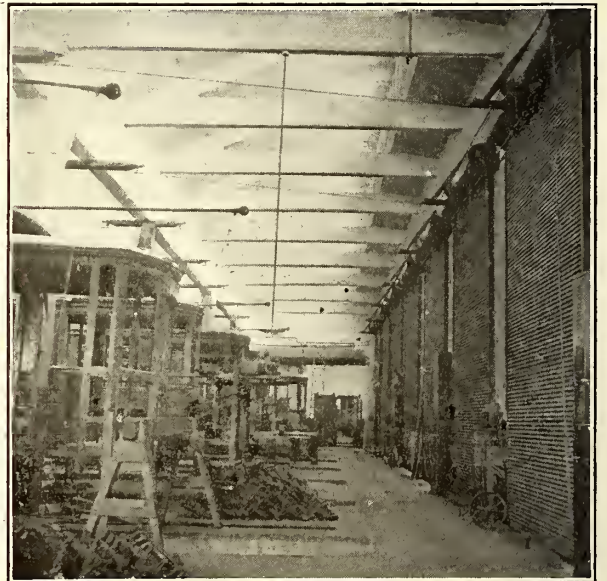
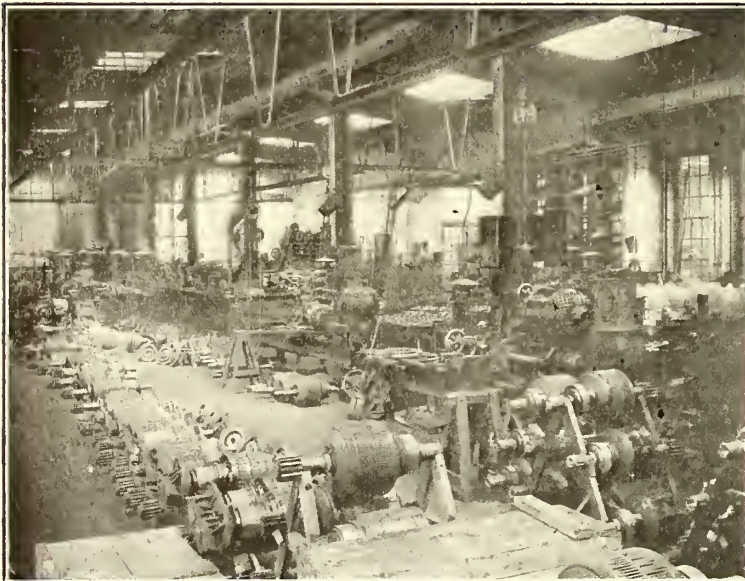
clearance is not at least $\frac{1}{8}$ in. on top and $\frac{5}{32}$ in. on the bottom, other pole pieces are put in to obtain these clearances. New commutator opening covers similar to those on the 216 motor but made in the Railways Company's shops are applied to all of the old GE-70 motors.

The motor-cleaning and testing section of the truck shop is located at the southeast corner and is provided with six work stands which support the motors at a height of about 18 in. above the floor. These stands are about 8 ft. long. Three of these stands are used for stripping motors and three for assembling. Each of the stands has two drawers, one on either side, in which scrapers and other tools are kept. The drawers are fitted with locks and the men are required to take care of their tools before leaving at night. Power cables and a controller are provided close to the assembly stands so that motors may be run for about five minutes before they are approved for mounting on the trucks. The circuit-breaker on this testing outfit is set at 60 amp.

WHEEL TURNING

The principal equipment of the wheel section is a William Sellers wheel lathe, direct-driven by a 35-hp Westinghouse variable-speed motor. This lathe is installed on a concrete foundation into which a sheet-iron trough has been built. This trough catches the tire turnings and furnishes a path by which they easily can be raked into a cart standing at the end of the lathe in a pit. When this cart is filled with turnings it is picked up by the crane and carried away to be dumped outside.

The large wheel lathe has two turret heads and its tail stock is moved by an independent motor. The control of the driving motor is governed by a reversing controller and also by two snap switches mounted on the frame of the lathe close to the operator's position. One of these switches serves to stop the lathe instantly and the other to reduce to half-speed while the lathe tools are passing through hard spots. The speed of the Sellers lathe is 16 ft. per minute and the wheels are turned with a $\frac{3}{8}$ -in. feed, using high-speed steel tools. One machinist and a helper turn about 10 pairs of wheels in a working day of nine hours. The wheels are brought close to



Chicago Railways Shops—View in Armature Room and of End Aisle of Carpenter Shop, Showing Roof Design

pany. It is stated that 80 per cent of the GE-70 motor frames have been strengthened in this way. The axle-bearing housings on the GE-70 motors are rebored and new bearings inserted, particular care being taken to obtain the proper spacing between the gears and pinions. All field coils and armatures are sent in to the electrical shop for testing and repairing. Pole pieces are removed from the shell and all parts thoroughly cleaned. When the pole pieces are assembled they are first gaged to assure the proper clearance, and after assembly, if the

the lathe by one of the traveling cranes and are placed in the lathe by a pneumatic hoist mounted over the lathe frame. Three-part bushings are placed over the journals and centered in the stocks; then the driving dogs are adjusted to close contact with the sides of the wheel tires and next the motor-operated tail stock is moved inwardly until the spring clutch on its motor slips. This driving in of the tail stock sets the dogs firmly in the wheel.

The lathe has two turret heads, in each of which are four

tools. In the order of their application to the wheel these tools are: (1) tread roughing tool, (2) flange roughing tool, (3) forming tool which gives the tread or bevel of 1 in 16, and (4) a beveling tool for the outside edge of the tread which gives it a taper of 1 in 10. Records of the contour of all wheels are taken before and after turning. A strip of solder is used to get the contour and its outline is traced on a record slip which is given the foreman. Permanent records of the service given by wheels are kept on record cards of the forms illustrated. These cards are $7\frac{1}{2}$ in. x 5 in. in size and will show data and measurements for four turnings.

AIR-BRAKE REPAIRS

The air-brake repair work is centralized within a railed inclosure at one end of the shop. The equipment here includes a double bench with fittings for making service tests. Brake cylinders also are inspected at this location. A car air-compressor outfit has been installed under the workbench so that an independent supply of air is available for testing valves and gages. Electrical connections to this compressor are so arranged that governors also may be tested. After engineers' valves have been reground they are tested by holding the outlet under water while the inlet is under air pressure and the valve in the lap and running positions. Careful records are kept by the repair men of work done on all air-brake parts. The air-brake and repair men make out a daily report to the foreman of the truck and of the machine shop. This report shows the number and types of compressors and parts received during the day and from what station they have been received. It also shows in detail the reason for making repairs, and it lists the work done on air motors, governors and compressor parts.

A row of stock bins about 20 ft. long has been built against the side wall close to the air-brake repair department. A supply of brake repair parts is kept in these boxes easily available for maintenance work. The man in charge of the brake repairing notifies the shop foreman when the stock in any of the bins is getting low.

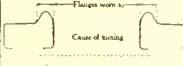
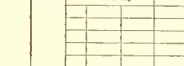
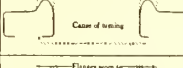

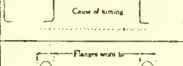
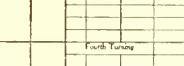
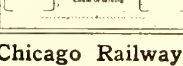
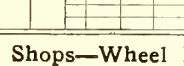
The door tender of the truck shop has a bench close to his door and he assembles and reshapes worn controller fingers. This door tender also keeps track of the reserve supply of brake rods and rigging parts stored near him and in addition

MACHINE SHOP EQUIPMENT AND PRACTICE

The machine shop is centrally located between the armature, forge and truck shops. It has floor space 228 ft. x 72 ft. subdivided by two central rows of columns. This shop is of particular interest because of its very complete equipment of tools, all of which are driven by independent motors. A general view of the shop interior was published last week. The absence of overhead shafting will be noted.

A gear and casting cleaning tank has been installed between the machine and truck shops. This tank has a cage in which 10,000 lb. of dirty castings may be lowered into a bath of hot soda water.

The tools of this shop include those from the old shop, which

WHEEL RECORD		AXLE No. _____		Diameter of Wheel when originally applied _____					
DESCRIPTION OF WHEELS		MILEAGE RECORD							
Turnings	Before Turning	After Turning	Before Turning	After Turning	Under Car No.	Days Applied	Days Removed	Miles run under each car	Total Mileage
First Turning									
Second Turning									
Third Turning									
Fourth Turning									

Chicago Railways Shops—Wheel Record

have been equipped with motors and control. In addition to these are a number of new tools purchased during the reconstruction period and designed for independent motor drive. Practically all of the shop tools are driven by Reliance motors and a large number of the units have the Monitor control. Each tool may be started or stopped with push buttons located at one or more convenient points on the tool frame within reach of the operator.

The following statement includes most of the machine tools, together with some notes regarding their use, characteristics and motor equipment:

Ten drill presses with independent motors. Three of the drills are radial, 2 ft., 4 ft. and 5 ft.; one multiple drill press (Moline), 1-hp motor, variable speed.

Gisholt horizontal boring machine with power-operated table, 5-hp motor.

Two 21-in. Gisholt turret lathes used most of the time for finishing bearings. Bearings are finished with Davis micrometer boring bars, one of which has been purchased for each of the turret lathes and two for the car-wheel boring mills. By the use of these bars a great deal of unnecessary calipering is avoided, since the cutters can accurately be set with the micrometer adjustment to any desired diameter. These tools do not need renewing when worn to a shorter length than the diameter of the bearing. Each of the Gisholt turret lathes has one 5-hp and one 1-hp variable-speed motor connected to the lathes by "silent" chains.

An 18-in. bearing lathe, $3\frac{1}{2}$ -hp motor.

Automatic tapping machine, maximum diameter $\frac{3}{8}$ in., 1-hp motor, and a six-spindle nut taper, 3 hp. On front of the nut taper is a group of Lyon sheet-steel compartments, 40 in number, into which the completed nuts are sorted as made. Each of the compartments in this sheet-steel case is 10 in. x 12 in. x 16 in. in size. At intervals the nuts are taken out with a shovel and carted to the stock room in a wheelbarrow.



Chicago Railways Shops—Pattern Storage Room with Steel Adjustable Shelving

gives the machine and truck shop foreman daily advice as to how many wheels of each kind are ready to be delivered to the carhouses.

The trolley-pole assembly and repair work is done at a bench on one side of the truck shop. This work requires all of one man's time. His working equipment includes a motor-operated drill press. He has stock supply bins for trolley wheels, harps, bases and miscellaneous parts.

Broaching machine, 3-hp motor. This company manufactures its own brush holders and yokes and uses the broaching machine to finish accurately the parts of these and other brass castings.

American planer with double head, 15-hp motor.

Two other planers, each with a 5-hp motor. Axle-bearing shells are finished on one of these planers. A cast-iron form has been provided for holding seven shells onto the bed of the planer so that both edges of all may be planed at one time by using two tools.

Cincinnati No. 4 milling machine, 10 hp. Kempsmith No. 5 milling machine, 5 hp. A similar machine is used in the tool-room. Two Pratt & Whitney hand-milling machines, 2-hp motors.

Stockbridge 18-in. shaper, 5 hp.; keyset cutter with 32-hp motor.

Hamilton 42-in. lathe, 15-hp motor, and nine lathes each with a 5-hp motor. Two axle lathes, equipped with 7½-hp and 10-hp motors.

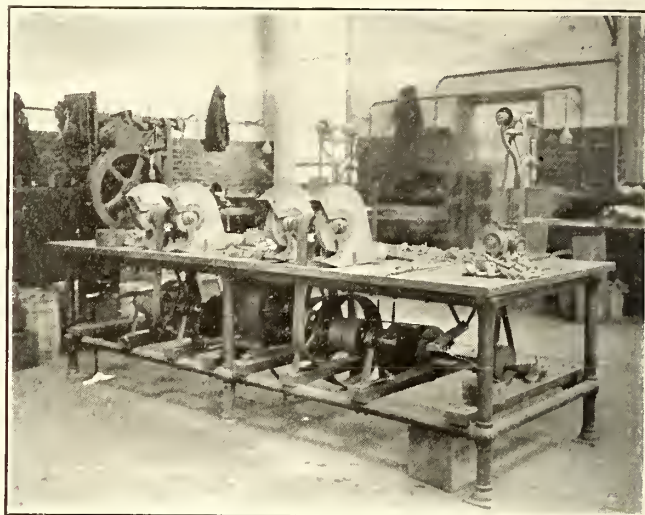
Two screw machines, 1-in. and 2¼-in. capacity, 2-hp and 3½-hp motors respectively.

Three bolt cutters, one with a double head, 5-hp motors.

Combination punch and shear, capacity 1 in. x 8 in., 7½-hp motor, and combination punch and shear, 3 in. x 3 in. billet capacity, 15-hp motor. Punch used for making controller-handle

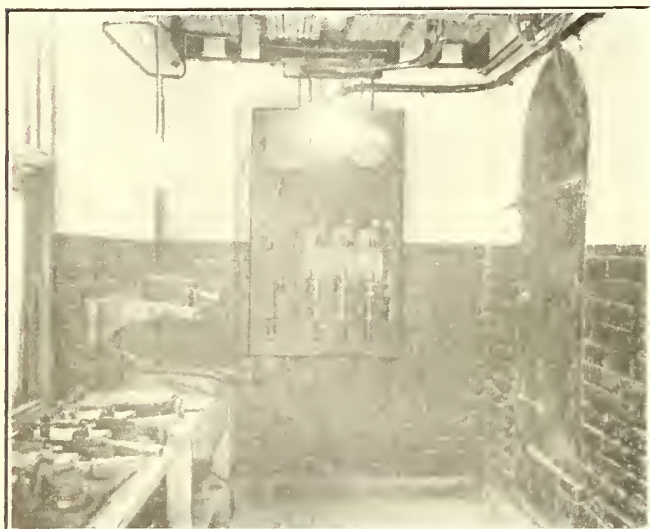
through the aisles. Also, at the time of the shop reconstruction benches were specially arranged according to the work required with hand tools.

Along the west side of the shop a bench 75 ft. in length is fitted with small tools and supply cases for the men who do the work of finishing controller parts, overhead fittings, brush holder parts and similar small work on soft metals. Opposite



Chicago Railways Shops—Group of Motor-Driven Tools for Brass Working

this assembly bench is a row of sheet-steel cases into which supplies and finished parts are sorted for use or delivery. All of the small copper and brass parts are made with jigs and templets. Tempered tool-steel jigs are provided for use in the manufacture of those details which are finished by filing. A proving jig is used for checking the assembly of brush holders before delivery. Near this assembly bench are the broaching machine, planers, milling machines, shapers and a buffing and polishing bench equipped with two emery and two polishing wheels and three small drill presses. A view of this bench is shown. The motor which operates the tools on this bench is placed underneath the bench. In connection with this bench



Chicago Railways Shops—Circuit Breaker Test Room

release springs and general work. Four punches with individual 5-hp motors.

200-ton axle straightener.

Burr key-way cutter.

Cold saw, 24 in., with 5-hp motor.

Water emery wheel, 5-hp motor. Two Ranson twin emery wheels, 5-hp motors.

Three car-wheel borers, driven by 7½-hp motors and having 1-hp motor-operated wheel hoists. Davis boring bars are used in these borers.

Fifty-ton hand-operated arbor press. One 200-ton and one 100-ton wheel press.

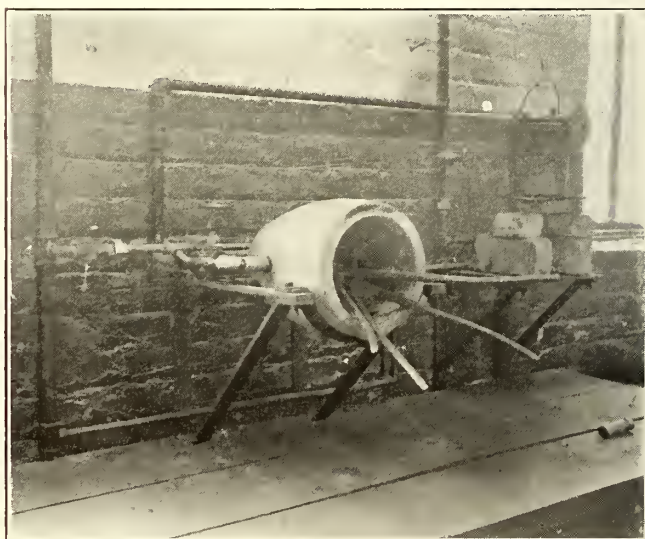
Two hack saws driven by one 5-hp motor. Band metal saw used for cutting off gates.

Rumbler for brass castings.

Portable stands for holding tools and small supplies are used in the machine, paint and carpenter shops. These stands have three shelves, each about 16 in. x 30 in., and are mounted on castors.

GROUPING OF MACHINES

At the time the machine shop was reconstructed and individual motors were applied the location of the machine tools was rearranged according to a definite plan of grouping, which permits the regular repair and manufacturing work to be conducted by this shop with a minimum movement of materials



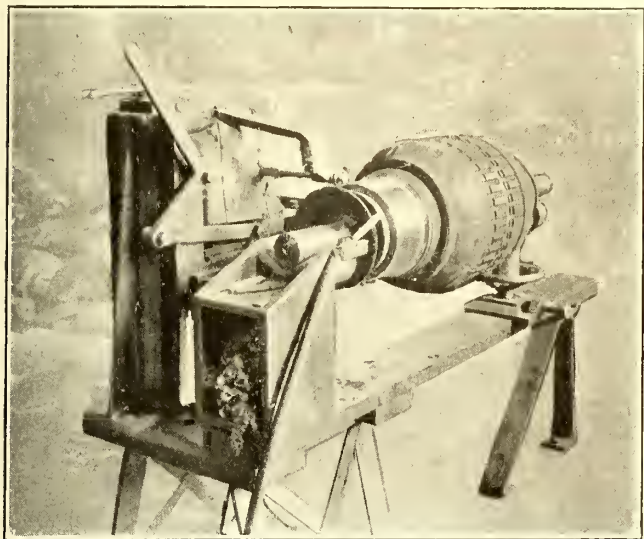
Chicago Railways Shops—Home-Made Furnace in Wood Mill Toolroom for Heating Tools

is a direct-connected exhaust fan which removes the dust from the grinding and polishing wheels.

The bearing department is located near the group of turret lathes and is provided with a wall bench about 100 ft. long. Five men are employed in finishing bearings and one man does all the fitting.

MACHINE SHOP TOOLROOM

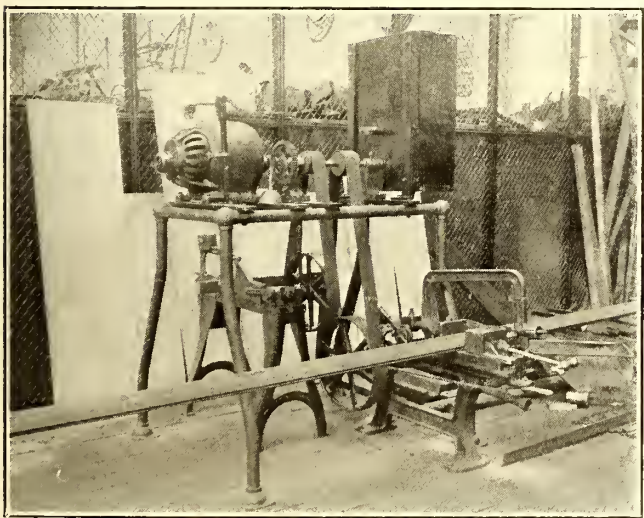
The toolroom of the machine shop is located near the middle of the building and is inclosed by a substantial steel cage reaching 20 ft. to the ceiling. The toolroom occupies a floor space of 70 ft. x 20 ft. and has a single entrance through a door that is kept locked. The fitting of this toolroom with sheet-steel shelving, drawers, counters and miscellaneous inte-



Chicago Railways Shops—Commutator Slotter

rior fittings was done by the Lyon Metallic Manufacturing Company, of Aurora, Ill.

The machine tool equipment of the toolroom includes a Universal milling machine driven by a Reliance 2-hp motor; Pratt & Whitney 16-in. toolroom lathe with a 5-hp motor; Yankee drill grinder; Universal grinder with 1¼-hp motor; sensitive drill press designed for four speeds driven by a 1-hp motor, and a Universal shaper with a 5-hp motor. The toolroom fittings include substantial benches of oak having locked drawers fitted with trays designed for storing different tools used in the toolroom. The tools which are kept in stock for distribution in the machine shop are stored in sheet-steel cases and drawers which were designed particularly for this use. A



Chicago Railways Shops—Motor Installation for Driving Two Hack Saws

system of brass checks is used to keep track of the location of each tool taken out of the toolroom.

Across one end of this room is a set of sheet-steel compartments for the storage of jigs and dies. This group of compartments is 20 ft. long by 6 ft. high and each section is about 2 ft. deep. The assortment of jigs and dies kept here for

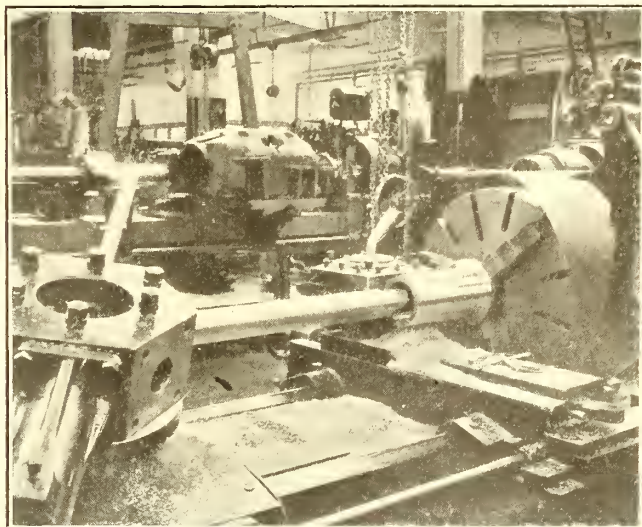
machine-shop use is very complete. It includes jigs for finishing brush holders on milling machines, for drilling brake levers, jigs for punching and cutting off controller finger springs with one operation, numerous dies for making all small parts of the electrical equipment and for general shop use. The jigs and dies have all been manufactured at this shop and with a view to averting accidents each die block is equipped with a spring trigger to throw out automatically the finished pieces.

ELECTRICAL SHOP EQUIPMENT AND PRACTICE

The electrical shop and armature room occupy a floor space 150 ft. x 50 ft. adjoining the machine shop. An industrial railway connects both of these shops with the shop storeroom, which is a three-story slow-burning building located near by. All of the principal tools in the shop and the intervening aisles are served with an equipment of Yale & Towne overhead trolley hoists provided with turntable junctions. A general view of the armature room is shown on page 566. Some of the more important tools in this room and their uses are as follows:

Hydraulic press for shaft and pinion work. The pump on this press is electrically driven, or, if desired, may be operated by hand. The latter method is used for the more delicate work, as in placing commutators. It is the practice to press on 2½-in. pinions at 10 tons and 2¾-in. pinions at 15 tons.

The banding machine in this shop is similar in design to those used by one of the motor manufacturers. It is con-



Chicago Railways Shops—Boring Bar Used for Finishing Bearings in Turret Lathe

trolled by a treadle operating a clutch which connects the 2-hp motor with a worm-driving gear.

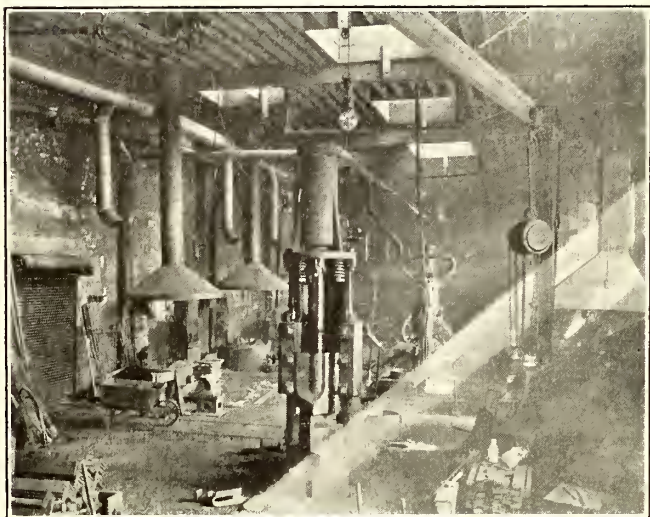
The commutator grooving machine has a 1¼-in. saw driven by a ½-hp motor. Beneath the saw is an adjustable horse for supporting armatures in the grooving position. The motor and saw are mounted on a carriage which may be moved backward and forward on a guide plate by a lever controlled by the operator. A small air nozzle keeps the dust away from the operator.

The lathe equipment of the armature shop includes one 20-in. and one 26-in. lathe, each with a 3½-hp motor. A Whitney milling machine driven by a 2-hp motor is used for general work and for cutting commutator segments and milling commutator fingers so that arcing pieces may be inserted. Contact fingers for controllers and circuit breakers are finished from copper castings made in the shop foundry.

Thirty-three men are employed in the armature shop. They do all the electrical car repair work for the entire equipment of the road, which includes approximately 2160 cars in daily service. All new coils are wound in the shop and before insertion in the slots are heated in electric ovens so that the insulation will be soft and pliable and may be forced into the slots without injury. Two electric ovens, which are small

portable devices, have been used for this purpose in these shops for a number of years. Each oven consumes about 275 amp at 500 volts.

When armatures are banded they are first put in the bake oven and thoroughly heated. After banding they are not returned to the oven. The banding wire when applied to a heated armature is more easily placed tightly around the slots, and when the armature cools the wire is put under additional tension. To this practice is attributed the great freedom from

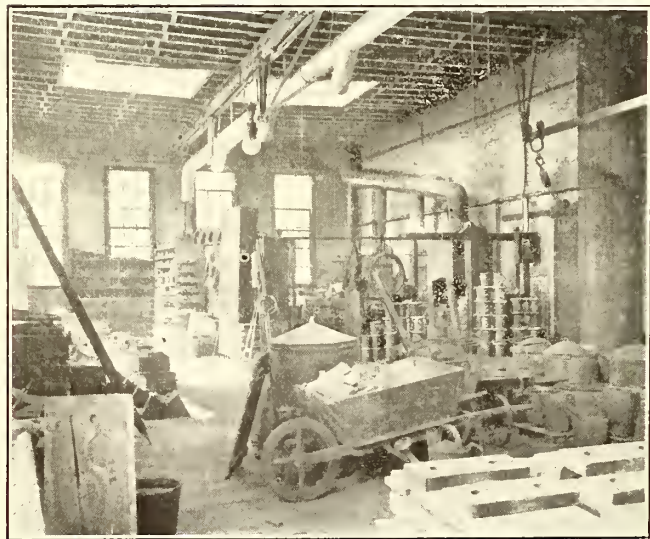


Chicago Railways Shops—Blacksmith Shop

band-wire troubles. A Century field tester is used in this shop and is said to give excellent results.

A reheating fixture is used for setting new insulation in reconstructed controller speed rolls.

Auxiliary contacts are being applied to all of the K-28 controllers used by this company. These are inclosed in iron hoods fastened to the back side of the controller cases and mechanically connected with the speed rolls. The contacts control the operation of independent contactors placed underneath the car bodies so connected as to break the arc on the first controller notch and at the transition point.



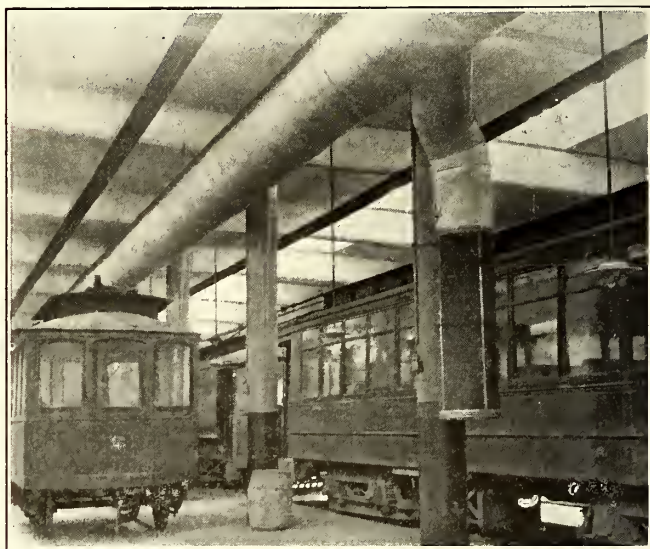
Chicago Railways Shops—Foundry

A special table with disappearing winding pins operated by a foot treadle has been built for rewinding strip-iron resistance.

Electrical heater coils are rewound on an attachment to the field-coil winding lathe. A chuck speeded to about 1500 r.p.m. drives a $\frac{3}{8}$ -in. steel rod which is 9 ft. long, and around which the heater wires are wound. To wind the coils automatically and smoothly a specially devised clamp for guiding the wire

onto the revolving rod has been made. This clamp is made of two pieces of $\frac{1}{2}$ -in. fiber about 3 in. x 6 in. in size. These pieces are hinged at the bottom, where a rod carrying a 5-lb. weight is attached. The hinged fiber pieces clamp over the revolving rod and have a thread groove cut in the opening between them. In winding a coil the wire is first given two or three turns about the rod and then the fiber clamp is screwed snugly in place about these few turns. Then, as the rod revolves, the coil adjusts itself to the thread grooves in the fiber pieces and acts as a screw, thus keeping the clamp moving along the rod at just the right winding pitch for additional coils. Bearings are inserted and removed from armature heads by a special screw press designed and built in these shops.

A circuit-breaker testing board has been installed in these shops. It is the practice to test breakers in their operation position before remounting on a car. The circuit-breaker testing equipment includes a master breaker, an ammeter and a series of load switches mounted on a slate panel. The switches are so connected with resistances that four different loads up to 450 amp may be obtained. Then by the use of an auxiliary switch an additional load varying by multiples of 15 may be applied up to 75 amp. The breakers to be tested are placed on a shelf mounted on trunnions, so that after connections have been made the shelf and the circuit breaker



Chicago Railways Shops—Outlet of Heating Duct in the Erecting Shop

bolted to it can be revolved into the position corresponding to that of regular operation.

BLACKSMITH SHOP AND FOUNDRY

The forging department has a floor space 114 ft. long by 32 ft. wide. A view of a portion of this shop showing the heating and ventilating pipes is reproduced. The equipment in the blacksmith shop includes nine forges, over each of which is a hood surmounted, above the roof, by a 16-in. Kernechen ventilator head. Two similar ventilators 12 in. in diameter exhaust the air from each of eight monitor skylights in the roof of this shop. In addition to this method of ventilation the blacksmith shop is furnished with hot air in winter and cold air in summer from a forced ventilating system having outlets near each forge.

The equipment of tools in the blacksmith shop includes three Ferguson oil furnaces, two No. 4 and one No. 2, supplied by the Railway Materials Company, and one home-made oil furnace which has openings on opposite sides, so that long pieces may be heated in the middle. This furnace is useful in straightening steel car sills. The oil furnaces in these shops consume about 1000 gal. of crude oil each week. The oil is stored underground outside of the shop. Other blacksmith shop tools include a No. 3 Acme forging machine and a

No. 6 Ajax forging machine. These tools are driven from line shafts extending across the blacksmith shop and through the partition wall into the machine shop, where independent motors are connected. It was thought that the motors might be damaged by the heat and dirt if installed closer to the forging machines. Two American steam hammers, one of 1500 lb. and the other 600 lb., and a 600-lb. Bradley hammer are installed near the center of the shop. Each of the larger tools in the blacksmith shop is served by a jib crane carrying a Triplex block. A steel locker is provided for each employee.

The foundry occupies a space 32 ft. x 75 ft. and its floor is paved with wooden blocks. One-quarter of the foundry is set off by a steel fence as a babbiting room. General brass and copper casting is done in the remainder of the foundry. A view of this department is shown. The equipment includes four crucible furnaces and four babbit melting furnaces, all supplied with induced draft, a crane for handling heavy ladles and a core oven.

CARPENTER SHOP

The design of the paint and carpenter shop building has been described. The equipment of the carpenter shop necessarily consists largely of the usual complement of hand tools, benches, horses, etc. In addition this shop has two twin Ransom motor-driven emery wheels, two benches equipped for assembling metal car fittings, a series of steel racks and boxes for a local stock of car hardware, six carpenters' benches and a warming table and gluing outfit for the cabinet makers. A view in one end of the carpenter shop showing the saw-tooth roof and reinforced concrete girders is shown.

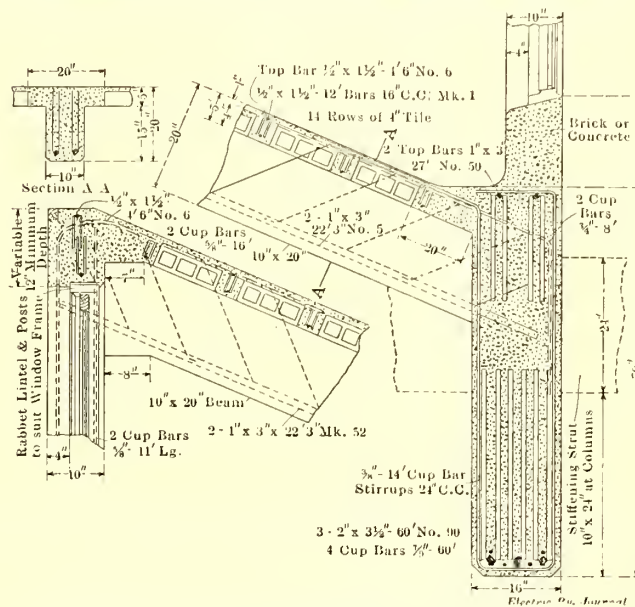
PAINT SHOP

The paint shop proper includes the building adjacent to the carpenter shop. This building has two annexes, each 158 ft. long, one of which is two stories high. More than 2000 cars were put through the paint shop during 1910. Of the company's equipment 650 cars have steel panels. Before paint is applied to these cars it is necessary thoroughly to clean the steel because of the rust action which sets in quickly. This is done with sand blast. When received in the paint shop steel-sided cars are first given a coat of steel preservative paint. This is followed with three or four coats of steel surfacer rubbed down to a smooth finish. With some inexperienced rubbers it is the practice to apply a black guide coat over the surfacer so that a definite indication will be had as to whether it all has been rubbed. After rubbing two coats of olive-green

above the trough and out onto a set of drying racks. The construction of the carpenter and paint shop building itself is shown in two sectional engravings on this page.

PAINT SHOP ANNEX

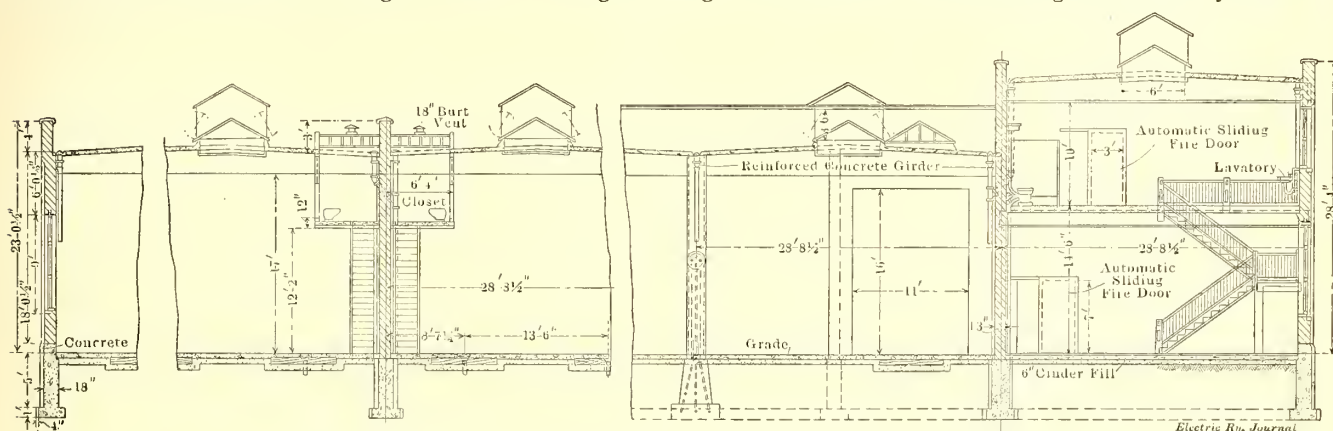
The two-story fireproof annex to the paint shop is used as a glass storeroom on the first floor and for curtain and sign rooms on the second floor. The curtain-room equipment includes two power-operated Singer sewing machines and one twin emery wheel. A special folding machine has been built for making four-ply canvas strap which is used in place of



Chicago Railways Shops—Detail of Roof Girder—Carpenter and Paint Shop

leather for supporting car cables. About 3000 ft. of this strap is used each month. Canvas is cut and folded into four-ply about 1 in. wide and then sewed with two rows of stitching. This material is said to be more satisfactory than leather because it has a longer life when subject to wheel wash.

Two men are employed in the sign shop stenciling destination signs and run numbers. Very favorable results are obtained with destination signs made of white cloth glued over light wooden frames. The wording is indicated by white let-



Chicago Railways Shops—General

Cross Section of Paint Shop

color are applied and the gold-leaf decorations are placed. Plain gold-leaf striping is applied with rollers. For all lettering and monograms on the cars duplex or double-paper Meyercord transfers are used. After the lettering and decorations have been applied two coats of body varnish are spread with 24 hours' time intervening. The interiors of the cars are cherry wood stained mahogany color and rubbed down to a dead finish.

In fitting up cars a large amount of beading is used because no old beading is put back. Before beading is placed it is dipped in a long trough, then pulled through a plush wiper

ters on a black background. On a great many cars where the routes are not changed these destination signs are used in place of the roller signs and an economy in maintenance results. The transportation department requires nearly 5000 run numbers each year. These are iron disks about 6 in. in diameter painted black and showing a white number. They are carried on the front of a car.

In the second annex to the paint shop are the finishing room and the paint stock room. Entrance to these rooms is had through fireproof vestibules with double automatic fire doors. The finishing room is equipped with a large number of racks

designed to hold all the sash for one car. The racks are mounted on castors so that when the sash are ready for delivery a rack may be rolled into the paint shop.

A bake oven, 15 ft. x 7 ft. in floor area and built of hollow tile, forms a part of the finishing room equipment. In this oven, which is heated by steam, are placed all the small car



Chicago Railways Shops—Elevated Toilet Room

parts which have been enameled, so that they may bake under a slow heat.

PAINT STOCK ROOM

The paint stock room is 50 ft. x 55 ft. in floor area and is a thoroughly fireproof room open to the air on three sides. A series of steel cases and lockers extends around two sides of the walls. The lockers are fitted with shelves designed for the systematic storage of small or valuable stock.

The naphtha and gasoline supply is kept in two 400-gal. tanks

The stockroom is heated by hot air from the general heating system of the shop and also by a series of steam coils which are used in the fall and spring to keep the paint shop warm when the general hot-air heating system is not in operation.

Compressed air is used in the stockroom for a number of operations. Paint in barrels is stirred by means of forcing air through a hollow stirring rod; the delivery of air at the bottom of the barrel serves to mix the paint quickly and thoroughly.

Varnish, turpentine and oil are stored in seven tanks mounted on a raised platform. Each tank has a capacity of six barrels. The large tanks are filled by the use of the compressed air and special portable pipe fittings.

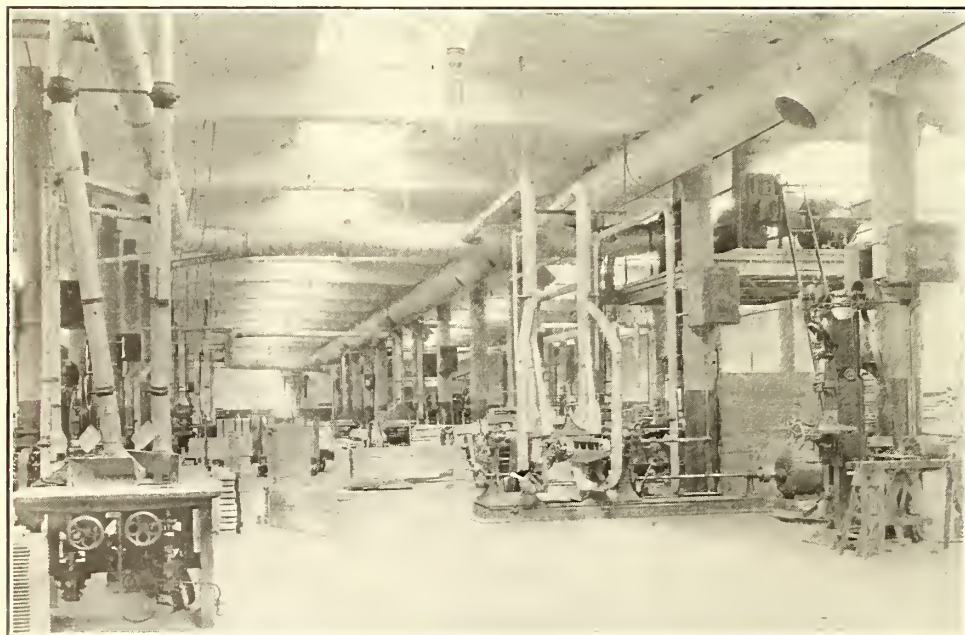
WOOD MILL

The wood mill of the new Chicago Railways shop occupies three-fourths of one bay in the newest building and is 114 ft. wide by 272 ft. long. This floor space is undivided except for a toolroom which has been partitioned off at one corner. The woodworking machinery in the mill includes fifty-six new tools, each with independent motor drive.

Exhaust piping with inlets at each of the woodworking tools keeps the shop floor free from shavings and sawdust. The system of exhaust pipes is subdivided into three parts, each with its separate fan and motor. The motors have capacities of 20 hp, 25 hp and 50 hp and are operated continuously throughout the day until the shop has been cleaned at night. The shop compressed-air system has outlets at every other post in the wood mill and hose and nozzles are attached so that all machines can easily be cleaned and the dirt blown into the exhaust system.

The accompanying view of the wood shop shows only part of the machines in one of the four aisles. In this mill all the machines are arranged for successively passing the work from one end of the shop to the other.

Timber for working in this mill may be delivered by running cars directly into the shop or by driving wagons among the machines. The timber is first cut up at the north end, then passed through the rip saw and planers to the tenoner and stickers and then to the sand-papering machine and miscellaneous smaller finishing machines. During its progress from one end of the shop to the other the material is carried from machine to machine on small wheel trucks, of which there



Chicago Railways Shops—Center Aisle of Wood Mill

buried underneath the concrete paving in the yard outside the building. Gages within the stockroom indicate the level in these tanks. Openings are provided in the pavement above the tanks so that wagons can drive directly over them and quickly transfer the oil to the tanks. Two hand pumps serve to draw the oil from the storage tanks into the stockroom.



Sanitary Drinking Fountains

are 36 in the wood mill. The finished product of the wood mill is delivered to the adjoining cabinet shop or across the street to the carpenter shop.

The equipment in the woodworking shop includes the following motor-driven machines: A carver and molder, 3½-hp motor; American door molder or sticker, 5-hp motor; Her-

mance 12-in. molder, 15 hp; combined ripping and molding machines, 12-hp motor (these machines are arranged with an intervening table so that fender slats may be cut and molded with one passage); a 9-in. molder, 10-hp motor.

Greenlee timber mortiser to cut square holes up to 2½-in., 15-hp motor; Fay & Egan hollow-chisel mortiser, 6-hp motor; H. B. Smith mortiser, 2-hp motor.

American Universal twin saw with tilting table, 5-hp motor; American tilting frame band saw, 8-hp motor; two smaller band saws, each with a 5-hp motor; double-head saw, 5-hp motor; Universal saw, 10-hp motor; self-feed rip saw, 6-hp motor; rip saw, 6 hp; rip saw capacity, 24 in., 12-hp motor; self-feed rip saw, capacity 8 in., 10-hp motor; cross-cut saw, 6 hp; Greenlee automatic cross-cut saw, capacity 12-in. timbers, 15-hp motor; McDonough resaw, capacity 26 in., 30-hp motor; cross-cut saw, 7½-hp motor; Fay & Egan jig saw, 2-hp motor.

Greenlee boring machine, 3-hp motor; Greenlee gang boring machine, 10-hp motor. A special jig built in the shops and having centering plates is used for making broomsticks for snowsweepers in this boring machine. The jig is so arranged that the holes automatically are spaced correctly and the rows are staggered. Fay & Egan boring machine, 6 hp.

No. 1 Boss timber sizer, capacity 12 in. x 20 in., 40-hp motor; Baxter & Whitney 36-in. surface planer, 15-hp motor; 30-in. planer, 10-hp motor.

Greenlee Universal woodworker, 7½-hp motor; Porter jointer, 5-hp motor; 24-in. joiner, 3½-hp motor; Greenlee sash and door rabbeter, 7½-hp motor; dovetailing machine, 3-hp motor; doweling machine, 14 in. to 1¾ in., Fay & Egan, 5-hp motor.

Tenon and gaining machine, Greenlee, capacity 12 in., 15-hp motor; three tenoners, each with 5-hp motor; Hays double-head tenoner, 15-hp motor; three shaping machines, each with 5-hp motor; panel raiser, 5-hp motor; Columbia 48-in. 3-roll sander, 20-hp motor; upright spindle sander and small hand-feed sander, both with 2-hp motors.

The equipment of the wood mill tool room includes steel lockers and tool cases of Lyon manufacture, the group being 40 in. high and 34 ft. 4 in. long. At one corner of the wood mill a cast-iron steam chest, 18 ft. long and 2 ft. in diameter, has been installed for use in bending wood. The steam chest is made of wrought iron and provided with two sets of interior supports, so that pieces for three separate jobs may be

corner of the wood mill by a steel grating. In this room are a number of automatic machines, including the following:

Power-driven tools for stretching large band saws preparatory to brazing; two grinders for planer knives; an emery wheel with independent motor; two automatic band-saw filers, and an automatic sharpener for circular saws.

The shop force has installed a gas furnace in which brazing



Chicago Railways Shops—Cabinet Section

tools used in joining band saws may be heated. This furnace consists of a crucible about 12 in. in diameter with air and gas connections to burners extending through holes cut in the sides.

MILL ANNEX

The annex to the wood mill is two stories high and includes the cabinet shop, about 325 ft. long, on the ground floor, and an equal space on the second floor subdivided into broom, tin and pattern shops and a pattern storage vault. The broom shop equipment includes steam tanks to soften the broom material and pipe racks of sufficient size to hold twenty broom sections at one time for filling. The broom sections are dipped and the ends are strengthened with through rivets.

Adjoining the broom shop is the tin shop, which is equipped with four workbenches, two cutters, one folder and a number of steel racks for storing small supplies.

The pattern shop is equipped with a wood lathe, planer and a band saw. Adjacent to the pattern shop is the pattern storage room, 96 ft. x 27 ft. in floor area, shown on page 567. This room is reached by a single entrance and is designed to provide the maximum protection against fire. Patterns are stored in ten steel racks, each 8 ft. high and 20 ft. long, having adjustable shelves. This storage equipment was built by the Lyon Metallic Manufacturing Company.

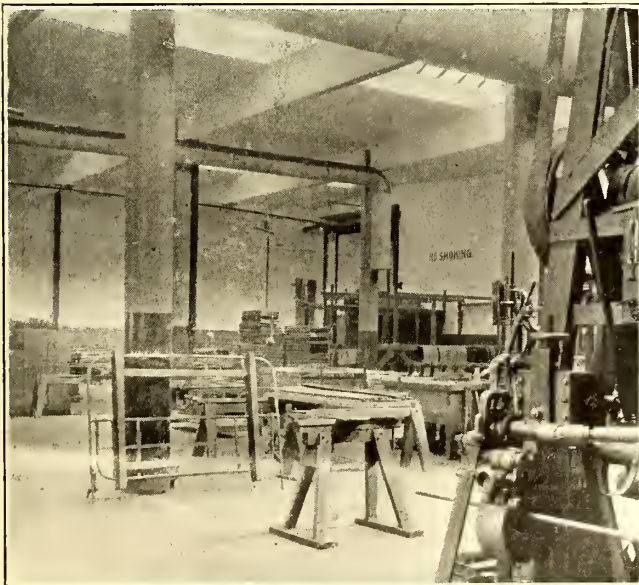
A view of the cabinet shop is shown. This shop has an equipment of steel storage cases for small parts, a gluing and drying section and five workbenches. One end of the cabinet shop is fitted with steel racks for the storage of window screens during the winter and storm sash during the summer. About 26,000 each of sash and screens have to be handled each spring and fall.

FENDER SHOP

A fender shop with a floor space of about 75 ft. x 90 ft. adjoins the wood shop. The equipment of the fender shop includes a number of motor-driven tools, among which are pipe reamers, pipe cutters, pipe threaders, an emery wheel and two drill presses. Three types of fenders are used by the Chicago Railways. The large new cars are equipped with the H. B. fender and older cars have pipe frame fenders with wood slats.

The shop adjoining the wood mill has a track capacity for 72 large double-track cars. At the present time this shop, which is subdivided into two bays, is used as an erection shop.

Adjoining the fender shop and close to the boiler house is a dry kiln, 16 ft. x 30 ft. in size. This kiln is connected with the wood shop by a system of industrial railway tracks, which also serves the adjoining ash-storage room.



Chicago Railways Shops—Fender Shop

steamed at one time. The steam chest has two live steam inlets placed on top at opposite ends and an outlet placed at the center underneath. The chest is made of three cast-iron sections, each 6 ft. long.

WOOD MILL TOOLROOM

A toolroom, 30 ft. x 48 ft. in size, has been set off from one

New South Bend Shops of Murdock Lines

This Shop Does the Repair and Heavy Maintenance Work on the 100 City and Interurban Cars of the Chicago, South Bend & Northern Railway and the Southern Michigan Railway.

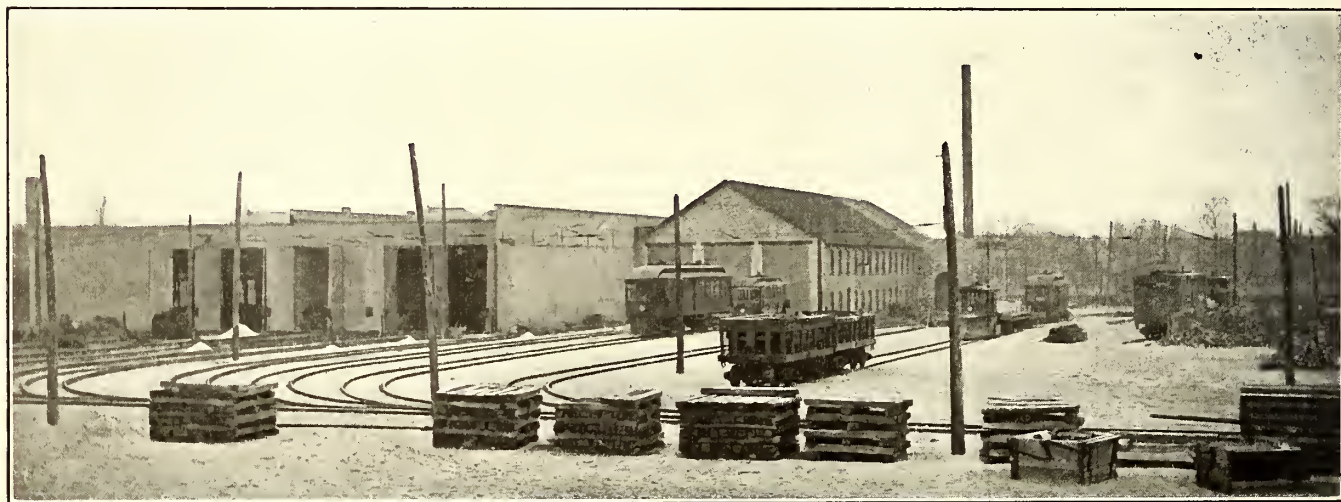
THE mechanical department of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway companies, which are jointly operated, has recently moved its equipment into a large new shop located close to the business center of South Bend, Ind. This shop does the repair and heavy maintenance work on the 100 interurban and city equipments of these two roads. The construction of the shop building was executed under plans prepared by Thomas R. H. Daniels, consulting engineer, Indianapolis, Ind. Several interesting features have been installed to provide for quick and economical handling of heavy car bodies, trucks and equipment. Fred M. Weld was master mechanic at the time these shops were designed and many of his ideas are incorporated in the building arrangement. Accompanying engravings reproduced from construction drawings illustrate the general features of design.

GENERAL ARRANGEMENT

The new shop consists of three principal bays subdivided according to the needs of the work. At the front end of two of

exception of the side walls and the roof, to suit the needs of the shop work.

The main shop and car-storage sections of the building are built with a steel roof structure supported by built-up columns inclosed in 13-in. brick walls. The floors and foundations are made of concrete, reinforced where necessary. The reinforced concrete is made of a 1:2:4 mixture of Portland cement, sand and screened gravel. The reinforced concrete floors were built by first putting down a 5-in. layer of 1:2:5 mixture of concrete. Then a top dressing, 1 in. thick with a sidewalk surface, was added and subdivided by semi-joints into squares containing not more than 20 sq. ft. each. The specifications for the cement used in the construction of these shops were carefully drawn and required that briquettes of neat cement 1 in. in section should develop a total strength of 400 lb. in seven days, having stood one day in the air and six days in water. A cross-sectional view shows the arrangements of the foundations for the steel work and the pit tracks. The side and end walls of the new shops are laid with first quality common brick in Port-



South Bend Shops—Portion of Storage Yard

the bays are sections of the buildings set off for an office, armature room, lavatory and stockroom.

The entire group of bays covers a ground space approximately 165 ft. x 225 ft. A repair bay incloses two tracks extending its full length and is 66 ft. 6 in. wide in the clear. The adjoining bay now is used as an interurban carhouse, but is available for shop purposes whenever the growth of the system may require it. It is 48 ft. wide and incloses four tracks. The third bay is 47 ft. wide and incloses three tracks. This bay is subdivided by a cross partition into two sections, one used as a paint shop and the other as a washroom. The stock room is 29 ft. x 61 ft. 4 in. in plan and has a second story. Adjoining the stock room and close to the main entrance to the shops is an office 12 ft. wide x 29 ft. long. The armature room, located at one corner of the building, to obtain daylight on two sides, is 14 ft. x 21 ft. in size.

TYPE OF BUILDING CONSTRUCTION

Because these several departments are installed in adjacent bays particular care was taken in designing the building to make the partition walls of fireproof construction. The section set off for the paint shop and washroom formerly was a part of the power house and has been entirely rebuilt, with the

land cement mortar, except the exposed faces both interior and exterior, which are laid with hard-burned brick. The window sills, cornices and the decorative parts of the exterior structure are made of Bedford limestone.

The roof trusses for the repair section are supported by the outside wall, an intermediate row of columns and the fire-resisting division wall between the repair and car-storage sections. The design of the roof trusses in the two sections is similar. These trusses are subdivided by skylights for daylight illumination of the center of the bays. The steel work over the smaller division of the repair shop section carries a runway for a 15-ton motor-operated crane.

The specifications for the structural steel work included the following test requirements:

"Tests: A copy of the chemical analysis of the finished material of every melt, determining the percentage of phosphorus, shall be furnished by the contractor and certified at the mill by the chief of the chemical department.

"Two test-bars for machine tests shall be cut from the finished material of each melt, and tested in their natural state, without annealing. These test-bars shall be of standard size and shape, and of at least ½ sq. in. section. The elongation

shall be measured on 8 in. of the original length, which shall include the break.

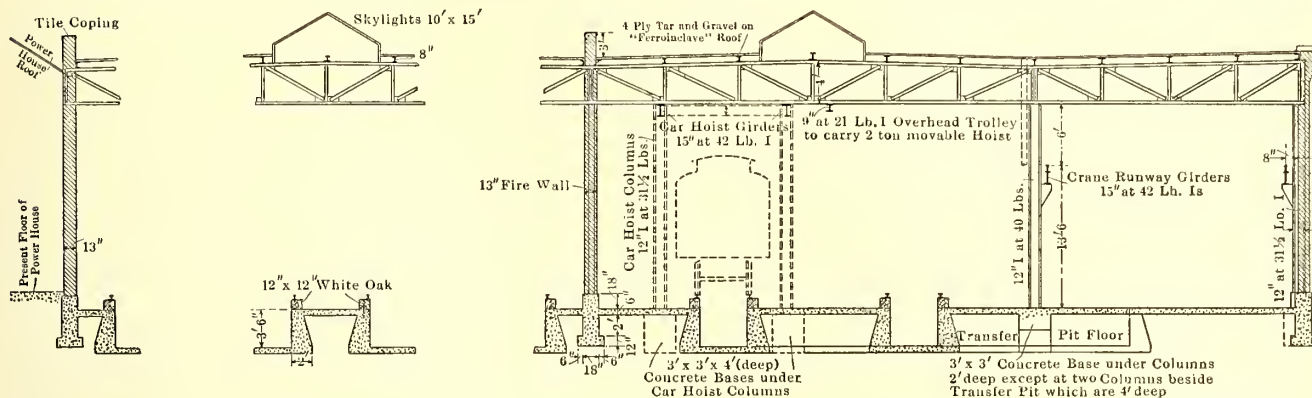
"Test-bars as above, broken slowly in the machine, shall meet the following requirements:

	Ultimate unit strength, lbs.	Elastic limit, lbs.	Elongation 1/2 ult. strength	Reduction of area 1/2 ult. strength
Rivet steel.....	48,000 to 58,000	1/2 ult. strength	26%	52%
All other steel....	56,000 to 64,000	1/2 ult. strength	23%	46%

"The entire fracture shall be silky and of uniform color.

was covered in a thorough way with Dixon's graphite paint.

The roof is made with four-ply tar and gravel on Ferrocement roofing. The specifications called for No. 24 Ferrocement sheets coated on the upper side with a mixture of one part of cement and two parts of sand having a thickness of 1/2 in. above the metal and coated on the under side with the same mixture, including as much hair as necessary to make it adhere properly and applied to a thickness of 3/8 in. The total thickness of the concrete portion of the roof, including the

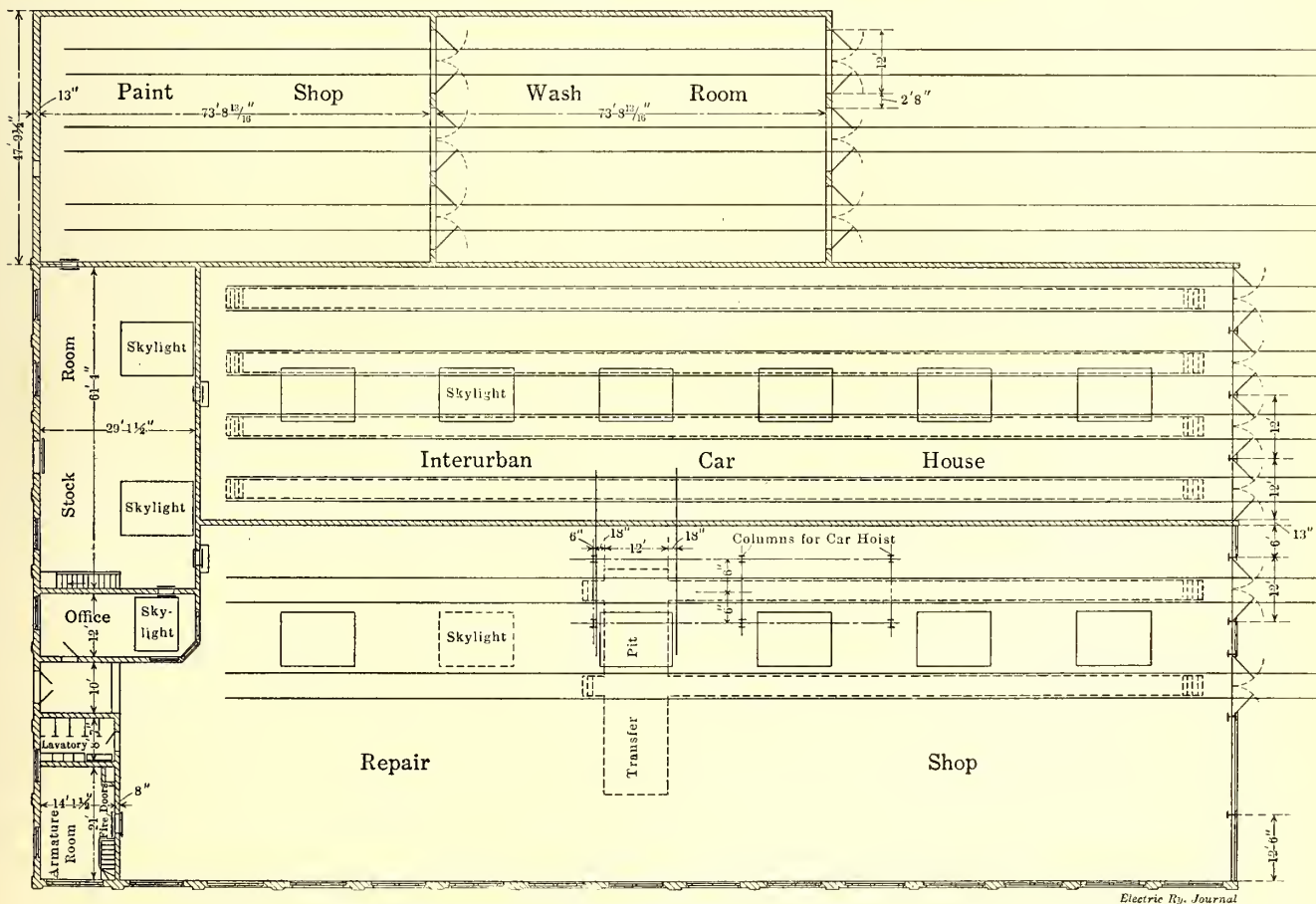


South Bend Shops—Cross Section of Car House and Repair Shop

"A piece of each test-bar, whose thickness is at least 5/16 in. after being heated to a cherry red, and quenched in water at 80 deg., shall stand bending 180 deg. to a curve whose diameter is equal to the thickness of the piece without fracture. In the

material held within the folds of the reinforcing, is 1 3/8 in. The tar and gravel covering for the roof was applied under the following specifications:

"The tarred felt shall weigh not less than 14 lb. per 100



South Bend Shops—Plan of Car House and Repair Shop

case of rivet steel, the test-bar shall stand bending flat on itself without fracture.

"The material, labor and appliances required for the tests shall be furnished by the contractor."

Before erection the steel work was given one coat of protective paint and after the erection all of the metal work

sq. ft., single thickness. The pitch shall be the best quality of straight run coal tar pitch distilled direct from American coal-tar, and there shall be used not less than 200 lb. (gross weight) per 100 sq. ft. of completed roof. The gravel shall be of such grade that no particles shall exceed 5/8 in. or be less than 1/4 in. in size. It shall be dry and free from dust and

dirt. In cold weather it must be heated immediately before using. Not less than 400 lb. of gravel shall be used per 100 sq. ft.

"The construction shall be as follows: First coat the concrete with hot pitch mopped out uniformly. Over the above coating of pitch lay two thicknesses of tarred felt lapping each 17 in. over the preceding one, and mopping back with pitch the full width of each lap. Over the felt thus laid spread a uniform coating of pitch mopped on. Then lay two thicknesses of tarred felt, lapping each sheet 22 in. over the preceding one. When the felt is thus laid, mop back with pitch the full width of 22 in. under each lap. Then spread over the entire surface of roof a uniform coating of pitch, into which, while hot, embed the gravel."

The monitor skylights are constructed of copper framework inclosing wire glass. Each monitor has an effective area of 10 ft. x 15 ft. and has ventilators installed in each end. All the shop buildings are heated by the Webster vacuum heating system.

TRACK ARRANGEMENT

The tracks within the new South Bend shops provide space

a good job of tamping could not be done, and so after the track had been leveled the ties were slushed with concrete.

REPAIR SHOP

A row of columns lengthwise of the repair shop sets off a floor space 25 ft. wide x 210 ft. long, in which the machine tools have been installed. This floor space is served by a 15-ton crane. The equipment of tools now includes the following: Niles-Bement-Pond wheel press driven by an induction motor, wheel lathe, wheel boring mill, axle lathe, drill presses, planers, emery wheels, hacksaws and punch.

The smaller tools are now run from a line shaft driven by two motors, but it is the intention of the company's engineers gradually to equip all tools with independent motor drive. The heavy machine tools used in wheel and axle work are grouped at one end of the machine section. Close to the center of this group is a post crane with sufficient swing to admit of handling wheels and axles to and from any one of the tools by which they are regularly worked. Smaller bracket cranes with chain blocks are installed at each of the heavier tools.

The bearing department with its bricked-in babbitt furnace is installed close to the machine-tool section on the same side of



South Bend Shops—Machine Shop Section

for 26 62-ft. cars, and yard tracks have been installed to store 50 additional cars. The tracks in the yards have been so laid out that a large interurban car will completely clear all curves before entering the barn. The yard layout includes ladders on opposite sides of the property, two connecting tracks, one of which is located in a parallel street, four stub-end storage tracks extending across the yard and the nine tracks which extend into the shop buildings. A "Y" at the southeast corner provides for turning cars, and an industrial siding connecting with the main line of the Grand Trunk Railway permits the economical transfer of heavy materials from steam cars to electric cars.

This track layout for the shop and yards has curves with a minimum radius of 50 ft. The special track work was supplied by the Lorain Steel Company. The grading of the yards provides a 2½-ft. drop from the shop entrances to the ladder tracks. All the special work in this large yard layout was installed in concrete. In planning the work it was found necessary to put the ties so close together that the engineers thought

the building. Probably the most interesting feature of the bearing department is an air-operated mandrel, which is said greatly to cheapen the cost of babbitting bearings. The air cylinder of this mandrel is placed below the work bench and by means of an air valve the mandrel, about which the babbitt is cast, may quickly be withdrawn from the hot metal, leaving a smooth interior surface.

The general repair shop floor has two pit tracks extending throughout its full length. These tracks are 18 ft. apart on centers and the floor between them and toward the side walls is depressed 12 in. below the base of the track rails. This feature places the running gear of a car at sufficient elevation above the floor to facilitate comprehensive inspection and repair methods.

Special facilities are provided for handling car bodies and trucks. The car hoist installed over one track is supported by a row of 12-in. I-beams surmounted by 15-in. cross girders. These girders carry Yale & Towne triplex blocks with which a 62-ft. car body may easily be lifted from its trucks. A sys-

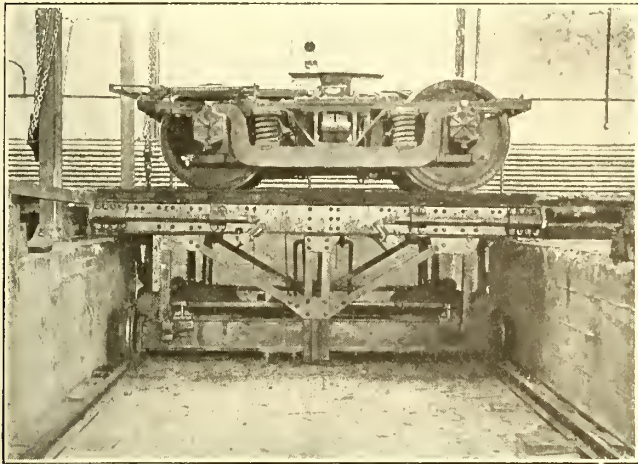
tem of overhead trolley hoists with two-ton movable blocks also has been installed. The runway for these trolley hoists consists of 9-in. I-beams supported from the roof trusses of the repair shop and machine section.

TRUCK TRANSFER TABLE

A specially designed truck transfer table serves to transport the trucks from their position on the pit tracks across the shop to adjoining tracks or to the machine section, where they may be handled by the overhead crane. This truck transfer table was designed and built by the Weir & Craig Manufacturing

small two-cylinder oscillating air engine geared to the axle. The design of this truck transfer table is said to have been based on a factor of safety of five and all pinions, gears and racks are cut from steel. While the truck transfer table is not in use its section of the pit-track rails is securely locked to the adjacent rails. Whenever these locks are withdrawn for the purpose of lowering a truck blocks are placed on the pit-track rails to prevent the accidental rolling of a car or truck into the pit.

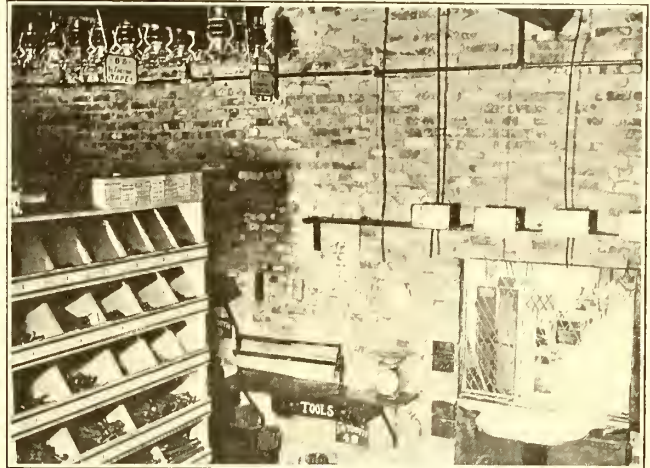
Within the repair shop the trolley wire is protected by



South Bend Shops—Air-Operated Truck Transfer Table

Company, Chicago. It operates in a cross pit 42 ft. long. The truck transfer table is so designed that when the weight of a car body has been taken off a pair of trucks the section of track supporting the trucks may be lowered into the pit and transferred across the shop to the parallel pit or to the machine floor.

The requirements to be met in the design of this table were a difference in elevation between the machine-shop floor and the repair-shop floor of approximately 17 in. and also that when the table was in the upper position cars normally would be run over it, throwing a weight of approximately 25 tons on the table; whereas, the trucks which it was designed to handle

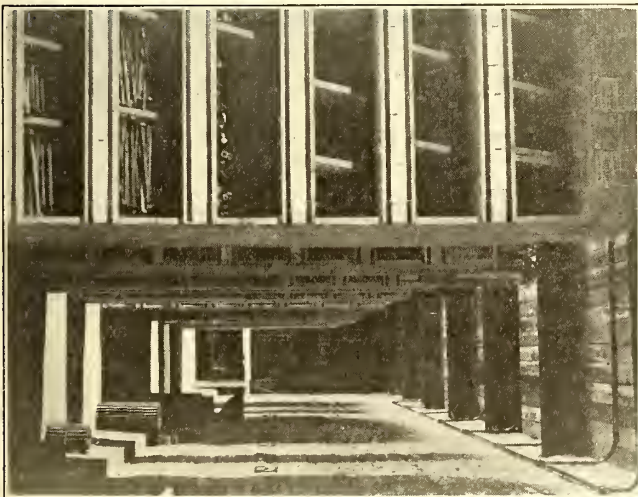


South Bend Shops—Delivery Window of Storeroom

wooden boxes supported on the steel cables which carry the wire. All lighting and other utility wiring within the building is inclosed in conduit.

ARMATURE SHOP

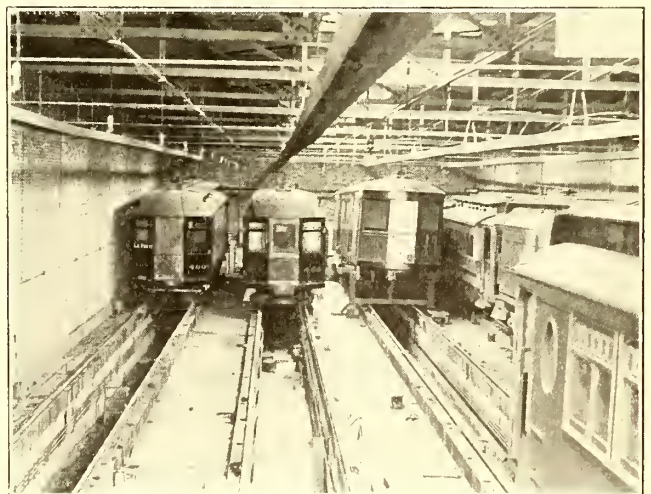
The armature shop provides facilities for doing all work necessary to repair and rebuild armatures. Its equipment includes a heavy lathe, a portable crane and a brake oven. This oven is 10 ft. x 6 ft. x 8 ft. in size, is built of brick and provision is made for heating it with steam in winter and with electric coils in summer. The armature coils used in this shop are manufactured by the substation employees of the road.



South Bend Shops—Storeroom Showing Adjustable Bins

did not weigh more than six tons. For these reasons the upper part of the table was designed as a bridge structure and provided with the locking bars shown in the illustration.

The elevating and lowering of the table with and without load is done by two pneumatic jacks placed near the ends of the table. In order that these jacks might work in unison four double racks were placed one at each corner of the table, these racks being connected by gears and common shafts. The table is propelled along the tracks in the cross pit by a



South Bend Shops—Car House and Light Repair Bay

Each substation has an equipment of the appropriate tools so that the substation attendants may wind coils during the time when they otherwise would have nothing to do.

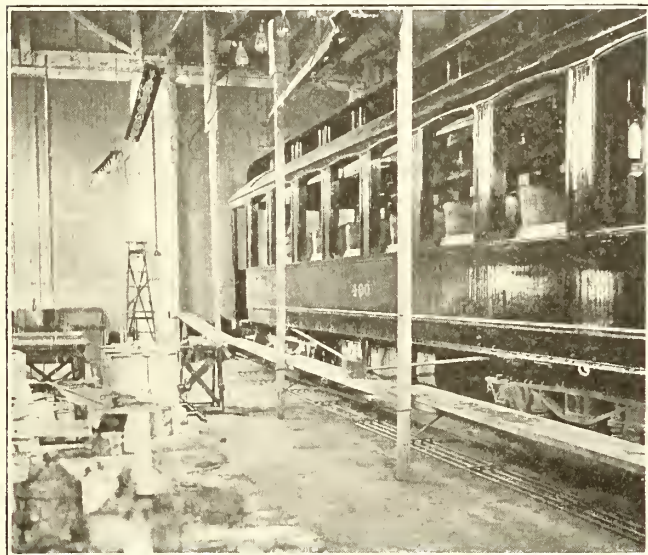
The main entrance to the shop building is through a vestibule located between the master mechanic's office and the lavatory.

STORE DEPARTMENT

The stockroom at the rear of the master mechanic's office is set off from the other portion of the shops by fireproof walls and double, metal-covered gravity fire doors. In the stock-

rooms, which are located on two floors, are 2000 storage bins. An air-operated elevator serves to handle materials between the two floors. Shipments of material from the steam roads are received on an industrial siding passing directly in front of the main entrance to the stockroom.

A view showing the storeroom side of the delivery window is presented. For facilitating delivery of car cable, wire, trolley rope and lamp-cord, supplies of these materials are kept on reels directly above the delivery window. Thus when needed the desired lengths can be pulled down in front of the window and cut off for quick delivery. The store department is run on the card system. The employee desiring the material from the storeroom pushes a button which rings bells inside the storeroom both upstairs and downstairs. By the time that the person wishing the material has his requisition made out the stock clerk has the material ready for delivery. Requisitions on the storeroom are made as follows: Each article which is in stock has a bin number. This number corresponds with a card in the office and the bin number is placed upon each requisition. Therefore, it is an easy matter to check out properly the storeroom material. The cards are on the lower ends of the bins. On one side of the card is the bin number and on the other is the full description of the article in that particular bin, just as shown by the catalog number and description. R. E. Cornwell, storekeeper, states that by having the catalog number and descriptions on these bins material is re-



South Bend Shops—Paint Shops Showing Adjustable Scaffolds

ordered more easily because it is not necessary to refer to catalogs.

The division boards for bins are cut on a 45-deg angle. All bins are made adjustable in this way so as to take care of any increased orders.

CAR HOUSE

The car house bay of the shop group has four tracks on 12-ft. centers and will house 12 large cars. The tracks have concrete pits under them 4 ft. 6 in. deep and the floors between the pits are depressed 12 in. below the base of the rails. As earlier stated, this section of the building has been so designed that it quickly may be adapted for shop use.

PAINT SHOP

Adjoining the car house on the opposite side from the repair shop are the paint shop and washroom, each with three tracks on 14-ft. 8-in. centers. The fittings in the paint shop include specially designed scaffolding. A unique feature of this painters' scaffold is that the posts supporting the scaffold planks may quickly be raised into the roof trusses so that all the floor space between the cars is clear of obstructions. Each of the scaffold posts is a piece of timber 4 in. square in section hung within a square hollow wooden box which, when the

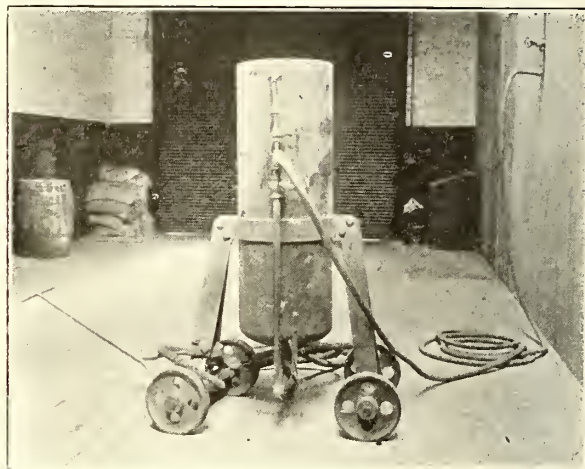
post is lowered to the floor, incloses only its upper end. When the post is raised it passes entirely inside the hollow box which is supported from the roof trusses and thus is out of the way. The scaffold posts are balanced with weights and cords passed over pulleys at the top of the hollow boxes. Holes are bored in the sides of the scaffold posts so that brackets made of round iron may be inserted for supporting planks at any desired height.

Special illumination for the sides of cars is provided in the paint shop. This is obtained by rows of incandescent lamps mounted within half-cylinders of sheet metal. These metal reflectors are 10 ft. long and four of them are hung on each side of a car. Each reflector with its row of lamps is supported by ropes and pulleys, so that it may conveniently be raised or lowered to obtain the best illumination on any part of the car. Similar banks of lights with reflectors are provided at each end of each car position on the three tracks.

These new shops are protected from fire by standpipes and hose in each corner of each subdivision of the building and by five city fire hydrants located on the outside of the shop group.

SAND BLAST FOR CLEANING STEEL CARS

The Chicago Railways Company has 650 large cars which have steel side panels and dashes. Before painting these first are cleaned by sand blast. A special equipment for doing this work has been made and is installed in a room set off from one corner of the erecting shop. In this room are two sand supply tanks and blast nozzles with hose of sufficient length to reach



Sand-Blast Outfit of Chicago Railways for Removing Paint from Steel Cars

all parts of a car. One of the sand blast equipments is illustrated. About four hours are required with the two nozzles to remove the paint from the steel exterior of a car below the window rail. After the paint has been removed the car is sent through the carpenter shop, where it is repaired, and then sent to washroom, where it is washed ready for painting.

SAFETY WASTE CANS

A special form of waste receptacle has been placed at those locations in the shops of the Chicago Railways where much wiping waste is used. The receptacles are large cylindrical waste cans into which a screen has been supported about 6 in. from the bottom. As the waste is thrown into the cans it rests on the screen and the oil and gasoline drain to the bottom space. Dirty waste collected from such cans can safely be thrown directly into the furnace without danger of flashing back into the fireman's eyes.

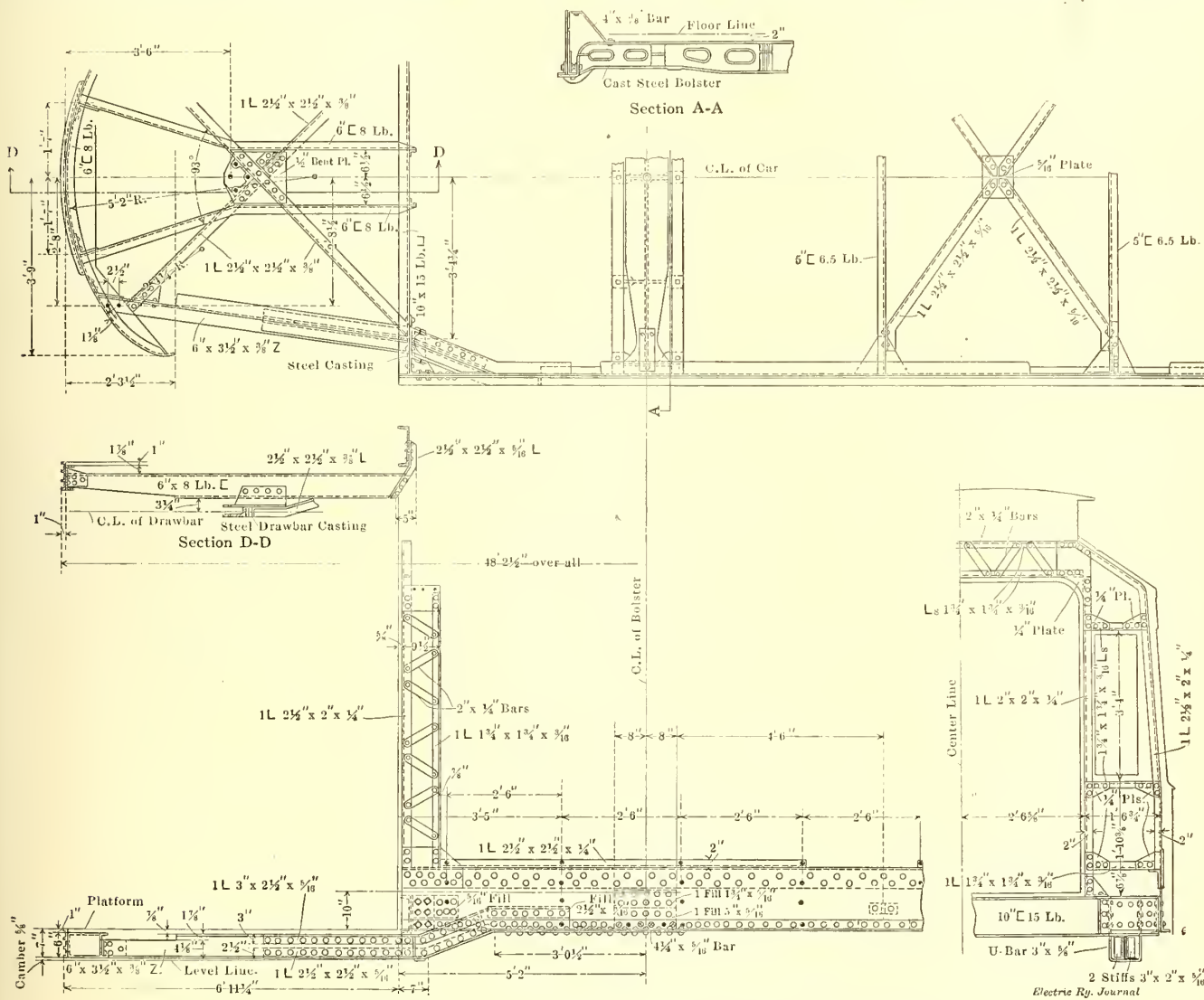
During January, 1911, 13 persons were killed on the street railways in Pennsylvania and 272 were injured. Of those killed five were trespassers.

New Pay-Within Cars at Boston

These Cars Are of the Semi-Steel Type with Manually Operated Doors and Steps, Capable of Being Controlled from Either Platform

THE Boston Elevated Railway Company recently placed a contract for the building of fifty new semi-convertible cars with the Laconia Car Works Company, of Laconia, N. H., the rolling stock being designed for surface operation with the prepayment system of fare collection licensed under the patents of the Pay-Within Car Com-

in turn are riveted to the end and side sills. Steel corner castings are employed for the purpose of connecting the end and side sills in a rigid manner, and are riveted to the end sills and bolted to the side sills by means of turned bolts in reamed holes. A 3 in. x 5/8 in. "U" hanger is attached to each steel corner casting to serve as a support for the platform knees.



Boston Prepayment Car—Details of Structural Steel Framework

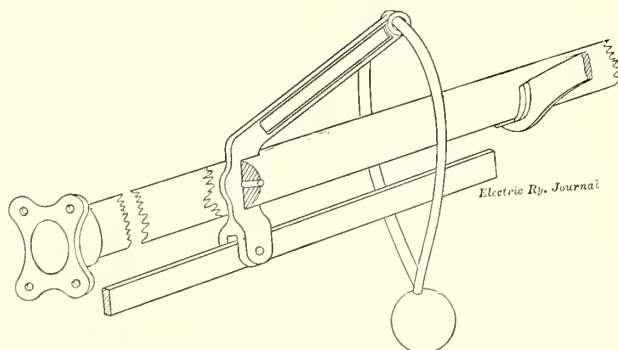
pany. The new cars illustrate a number of improvements upon the company's previous practice, including the use of an all-steel underframe of special design, steel bulkheads, steel roof trusses and folding steps and doors of the manually operated type. Each car is to be equipped with four Westinghouse "306" interpole, 60-hp motors with a gear ratio of 16 to 68; the seating capacity is to be fifty-two passengers, and the approximate total weight of the complete car, without passengers, is 26.5 tons.

The principal dimensions of the cars are given in the table printed in the opposite column.

The entire underframe, cross-framing at the bulkhead and trusses supporting the roof are of steel construction, a special feature being the bulkhead design. This consists of latticed corner posts at each end of the car made up of 2-in. x 2 1/2-in. x 1/4-in. angles tied together with 2-in. x 1/4-in. bars and attached to the underframing by being riveted to gusset plates which

BOSTON ELEVATED RAILWAY COMPANY, NO. 4 SEMI-CONVERTIBLE CARS		
	Feet. Inches.	
Length over bumpers.....	48	2 1/2
Length over corner posts.....	34	4
Distance center to center of bolsters.....	24	0
Width over eaves, lower deck.....	8	2
Width over eaves, upper deck.....	5	5 3/4
Width over window rails.....	8	8 3/4
Width inside at seats.....	8	3
Width of aisle.....	2	4
Width of arch in bulkhead.....	5	0
Height from rail to top of trolley board.....	12	0
Height from rail to car eaves.....	9	8 3/4
Height from rail to top of floor matting.....	3	4
Height of steps.....	17	
Height of platform.....	2	6
Height from rail to top of body center plate.....	2	6 1/2
Height from sill to trolley base.....	9	6
Height from top of rail to sills.....	2	6

The upper part of the bulkhead framing consists of an arch built up of $1\frac{3}{4}$ -in. x $1\frac{3}{4}$ -in. x $\frac{3}{16}$ -in. angles latticed together and forming a structure which takes practically all the thrust of the roof which is ordinarily transmitted through the wooden corner posts of a car and consequently requires in usual designs the use of heavy posts. The construction adopted tends to decrease the dead weight carried above the platform and to reduce the side sway. The wooden posts used in these new



Boston Prepayment Car—Double Signal Bell Pull

cars simply divide the window spaces and carry but little load, and practically the entire overhead weight is supported by the steel framework.

The underframe consists of steel side sills built up of plates and angles running the full length of the car between bulkheads and connected at either end with the channel end sill. The principal members of the side sills form on each side a 16-in. girder provided with reinforcing angles at the top. The floorbeams consist of 5-in. channels running between the side sills and riveted to the latter by framing connections and gusset plates. The platform supports consist of 6-in. x $3\frac{1}{2}$ -in. x $\frac{3}{8}$ -in. Z-bars fastened to the side sills, bent down to take the platform and reinforced with angles. Two center sills are provided for each platform, each being made up of 6-in. channels which connect the end sill of the car framing and the bumper. Diagonal bracing is provided for each platform, of $2\frac{1}{2}$ -in. x $2\frac{1}{2}$ -in. x $\frac{3}{8}$ -in. angles. These diagonal braces are riveted to a $\frac{1}{2}$ in. steel plate, flanged up on each side and riveted in turn to the 5-in. center channels. The drawbar steel casting is bolted to the diagonal braces and also to the $\frac{1}{2}$ -in. plate. The bumper of the car is a 6-in. channel connected to the ends of the platform sills. It is equipped with Hedley anti-climbing bumpers.

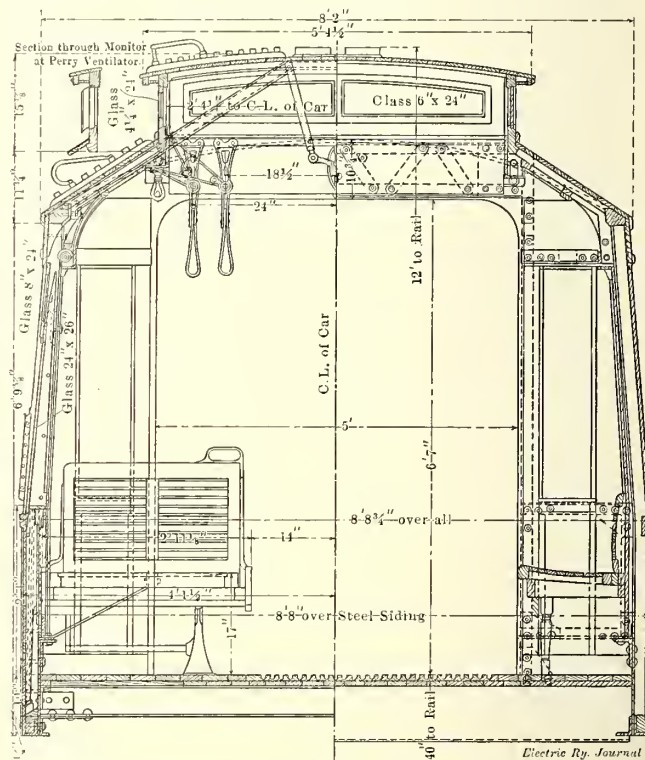
The platform sills are riveted to the end sills. The bolsters are solid steel castings and are provided with holes for center plates, pipes and conduits. They are attached to the side sills by bolts and are provided with steel braces to the top of the side sill and also with steel wear plates. Symington ball-bearing center plates are provided, and the side bearings are made of 3-in. x $\frac{1}{4}$ -in. steel plates. The under framing is provided with 2-in. x $2\frac{1}{2}$ -in. x $\frac{5}{16}$ -in. angle cross-bracing between the side sills. The main roof supports consist of four steel trusses, each consisting of a 2-in. special channel extending across the car from post to post, reinforced by one $1\frac{1}{4}$ -in. x $\frac{1}{4}$ -in. horizontal bar and two 1-in. x $\frac{1}{8}$ -in. diagonal braces. Between the channels the roof is carried by $\frac{7}{8}$ -in. x $1\frac{1}{4}$ -in. ash rafters. The posts are of Indiana ash, bolted to the side sills and furred in at the top. Provision is made in each of the smaller posts to receive the wiring for the electric bell-signal system of the car, which is being supplied by the Consolidated Car Heating Company.

The roof boards are of $\frac{1}{2}$ -in. whitewood covered with cotton duck. Six Perry ventilators are to be provided in each side of the upper monitor deck. The upper deck is being built with no head lining, and the lower deck is straight from the lower deck sill to the body plate, giving the company the advantage of using wood in the direction of the grain and securing a stronger construction for a given weight of material as well as a slight reduction in the total cost of manufacture.

The vestibule frame is of ash, reinforced at the center posts by a $1\frac{1}{2}$ -in. x $\frac{1}{2}$ -in. steel trap extending the full length of the post to which it is fastened by screws. It is also fastened to the platform crown piece at its lower end and to a 3-in. x $2\frac{1}{2}$ -in. angle at its upper end. This angle extends around the vestibule at the plate from bulkhead to bulkhead in a continuous piece. It is hoped by this construction to increase the safety of the vestibule in case of collision, the idea being to have the whole vestibule buckle rather than have the corner posts break and splinter. Each side of the vestibule is fitted with two sets of double-leaf folding doors opening outward, one set toward the car body and the other toward the vestibule corner posts. These folding doors are operated manually by a device specially designed by the Pay-Within Car Company, with operating levers located under the platforms, and are so constructed as to enable the conductor to operate the doors and steps for either side of the platform from his fixed prepayment position. The motorman's control is similarly arranged so that he can operate both sets of doors and steps without moving from his position.

The cars are of the double-end type. Rubber strikers are provided on the edges of the vestibule doors. The steps on each side are operated by the same system of levers which swings the doors in and out. The steps are carried on wrought iron hangers which are fastened to the vestibule floor frame, and toe guards are installed to inclose the opening from the step tread to the platform.

The steps are of ash $1\frac{1}{4}$ in. thick, are provided at their



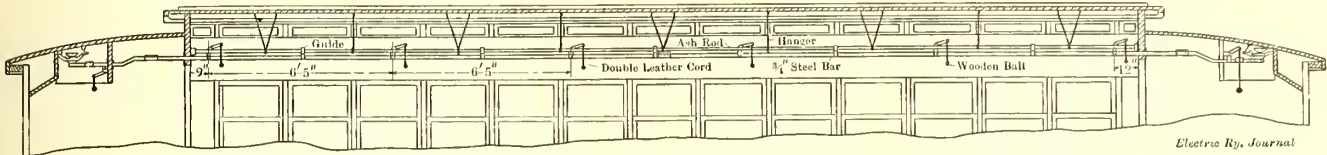
Boston Prepayment Car—Cross-Section

outer edges with Universal safety treads set flush with the top of the step and bent down over the edge to form a nosing. Each step is strengthened by four steel dowel pins, $\frac{3}{8}$ in. x 6 in. in size. The floor is single beneath the seats and double beneath the center. The side flooring and under flooring in the center are of $\frac{7}{8}$ -in. Southern pine and the top flooring in the center of the car is of $\frac{7}{8}$ -in. matched maple extending the full width of the aisle. The car floor is extended out on the platform in a tapered form for a distance of 13 in. to provide a position for the conductor. This enables him to see the full width of the step at an elevation above the passengers during the boarding and alighting. This arrangement also provides wider entrance and exit passages between the conductor's control stand and the bulkhead panel. Although the cars are to be

of the prepayment type, with the door and step operating mechanism built under the patents of the Pay-Within Car Company, the railway company has not yet decided the exact details of the fare collection.

Each vestibule is to be provided with two three-leaf swinging doors, which, when extended, will form a motorman's compartment. These doors, when not forming the cab, are arranged to fold back against the slanting side of the vestibule. On the underside of the hood, extending from the top of the motorman's cab doors to the roof and following the outline of the cab, is an ash bulkhead, 1¼ in. thick, to which

The interior finish of the cars is to be of mahogany up to and including part of the monitor sill, the balance of the monitor being stained to match the finish below. The rafters and under side of the monitor roof are to be painted. The finish below the window rail in the car siding is to be of 3/16-in. agasote paneling, this material also being used on the under side of the lower deck. The exterior of the car body will be painted the Boston Elevated Railway Company's standard green color. All steel members are being given a priming coat of paint before assembly. The agasote paneling on the inside of the car siding is removable, and is held in place by small steel

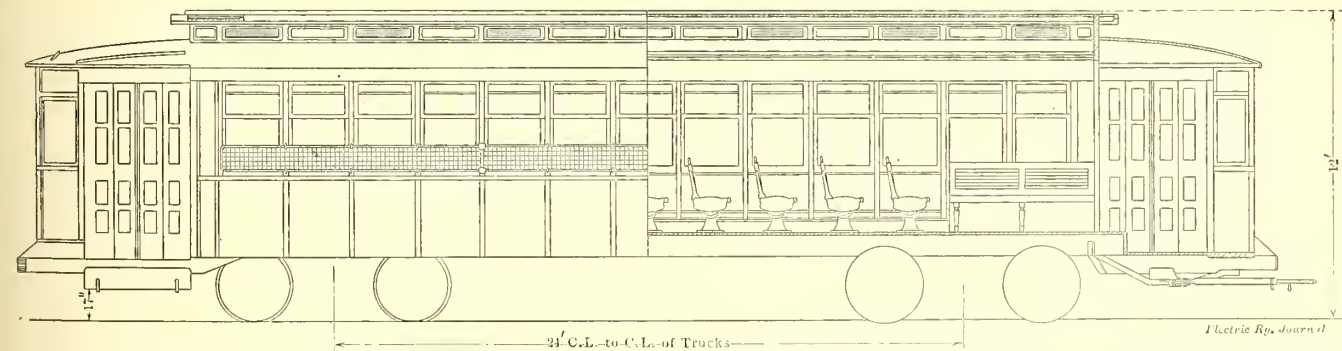
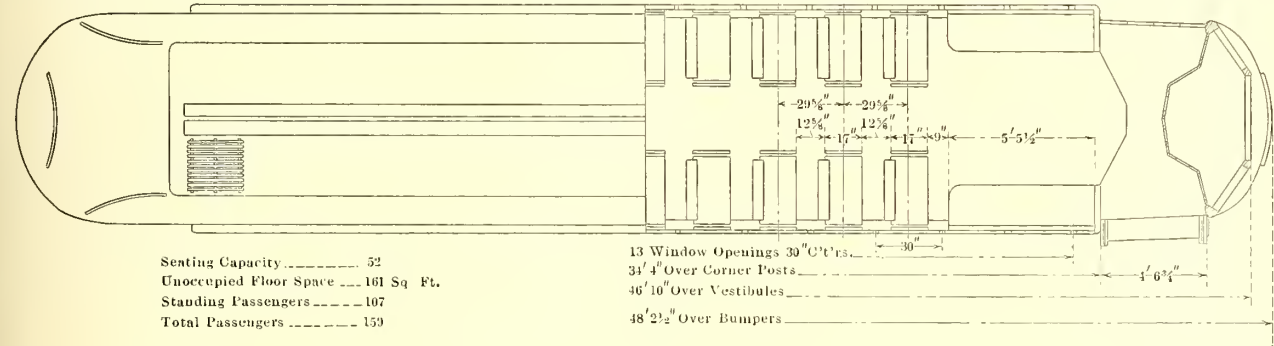


Boston Prepayment Car—Longitudinal Section, Showing Double Signal Bell Pull

are to be attached the switches, circuit-breaker, fuses, etc., included in the electrical equipment. This bulkhead is to be lined with "transite" on the motorman's side, and this material is also to be placed over all woodwork within a distance of 8 in. of switches, fuses, etc. Illuminated signs of the Hunter type are to be installed over the center vestibule windows.

Thirteen windows are to be provided on each side of the car body. Each consists of two sash which are arranged to slide into a lower deck pocket in the roof and into a pocket in the side of the car. The outside of the window rail is to be covered with sheet steel in one continuous piece throughout full length of car. There will also be sheet steel plates ex-

angles. Advertising space is to be provided over windows extending the full length of the car, on the end bulkheads and on the outside of headers over the motorman's cab doors. The controller, brake valve and other fittings are attached to a 2½-in. x 2-in. angle extending around the front of each vestibule. The outside of the vestibule is to be sheathed with 5/16-in. whitewood covered with sheet steel, the inside finish below the window stool also being of sheet steel. Hand-strap poles are run longitudinally on each side of the car and in the center of the car the hand-strap pole is brought out nearer the center of the aisle so as to be more convenient for passengers standing in the aisle between the cross-seats. Hand straps



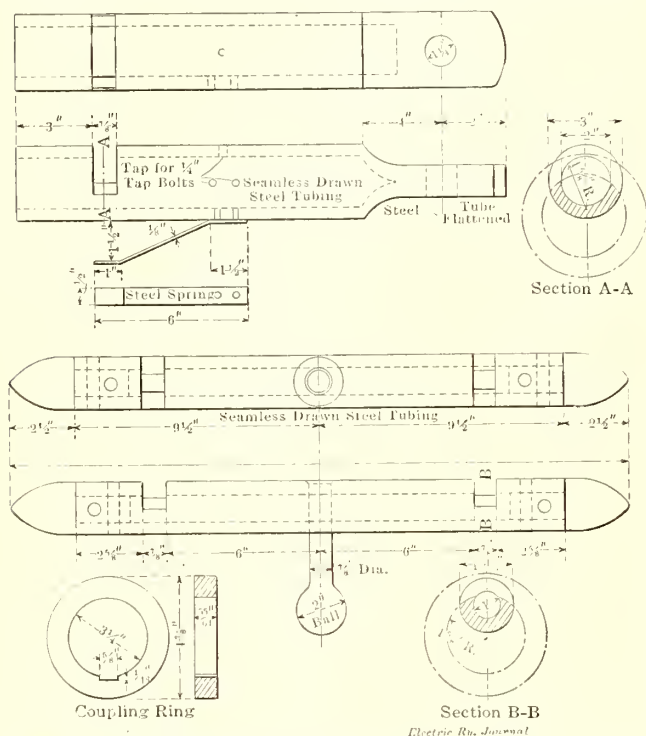
Boston Prepayment Car—Plan, Part Side Elevation and Part Longitudinal Section of Car; Showing Also Part Seating Plan, Over-All Dimensions, Passenger Capacity, Etc.

tending from post to post, which will form the lip on the inside of the window rail. Sash pockets are to be provided in the sides of the car below the window opening. Rubber cushions are set at the bottoms of the pockets. There are to be nine cross-seats on each side of the car and one longitudinal seat in each corner. The seats are of the Heywood Brothers & Wakefield type, the cross-seats having wooden slat backs of the reversible type with stationary cushions on the bottoms.

are to be 5 ft. 3 in. from the floor of the car. The buzzer system will be operated from the power circuit through appropriate resistance and fuse. Sand boxes of the Kilbourn type are to be installed under the seat in the left-hand diagonally opposite corners of the car, and an air-pump governor will also be located below the seating space. The sand boxes are to be arranged for foot operation, with pedal in the cab. The heaters are to be of the truss plank type, supplied by the Consolidated Car Heat-

ing Company and mark a change in the location of this type of equipment for Boston Elevated Railway service. In the preceding type of semi-convertible cars built by the company the heaters have been located beneath the seats. The outside of the car is to be equipped with Clinton electrically welded wire screens at the window openings, the screen width being 12 in. The motors are to be controlled by the Westinghouse unit-switch control system, type "HL," with no jumper provision for train operation. Libby fenders are to be used, and the scrapers are to be arranged for pneumatic operation. The Westinghouse straight air-brake equipment, type "SME," is to be employed, and a hand wheel brake connection will be provided in the cab.

The trucks are to be supplied half by the Standard Motor Truck Company and half by The J. G. Brill Company. The trucks are to be designed for proper clearance under the car body, on curves of 35-ft. radius, allowing for a spring com-



Boston Prepayment Car—Details of the New Type of Draw-bar Made of Seamless Steel Tubing

pression of 2 in. under load. The principal truck dimensions are as follows:

	Feet.	Inches.
Diameter of wheels.....	4	33 1/4
Wheel gage.....	4	8 1/4
Diameter of axle.....	5	5 1/4
Size of journals.....	1 1/4	in. x 8 in.
Wheel material.....	Rolled steel	

The cars are to be equipped with Neal headlights and double-faced pantasote curtains. A double signal bell pull is to be installed, operating a bell at each end of the car by hand lever attachment. The drawbars are of a type recently designed by Paul Winsor, chief engineer of motive power and rolling stock of the railway company, the essential feature being the use of a hollow tube of Shelby seamless steel into which fits a round slotted coupling bar of the same material. A slot in the outside tube is provided into which a coupling ring of steel is slipped, and in this manner the inner and outer tubes are locked together effectively, as indicated in the accompanying drawing.

All wiring is in conduit, and the lighting wires are run in two lines of loricated conduit down the sides of the car, one line on each side, with appropriate outlets for incandescent lamps. The car bodies are now being assembled at Laconia and will shortly be delivered to the railway company for equipment. The motor requirements were based on service on lines radiating northward from the Sullivan Square terminal.

EXTENSION OF THE LONDON, BRIGHTON & SOUTH COAST RAILWAY

According to a telegraphic dispatch from London, dated March 25, the success of the single-phase electric equipment of the London, Brighton & South Coast Railway has been so marked that the company has now decided to equip electrically the entire system of 479 miles. It is expected that the equipment will be completed in 1916.

This dispatch adds interest to some further particulars of the equipment of this line contained in the paper presented by Philip Dawson at the meeting on March 14 of the Institution of Civil Engineers in London. Mr. Dawson says that the company obtained parliamentary powers to equip its lines in 1903 and at that time he was appointed consulting electrical engineer. The system adopted was the single-phase at 25 cycles per second and a trolley voltage of 6700. The first electrical train was run Jan. 17, 1909, and the full public service was begun Dec. 1, 1909. Thirteen months of regular operation have entirely justified the adoption of the system. The distance first equipped was 8.7 miles, on which there were 10 intermediate stops of 20 seconds each, and the run is being made in 24 minutes. Subsequently the company decided to extend the system so that the amount electrified would be equivalent to 62 miles of single track.

The minimum drop in the earth return is limited by the Board of Trade to 20 volts. A system of distribution and feeding has been designed to meet these requirements and series booster transformers installed have given excellent results. There were originally 16 motor cars each equipped with four 125-hp Winter-Eichberg compensated repulsion motors. The new cars will have four 150-hp Winter-Eichberg motors, and 30 motor cars and 60 trailer coaches have been ordered. The new trains will be made up of units consisting of one motor car and one trail car instead of two motor cars and one trail car as formerly. The range in height of the trolley wire is from 20 ft. to 13 ft. 9 in. The contact surface of the bow collector is aluminum and it lasts from 5000 to 6000 miles. The pressure against the trolley wire varies from 8 lb. to 12 lb. Two bow collectors are used for each motor car, one for each direction of running. The operation of the reverser automatically reverses the bow collector and one collector does not come down until the other is in contact with the trolley wire.

In a recent trial run of a three-car train weighing 146 tons the train ran continuously for 12 hours with 20-second stops at each station and covered a distance of 173.58 miles. The average length of run was 0.79 mile. At the conclusion of this run the maximum rise of temperature of any part of the electrical equipment was 66 deg. C. (151 deg. Fahr.). During this test the following results were obtained: Power factor, 80.8 per cent; maximum current at starting, 126 amp; average acceleration, from 0 to 25 m.p.h., 1.75 ft. per second; and the power consumption on the train (which was a new one) 73 watt-hours per ton-mile. All the measures showed that the test results were within the guarantees. After the train had run for some time further tests were made which showed, in the case of a single trip from Victoria to London Bridge, an energy consumption of 65.7 watt-hours per ton mile for a schedule speed of 22 m.p.h., including 20-second stops at each station. The influence of a long run on the energy consumption is shown by the fact that for a through non-stop trip from Victoria to London Bridge at an average speed of 37 miles per hour the energy consumption was 34.4 watt-hours per ton mile, the maximum speed reached during the run being 50 m.p.h.

The weight of a complete motor car on the rails is 108,982 lb. The total weight of all electrical equipment, including collecting device, lighting, compressor, etc., is 40,484 lb.

The principal contractor was the Allgemeine Elektrizitäts Gesellschaft, of Berlin. All the overhead work was carried out by R. W. Blackwell & Company, and the rolling stock was constructed by the Metropolitan Amalgamated Carriage & Wagon Company.

ABBREVIATING CAR PAINTING METHODS

BY H. ARNOLD FRENCH, MASTER PAINTER, THE RHODE ISLAND COMPANY

The problem of reducing the cost of electric car painting is really a problem of methods. The many possible compounds of pigments and vehicles and the many different ways of applying them to surfaces offer a great number of working formulas for choice. The new order of things resulting from enforced economical requirements necessitates some radical changes in comparatively modern methods, which, if adopted, must necessarily sacrifice to a small extent the highly polished appearance of surfaces that are so expensive to obtain. If this can be accomplished without jeopardizing durability a very important part of the problem will be solved.

It is quite interesting to note the effect that any change in the painting of the electric cars of a city has upon the people who patronize them and see them daily. As long as the color and style of ornamentation to which they have been long accustomed remain the same the cars pass unnoticed as far as concerns any criticism of the condition of the paint. It is remarkable that this important point apparently is so little understood and exploited. Complaints are seldom heard from owners of fine estates concerning the large square span wire poles of the street railways in front of their residences, although the poles are covered with a rough but durable paint. On the other hand, it is a universal rule that the cars of the same railway, although seen only at intervals, must be painted by comparatively expensive methods.

Unless specifically brought to its notice the public, generally speaking, has little idea of car painting methods. Advantage should be taken of this fact for business reasons. To illustrate this point, take an old car body with the old paint removed and paint it with one coat of lead priming and two coats of rough stuff filling—a method recently considered as being extremely economical for a base on which to color. When finally varnished this car will look as though two coats of priming and four coats of filling had been applied for a foundation, provided due care was exercised in removing the old paint and in leaving the surface of the car free from scraper marks. Then take another old car body and, if there be no superficial disintegration, cover the old paint and varnish with one coat of some dark color of strong covering capacity. It is safe to say that when this second car is colored, ornamented and varnished exactly like the first not one person in a hundred unfamiliar with the painting business could detect any difference in the appearance of these cars in service on the street. In the past the writer has made some personal experiments along these lines with people of very good taste in most matters, yet he found only very few who could detect the difference between cars with a piano finish and cars painted like a tip-cart so long as both were brightly varnished. Where, then, is the wisdom of applying successive coats of rough stuff filling, composed mostly of costly varnish, to be followed by a greater expense in the scouring to obtain a mirror-like surface on street cars when the results are appreciated only by expert painters or a few sharp-eyed patrons?

The question of the value of strata of paint composed of three or more coats or rough stuff filling as a medium for the protection of wood and metal is, of course, a debatable one. Much has been written pro and con on this subject by noted master painters, whose opinion, based on experience, should be more or less convincing. Yet some new information is often obtained when the whole body of oxidized paint material that covers a street car is examined in detail from its adhesion to the surface through its different strata to the protecting varnish film on the outside. Contractions and expansions occasionally occur in well-seasoned whitewood car panels because they contain large volumes of interstitial air, together with their natural water which generally constitutes one-eighth of their total weight. This movement of the wood is very irregular, as the longitudinal action is much less than the

transverse action. The priming coat into which a sufficient amount of oil can be incorporated to keep it in an elastic state moves with every motion of the wood without breaking; but the filling, whose main office is to produce a level surface, must necessarily be of a hard, brittle nature in order that the stone may successfully cut off the surface. If the filling is compounded so that it may, when oxidized, remain in an elastic, protective state, the operation of rubbing it would be similar to that of filing off a piece of rubber to make it smooth. It is often the practice, especially among car manufacturers, purposely to let the filling dry in a soft, chalky condition in order to facilitate the leveling; as it is a soft stratum, it acts as an absorbent to the succeeding coats. The action of the filling on the varnish coats is noticeably effective, leaving them devoid of their natural luster after a time. Finally, when all of the coats of paint material are applied the filling, minus the tenacious qualities of the other coats that are capable of yielding to every movement of the active foundation, is always a menace to the durability of the whole paint body.

At the Oct. 21, 1910, meeting of the New York Railroad Club a paper on "The Protection of Metal Equipment" was read by a member and discussed by some of the most able master painters in the country. [An abstract of this paper by Wm. Marshall was printed in the *ELECTRIC RAILWAY JOURNAL* of Oct. 29, 1910.—Eds.] In view of the fact that all cars, irrespective of their motive power, are generally painted by similar methods it might be of some interest for the writer of this article humbly to comment on some of the deliberations of the club named and also to hazard a few suggestions.

In several painting formulas that were submitted rough stuff filling under different names was unanimously advocated as a necessary part of steel car painting; the object of its use, as was gathered from the proceedings, was mainly to effect a level surface. With all due regard for the opinion of these masters, I would like to inquire if it is absolutely necessary that cars that are seldom in a position to be critically examined, since they are isolated in train yards when not in use or are swiftly passing through sparsely populated sections when in service, should receive this expensive treatment? We might argue that freight cars are as much, if not more, in evidence than passenger coaches, yet no information is at hand of a freight car being treated with rough stuff filling in order that it might be beautified—certainly it is not the rule. Then, why waste time and money embellishing the exterior of a passenger coach when it can be protected and operated equally well by simpler painting methods that might save from 20 per cent to 50 per cent of the cost? If the surface of these cars, either at the time when it is necessary to remove the old paint or when they are being constructed, was prepared in the best manner to leave them as smooth as possible under the circumstances, then the application of lead, color and varnish judiciously mixed and properly applied would afford ample protection to either the wood or the metal of which they were constructed and still permit them to present a satisfactory appearance when in service. It might not be a very strong assertion to make that if a car was treated in the manner described and placed in a train composed of cars that were treated with the filling process the difference in appearance would not be detected by the public, provided that all of the cars of the train were newly varnished. Anyway, it is a simple matter to try the experiment on one car and watch the results.

My claim to the soundness of this reasoning against fillers is based somewhat on the failure of all of the painters in our shop to notice anything unusual about an electric car that had been painted the common way minus the filling during the time it remained in the shop to be varnished after more than a year's service. Yet this car was standing in a good light among 15 cars of the same type that had been treated with the filling process. Considering the high cost of all paint material at the present time, the significance of these remarks should offer some food for reflection. It cannot be disputed that a car finished with the elegance of a piano is a pleasing thing to gaze upon, but the question ever before us is: Is it practical or neces-

sary to place this finish, well as it may look, on a car of any kind?

So it seems reasonably clear that if a fairly level surface can be obtained by some other less expensive process than by the rough stuff filling that approximately represents 20 per cent of the cost of painting a car the filling might well be dropped from painting entirely as far as its value for anything else is concerned. It would be nonsense to assume that as level a surface could be produced by any other means as by the filling method, but, viewed from a practical standpoint, when difference in the cost is considered a small amount of the reduction of the finish would never be missed. However perfectly a surface is leveled and by whatever costly method this leveling is obtained, the effect remains in evidence only during the usually brief period between its application and the time it is subjected to modern car-washing practices, which invariably produce a "dead finish." This last thought suggests the unique proposition that the last coat of varnish on the exteriors of newly painted cars be rubbed to a "dead finish" in order that surface imperfections due to the absence of filling may be less noticeable. This operation could be done at a very small expense compared to the cost of rubbing filling, and the varnish would receive no harm from losing its superficial gloss. Nearly all of the interiors of new cars are finished without the gloss showing. It is a well-known fact that interiors are often purposely finished in this way so as to cover a multitude of small surface elevations and depressions that would be greatly magnified if the last coat of varnish was allowed to retain its brilliant gloss. Probably the only objection that would be raised to this novel departure from customary practices would be the time that would be required for the varnish to oxidize to sufficient hardness to allow the rubbing to be done, but car varnishes as a rule dry quickly, so it might make a difference of only two or three days, which would not be a matter of much consequence.

It is not so long ago that a proposal to paint cars in the present comparatively plain manner would have been commented upon only by a few far-seeing practical men and ignored by the majority as unworthy of notice. Yet the fact is established beyond controversy that this plainness represents a vast saving of money. A recent search of some old accounts emphasized this fact more fully by revealing some interesting comparisons regarding the cost of past and present painting methods. One item of touching up and varnishing a small, open-face, 16-ft. horse car placed the cost at \$32; another account on the same type of car showed the cost of gold leaf for ornamentation, outside of labor to apply it, to be \$27. All other work was charged in proportion. To-day we paint and varnish large 30-ft. vestibuled cars for less than it formerly cost to paint small horse cars. This radical change has been wrought by slow stages during many years, and still there remains the opportunity to reduce car painting expenses to a much greater degree, if we can be educated to relinquish our desire for ostentatious shine and glitter.

It may seem somewhat presumptuous to predict that some time in the future all passenger cars, both electric and steam, may be painted not only by methods that will not require rough stuff filling in the process, but that varnish also may be excluded. At first glance this proposition might seem somewhat startling just because it is not in accordance with customary practices; nevertheless, the probability of this change may develop into a fact at any time. A review of past and present economical requirements regarding the maintenance of cars foretells that further revision downward in the cost of painting methods may be expected in the future. However this may be, there is yet room for further reduction, if preservation alone is considered, as by the use of oil paint exclusively; for if gum and filling are eliminated—two ingredients that are not absolutely essential to the homogeneous body of paint in this case—the possibilities of further reduction in the cost can be easily estimated.

It seems rather illogical to argue that because a street car is such an ordinary object in the streets it attracts no

special interest outside of the service it renders. The chief point to be noted is the tendency of the public to regard the cars with the same indifference that they do the houses they pass, and the question arises, Why should they be painted by more expensive methods? No law is violated if a car should be painted as houses are painted. It would be only a change from established custom. Most of the houses that we dwell in are decorated and protected with oil paint alone. It would be considered absurd if rough stuff filling and varnish were included in the specifications for the painting of the exterior of a house. Doubtless there are a few fastidious people who would like to have the outside of their houses filled and varnished if the operation did not involve an enormous expense. If such expense is considered excessive on houses why should it not be so regarded on cars?

Viewed from any practical point, it must be acknowledged that an enormous amount of railway capital is invested in surface "mirrors" that reflect no financial return. Under the best circumstances these "mirrors" remain polished but a short time. The spending of money for paint material to be used for preserving railway equipment is manifestly a wise course to pursue, but dollars for decoration might better be used for purer pigments and vehicles that will prolong the life and usefulness of cars and still show a considerable balance on the right side.

SLIDING PORTABLE CROSSOVER OF THE DETROIT UNITED RAILWAY

A sliding portable crossover is in use by the Detroit United Railway. Details of the construction are shown in the accompanying illustrations on page 585.

The crossover is made of 7-in. guaranteed construction with run-offs at each end of 70-lb. rail. It is put together with iron spacing bars with a shoulder on each end and a drive key on the outside of the rail. By the use of the key the crossover can be put together and taken apart in a much shorter time than by any other method. Flanged shoes, attached to the bottom of the rails, hold the crossover at its proper place on the track and are also used for sliding the crossover on the track rails. As the crossover is of such weight that it cannot be pushed by a car it is not necessary to fasten it to the track in any manner.

The crossover while in use in Detroit has been moved from place to place on lines where cars are operated on a headway of one minute without delay to the regular cars. The crossover is pulled by the regular cars on lines where these cars have a four-motor equipment. On lines which have not this equipment construction cars are sent out to pull the crossovers when necessary. With the old type of surface crossover it was found that the expense of moving from one location to another was \$8 for labor and \$4 for material and repairs to the pavement. The sliding crossover is moved from one location to another for a total expense of \$2, making a saving in each movement of \$10. The total saving due to the introduction of this type of crossover on the Detroit city lines is estimated at about \$4,000 per year. The new crossover has been found to be more reliable than the old surface form and less of a disturbance to the operation of cars and derailments from its use are unknown. John Kerwin, superintendent of tracks of the Detroit United Railway, who has courteously furnished the information in relation to this improvement, states that this type has also been found to be a great deal more convenient and economical than the surface type of crossover formerly employed.

The first of the illustrations published on the opposite page shows the location of the anchor points and lengths of rails, the shoes and the tie rods.

Fig. 2 shows the details of cast-steel shoes, anchor points and tie rod "B." Fig. 3 gives the details of the tie rod and the tie-rod brace.

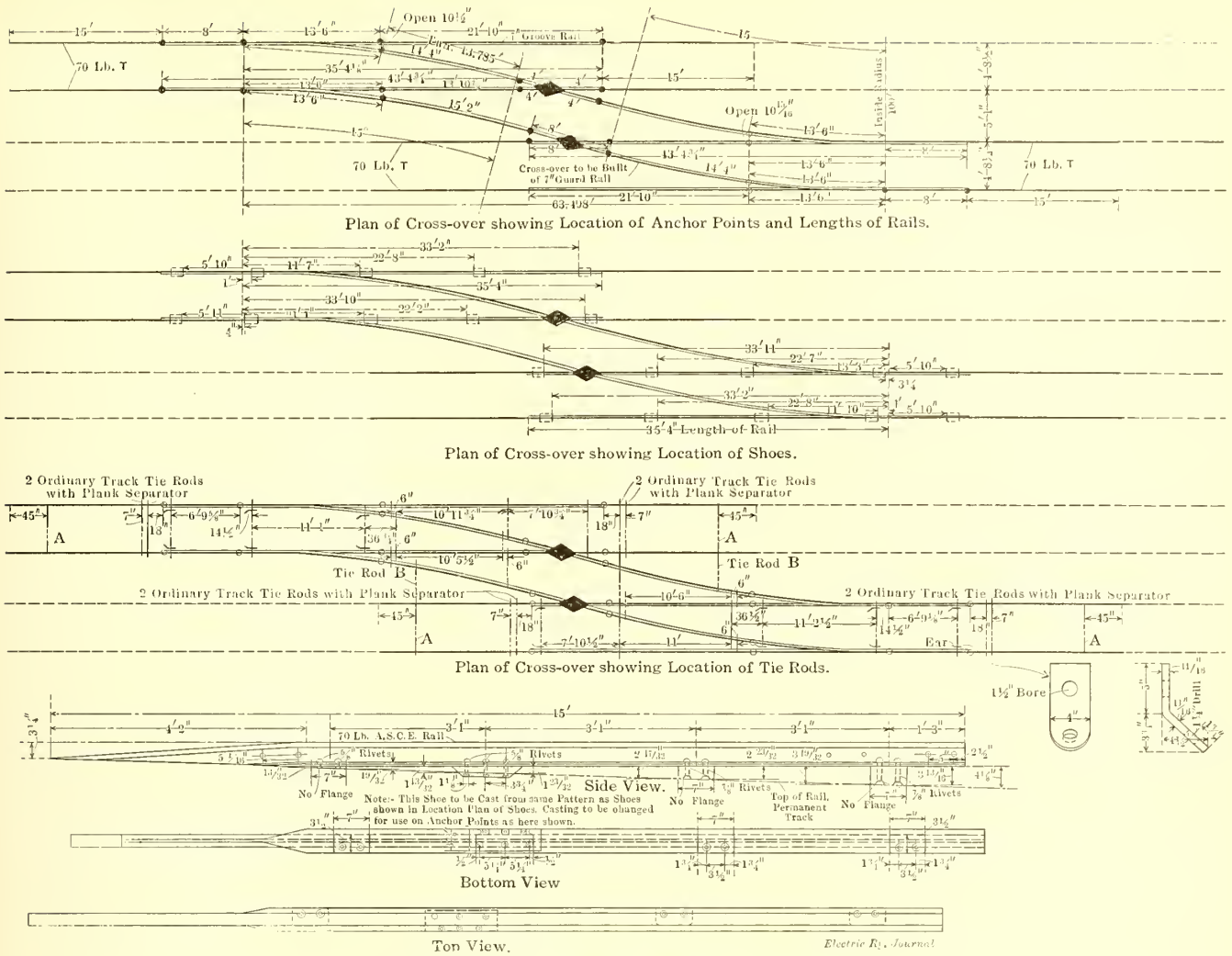


Fig. 1—Plan of Sliding Cross-over, Detroit

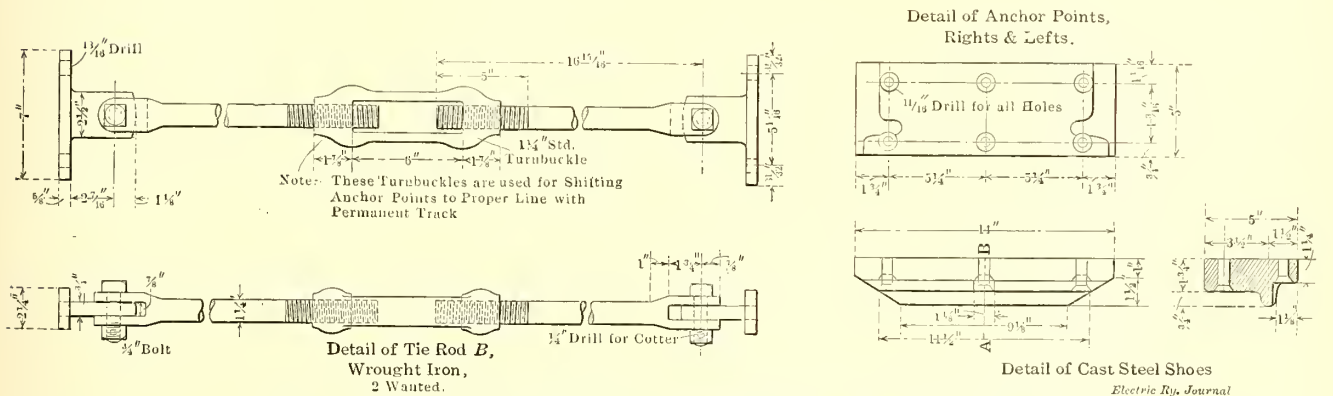


Fig. 2—Details of Tie Rod "B," Anchor Points and Cast Steel Shoes

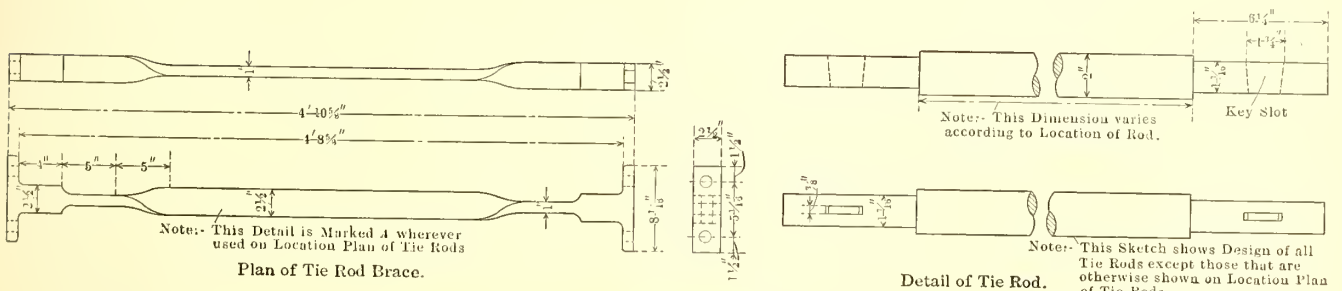
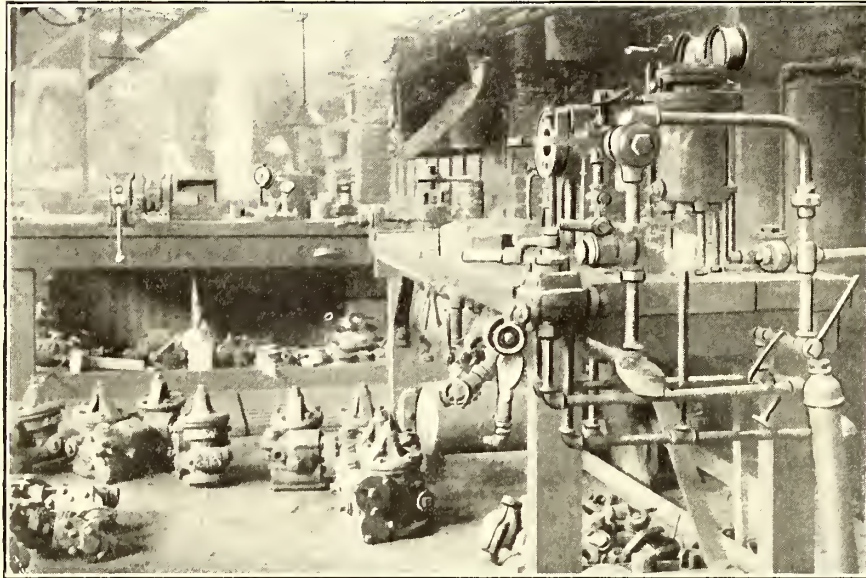


Fig. 3—Details of Tie Rod Brace "A" and of Tie Rods

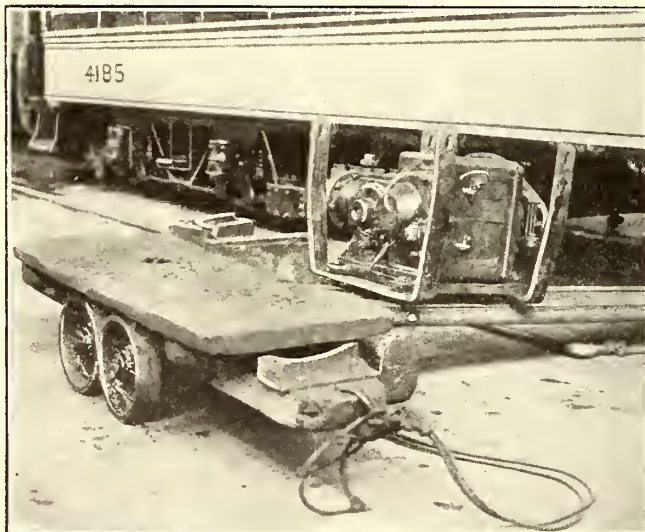
AIR BRAKE AND COMPRESSOR DEPARTMENT OF THE BROOKLYN RAPID TRANSIT SYSTEM

The beneficial results of the Brooklyn Rapid Transit System's policy to concentrate at one point all maintenance work of a certain character are well illustrated by the organization of the air brake and compressor departments. By placing all work of this kind at the Thirty-ninth Street shops it has



Brooklyn Air Brake Department—Triple Valve Testing Rack

been found feasible to secure the very best testing equipment and the highest grade of labor obtainable for this extremely important part of car maintenance. In order to reduce delays to a minimum every maintenance depot is supplied with enough spare compressors, valves and fittings to permit the cars to be available for service immediately without waiting for the return of the parts which require repair. Except for the simple replacement of compressor field coils and armatures, no important air-brake repairs of any character are now permitted



Brooklyn Air Brake Department—Slide and Truck for Compressor Removal

at other depots on the Brooklyn Rapid Transit System. It might be mentioned incidentally that the compressor field coils are made at the Fifty-second Street shops. They are impregnated by the vacuum process with very satisfactory results.

The work of this department is divided into two sections, one taking care of compressors only, while the other handles the rest of the air-braking equipment. The latter force is provided with a standard Westinghouse triple-valve test rack for trying

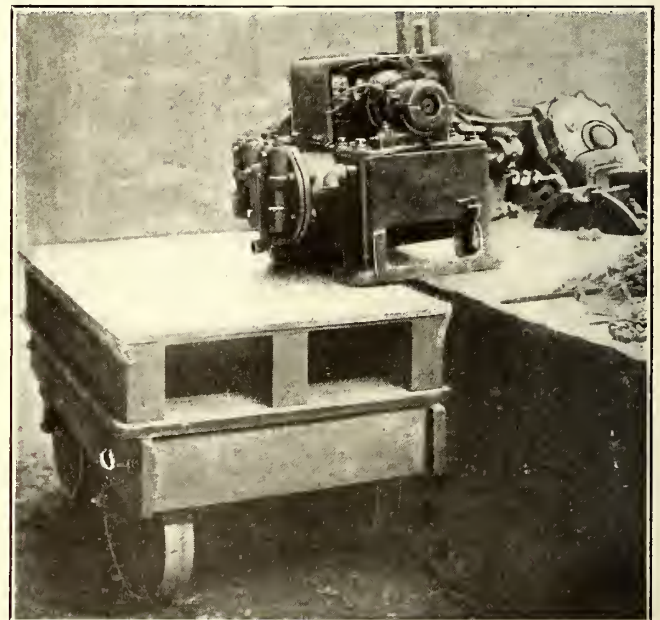
out the apparatus under more scientific conditions than would be possible with a home-made equipment in which the piping and pressure conditions under a standard car are directly imitated. Other equipment for this work includes a Hartford-Blanchard valve grinder and a Crosby gage calibrating machine.

As the equipments come into the shop for overhauling all of the parts, including the motorman's valves, triple valves, train-line feed valve, control-reducing valve and governors, are taken off and thoroughly inspected and repaired, after which the complete equipment is tested as installed under the car. Particular attention is given to the triple valves which are brought in every three months for cleansing and testing on the special test rack.

The different classes of work done by this force, which is composed of six men, are highly specialized. One man, for instance, takes care of the triple valve inspection, a second of the triple valve grinding, a third of the engineer's valves and governors, a fourth attends to all gage calibration, etc.

The compressor maintenance force is supplied with several interesting devices for saving labor in compressor handling and for decreasing maintenance expense. A compressor is removed from beneath a car by two men who draw it up a steel-lined wooden skid to a low truck, as shown in one of the accompanying illustrations. This work is usually done in about 15 minutes. The loaded truck is

then taken to the shop, where a chain hoist is attached to the compressor for delivery to the work tables. The compressor shop is also furnished with another type of truck. The top of this truck is flush with the work tables so that pump motors can be pushed onto the trucks and moved about readily to places where the hoist is not available. The compressors are



Brooklyn Air Brake Department—Truck for Compressor Transportation

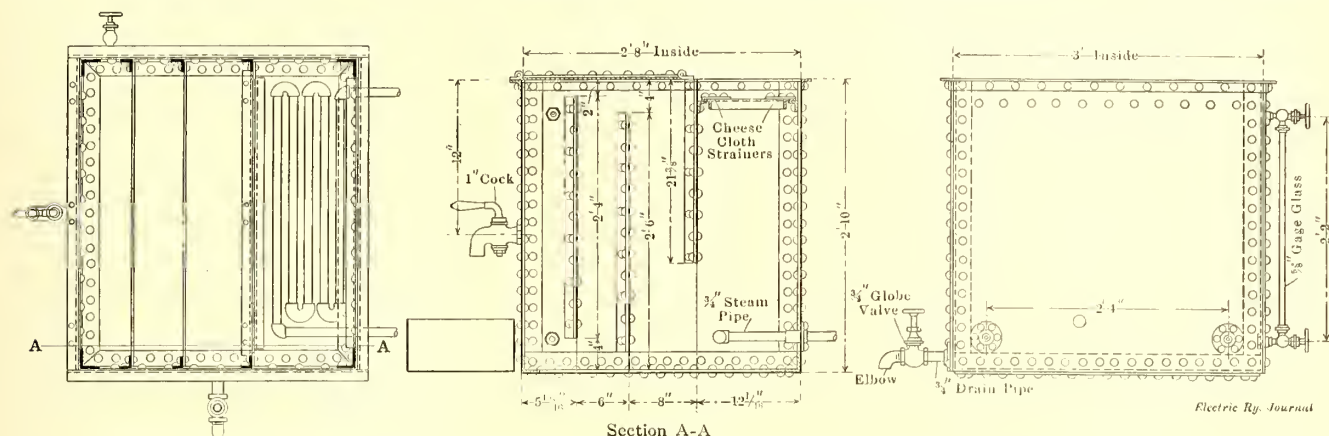
taken apart, thoroughly cleaned, their shaft bearings are renewed, their connecting rods examined, etc. The reassembled compressors are subjected to a five-hour test, during 80 per cent of which period the compressor is running.

The piston rings for Christensen B2 compressors are made at the East New York shops, but at Thirty-ninth Street the rings of the compressors are ground to a true surface by moving them over a lead plate covered with emery grains.

Much trouble has been experienced through the rusting of the entering ends of the air-hose nipples. Formerly these nipples were pushed into the pipe by hand, with the frequent consequence that the hose was injured even before it was placed in service. Furthermore, the oxidation of the hose caused the cutting of the rubber by flakes of rust and by the jagged edges

under piston, presses the pedal to clamp the hose in the aperture formed by the blocks and then admits air to the cylinder to operate the piston. This device enables a man to insert 150 non-rusting nipples a day, which is three times as fast as was possible by hand.

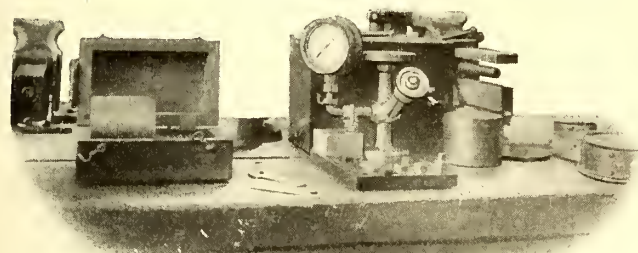
The accompanying drawing shows the type of four-chamber



Section A-A
Brooklyn Air Brake Department—150-Gallon Oil Settling Tank

of the nipple. Sometimes the nipple would drop out on account of the reduction in diameter due to rusting. The company is endeavoring to eliminate these undesirable conditions by inserting the nipples pneumatically and by providing the entering end of the nipple with a brass ferrule. The device

metal tank which was devised for the recovery of compressor oil. The first section is provided with cheese-cloth strainers. The oil is gradually cleansed as it percolates through these strainers. On reaching the bottom of the first chamber it flows into the second compartment, then into the third compartment and finally enters the fourth compartment through an opening at the bottom. By the time the oil has reached the fourth chamber it is thoroughly satisfactory for re-use. One faucet is provided to draw clear oil and another is installed for relieving the tank of sediment and water. Steam coils are used to maintain the temperature of the oil at 100 deg. Fahr. A gage is also attached to the tank to show the relative amount of oil and water contained therein. The dimensions show a 150-gal. tank, but the one at Thirty-ninth Street is of 250-gal. capacity, measuring 5 ft. instead of 3 ft. inside.

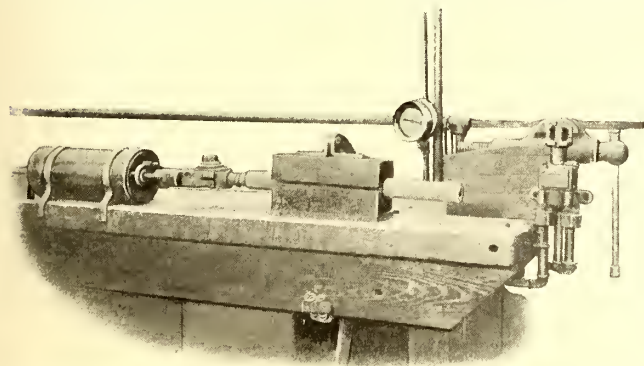


Brooklyn Air Brake Department—Gage Tester

for installing the nipples is shown in an accompanying illustration. The power is furnished by means of a home-made cylinder composed of a piece of 6-in. pipe, which was bored and packed like a regular brake cylinder. The piece of hose into which the nipple is to be inserted is placed in a grooved block

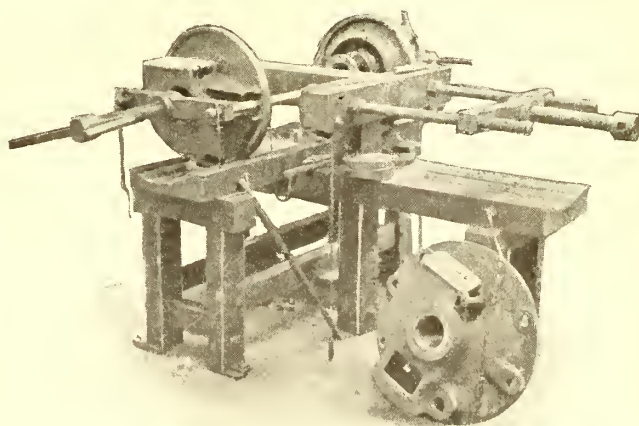
PRESS FOR ARMATURE BEARINGS

An accompanying illustration shows a press built in the shops of the Chicago Railways Company for placing or removing bearings in armature heads. The press is designed for use with both heads of a GE-70 motor and the pinion end head of a GE-216 motor. An armature head is slipped over two



Brooklyn Air Brake Department—Inserting Nipples into Air Hose Pneumatically

in line with the piston of the cylinder. The hose is clamped tightly by pressing upon it an upper grooved block which is hinged to the lower one and operated by means of a pedal. In addition to holding the hose in this manner, it is prevented from slipping by facing the grooves with rough pieces of old hose lining. When using this apparatus the operator lines up the hose with the ferruled nipple which is attached to the cyl-



Press for Armature Heads

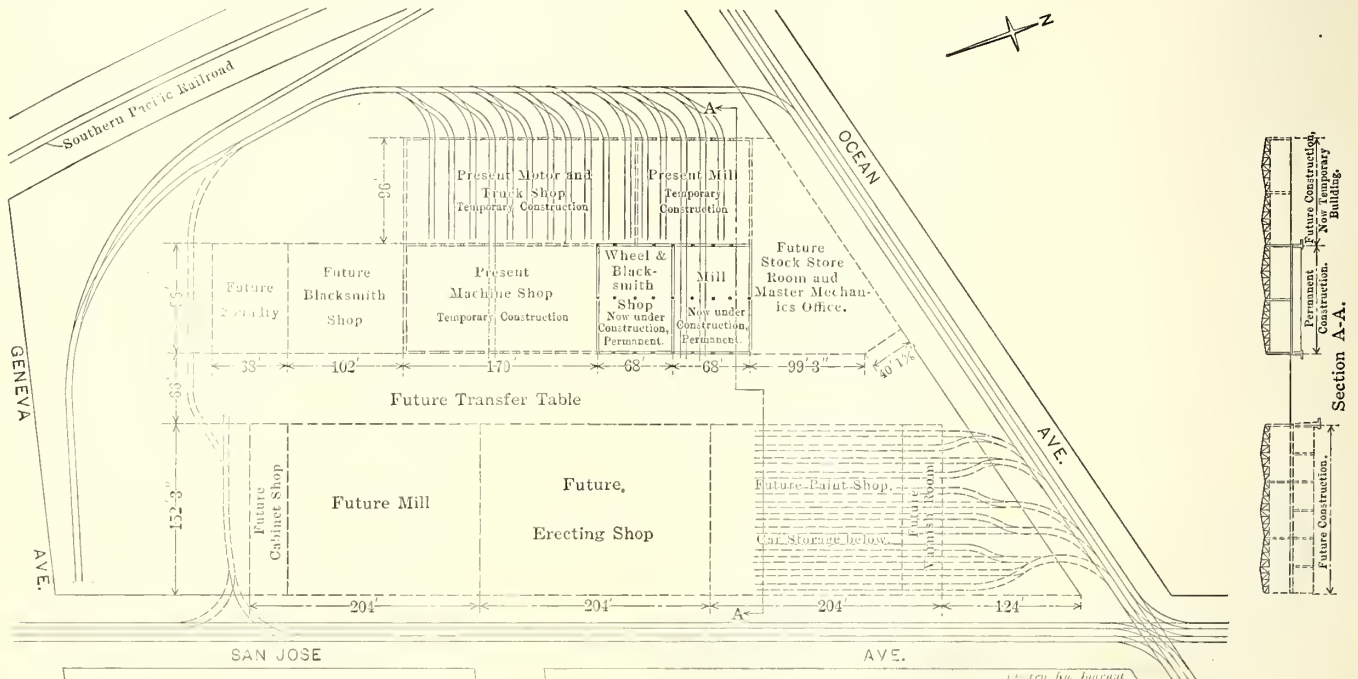
horizontal rods and a screw nut applied to force the bearing in or out of the head. In the application of new bearings the head is pushed over the bearing and a wrench is used to guide the dowel pin into its proper location. Bearings easily may be shimmed when being pressed in and more reliable work is obtained than when the bearings are driven in.

NEW SHOPS FOR THE UNITED RAILROADS OF SAN FRANCISCO

The United Railroads of San Francisco has just let the contract for the first section of its permanent shops to be erected on the tract bounded by San José, Geneva and Ocean Avenues. Elaborate plans for these shops were completed over four years ago and work was about to be commenced on their erection when the earthquake and fire of April 18, 1906, brought everything to a standstill. During the period of haste and confusion following the catastrophe temporary wooden shops with corrugated iron roof and sides were hurriedly erected to accommo-

used at present for a mill, blacksmith and wheel shop. A basement 96 ft. x 34 ft., with a clear height of 8 ft. 6 in., will be built under the north end of the shop for the special purpose of accommodating the motor and all shafting necessary for driving the mill machinery. In this way an absolutely clear space will be left for the operation of the monorail cranes. This idea will be carried out in all future extensions of the plant, as an elaborate system of monorail cranes will be used for intercommunication from one part of the shop to another. All cuttings from the mill machinery will be removed by suction machinery operated from a central plant.

The entire building will be absolutely fireproof, all walls,



Plan of New and Proposed Shops of the United Railroads of San Francisco

date the absolutely necessary repair work. These temporary shops followed the lines of the original plans. Later it was found that these buildings were not large enough to satisfy the demands upon them, so a temporary wooden paint shop was erected in one corner of the grounds entirely separate from the area allotted to the permanent buildings.

The enormous amount of repair and construction necessary on the entire system, due to the ravages of the earthquake and fire, delayed any further work on the shops until the present year. By that time the rapid growth of the system, as well as the expectation of the heavy traffic that the Panama Pacific Exposition of 1915 will bring to San Francisco, impressed the management with the necessity of providing adequate shop facilities. With this end in view there was designed the present steel frame building, which will be so placed that it can be used in conjunction with the wooden shops already in place and will at the same time be a nucleus for a permanent layout. As the wooden sheds deteriorate they will be replaced by steel shops similar to the present structure until the entire plant as originally planned will be in place. A certain amount of shifting from one plant to another will be necessary, but by careful planning this can be reduced to a minimum.

The new shop covers an area of 136 ft. x 96 ft. The roof is carried on trusses with a span of 48 ft., with a clear space from floor to truss of 19 ft. The trusses are spaced on 17-ft. center line. This layout requires only one line of columns through the center of building. In addition to the concrete roof the trusses are designed to carry three fully loaded 2-ton monorail cranes, figured as follows: Weight of crane, 2000 lb.; weight of load, 4000 lb.; allowance for impact, 2000 lb.; total load for one crane, 8000 lb.

At the apex of each 48-ft. bay there will be a 12-ft. x 102-ft. skylight of sheet metal and wired glass. The building will be

roof and floors being of concrete. All windows will be of rolled steel sections with ventilators.

Acknowledgments are due to W. B. Farlow, architect and engineer of buildings, and B. P. Legaré, engineer maintenance of way and construction, United Railroads of San Francisco, for the data in this article.

ALUMINUM CAR SIGNS IN NEW YORK

During January of this year the Metropolitan Street Railway of New York installed aluminum notice signs in about 40 cars. Usually there are carried in the cars of this company two transfer notices and one Board of Health notice. The ordinary type of sign, which is of cardboard, is placed in a glass-covered wooden frame. The aluminum sign is installed without any frame as it is screwed directly into the wood-

**CONDUCTORS ISSUE TRANSFERS ONLY
UPON REQUEST, WHEN RECEIVING FARE.**

Receivers, METROPOLITAN STREET RAILWAY CO.

Aluminum Car Sign

work of the car. When purchased in quantities these metal signs cost, fully lettered, only 40 per cent to 45 per cent as much as the other signs. The aluminum sign is not only light and very neat in appearance, but it is also likely that its maintenance will be inconsiderable. The only attention that the new signs will require is the keeping up of the original finish. These signs are bordered to give the desired framing effect.

PIT AND TRESTLE CONSTRUCTION FOR CAR MAINTENANCE

BY H. C. PRATHER, SUPERINTENDENT OF MOTIVE POWER AND MASTER MECHANIC BUFFALO, LOCKPORT & ROCHESTER RAILWAY

At the present time car inspection and maintenance is carried out over various types of pits, but occasionally a trestle track is employed as is the case in the shops of this railway. It may be of interest to discuss the conditions under which each class of construction is likely to give the best service.

The open pit construction undoubtedly has the advantage of superior light. Easy access from pit to pit also makes the foreman's work lighter, as he can look about without crawling down a hole and picking up a drop-light. Furthermore, the men working inside the pit are always under his immediate observation. By building a 30-in. man-way at both sides of every pit about 18 in. below the rail line a man can work more easily on brush holders, motor leads, lubrication, etc., when the cars used are without trap doors.

The trestle construction is undoubtedly superior where it is unnecessary to wash cars or wipe the outside of bodies on the same tracks where trucks, brake rigging and other apparatus are inspected or repaired under the car. The writer does not believe it practicable to change wheels on the trestle construction where the motors are of 75 hp or greater capacity, as most motors of such size have axle bearings split at 90 deg. so that quite a lot of rigging is required to hold the motor in place while the wheel is being removed. Our management is not in favor of changing wheels over a wheel pit, as it believes that the inspection benefits derived from removing the truck would outweigh any saving in time due to changing wheels over a drop pit.

The closed pit undoubtedly has the advantage of easy access to the car body by inspectors and car washers. It can also be made safer, as there is less danger from spreading rails where each track is connected by flooring or girders to the adjacent tracks.

The type of pit which appears the most advantageous to the writer for city carhouses (this does not include general shops) is a trestle pit construction floored between adjacent tracks 18 in. below the rail line. The men can travel from pit to pit easily, work on the lower part of the outside of the truck or brake rigging from the floor, which is depressed 18 in. below the rail line, and material can be moved between tracks and taken to the place of storage or application with much greater ease than if pulled along among a network of the piers and batterlegs which are absolutely essential to a safe open trestle. The only advantage that the open trestle pit construction would have over the floored type is superior light.

Any type of pit may be easily spoiled by an outside architect or building engineer who does not take into consideration the comfort of the man who has to do the work in the pits. The majority of pits built to-day have flat floors. This is entirely wrong. All pit floors should be crowned in the center and drained to shallow gutters running parallel with the tracks. These gutters should have a steep grade so that all snow, water and wheel wash which drops to the floor pits can be quickly carried away.

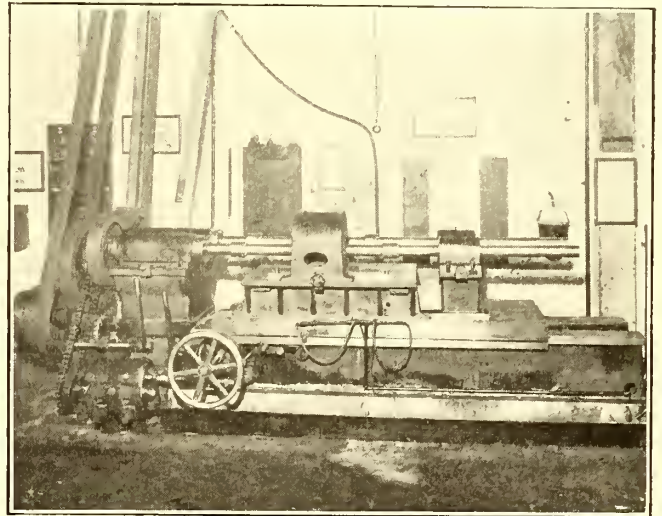
It has been the experience of the writer that four out of ten shops or carhouses have the pit floor below the seepage water line, so that the pits are constantly wet. It is hard to keep good men working in the pits when they find it necessary always to wear rubber boots or be at home sick with a bad cold three or four days out of the month. Work under a wet car at any time is very unpleasant, but if a man can keep his feet dry in winter weather he will be in much better condition to produce a good day's work than when he is constantly slopping and slushing around in the muck and mire of a poorly drained pit floor.

To sum up, the open type of pit construction is superior for inspection only, but for repairs it is more advantageous to use a closed pit with a depressed floor between adjacent tracks.

However, the type of pit selected for any carhouse should be entirely governed by such local conditions as the number and type of cars, the types of motors and trucks and whether car washing or cleaning is to be done over the same pit where inspection or repairs will be carried on. A combination of the trestle pit and the closed pit might be advisable in a carhouse handling several types of equipment.

REHABILITATING MOTORS OF THE METROPOLITAN STREET RAILWAY, NEW YORK

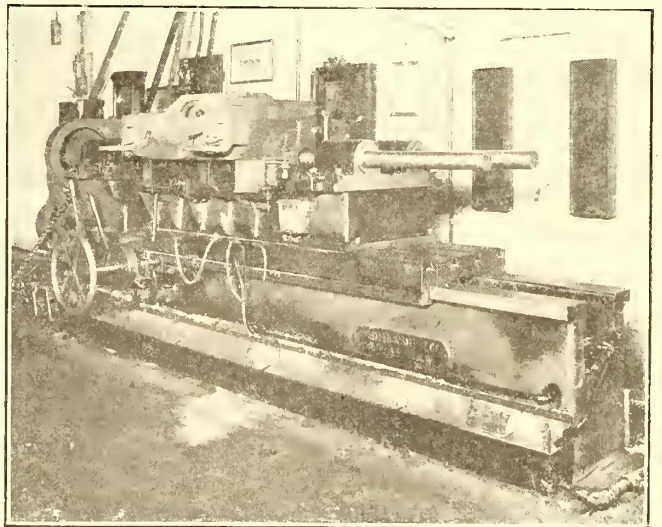
The Metropolitan Street Railway, New York, has in service under its cars a total of 1930 GE-57 motors. The frames of many of these motors have begun to wear in the axle and armature-bearing seats to such an extent that it is impossible to hold the bearing shells firmly in place and consequently considerable



Two-Spindle Boring Mill for Motor Frames

trouble has been experienced with the bearings. In order to prolong the life of the motors, which are still in good electrical condition, a method of reboring the frame bearings has been devised and all motors of this type are being rehabilitated as rapidly as the shop facilities permit.

A specially designed two-spindle horizontal boring machine made by the Beaman & Smith Company, Providence, R. I., has



Motor Frame in Place on Boring Mill

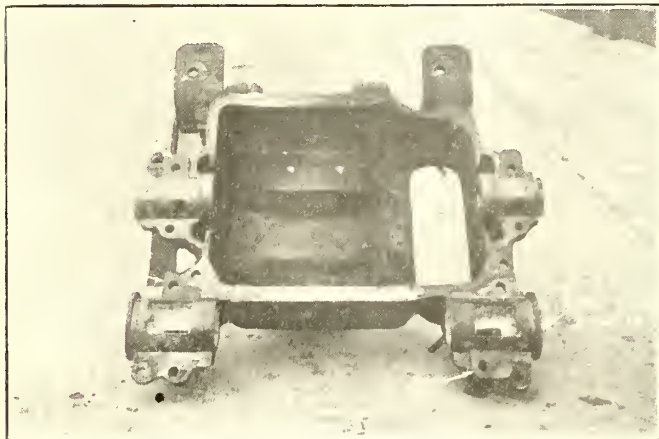
been purchased and installed in the Fiftieth Street shop. The two spindles of this machine are adjustable laterally and their outer ends turn in sleeve bearings mounted on the movable car-

riage. A saddle or jig is bolted to the carriage between the head stock and the outboard bearings of the spindles and the top half of the motor frame with the armature and axle caps bolted on is placed on this saddle. Shims are placed under each corner of the frame to raise it to a true alignment with the boring bars and the frame is then fastened down on the saddle with bolts put through the pole piece bolt holes. Each boring bar carries two cutter heads in which are inserted several small adjustable milling cutters, which are set to the proper radius. When the frame is accurately centered on the saddle the machine is started and all four bearings are bored at one operation. This saves time and insures absolute accuracy in the alignment of the bearings with respect to each other. A cut varying from $1/16$ to $1/8$ in. is taken by the machine. The cutters are flooded with a lubricant supplied from a barrel suspended above the machine, and as no lifting pump was supplied the lubricant is raised by

\$20 per motor, if the scrap value of the old shells is credited. It is believed that the life of each motor is increased about 20,000 miles by reboring and the complete overhauling which is given at the same time to the fields and armatures. This paper is indebted to H. H. Adams, superintendent of rolling stock and shops of the Metropolitan Street Railway, for the information from which this description was prepared.

GEAR-WASHING MACHINE

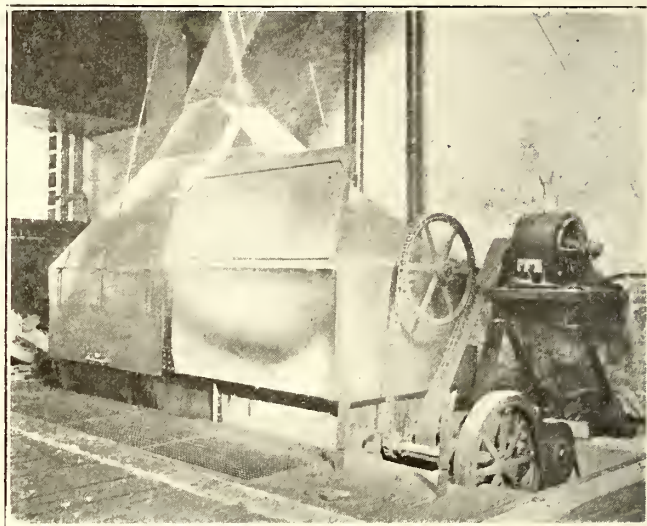
A machine for washing grease and dirt from motor and truck parts has just been built and installed in the Chicago Railways shops. This machine is located in a covered aisle between the truck shop and the machine shop. Briefly, it consists of a large tank into which may be lowered a steel cage



Motor Frame as Rebored, Showing Bearing Shells and Flat Keys

means of compressed air from a barrel under the floor into which it drains.

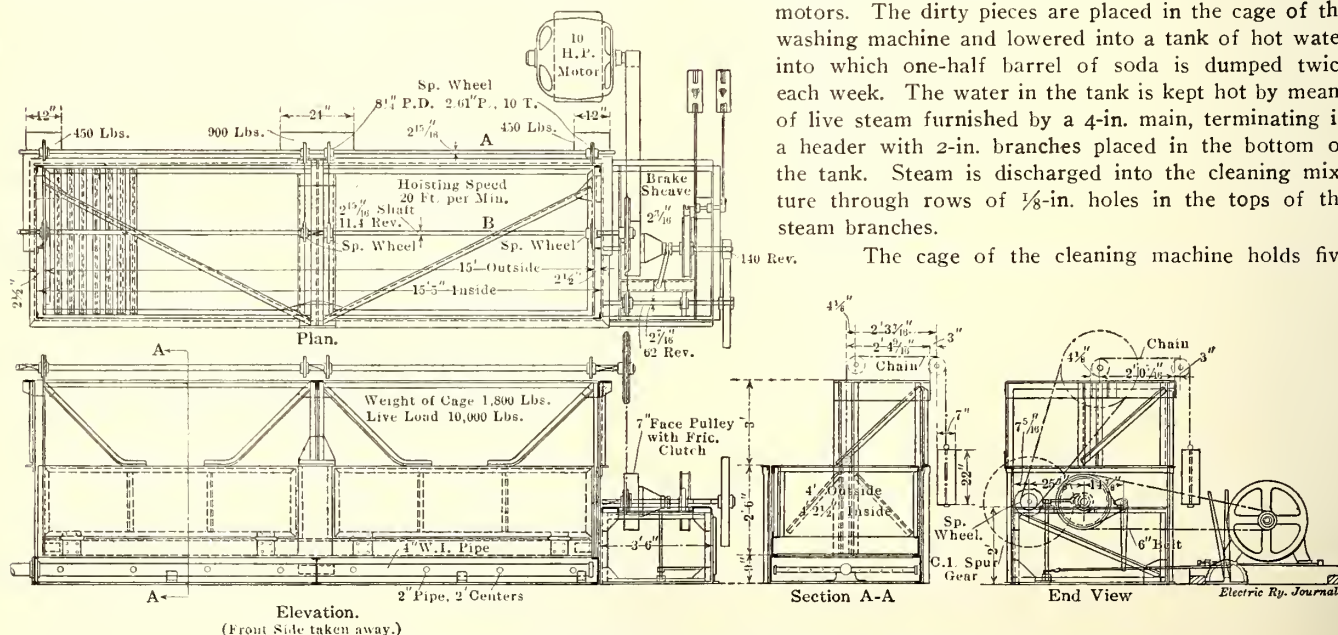
In reboring the frames the dowel pins in the bearing caps are cut off and flat keys fitting into slots in the bearing shells are substituted. The caps and the bearing lugs on the motor frame are slotted out on one side and the keys are inserted and held in place by one of the cap bolts. The keys cannot work loose and



Gear-Washing Machine in Chicago

carrying the parts to be cleaned. The accompanying illustrations show its appearance. This washing tank has brought about a substantial economy in cleaning gears, axle collars, armature heads, gear cases, journal boxes and similar parts of trucks and motors. The dirty pieces are placed in the cage of the washing machine and lowered into a tank of hot water into which one-half barrel of soda is dumped twice each week. The water in the tank is kept hot by means of live steam furnished by a 4-in. main, terminating in a header with 2-in. branches placed in the bottom of the tank. Steam is discharged into the cleaning mixture through rows of $1/8$ -in. holes in the tops of the steam branches.

The cage of the cleaning machine holds five



Plan, Elevations and Section of Chicago Washing Machine for Gear Cases

the shells are held more securely than with a single small dowel pin. This scheme of keying in the shells was devised by H. P. Clarke, master mechanic in charge of shops. About five motors can be rebored in a day with the machine described and the total cost for machining and new bearing shells is less than

tons and is charged once each hour. As the dirty castings are removed from the hot soda mixture they are swabbed off with a broom.

The steel tank which holds the cleaning mixture has inside dimensions of 15 ft. x 4 ft. 2 1/2 in. It is 3 ft. 3 in. deep and is

made from $\frac{3}{8}$ -in. plates riveted to channel irons and angles. The cage in which the parts to be cleaned are placed for lowering into the tank also is built of structural steel. It weighs 1800 lb. and is designed to carry a load of 10,000 lb. This cage is raised and lowered by means of a 10-hp motor and a link-belt transmission which includes a band brake to control the lowering, which is done by gravity. The cage has a lifting speed of 20 ft. per minute.

This washing machine and its operating mechanism are installed on a large concrete foundation so arranged that the washing tank extends but 16 in. above the floor. A concrete pit in front of the tank covered with iron grating receives the dripping from the castings as they are removed from the tank. This pit, which is $3\frac{1}{2}$ ft. wide and 4 ft. deep, also makes the lower part of the washing tank easily accessible. Sheet-iron covers for the top of the tank are provided to close it tightly when castings are being cleaned. A sheet-steel hood and stack have been placed above the tank to carry away the gases.

NEW COAL STORAGE PITS OF THE ILLINOIS TRACTION SYSTEM

The bridges and buildings department of the Illinois Traction System has just completed the first of two large coal storage pits for the power department. This company owns three coal mines and requires about 1500 tons of coal a day for its several plants. The two most important generating stations, so far as the interurban lines are concerned, are those at Peoria and at Riverton, a few miles east of Springfield. The two new coal storage pits are designed to provide under-water coal storage for these plants. The storage pit at Riverton is close to the plant, while the other pit is 16 miles east of Peoria, at Mackinaw Junction, and 20 miles west of Bloomington, where the local railway and light plant also is operated by the Illinois Traction Company. This location is easily accessible from Springfield and the pit probably will be filled with coal from the Springfield district.

The Riverton pit is 225 ft. long by 120 ft. wide and is an excavation below the general ground level. All four sides slope at an angle of 45 deg. to a depth of 20 ft. A framed trestle extending over the center of the pit will support the hopper-bottom cars in which coal will be received and also will carry the company's long-boom locomotive crane which will operate the grab bucket to be used in reloading fuel.

concrete in place, which was dumped to them from the top of the slopes. The reinforcement was laid on the ground first and then as the concrete pavement approached the top the workmen from time to time raised it to its proper position in the slab. The wearing surface was applied in the same manner as the slab, only it was allowed to lap the joints made in the concrete slab proper.

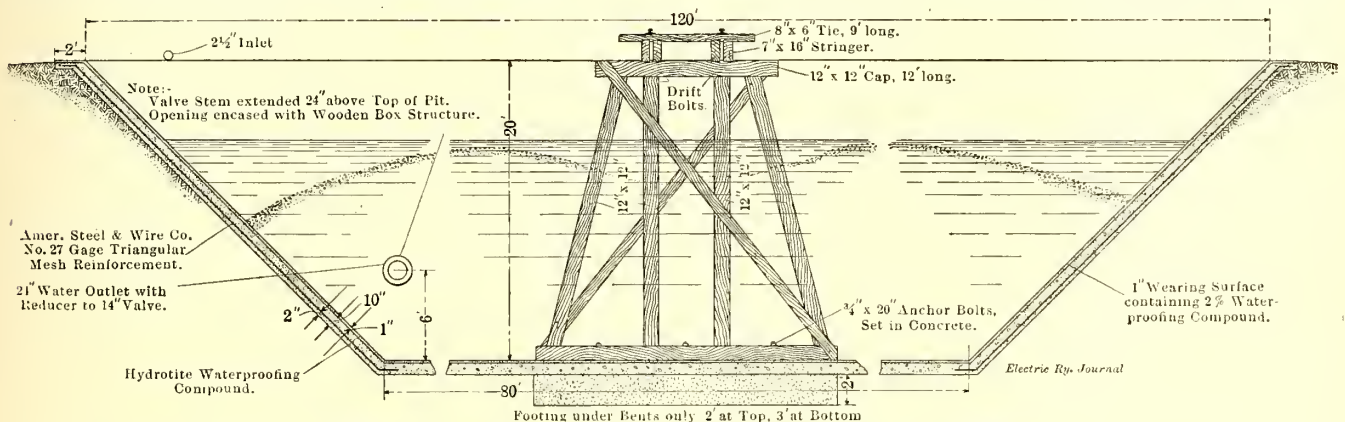
The slopes of the pits were made 1 to 1 to allow the coal to slide freely to the bottom. The bottom of the pit was reinforced under the frame bents to offer good foundations. A typical bent, as shown, was used throughout with anchor bolts



Coal Storage Pit and Trestle

set in the floor to prevent any side motion which might be caused by vibration. A 16-ft. reach was used with double 7-in. x 16-in. stringers. Ties were spaced with 24-in. centers, the idea being to use only sufficient chords to carry the maximum load and thus leave ample space between the ties to allow drop-bottom dump cars to be handled. This trestle runs through the center of the pit and the width of the pit was governed by the length of the boom or extreme reach of a locomotive crane. The track over the pit is a stub siding with an Ellis bumper at the extreme end and the ties are extended over the 9-ft. length to allow for a 2-ft. walkway so that workmen may have free access to the sides of the cars.

The water supply is from a 3-in. main which discharges waste water from the condensers at the power house. The outlet was installed about 6 ft. above the bottom of the pit.



Section of Coal Storage Tank Used by Illinois Traction System

In constructing the pit the sides and bottom were paved with a 10-in. concrete slab, 9 in. being a 1:3:5 mixture of concrete with style 27 American Steel & Wire Company reinforcement placed about 2 in. from the bottom to prevent cracks and sliding from expansion, settling and contraction. The entire inside surface was coated with a 1-in. wearing surface of a 1:2 mixture of sand and cement, containing Hydratite waterproofing in the proportion of 1 part to 50 parts of the cement, mixed comparatively dry and laid in alternate sections, 6 ft. in width, running from the top to the bottom of the pit. The men worked from a temporary step scaffolding and tamped the

the idea being that when the water was as low as this the crane man would have no trouble in picking up the rest of the coal in the bottom of the pit. Also it was necessary to retain a certain amount of water at all times owing to the pit's proximity to the river and the relative average water elevation in the river. The subgrade in the bottom of the pit is ordinary river sand and considerable pressure was anticipated during high water in the river, when the slab might heave and break. When 6 ft. of water is maintained in the pit the river pressure is counteracted.

The outlet was made 24 in. in diameter to reduce the scour-

ing effect of the overflow. The outlet valve was inclosed in a vertical 4-ft. square wood box made of 2-in. yellow pine, allowing about $\frac{1}{4}$ -in. space between the boards. This box will act as a screen to keep fine coal from being discharged from the pit when the water flows out. The valve stem is run to a point above the top of the pit where a hand wheel and walkway are provided from the edge of the pit to the valve box.

The coal storage pits were built under the supervision of E. M. Haas, of the Illinois Traction System.

A CONVENTION WITHOUT A COLLECTIVE EXHIBIT

A somewhat startling experiment is to be tried this year by the National Electric Light Association, whose convention in New York will be conducted without any formal exhibit of electrical apparatus. The convention begins on May 29 and continues until June 2; the technical meetings will be held in the Engineering Societies Building, in Thirty-ninth Street. The decision to dispense with the usual exhibition of electrical apparatus which has heretofore been an accompaniment of the conventions of this association was reached from a variety of

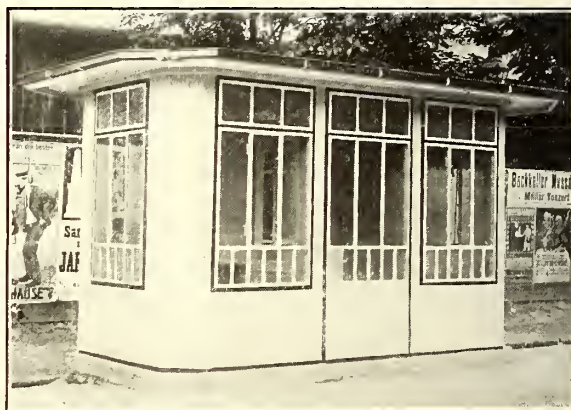
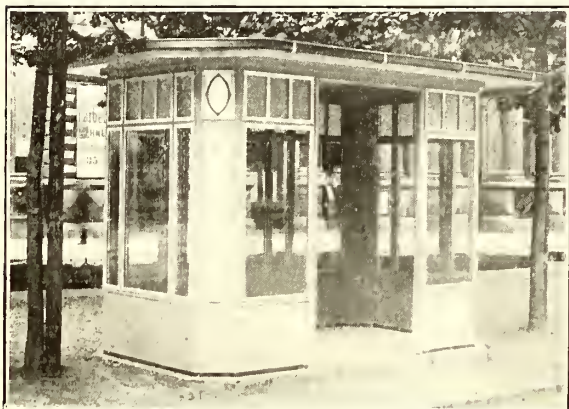
this kind, and it was found that about only 5 per cent cared to engage in such an exhibit.

Last year the convention of the National Electric Light Association was held in St. Louis, where the exhibit of apparatus made in connection with the convention was combined with a local electrical show. The exhibit continued for two weeks. During the first week admittance was obtained only by holders of special cards. The next week the public was admitted upon payment of a small fee, and the exhibitors shared the gate money.

Another somewhat novel feature of the National Electric Light convention this year is that there will be no official headquarters. The reason for this plan is obvious in a city like New York, where there are a large number of first-class hotels—perhaps 40—close to the place of meeting. The offices of the association itself will be the natural headquarters.

WAITING STATIONS IN VIENNA

A few months ago the Vienna municipal railway system decided to replace the old-style iron waiting stations used on the



Shelter Stations Recently Erected in Vienna for Surface Railway Passengers

reasons. One of these, and probably the principal one, was that for many years it has been customary to hold an electrical show in New York during October, at which the exhibits are very similar to those which would naturally be shown in connection with the National Electric Light convention, and it seemed to be unnecessary, as well as a considerable hardship on the manufacturers, to ask them to repeat next month the exhibit which they made in New York last October and which they will probably repeat in New York next October. Again, most of the types of apparatus which would be shown at a convention of this kind are in use in the large electric lighting and power stations in New York—or in showrooms—where they can be seen in operation. The decision to abandon the exhibits was not reached until after a consensus of opinion as to the desirability of such a move was obtained from all the manufacturers who would naturally exhibit at a meeting of

system with stations of a more modern type. Typical examples of the new stations are shown in the accompanying engravings. Three of these stations are designed in the "secession" style and vary in size according to the importance of the traffic at the points at which they are located. They have an iron frame with wooden sashes and fillings of marble and glass. The foundation is of concrete. The marble in some cases is ornamented. The roof is of iron and wood covered with metal, and has broad, projecting eaves to protect passengers standing on the platforms. The exteriors are painted gray and white, and in some cases are decorated inside with framed pictures. Care was taken that the style of the station should harmonize with the surrounding buildings.

One of the engravings shows an all-iron station of different design from the others. Stations of this type are painted a light green, and the roof is covered with copper.

ANNUAL MEETING OF THE NEW ENGLAND STREET RAILWAY CLUB

The annual meeting and banquet of the New England Street Railway Club were held at the Somerset Hotel, Boston, on the afternoon and evening of March 23. At the meeting in the afternoon the following were elected officers of the club for the ensuing year:

President, Franklin Woodman, Haverhill, Mass.; vice-presidents, Thomas Lees, Lowell, Mass., Thomas Hawken, Rockland, Maine, E. T. Millar, Concord, N. H., A. J. Crosby, Springfield, Vt., A. E. Potter, Providence, R. I., J. K. Punderford, New Haven, Conn.; secretary, John J. Lane, Boston, Mass.; treasurer, E. P. Shaw, Jr., South Framingham, Mass.

Executive committee, C. H. Hile, Boston, Mass.; Elton S. Wilde, New Bedford, Mass.; M. H. Bronsdon, Providence, R. I.; E. J. Dickson, Springfield, Mass.; Carl A. Sylvester, Newtonville, Mass.; John F. Stout, Boston, Mass.; F. M. Nellis, Boston, Mass. Finance committee, Franklin Woodman, Haverhill, Mass.; A. S. Michener, Boston, Mass.; Percy Hodges, Boston, Mass.

THE BANQUET

The annual banquet was served at the Somerset Hotel. The banquet hall was handsomely decorated. On the center of the wall over the head table was the flag of California, sent by Patrick Calhoun, president of the United Railroads of San Francisco, who was invited, but could not attend. There were music by an orchestra, singing by a quartet and chorons singing by all present. Nearly 600 guests were present and enjoyed the excellent repast provided.

C. H. Hile, the retiring president, opened the after-dinner exercises and introduced the newly elected president, who, after a few felicitous words of welcome to the guests, told of the flourishing condition of the club at the present time with 727 members and \$3,500 in the treasury. He then introduced Hon. Henry F. Hurlburt as toastmaster.

The first address of the evening was by Hon. Eugene N. Foss, Governor of Massachusetts. Governor Foss said in part:

"Whatever you may think of your companies as private properties, the fact is that they are private only in a very limited sense. In a large sense they are public. We call them quasi-public, because although they are financed by private capital still they are directly in the service of the people, and the public is the real source of their rights and powers. The time has now come when the people themselves are aroused to the necessity of having a hand in all public service corporations, and the company which fails to recognize this is bound to lose. Every head of a public-service corporation owes it not only to his own sense of justice, but owes it also to his stockholders, to act in full recognition of what is due to the public.

"It is not enough for a company to maintain the passive attitude of merely abstaining from all lobbying methods. In my judgment a company owes it to itself to come out openly with the greatest possible degree of frank publicity, not only regarding its assets, its expenses and its profits, but regarding its methods of doing business, its present efforts to please the people and its plans for further service. It should keep its ears open to every public criticism and should either answer these if they are wrong or comply with them if they are right.

"The people as a whole, even in the face of constant friction with the quasi-public corporations, rarely contemplate taking over such properties for themselves. They do not want them. All they want is to know that everything is open and above-board and that they are getting a square deal. The public ownership of these corporations is not generally a desirable thing—and the people have found that out."

General William A. Bancroft, president Boston Elevated Railway Company, made a convincing address. He said that he agreed with the statement of Governor Foss about publicity, as the time for concealment had long gone by—in fact, there was nothing to conceal. The question now was how long the street railway business is going to be a business at all. Most of the

troubles of the street railways to-day came from a lack of gross income, and this jeopardizes good service. Speaking then as a private individual, General Bancroft said that if private capital was to continue to furnish transportation it should be done upon the ordinary terms of business, that is, with the expectation of a reasonable profit. But the companies are met by the declaration which comes from many persons of reputed intelligence that capital in public utility enterprises is entitled to only "savings bank interest." Many men who say this expect in their own business profits of 25 per cent or 50 per cent or more. So there is legislation for reduced fares, for longer rides, for free transfers, for more paving, for bigger cars and for more frequent service. In short, burden upon burden is added until it is impossible for the company to earn even savings bank interest, and finally not even fixed charges. The natural sequel is municipal ownership; but if municipal ownership should be applied to transportation, there is no reason why it should not be applied to the other necessities of life, such as the telegraph, telephones, housing, clothing, furniture, fuel, etc.

Continuing, General Bancroft said that there were two conceptions of society in this country. One was that adopted by our forefathers and might be expressed by the phrase, "The laborer is worthy of his hire." This meant that industry, thrift, intelligence, prudence, foresight and sagacity were entitled to their reward. The other, raised to a considerable extent only within the last few years, was the cry, "Wealth is a crime," This meant that those who had riches must be deprived of them by taxes, income taxes, inheritance taxes, etc. This cry comes from the newspaper, from the chair of learning, the pulpit, the bench, the bar, the publicist, the office holder, the retired merchant and even the active merchant, not perhaps from all, but from some of them. It can be heard from every side. General Bancroft asked where the transportation man and the man of every other business should stand in this demand to abolish wealth. He asked particularly whether New England wished to keep its ideal of independence and its institutions of learning, of religion and of humanity. He believed that all who represented the hard-working men of the country would fail of their duty if they did not combat by every honest endeavor those measures which not only seek their destruction but the destruction of the government itself. In the final case the issue was whether the laborer was worthy of his hire or whether wealth was to be considered a crime.

The next speaker was Arthur W. Brady, president of the American Electric Railway Association. Mr. Brady paid a high compliment to Massachusetts and its railroad policy, which he said had a reputation elsewhere of being sane and being safe. The tendency of the times seems to be toward the regulation of public utilities companies by commissions, and this policy has been developed in Massachusetts to a degree unexampled elsewhere. A special feature which interested him in connection with this practice in Massachusetts was that the acceptance of the rulings of the railroad commission did not seem to depend upon its legal status, but that even the recommendations of the commission were accepted. Elsewhere the commissions seem constantly to be reaching out for broad plenary powers, which they claimed were necessary in their government of public-service companies. Another point of interest to Mr. Brady in Massachusetts railway practice was that the franchise question seemed to be settled. Elsewhere this question had still to be decided, as in Cleveland, Detroit and some other cities. Another point in Massachusetts practice that attracted wide attention in other States was the position taken in regard to higher fares. The 5-cent fare was no longer in Massachusetts considered a sacred thing, and companies, after showing all the facts in regard to their operation and proving that they needed a higher fare than 5 cents, had had such a higher fare granted to them with public approval.

In closing, Mr. Brady complimented the New England Street Railway Club on its growth and prosperity. He said that he American Electric Railway Association were partly internal, that is, they are related to improving the art in its different de-

partments, and partly external, that is, they consider the relations of the companies to the public. He believed that if the public was taken into the confidence of the railway corporations to a greater extent the people would be altogether fair, and said that the duty of the railway companies throughout the country was to let the public know the facts in regard to the earnings and profits, as well as the losses, of the corporations.

Dr. Richard C. MacLaurin, president Massachusetts Institute of Technology, was then introduced by the toastmaster. Dr. MacLaurin told how science had made modern systems of transportation possible, and urged the railroad men to avail themselves of the potentialities of the young men trained in the scientific schools. He said that electric railways have a great influence not only on the material prosperity of the community in which they are located, but also upon the mental, spiritual and social development of the community. In conclusion he paid a tribute to the genius of Michael Faraday, whose early inventions and discoveries had laid the foundation for the modern science of electrical engineering, although Faraday did not at the time realize their industrial importance.

Hon. Walter Perley Hall, chairman Massachusetts Board of Railroad Commissioners, the next speaker, referred to the importance of railway companies looking out for the minor features of operation, which he said had a great deal to do with the attitude of the public toward the corporations. He gave as instances of points which he had in mind the desirability of neatness in appearance of the conductors and motormen, clean windows, freshly painted cars and absence of flat wheels. These may seem to some managers to be of minor importance, but they had a great influence in gaining public approval for the companies. Another matter which he urged upon the companies was to be perfectly frank with the public in regard to the declaration of their policies as carriers. He said that the average man did not care particularly about the financial management of the companies, but he did care about the service they were giving him.

Other speakers were Hon. James F. Swift, Attorney General of Massachusetts, and Joseph Smith, a representative of one of the daily papers in Lowell, Mass.

DECORATED CAR IN MANILA

On several occasions illustrations and descriptions have been published in these columns showing specially decorated railway cars for different large celebrations. One of the latest of these is a car of the Manila Electric Railroad & Light Com-



Decorated Car in Manila

pany, shown in the accompanying illustration. The car was decorated with American and Chinese flags, characters, etc., in honor of the great many Chinese located in Manila, and ran over the lines of the company on the Chinese New Year, at which time the Chinese hold large festivals. Inside the car was a band made up entirely of Chinese.

MARCH MEETING OF ILLINOIS ELECTRIC RAILWAY ASSOCIATION

An enthusiastic meeting of the Illinois Electric Railway Association was held at Bloomington on March 24. About 30 representative railway officials attended. The principal subjects discussed were interchangeable mileage, promotion of traffic, joint ticket and information bureau at Chicago and the establishment of the association on a firm working basis. H. E. Chubbuck, vice-president executive of the Illinois Traction System, presided over the single session which was held. After a luncheon at the Illinois Hotel Mr. Chubbuck entertained a party of 25 with a trip to St. Louis in his office car. This trip of 175 miles was made in six hours' running time, including short visits for the inspection of the extensive new facilities at the St. Louis terminal. On arrival at St. Louis Mr. Chubbuck entertained his guests with a dinner at the Jefferson Hotel.

At the beginning of the Bloomington meeting Secretary C. E. Flenner read the minutes of the previous meeting and W. L. Arnold, as chairman of the membership committee, announced the acquisition to membership of several new companies, including the Metropolitan West Side Elevated Railway and the Chicago & Oak Park Elevated Railroad. The Westinghouse Electric & Manufacturing Company and the Pennsylvania Steel Company were elected supply members.

H. J. Vance, general superintendent Chicago, Ottawa & Peoria Railway, reported the progress being made toward joint interchangeable mileage with the Central Electric Traffic Association. He had received a letter from A. L. Neereamer, chairman, stating that the proposed joint arrangements were being considered and no doubt a decisive answer could be given at the time of the next meeting. C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company, who was a guest of the Illinois Association, described the considerable advancement made in joint traffic and transportation affairs in Indiana and the lines of the member companies of the Central Electric Railway Association.

John Leisenring, signal engineer Illinois Traction System, reported, as chairman of the block signal committee, that two members of his committee had attended the recent meeting of the block signal committee of the American Electric Railway Association. Plans were made for co-operation between the two committees.

Robert A. Barnett, chairman of the traffic auxiliary committee appointed at the last meeting to report on the accommodations available for a joint traffic and information bureau in Chicago, reported in part as follows:

"The committee appointed to investigate the feasibility of establishing an interurban city ticket office in Chicago has found a number of desirable locations, some of which are vacant at present and others will be available on May 1. A list of these offices together with data regarding their size and rental shows that very desirable quarters may be obtained on Clark Street in the loop district on the ground floor of buildings adjacent to those occupied by the steam trunk line city ticket offices for a rental of approximately \$5,000 a year. The committee gave no consideration to locations outside of Railroad Row. The committee made an approximate estimate of the operating cost of the joint office which showed that, including rental, the cost to the companies which had signified their willingness to operate this office jointly would total about \$10,000 a year. From the traffic standpoint the committee holds that the opening of this Chicago office will well be worth the expense to the interested lines."

The members of the association discussed ways and means for prorating the operating expense of the joint Chicago office and instructed the committee to determine definitely what companies would share in the expense. W. O. Woodward, traffic manager Chicago, Lake Shore & South Bend Railway Company, spoke of the value which a joint ticket office would be to his road and to the four other roads entering Chicago. Mr.

Chubbuck stated that the Illinois Traction System and the Chicago, Ottawa & Peoria Railway would willingly enter into an agreement for the maintenance of the joint office in Chicago. The traffic committee in charge of the joint ticket office subject will report in advance of the next meeting of the association, which will be held on May 26.

MARCH MEETING OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

About 125 representatives of member companies of the Central Electric Railway Association held an enthusiastic meeting at the Hartman Hotel, Columbus, Ohio, on March 23. E. B. Peck, the new president, was in the chair and led the discussions on the various papers, so that considerable valuable information was elicited. Several parties traveled to Columbus by special interurban cars, one party being that chaperoned by Mr. Peck, who is vice-president of the Terre Haute, Indianapolis & Eastern Traction Company. F. E. Myers and E. F. Schneider took a party from the northern part of Ohio to Columbus in a parlor car of the Cleveland, Southwestern & Columbus Railway.

The next meeting of the association will be held at St. Joseph, Mich., on June 22, and the president suggested that all the members travel to the convention by special interurban cars so that there might be an opportunity for interchange of ideas and observation of other lines en route. After the reading of the minutes by Secretary Neereamer eight new supply members were admitted to the association.

STANDARDIZATION COMMITTEE REPORT

H. H. Buckman and W. H. Evans, in behalf of the standardization committee, described the work which the committee had done on the subject of brakes and brake riggings. No written report was ready for submission to the association, but the committee had prepared drawings which showed the proposed standards in regard to the size of cylinders, length of piston travel and maximum and minimum air pressures. Mr. Evans stated that prints showing these suggested recommendations of the committee would be sent to the different members of the association, so that the proposed standards could be discussed at the next meeting of the association.

INTERLINE TRAVEL

T. J. Gore, general agent Indianapolis Interurban Joint Ticket Agency Association, presented a paper on "The Development of Long Distance Travel." This paper was published on page 507 of the *ELECTRIC RAILWAY JOURNAL* for March 25.

F. D. Norveil, general freight and passenger agent Indiana Union Traction Company, spoke of the progress made in traffic affairs since the organization of the Central Electric Traffic Association, calling attention to the increase in interline ticket sales mentioned by Mr. Gore. Mr. Norveil held that any future increase in traffic in Indiana must largely be expected to come either from the natural growth of population or because of development of interline business. In competition with steam roads the electric railways of Indiana were now getting their share of local and through business, but an increase in the long-haul business was to be expected in proportion to the accommodations which the electric lines afforded. The duty of the traffic association as seen by its members was to bring about an increase in long distance business by keeping the ticket agents well informed regarding through routing and rates.

M. J. Insull, general manager Louisville & Southern Indiana Traction Company, complimented Mr. Gore when he stated that the substantial increase in interline business, as indicated by the ticket sales at the Indianapolis Terminal, might partly be attributed to the good work of the Indianapolis ticket-selling staff. At times as many as eight ticket sellers are on duty at the terminal station and they have a wonderful variety of questions to answer as a part of their regular duty. This

part of their work had been done so courteously and with such good judgment that it had been a factor in the increase of sales of long distance tickets.

Mr. Insull spoke of the field for development in interline travel. The possibilities of long trips and the convenience with which they could be made he thought should be placed more prominently before the public. He advised increased advertising of these facilities by all roads interested. This advertising should make it plain to a possible traveler how easily and how quickly the long trips could be made by interurban.

J. H. Crall, general freight and passenger agent Terre Haute, Indianapolis & Eastern Traction Company, called attention to several factors which had induced long distance travel. These included the through car service, high speeds, through checking of baggage and close connections at junction points. The latter factor was one which Mr. Crall thought should be given considerable attention with a view to improving connecting schedules.

Mr. Myers said that the possibilities of long distance travel depended so much on the design of the interurban car that he would appreciate expressions from other men regarding the best car for long distance interline service.

H. A. Nicholl, general manager Indiana Union Traction Company, told of the interline business of his company. Effort was made to run through cars over connecting lines wherever possible. He believed that interline operation had had a very great deal to do with increased revenue because passengers disliked so much to change cars at junction points even though close connections were regularly made. His company had practically adopted as standard for long distance runs a three-compartment car with a motorman and baggage section 10 ft. long, smoker 16 ft. and a general passenger compartment in the rear. So far single-car trains had been run, but traffic now required two-car trains and these would soon be put in service on the "Muncie Meteor" and the "Marion Flyer," fast trains of his road. Mr. Nicholl's preference for interurban cars was one with a center entrance and his company was planning to build such a car, arranging the interior for the general passengers in front with smoking and baggage compartments at the rear of the center entrance.

J. F. Starkey, district freight and passenger agent for the Indiana Union Traction Company, who soon will be traffic manager of the Lake Shore Electric Railway, argued for more traveling on the part of traffic officials. He cited several instances showing how desirable business had been obtained because the traffic officials were acquainted with operating conditions on foreign lines. He had just made a trip from Anderson to Louisville to make arrangements for a party which would charter a car for a trip from that city to Detroit, Mich.

Mr. Nicholl stated that while some through runs might be very desirable from the traffic standpoint they were often inadvisable because of operating reasons; also, interline cars sometimes were a burden to the connecting road having the least traffic, and to be successful a through run should be justified on both roads and be so scheduled that the through car could replace an existing train.

O. H. Murlin, general passenger agent Dayton & Troy Electric Railway, referring to the increase of interline business in 1910, thought much of it had been due to the increased familiarity of the station agents with the interline tariffs issued by the Traffic Association during the summer of 1909. He thought his road was one of the first to operate limited trains and at that time the maximum run was only 31 miles. The service had been so well received that it now included eight limited trains from Dayton to Lima and six between Dayton and Toledo, a distance of 164 miles. His Dayton office frequently had calls for through tickets to Detroit, Mich., and Louisville for long routes.

Mr. Tomlinson, Ohio Brass Company, suggested the use of time cards for through routes to assist in the promotion of long distance travel. He also described the fast four-car observation train service of the Puget Sound Electric Railway,



Group of Attendants at Meeting at Columbus of the Central Electric Railway Association

mentioning the normally crowded condition of the excess fare parlor cars operated.

W. E. Rolston, superintendent power and shops of the Cleveland, Southwestern & Columbus Railway, mentioned the factors tending to decrease the cost of limited service as compared with local service. Limited trains required from 30 per cent to 40 per cent less power, the maintenance charge was less, the labor cost was lower, and in addition a higher average fare per passenger was obtained with safer operating conditions.

John M. Keys, passenger agent Detroit United Railway, described the new joint service which will be inaugurated on April 4 over this line and those of the Michigan United Railway. Trains will be operated between Detroit and Lansing and Kalamazoo, the latter cities being 113 and 145 miles respectively from Detroit. Six through limited passenger trains will be operated daily each way between Kalamazoo and Detroit. In addition a fast through train will be operated each way daily between Lansing and Detroit. It will be called the "Capitol Flyer" and will require about four hours each way for the run.

W. S. Whitney, general passenger agent Ohio Electric Railway, spoke of an increase in traffic brought about by through cars. At one time the limited service between Dayton and Columbus and Zanesville and Columbus was operated as two runs of approximately 70 miles each. Last fall the two limited runs were consolidated, and as a result of the through service the earnings for four months show a considerable increase, which is thought to be brought about by no other reason than the through cars.

Mr. Insull asked whether from the earning standpoint parlor cars were desirable for long runs. He had in mind that the electric roads were not getting a certain class of travel because they were not giving fine enough equipment accommodations to encourage it. It was a question, however, whether it would pay to operate parlor cars.

H. C. Donecker, secretary American Electric Railway Association, was introduced by President Peck and addressed the meeting on the subject of co-operation, calling particular attention to the good feeling existing between the American Association and the sectional associations. He said in part that about 35 per cent of the operating companies in the United States were members of the American Electric Railway Association. This membership covered about 75 per cent of the total mileage in the country and on the basis of income represented about 80 per cent. The membership was as widely scattered as Montevideo, Uruguay, and Cape Breton, Canada. The American and affiliated associations had 44 committees with 303 members preparing reports for the next convention. Within the Central Electric territory were only five or six companies not members of the American Association. Mr. Donecker's compliments to the Central Electric Railway Association were received with much applause.

A paper on interline accounting next was read by L. T. Hixon, auditor Terre Haute, Indianapolis & Eastern Traction Company. This paper was published last week. Its discussion preceded a recess for lunch.

WHEEL TURNING

The first paper of the afternoon session was "Wheel Turning," by H. S. Williams, engineer Peter Smith Heater Company. This paper will be found on page 505 of last week's issue.

In discussing the wear on wheel flanges Mr. Ralston spoke of the severe wear brought about by operation over tracks built for city cars. An interurban car should have flanges 1 in. deep and $1\frac{1}{4}$ in. thick at the throat, but the track in few large cities would permit flanges of these dimensions and so the life of the wheel was reduced. He had found it best to establish a limit of wear which would be on the safe side and would not be so great that the worn flanges might permit the trucks and wheels to have a side motion that would increase their maintenance. His company thoroughly inspected all trucks after they had run 50,000 miles and put them in first-class condition. He had noticed even on this basis of inspection and repair that sometimes wheels operating under identical service showed from 5000 to 10,000 miles variation in mileage. The average results indicated that with $\frac{3}{8}$ in. taken off from the tread a full flange could be obtained after a service of 62,000 miles. He did not favor the leaving of a witness mark on the flange. While this witness mark might not impair the strength of the flange or its suitability for high-speed operation, nevertheless, should the car be derailed, Mr. Ralston feared that the presence of witness marks might bring about disfavor in court. Another reason for not favoring them was that of economy. If witness marks were left, usually they were about $\frac{5}{8}$ in. above the tread, and Mr. Ralston said that this made the effective flange only $\frac{5}{8}$ in. high. He next discussed the possibility of obtaining longer life from wheels. He had in mind that it might be possible by heat-treating the tread and flanges, as was done with gears, to obtain before the first turning a possible mileage of twice that now had. It would no doubt be difficult to handle hardened treads and flanges in the shop, but ways and means were now available for turning off hard spots in steel wheels. It might also be possible to anneal the wheels for re-turning. Mr. Ralston said that

the present cost in his shop for turning wheels was about 75 cents per pair and that the lathe machinist was paid \$2.25 per day.

Mr. Williams reviewed some of the discussion on this subject which was had at the New York State meeting, calling attention to the need for careful mating of wheels in order that uneven wear might be reduced. It was suggested that hardened wheels might be ground to shape, but he doubted whether grinding would serve to form a good flange.

Mr. Ralston thought grinding would be too expensive. In eight years there had come to his notice but two sets of steel wheels with flat spots of such size that the wheels required turning, and these two instances were brought about by skidding the wheels to avoid hitting vehicles.

Mr. Sawtelle, Tool Steel Gear & Pinion Company, said that his company was planning to harden wheel treads and flanges and he would be glad to hear discussion on whether such wheels might be lacking in adhesion.

C. Skinner, superintendent Scioto Valley Traction Company, thought that hardened wheels would have a tendency to slip. In his earlier service as a steam locomotive engineer he had had experience with chilled tires which had to be abandoned because of their slipping qualities.

W. H. Evans, superintendent of motive power Indiana Union Traction Company, also thought that hardened tires would be lacking in the adhesion so necessary for driving and braking in electric service. In connection with Mr. Williams' paper Mr. Evans called attention to the great need for extreme care in mounting wheels so that they should be properly placed on the axle in right relation to their journals. Careful mounting and accurate mating by the use of wheel tapes would reduce flange wear.

THE USE OF SAND

A paper on "The Use of Sand on Interurban Cars" was read by W. H. Evans, superintendent of motive power Indiana Union Traction Company, and will be found on page 506 of last week's issue. Mr. Ralston did not think it had yet been demonstrated that cars could be operated with maximum safety without sand. James Anderson, general manager of the Detroit United lines in Canada, said that no sand was used on his cars and no need for it was found. He believed better operation was obtained when the men were trained to operate the cars without the use of sand.

Mr. Skinner said that the Scioto Valley Railway, operating high-speed, heavy interurban cars and freight trains with three and four trailers and automatic air brakes, had found no need for the use of sand. Their cars were not equipped with sanders and he feared that at times damage might result if reliance were put on sanders and they got out of order. Mr. Anderson said that the Detroit city lines use sand and that the sanders were placed sufficiently high above the platform to assure that the sand would be kept dry.

Mr. Moore, superintendent Ohio Electric Railway, said that the State authorities were now under the impression that sand was necessary. He was pleased to learn that Mr. Skinner had been successful in operating 40-ton cars without sand. His personal view was that with two-motor equipments it was desirable to have sand to assist in getting the cars under headway and that sand was useful if properly handled. From his own experience Mr. Moore would dislike to operate 40-ton cars over city streets without having sand available. It was known, however, that an application of sand would not start wheels revolving after they had begun to skid, but if applied at the right time it would assist in making stops.

F. W. Coen, general manager Lake Shore Electric Railway, was operating his heavy, high-speed cars with sand, and the slower cars of less weight without sand, no matter whether equipped with air or hand brakes. The lighter cars had once been equipped with sanders, but the year after the use of sand was discontinued the accident troubles were reduced 50 per cent and this reduction might be due to the abandonment of sand. On his large cars he used lake sand carefully dried and kept in boxes above the floor level.

T. F. Grover, general manager Terre Haute, Indianapolis & Eastern, used sand in city service, but said that the sand boxes required filling only four times a year and then the old sand was removed and dried. When the tracks were slippery a sand car applied sand to the track at all the hazardous locations. Sand was rarely used on the interurban lines. Mr. Anderson said that it was the practice also in Windsor to operate a sand car, which tended to lessen flat wheels.

Mr. Evans said he was surprised to learn how little definite knowledge there was about the use of sand. He had found in preparing his paper that the subject was of far greater importance than he had imagined, and he suggested that the association could do much by further consideration of this and other apparently commonplace subjects. Mr. Evans was not willing to agree that any court might not change its preconceived ideas about the desirability of sanding equipment on cars if investigations made by a representative committee showed that it was not desirable to provide sand.

A paper on "Asphaltic Oils as Economical Wood Preservatives" by F. W. Cherrington, Indian Refining Company, was read by T. U. Franklin, of the same company. An abstract of this paper was published on page 504 of the ELECTRIC RAILWAY JOURNAL for March 25.

After a short discussion on wood preservation and the customary vote of thanks to the authors of the different papers, President Peck announced the adjournment until the St. Joseph (Mich.) meeting, which is scheduled for June 22.

CO-OPERATIVE EFFICIENCY WORK AT BOSTON

During the past few years the management of the Boston Elevated Railway Company has been confronted with many changes in the conditions under which service is rendered in metropolitan Boston. In common with all other transportation systems the company has had to sustain additional burdens comprised in the general term "increased cost of living," leading to advances in the unit cost of labor and material. The demand upon the company for service extensions and especially for additional transfer facilities, combined with a fare unit fixed by legislative enactment, has made it necessary for systematic studies of economy to be made with reference to the work of all departments. The problem of reducing expenses without sacrificing the quality of the service has been approached from many angles. Previous issues of this journal have reviewed the work which the company has done in the improvement of practice in carhouses and shops, leading to striking reductions in the number of defects of rolling stock on the road and to substantial gains in the mileage of wearing parts. Reference has also been made to the campaign of education adopted several years ago by the company in connection with the handling of cars on the street by motormen, and to the meetings of chief engineers of power stations, carhouse foremen and division superintendents at regular intervals throughout the year in the interest of increased efficiency of administration and service. Few companies have gone so far in the training of new men in the economical handling of rolling stock as the Boston organization, including elaborate provision of apparatus and graphic exhibits for the use of the company's school for transportation employees.

The possibility of still further improvements in the efficiency of the service and of larger economies in the transaction of business recently led the management to take two advanced steps toward insuring the most effective application of the specialized ability and insight possessed by employees. One step was the formation of an "Efficiency Club," composed of executive officers, bureau and department heads, and the other the organization of a so-called "Efficiency Committee," composed of certain responsible department heads and executive assistants in close touch with the larger details of administration through their personal contact with the work of the different branches of the company's service and their relations with the subordinate staff. Through the courtesy of General W. A. Bancroft, president of the company, the following out-

lines are given of the work of the Efficiency Club and the Efficiency Committee.

BOSTON ELEVATED EFFICIENCY CLUB

The first meeting of the club was held at the Parker House, Boston, on the evening of Feb. 28, 1911, and it was attended by about forty officers and employees of the company. A dinner was held, after which General Bancroft took the chair as the first chairman of the organization, stating that the object of the club was to be the interchange of ideas upon propositions directed toward increasing the efficiency of the company's service and business. Monthly meetings will be held, with the possible exception of during July and August, and at each meeting it is planned to have presented a paper bearing upon the economic side of the company's work, special effort being made to point out improved ways and means of handling the work of different departments. General Bancroft said that another purpose of the club is the closer acquaintance of department officers and responsible employees. The meetings will be planned to afford the fullest discussion of topics of interest, and the management hopes to secure in this way the benefit of many ideas. Speaking of the object of the club, he said: "What is wanted are ideas with sound reasons—a particular method of doing a piece of work; a particular treatment of material or machinery; a particular system of administration; a method of insuring the performance of given instructions; a particular arrangement of the hours of working on a given job; a given construction of a car, of a motor, of trucks; the arrangement of a carhouse; a system of moving supplies; the arrangement of timetables; an effective way of procuring sand, and its distribution; the disposal of snow; the cleansing of cars. These are some of the subjects which may be discussed. The directors have great expectations that you will be of assistance, both to the public and to the company, as a result of your studies and discussions. It does not matter where ideas may come from. A person who has only recently entered the service or a person whose duties and responsibility may not be of the greatest may give an idea which is not only worth considering, but which may prove worth adopting."

C. S. Sergeant, vice-president, succinctly set forth the purposes of the club by saying, "What we want of the members of this club is to pull weeds. Department heads must watch for leaks and practise economy in the interests of the company and the public that it serves."

The second meeting of the Efficiency Club was held on March 9, and in accordance with a rule adopted at the first meeting a new chairman occupied the chair, the incumbent being C. S. Sergeant, vice-president of the company. At this meeting the first regular paper to be read before the club was presented by H. M. Steward, roadmaster of the elevated division, his subject being "Handling of Supplies at the George Street Yard." This paper discussed the local transportation problems involved in the reception and transfer of materials and freight consigned to the company. It reviewed the various stages of development which the yard in question has undergone, illustrated by blueprints the successive track arrangements within the past ten years, pointed out the obstacles existing to the most efficient service and outlined a plan of improvement tending toward the realization of substantial gains in operating economy. Special attention was given to the problems of yard congestion as exhibited in the specific case in hand, and an estimate was given of the cost of various improvements, including the installation of an electric locomotive crane, with a statement of the probable yearly saving of the improved methods in different items of the yard operation. Although the treatment of topics at the club meetings will necessarily be based upon local interests within the company's organization, it is the intention of the management to seek the frankest discussion for the benefit of the company as a whole, and so far as possible the data and points brought out will be turned to account in the forming of conclusions and lines of policy.

WORK OF THE EFFICIENCY COMMITTEE

The Boston Elevated Efficiency Committee represents a new departure in executive administration. Its fundamental object

is to secure a more efficient conduct of detailed matters within the company through the presentation of advisory recommendations to the executive officers of the road. The committee is organized to give the management the benefit of its specialized and highly technical judgment upon a great variety of matters of detail which the executive committee of the board of directors has not the time to analyze in minute degree. The president and vice-president of the company are also constantly occupied with executive problems which leave little time for the protracted consideration of detailed matters. Through the Efficiency Committee, therefore, a great variety of subjects receive extended study and discussion, are passed upon by employees familiar with the general scope and purposes of the company's service, and are finally submitted to the executive officers with specific recommendations accompanied by condensed reports of their essential features. Final decision is then rendered by the executives on the basis of a broad knowledge of the company's policy and the expert presentation of evidence in connection with the committee's recommendations.

The committee is composed of the following gentlemen: Chairman, Matthew C. Brush, assistant to the vice-president; C. H. Hile, assistant to the vice-president; J. Henry Neal, general auditor; John Lindall, superintendent of rolling stock and shops; and James D. Andrew, superintendent of power stations. The work of the committee began on Feb. 6, 1911, when the first meeting and organization took place. Regular sessions were begun on Feb. 8, at the company's offices at 101 Milk Street, Boston, and 12 meetings were held in February. At present the committee devotes Tuesday and Thursday mornings and Friday afternoons weekly to its meetings. In general the matters that are brought before it have a close relation to the economy of operation within departments, but special consideration is given to the discussion of questions affecting the quality of service and the probable reception of changes and improvements by the public.

Special efforts are made by the committee to express in figures the various aspects of their investigations and recommendations. The meetings of the committee are made entirely private in order to facilitate the freest possible discussion, and not even a stenographic report is made of the deliberations. The meetings take a large share of the time of the committee members, but their direct connection with problems of a distinctly economic nature appears to justify this. All along the line the fact that such thorough consideration is being given to technical matters and questions bearing upon improved methods of doing business has done much to increase the interest of the rank and file of the company's employees in possible reductions of waste and better ways of performing old tasks.

The members of the executive committee of the board of directors are thoroughly in sympathy with the efficiency work of the company, and, as a member of the committee, James L. Richards recently stated to a representative of this journal that the results thus far obtained have been most gratifying, considering the short time in which these policies have been in effect. He felt that a long step had been taken in the right direction, and that the outlook for the future of such work is most attractive. The executive committee is now composed of the following gentlemen: General Bancroft, Robert Winsor, James L. Richards and James M. Prendergast. The working out of the scheme as a whole furnishes a striking example of the efforts of one of the largest street railway organizations in America to realize to the full the benefits of scientific management.

At the experiment station of the United States Bureau of Mines, Pittsburgh, Pa., several trial runs have been made with an experimental gas producer, using coke as fuel, with which limestone has been mixed in varying proportions. The purpose has been to flux the ash and form a liquid slag and thus avoid clinker and ash troubles and consequent shut-downs. Liquid slag has been readily made which runs freely from the producer. The high temperatures necessary are very efficient in the generation of gas.

CHICAGO MEETING OF JOINT COMMITTEE ON BLOCK SIGNALS

The joint committee on block signals of the Engineering and Transportation & Traffic Associations met at the Congress Hotel in Chicago on March 22. The following members of the committee were present: J. M. Waldron, signal engineer Interborough Rapid Transit Company; C. D. Emmons, general manager Ft. Wayne & Northern Indiana Traction Company; G. H. Kelsay, superintendent of power Indiana Union Traction Company; John Ross, assistant superintendent of track, Detroit United Railway. Morning and afternoon sessions were held. On invitation of the committee the following signal experts attended these sessions: E. B. Smith, signal supervisor New York Central & Hudson River Railroad; James H. Cormick, signal inspector Northern Pacific Railroad; John Leisenring, signal engineer Illinois Traction System; M. H. Hovey, consulting signal engineer Wisconsin Railroad Commission. Short addresses on signaling and signal apparatus were made by a number of engineers representing manufacturers of signal apparatus. These representatives included the following: W. K. Howe, General Railway Signal Company; Frank Rhea, signal department General Electric Company; L. F. Howard, Union Switch & Signal Company; M. D. Hanlon, Union Switch & Signal Company; M. R. Briney, General Railway Signal Company; W. A. Peddle, Hall Signal Company; C. B. Nachod and F. W. Kulicke, Nachod Signal Company; M. E. Launbranch, United States Electric Company; R. F. Gammons and J. J. Ruddick, United States Electric Signal Company. L. E. Gould, Western editor *ELECTRIC RAILWAY JOURNAL*, was appointed secretary of the meeting.

At the opening of the morning session Messrs. Waldron and Emmons described and discussed the replies to the data sheet on signals sent out by the committee which already had been received. A general discussion followed on the work which the signal committee should do preparatory to making its first report. Mr. Rhea recommended that the committee decide on uniform signal indications and aspects. Mr. Waldron mentioned the paper by W. K. Howe read before the New York State Association and his consideration of that subject. This would be of assistance to the committee, which already had started to obtain general data regarding systems of signaling and means for the protection of traffic.

Mr. Briney held that each electric road would be a subject for independent study and that eventually the electric roads would take advantage of the signaling experience of the steam roads. He recommended that an electric road begin its signal installation with apparatus and fundamental designs such that additional protection in later years could be afforded by additions to the first installation.

Mr. Howe said there were certain fundamental differences between steam and electric roads which would permit signaling electric roads at less cost.

Mr. Launbranch stated that his company manufactured selective dispatchers' signals which were not block signals in the strict sense of the word, but were installed with the idea of facilitating traffic by giving the dispatcher means for calling crews at any siding.

Mr. Rhea said he was firmly convinced that an installation of signals should be such that no special operating rules would be required. He advocated the policy of first protecting the curves and hazardous zones with signaling equipment that could later be made a part of a more complete installation. For most roads, two-position signals would suffice, but he recommended the installation of signal mechanisms designed for three-position indications which could be operated for the present as two-position signals and later used as three-position signals. He thought it would be well to consider the desirability of normal danger signaling on account of the short preliminary sections in the danger zones. The upper left-hand quadrant indication no doubt would be adopted universally by electric roads. Mr. Rhea favored installing four signals be-

tween adjacent passing points. The desirability of planning signals for the later addition of automatic train stops was recognized.

Following the general discussion on signaling the committee arranged a program for the day so that a representative of each signal company should have a private audience of one-half hour with the committee. At the conclusion of the meeting each signal company was requested to prepare a concisely worded and comprehensive description of its apparatus and its recommendations for installation, these descriptions to be accompanied by blueprints of circuits and other illustrations.

L. F. HOWARD, UNION SWITCH & SIGNAL COMPANY

Mr. Howard in his talk with the committee said that he agreed with Mr. Rhea as to the proposed scheme of locating four signals between sidings. The Union Switch & Signal Company was installing signals on the Illinois Traction System in accordance with this plan which it had followed also on several thousand miles of the Harriman System. He agreed with Mr. Briney that because of variations in operating conditions each electric road would warrant an individual signal study. He was a thorough believer in the continuous track circuit, but on some roads conditions were favorable to the use of the staff system and in other locations it might be possible to operate the signal mechanisms with short setting sections. This latter plan would reduce the degree of safety and no doubt would be abandoned in favor of the continuous track circuit as soon as financial conditions warranted installation of the latter. Mr. Howard said he understood that proposals had been made for the installation of short setting and resetting sections. His company was willing to sell apparatus suitable for such installations, but would not recommend the plan. Setting sections were safer than track instruments, but neither could be recommended.

Mr. Waldron said he would not recommend the use of setting sections of more than one or two rail lengths for surface track signaling. He asked if the committee thought it advisable to define and compare the value of continuous track circuits, short setting sections and track instruments.

When questioned Mr. Howard stated that his company was prepared to furnish signaling apparatus that would be operable on any kind of electric road. In reply to Mr. Kelsay he stated that alternating-current supply voltages ranged from 55 volts to 6600 volts, according to the economies of transmission. If a road had a 33,000-volt, 3-phase, 25-cycle transmission system, current for operating the signals could be obtained by reducing from 33,000 volts to 1100 volts or 2200 volts for distribution along the line. The signal mechanisms and lamps usually were operated at 110 volts. Track-circuit voltages rarely exceeded 8 volts at the track. Mr. Kelsay doubted whether on most electric roads the present poles would afford room for an additional single-phase, 2300-volt power line and from three to five signal control wires without placing the wires so that continuity of signal operation might be jeopardized.

Mr. Leisenring said that the Illinois Traction System was using three-pin arms to carry its signal control wires and was supporting the fourth and fifth wires underneath the arms. It was using a special scheme to save a transformer by feeding the local relay winding from the track transformer over an additional wire. Mr. Leisenring said that the signal work included full automatic distant signals, substation equipment and the lengthening of the sidings. The substation equipment included a panel with switches, circuit-breaker and fuses to control the output of a transformer which had its primary connected with the secondary side of a rotary converter transformer and which fed alternating current to the signal system along the road. Mr. Howard said that the Illinois Traction System was putting in an ideal signal installation and spending more money than most roads could afford.

Mr. Gould mentioned a possible economy in the use of light signals for daylight indications. A series of tests with signals having 8-in. and 10-in. lenses had recently been made by him on a high-speed, third-rail electric road and it was found

under the most trying daylight conditions with a bright sun reflected from fresh snow that the red indications could be seen plainly at distances from 1000 ft. to 1500 ft., which was approximately twice the braking distance.

Mr. Kelsay suggested that the committee request circuit diagrams of signaling apparatus, stating that while these were hard to follow the education obtained by studying them was worth while. Mr. Howard explained how the signal circuits were arranged so that any interference with or failure of the parts brought about a stop indication.

Mr. Hanlon said the Union Switch & Signal Company was developing several types of automatic stop arms using glass tubes and stop valves. The stop arm could be held in the clear position by an electric lock when necessary. Another scheme was to use a two-arm signal mechanism to operate the signal and the automatic stop arm. He noted that if light signals were used additional mechanism would be necessary for operating automatic stop apparatus.

FRANK RHEA, GENERAL ELECTRIC COMPANY

Mr. Rhea outlined the policy of the General Electric Company regarding the furnishing of signal equipment for electric railways. The question of electric railway signaling demanded careful consideration. No system of signaling should be installed that would require special rules unless as a last resort, although the installation of signal apparatus would no doubt require some additional rules. It was the best policy for a road to start out with the idea of getting the best possible signal equipment and then reduce the size of first installation according to the money available, bearing in mind a complete installation as the ultimate object. Single-track signaling was a subject of much importance and required much thought. The electric roads could do no better than follow steam-road practice for double-track signaling. After a general plan of signaling had been adopted the first step would be to protect the hazardous points and later finish the installation. Few electric lines would be warranted now in installing distant or three-position signals because of the expense, but two-position signaling had been thoroughly tried in steam railroad practice and electric railway service justified its use. He suggested installing three-position mechanisms which could be had at no additional cost and using the zero to 45-deg. indication at present, thus leaving the 90-deg. indication available for three-position work. There were no patent complications involved in the use of upper-quadrant signals. On account of the short time intervals between cars in electric railway operation it would be well to investigate the normal danger method of control, because with this form of control the motorman knows when he sees a signal clear that the signal at the other end of the block is set at stop. In this connection Mr. Rhea outlined some principles in connection with single-track signaling. Electric roads should first decide on the protection for opposing trains and then consider following movements. He suggested five typical arrangements of signals for single-track roads. If automatic stops were to be used later he would recommend instead of through sidings the use of two spur sidings, one for each direction, with sufficient space between them for braking and require trains to head in and back out.

Regarding the use of short track sections for setting signals Mr. Rhea said that they required stick relays and their operation violated the closed circuit principles, which were greatly to be desired.

A second development after signals had been located at the sidings was the use of intermediate signals, placing the siding signals at a coincident location. Another question to be decided was whether or not an electric road could afford to install single or double-end preliminary sections.

Regarding the so-called "trolley contact" signals Mr. Rhea recommended their use, providing a road could not afford track-circuit signals. Such signals had a useful and legitimate field on certain roads.

W. K. HOWE, GENERAL RAILWAY SIGNAL COMPANY

Mr. Howe stated that his company manufactured a full line

of automatic signaling apparatus, interlockings, etc., but did not build trolley contacts. His company was prepared to furnish selective dispatchers' signals, either power-operated for both setting and restoring, or manually restored. Mr. Howe did not agree with Mr. Rhea fully regarding the location of signals at and between sidings. He said that a permissive signal would be applicable to many situations on electric roads. A question to be answered regarding automatic stops was whether the railroad desired them as a check on the observance of signals or as a means for bringing a train to a standstill when a signal had been disobeyed. Mr. Howe said that experience with automatic stops installed by his company on one interurban road had shown that they assisted discipline greatly. One of the best motormen on this road endeavored to see how close to a stop arm he could run his car and drifted into the arm, thus breaking the glass tube. That man wrote a three-page letter to the superintendent showing his regard for discipline. If automatic stops were to be provided then all signals must be staggered to provide sufficient braking distance. This added to the cost of installation. When a company was considering automatic stops a careful analysis of the methods of operation and a study of the past records should be made to determine for which of the two results the automatic stops should be designed. Mr. Howe agreed with Mr. Rhea that future signals probably would be of the three-position type but he thought that two-position signals in most instances would suffice now. He made a plea for standardization of signal aspects and materials. He felt that only one kind of indication should be used for one set of conditions. This requirement would not affect the details of the apparatus and would greatly reduce the cost of manufacture.

Mr. Howe said that nine-tenths of the problem of signaling any road was to know what was required, and the committee by establishing requirements could greatly assist the signal companies. Mr. Howe called attention to the data sheet accompanying the paper which he recently presented before the Street Railway Association of the State of New York.

In connection with the light signals which his company was prepared to install Mr. Howe said means were available for checking a motorman when a signal was passed but that this would not stop the train. Mr. Waldron said that his experience had shown it to be cheaper to use light signals than semaphore signals in connection with automatic stops.

Mr. Howe said that the cost of a signal installation was largely dependent upon the service, the distance between sidings, whether they were stub-end or through sidings and the amount of return current necessary to be handled through the track rails. He did not recommend economy when it affected safety. The order of consideration was first safety, second reliability and third economy. Short setting sections did not give 100 per cent safety and signal engineers called them "trap" circuits. When questioned by Mr. Smith as to whether the railroads should adopt some odd frequency for signaling, Mr. Howe said that this would require the installation of frequency-changers in place of static transformers and since the double-wound relays largely provided against false indications in a.c. signaling work he did not recommend an odd frequency.

Regarding light signals Mr. Howe said that preliminary tests had shown them to be distinguishable under severe sunlight conditions at twice the braking distance. Light signals would bring about a reduction in the cost of signaling for electric roads of approximately 15 per cent. They were more reliable than semaphores and their maintenance was practically nothing. He did not, however, wish to minimize the value of a semaphore indication to those roads which could afford it.

C. B. NACHOD, NACHOD SIGNAL COMPANY

Mr. Nachod first described the principles of obtaining signal indications with continuous track circuits and with local contacts. He thought that so far as safety was concerned they were equivalent, provided that with the contact system the trains were indivisible within the block. He said that most electric roads preferred to operate permissively and that non-

permissive operation would change conditions greatly. He next described the various contact-making devices. (1) A track contactor consisting of a short piece of extra rail used in connection with a contact shoe carried on a car. This was not approved by him because of the additional apparatus required. (2) Track instruments which cannot be used for permissive operation because it is impossible to build an instrument which will count fast enough and accurately enough to register the wheels of a train. (3) Insulated track sections. To have a sense of direction two track sections are needed, each of sufficient length so that a train will count as a unit. This would require sections of at least two rail lengths. The setting sections might be energized by a battery or through a high-resistance connection between the trolley and the ground with a current tap at an intermediate point. This was objectionable because of the power wasted and the high voltage existing when the ground connection was broken. Regarding the insulated setting sections of track, Mr. Nachod said there was danger of failure if two trains left a block section as one train. A failure might also occur if a train touched a track section without passing clear through. This, however, would be a danger failure and not a clear failure. A foreign body might short-circuit the setting section and give a clear failure.

Mr. Nachod next described trolley contacts. These were either mechanical or electrical. The mechanical contacts were not so satisfactory because of the requirements for maintenance of moving parts. The electrical contactor had no moving parts and the type furnished by the Nachod Signal Company was now operating satisfactorily at 55 m.p.h. on the Chicago & Milwaukee Electric Railroad. He believed that it would work satisfactorily at higher speeds. The signal mechanism manufactured by his company was actuated by the power from the trolley line. This meant that the trolley wheel must be on a live wire or the signal would not be set. For these reasons the signals had been located in advance of the contactors so that a motorman could see the signal that had been set to protect his train. This arrangement aided discipline.

The advantages of trolley contactors as outlined by Mr. Nachod were their short length as compared with track setting sections, thus providing against the probability of simultaneous setting from opposite ends of the block. With these contactors short-circuiting was extremely improbable and no additions to the car equipment were required because they were operated directly by the trolley wheel. These contactors were suitable for operating any signal with any desired aspect. He would not, however, advocate the use of trolley-contacts for controlling signals in complicated yards. Other advantages claimed for the Nachod contactor were ease of installation, low maintenance cost and non-interference with the track.

The relay furnished with the Nachod signals operated from the trolley-current supply and because of this the parts could be massive and ample power used to eliminate possibility of sticking. These relays required little attention. In the *ELECTRIC RAILWAY JOURNAL* for March 11 a description of the Nachod signals showing their flexibility with regard to an installation on single-end sidings was presented. Mr. Nachod said that his relay could operate over a range of from 180 volts to 650 volts. It was suitable for controlling semaphore signals of any design. He had in mind the manufacture of solenoid-operated signals for interurban use. The light signals were visible on a hazy afternoon at a distance of 800 ft. Regarding light signals for high-speed operation Mr. Nachod said that if the railway company would install an a.c. power line to furnish good voltage to the signal lamps he thought that excellent indications could be given by lamps in the daytime.

R. F. GAMMONS, UNITED STATES ELECTRIC SIGNAL COMPANY

Mr. Gammons told the committee that his company was the pioneer in building automatic signals for electric railways and for 12 years it had devoted its attention very largely to protecting single-track roads. The first signals had given light indications, but now inclosed semaphores had been added. The signals were operated by overhead contactors and worked very satisfactorily up to 30 m.p.h. His company was bringing out

as an improvement on its old design a new contact maker that would be satisfactory for any speed. One of the principal advantages of the United States signals was the low cost and they were perfectly satisfactory except for purely high-speed roads, on which the former types of contactor had not been satisfactory. These mechanisms could be used with signal blades if preferred, but with the present type of signals the indication is in the form of a white disk at the entrance end and a red disk at the leaving end of a block. The latest signals manufactured, he said, had the appearance of steam railroad semaphores. They were installed on concrete foundations and could be operated from trolley contact-makers or by track-section setting.

Mr. Ruddick said the signals operated from the 500-volt supply and where track-setting sections were used a difference of potential of only 1.75 volts existed across the insulated joints. The relays operated well with that voltage. The signal system wasted only $\frac{1}{2}$ amp at each end of a block and worked effectively on 250 volts drop. The relay was normally closed. The cost per block was about \$350 for counting signals.

W. A. PEDDLE, HALL SIGNAL COMPANY

At the beginning of the afternoon session Mr. Peddle described the signal apparatus supplied by the Hall Signal Company for electric roads. The most novel piece of apparatus was the track transformer which replaced the insulated rail joints and inductance bonds used by other signal companies at the ends of track sections. This track transformer used the track rails as the primary and a coil of cable laid against the webs of the track rails for a length of about 15 ft. as the secondary. The current induced in the secondary was sufficient to energize the track coil of the signal relay. Signals operated with these track transformers had been installed on the Long Island Railroad and on the Interborough Rapid Transit lines. The principal advantage was the absence of insulated joints. Relays of the galvanometer type were used.

The Hall Signal Company was designing a new bond that would operate at 4 volts with 25 amp flowing through the track circuit. The consumption of current at the coil location was now about 30 watts and the operation of a 2000-ft. track section required about 100 watts. Mr. Peddle said that the Hall Signal Company's track instruments were used to operate signals on the Paris underground railway.

M. E. LAUNBRANCH, UNITED STATES ELECTRIC COMPANY

Mr. Launbranch described the system of selective signals manufactured by his company. Their operation was based on the use of the Gill telephone selector, several thousand of which were in service on 70 steam roads. Some railroad circuits on which 30 of these selectors were in use had shown no failures in two years. The Gill selector was operated directly over any existing telephone line and served either to ring a call bell in a station or release a semaphore. The dispatcher's signal which the United States Electric Company made was a combination of the Gill selector and a standard Hall electric slot semaphore arm. It was designed for control over the telephone circuit. A key in the dispatcher's office sent out a combination of irregular impulses to which but one of the receiving stations would respond. This principle of selecting by means of a combination of irregular impulses rather than a series of regularly spaced impulses, it was claimed, increased the safety of selection.

The selector at the signal on receiving the correct combination of impulses closed a contact which in turn opened a local circuit, releasing the electric slots and permitting the signal arm to drop to the stop position. This arm was locked automatically in that position and could be restored only when released by the dispatcher. This provided against unauthorized manipulation of the arm. The falling of the arm made certain electrical contacts, giving back an answer which could be read audibly by the dispatcher or registered on a tape. After the dispatcher had given his orders he released the arm by again calling that station and an indication that the arm was ready for restoring was given to the motorman by the tapping of a bell.

The object of the dispatcher's signal was to facilitate traffic

by enabling the dispatcher to call crews to the telephone. A feature of the United States Electric Company's dispatcher's signal was the automatic locking of the arm in the stop position. These arms might be set by track relays if desired, and the relays would operate in conjunction with the Gill selector. The Gill selectors in connection with semaphore arms and slots manufactured by the Union Switch & Signal Company had been installed by the Twin City Rapid Transit Company on its Still-water interurban line.

Regarding the flexibility of application of the Gill selector, Mr. Launbranch said that the Union Pacific Railroad had some circuits including 30 of these selectors, part of which controlled semaphore arms located at sidings at which there were no operators. By the use of these semaphore equipments the dispatcher could call train crews to the telephone and facilitate traffic. It was the practice on the steam roads to use an audible answer-back.

ORGANIZATION OF COMMITTEE WORK

At the conclusion of the audiences with the representatives of the signal companies the committee arranged for subdividing the preparatory work on its annual report into the following sections:

1. Instructions from associations.
 2. Personnel of committee.
 3. Minutes of meetings.
 4. Introductory paragraph on signals.
 5. Historical.
 6. Résumé of data sheets.
 7. Necessities of electric railway signals.
 8. Digest of state and interstate commission rulings and laws.
 9. Present signal installations and cost.
 10. Work under way during 1911.
 11. Conclusions and recommendations for 1912 committee.
- Appendix. Abstracts of descriptions of apparatus furnished by signal manufacturers.

EXHIBIT NOTES RELATIVE TO M. M. AND M. C. B. CONVENTIONS

J. D. Conway, secretary Railway Supply Manufacturers' Association, 2135 Oliver Building, Pittsburgh, Pa., has issued a list of the companies which up to March 24 had announced the intention to be represented at the June, 1911, Atlantic City convention of the Master Mechanics' and Master Car Builders' Associations. It is announced that the total exhibit space occupied will be something over 76,000 sq. ft., which is an increase of over 5000 sq. ft. compared with 1910.

The Eldredge Express & Storage Warehouse Company, Atlantic City, N. J., has the contract for both the hauling of exhibits to and from the railroads and also their placing in the exhibit spaces. The association will issue Circular No. 2 about May 1, with particulars as to the official firms selected by the association to provide furniture, floral decorations, special electric work, shipping instructions, etc.

PROPOSED AFFILIATION OF CENTRAL ELECTRIC RAILWAY AND ACCOUNTING ASSOCIATIONS

As announced on page 503 of last week's issue, committees are at work on the plans for the affiliation of the Central Electric Accounting Conference with the Central Electric Railway Association. At a meeting held March 22 the subject was discussed by the executive committee of the larger association. This association has appointed a sub-committee on consolidation as follows: H. A. Nicholl, M. J. Insull and R. A. Crume. The sub-committee of the Accounting Conference which has been instructed to report on this subject to the Accountants' conference at its meeting in June at Springfield, Ill., is comprised of J. D. Maynes, E. L. Kasemeier and L. T. Hixon.

THE "NINE-HOUR IN ELEVEN" BILL IN MASSACHUSETTS

The Massachusetts Street Railway Association has recently compiled and published in pamphlet form statistics and other information relative to the bill now before the Street Railway and Labor Committee of Massachusetts known as the "Nine-Hour in Eleven" bill. Briefly this bill provides that, except on legal holidays and Sundays and in case of accident or unavoidable delay, a day's work for trainmen on electric railways shall not exceed nine hours, and that it shall be performed within 11 consecutive hours. The pamphlet contains the substance of laws relating to the regulation of hours of street railway employees in other States where any statutes of this kind have been passed. Only nine States outside of Massachusetts, namely, Rhode Island, New York, New Jersey, Maryland, Illinois, Louisiana, Florida, Washington and California, according to the pamphlet, have statutes regulating such hours, and no State has any law approaching the arbitrariness of restrictions proposed in the Massachusetts law. The testimony of employees on many roads is given to show that there is not only no demand for such a law, but that the employees consider it unwarranted and detrimental to their own interests.

Statistics are added obtained from 24 roads in the State operating 2225 miles of track, or 94.6 per cent of the total mileage of the State, and employing 8518 regular men, and a total of 10,225 men including extras. These show that under the proposed law, if no additional extra men were employed, the companies must abandon 3294 trips, or 11 per cent of the present service. If the present schedules were operated it would be necessary to employ 4014 additional men, or 47 per cent of the present total number. The following combined statistics of the roads reporting are added:

Hours of Operation:	
No. of cars operated more than 18 hours daily.....	27.7%
" " " between 16 and 18 hours daily.....	13.4%
" " " 14 and 16 " " ".....	1.7%
" " " 5 and 14 " " ".....	8.6%
" " " 2 and 5 " " ".....	18.4%
" " " less than 2 hours daily.....	30.2%

Present Working Hours:	
No. of men working 9 hours and over daily.....	5834 or 68.3%
" " " 8 to 9 hours daily.....	794 or 9.3%
" " " 7 to 8 " " ".....	434 or 5.1%
" " " 6 to 7 " " ".....	296 or 3.5%
" " " 5 to 6 " " ".....	357 or 4.3%
" " " less than 5 hours.....	809 or 9.5%

Average Length of Service of Employees:	
No. of men who have left service in past 5 years.....	8792
No. of these men who left service on account of death, ill-health or disability.....	346 or 3.94%
Average length of service of all present men, excepting first-year men.....	7.65 years
No. of men in service less than one year.....	2772 or 27%
" " " " from 1 to 5 years.....	3219 or 31.5%
" " " " 5 to 10 " " ".....	1726 or 17%
" " " " 10 to 15 " " ".....	1282 or 12.5%
" " " " 15 to 20 " " ".....	665 or 6.5%
" " " " more than 20 " " ".....	561 or 5.5%

Comparative Size of Cars:	
Average seating capacity of open cars, 1893.....	35
" " " " 1911.....	51.7
Increase.....	47.8%
Average seating capacity of closed cars, 1893.....	25.7
" " " " 1911.....	35.7
Increase.....	39%

Comparative Speed:	
Average speed, 1893.....	8.52 miles per hour
" " " " 1911.....	9.80
Increase.....	15%

Comparative Wages:	
Minimum wage paid in 1893.....	15c per hour
Maximum " " " 1893.....	22½c " "
" " " " 1893 (except Boston Elevated).....	20c " "
Minimum " " " 1911.....	17½c " "
Maximum " " " 1911.....	27c " "
Average wage paid in 1893.....	about 19c " "
" " " " 1911.....	25c " "
Increase in average wages.....	31.5% " "

Number of Cars Equipped with Air Brakes:	
In 1893.....	0
In 1911.....	2448 or 23.3% of total number
Number of Double Truck Cars in Service without Air Brakes in 1911:	
Boston Elevated.....	1164
Boston & Northern and Old Colony.....	182
All other roads.....	9

Number of Cars Equipped with Arc Headlights:	
In 1893.....	0
In 1911.....	2005 or 28.6% of total number
Number of suburban or interurban cars without arc headlights in 1911.	
Mileage Protected by Block Signal or Telephone Dispatching:	31
In 1893.....	0
In 1911.....	1737 or 78.1% of total.

Average Weight of Rail:	
In 1893.....	47.4 lb. per yard
In 1911.....	73.1
Increase in average weight.....	54%

TRACK AND ROLLING STOCK CHANGES IN SCRANTON, PA.

During the past year the Scranton Railway Company, which is a subsidiary of the American Railways, Philadelphia, has done some interesting track work and has made various changes in rolling stock and shop practice under Frank Caim, general manager, as described in the following paragraphs:

Beginning in April, 1910, the company electrified 9 miles of track embracing a line to Moosic Lake which had been operated by steam under the name of the Scranton, Dunmore

track. This unit cost was made up of \$.259 for the 80-lb. rails and fixtures, \$1.93 for all concreting and paving 17 ft. wide and 33 cents for the line and bonding. There was considerable rock excavation and grading on this job. Other special conditions were the inclusion of a cross-over in the middle of the section and a turn-out at the end. It was also necessary to rebuild 300 ft. of one track owing to the settlement caused by an abandoned sewer.

On all tangent jobs with similar construction, but using 90-lb. rail, the cost was \$4.25 per foot of single track. A third

GEAR LUBRICATOR'S REPORT.

Car Number	Gears				Pinions				Air Motor		
	Gears O.K.	Gears Fair	Gears Bad	Lubricated	Pinions O.K.	Pinions Fair	Pinions Bad	Greased	Type	Cleaned	Oiled

MOTOR LUBRICATOR'S REPORT.

Car Number
Style of Motor
Greased
Oiled
Car Number
Style of Motor
Greased
Oiled

AIR MOTOR REPORT.

Car Number
Brakes do not release
Compressor fuse blown
Compressor out of order
Motorman's valve O.K.
Motorman's valve stiff
Motorman's valve leaks
Reservoir O.K.
Reservoir leaks
Reservoir drained

Electric Ry. Journal

MOTOR REPORT.

[illegible]

CAR WIRING REPORT.

[illegible]

Electric Ry. Journal

Scranton Railway—Headings on Five Inspection Forms

& Moosic Lake Railroad. This lake is 12 miles from Scranton and consequently the first 3 miles are a part of the Scranton city system. The electrification of the line necessitated the erection of poles, overhead wires and considerable changes in track and power equipment. Many curves were eliminated, grades were reduced and additional switches installed to handle with greater dispatch the large summer business to the lake. The rails were bonded with the electric-weld system of the Electric Railway Improvement Company, Cleveland. The company also installed two 400-kw portable substations.

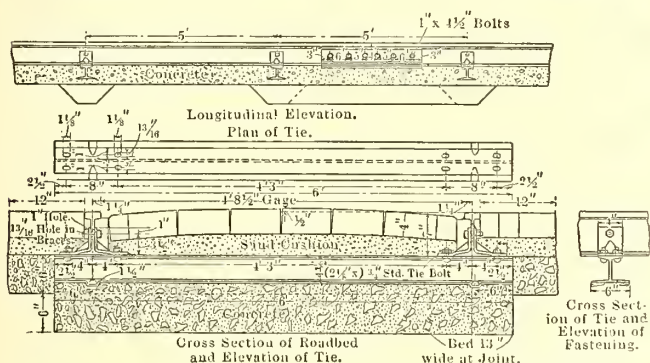
During the last four years the Scranton company has reconstructed about 15 miles of track on account of changes in paving. The principal feature of this track is the use of a concrete foundation, Carnegie steel ties spaced 5 ft. centers and Lorain 80-lb. 7-in. rail section No. 235. No tie rods were used, as the rail clips were made to serve as braces. About 3 miles of this construction were laid during the summer of 1910, except that the rail was an A. S. C. E. section weighing 90 lb. per yard. It included filler brick alongside the web and beveled block to form a groove. This track is furnished with

job covering 7300 ft. of single track with 80-lb. rail, including some special work, cost \$4.67 per foot of single track.

The unit costs for the steel tie and concrete construction were usually as follows:

Steel ties.....	\$1.40 each
Rail braces.....	.35 per set
Stone.....	\$1 per cubic yard at the quarry, which was 4 miles from the work.
Sand, 70 cents per ton, I.O.B. Scranton, but 2 miles to the work.	
Cement, \$1.25 per barrel, delivered to the concrete mixer.	
Paving block, 3 in. x 4 in. x 8½ in., \$24.30 per 1000 delivered at the job.	
Stretcher brick and filler brick, 43½ cents per running foot.	
Ordinary labor, \$1.75 to \$1.50 a day.	

During 1910 the company remodeled nine double-truck cars at an expense of \$1,100 each. Among the changes made was the installation of longer platforms and longitudinal seats, which are preferable to the original cross seats on account



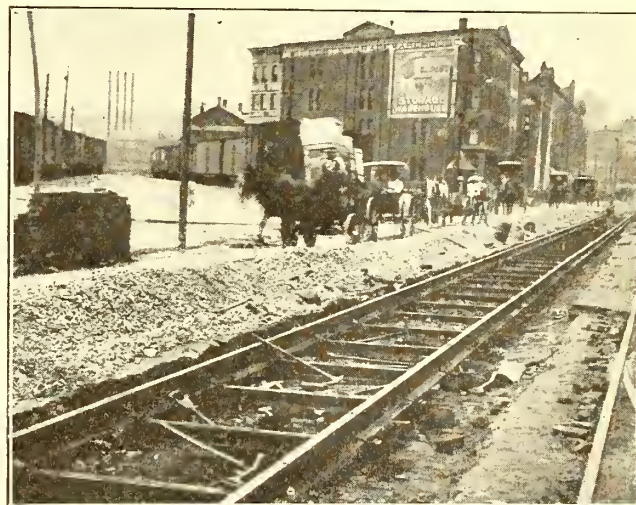
Electric Ry. Journal

Scranton Railway—Steel Tie and Concrete Construction

Continuous rail joints and 9-in. concealed flexible bonds.

The company is also doing work on the main highway between Luzerne and Susquehanna Counties. Twenty-one miles of this highway are to be paved, and the railway is therefore reconstructing the 17 miles over which it operates. The construction used for this road will consist of 70-lb. A. S. C. E. rails, wooden ties, Duquesne joints, Churchill splice bars and concealed bonds.

It may be of interest to give some costs of the steel tie and concrete foundation track previously mentioned. In one case 2850 ft. of track was constructed for \$4.85 per foot of single



Scranton Railway—Steel Tie and Concrete Construction

of the narrow cars. The new cars for Scranton will probably be of some prepayment type and have flat arched roofs. The flat arch roof should prove very desirable because of the many low railroad bridges in Scranton. It can be designed to give a desirable increase in the inside height of the car and yet have a lower roof clearance than the present monitors.

The Scranton company prefers the use of steel-tired wheels. These wheels are of the National type, and average 96,000 miles despite considerable scoring from the gritty soil. The original depth of the flange is $1\frac{1}{8}$ in., the wheels being sent to the shop when the flange is worn down to $\frac{3}{4}$ in. The wheel

press is used to insert steel bushings for loose wheels. The company is now replacing its 4-in. axles by 4½-in. axles and its 4½-in. axles by 5-in. axles.

The Scranton company uses split gears only. These are lubricated with Dixon graphite grease with satisfactory results. All of the gear cases are of malleable iron, either of the General Electric or Columbia Machine Works manufacture. The experiment is now being tried of lubricating the remaining Westinghouse Nos. 3, 12 and 68 and G. E. Nos. 57 and 67 motors with oil-soaked woolen waste which is packed in the grease box. The other motors, which are of the G. E. Nos. 70 and 80 types, are fitted with oil cups. It is the practice to lubricate all motors twice a week. The brushes are of the Laclede type and are maintained at a tension of 8 lb. Cars are overhauled about every 50,000 miles.

John Duffy, master mechanic of the company, has recently devised some inspection forms which are drawn up to convey much more information than the usual shop report. Each report is individually signed by the man who does the work, and countersigned by the night foreman, so that in case of court proceedings the form is admissible as legal evidence. The extended inspection data called for by these forms will be noted by reading the headings in the accompanying cuts. Thus

TROLLEY REPORT.

Car Number	Base			Pole		Wheel		Harp	T. Wire	Catcher	Rope
	Base O.K.	Base broken	Base tilted	Pole O.K.	Pole bent	Wheel O.K.	Wheel worn out	Harp O.K.	Trolley wire off	Catcher O.K.	Rope O.K.

Electric Ry. Journal

REPORT OF CAR INSPECTOR.

Car Number	Axle Caps		Arm Caps		Axle Brasses		Axle Collars		Motors		Gear Cases		Wheels	
	Cap O.K.	Cap loose	Cap tightened	Cap O.K.	Brass O.K.	Brass fair	Collar loose	Collar tight	Arm O.K.	Arm needs oil	Case O.K.	Case worn out	Wheel O.K.	Wheel flatted

Electric Ry. Journal

REPORT OF CAR INSPECTOR.

Car Number	Brakes										Trucks		
	Brake O.K.	Brake Hanger Broken	Brake Rods Stripped	Brake Shoes Broken	Brake Shoes Worn Out	Brake Handles Out of Order	Brake Wheel and Dog Out of Order	Brake Pins Broken	Release Spring Broken	Trucks O.K.	Journal Box Broken	Truck Springs Broken	Pilot Board Broken

Electric Ry. Journal

Scranton Railway—Headings of Truck, Brake, General Motor and Trolley Forms

the report of the inspector of brakes and trucks is not confined to a simple statement that the brake rigging is "O. K.," but it also must show separately whether the brake hangers, rods, shoes, handles, pins, ratchet wheels and release springs were found in order. The truck inspector must report specifically on the journal boxes, truck springs, etc., while the electrical inspector must testify to at least 26 possible conditions relating to axle and armature caps, axle brasses and collars, motor gear cases and car wheels. The car wiring inspector must report on a minimum of 31 items. The motor report gives the brush-holder and brush data for the individual railway and compressor motors, and also includes six columns for various commutator troubles. The report for the air brake equipment includes information on brake release compressor fuse, reservoir and motorman's valve. Two report forms are used for lubrication, one of which covers the greasing of gears and other work on the same, and the other of which relates to the oiling or greasing of the motors. A rather unusual form is that for the overhead current-collecting equipment. This report is designed to give all pertinent facts concerning the condition of the trolley base, the pole, the wheel, the harp, the wiring, the trolley catcher and the catcher rope.

Doubtless some railway superintendents will consider these forms rather elaborate, but there is no gainsaying the fact that the average shop inspector is not a man who will or can make out a detailed report unless most of the possible troubles are before him in print for simple confirmation or denial.

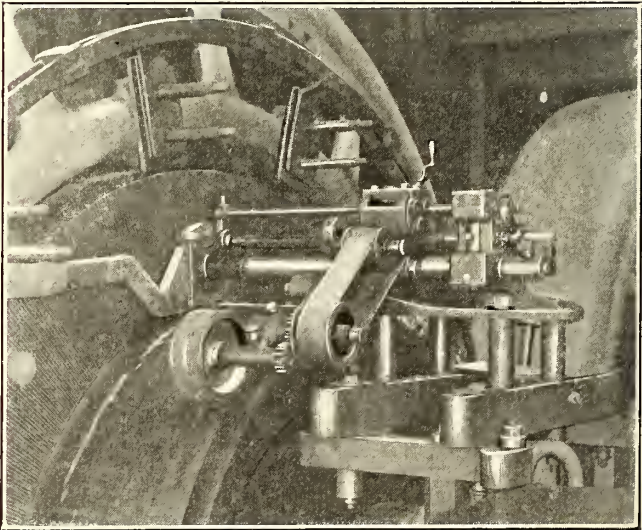
MEETING OF THE COMMITTEE ON CONVENTION LOCATION

A meeting of the committee on convention location was held in Chicago, March 24. The American Electric Railway Association was represented by John I. Beggs, John H. Pardee, E. C. Foster and H. C. Donecker. Mr. Foster attended the meeting in place of James F. Shaw, who was unable to be present. The Manufacturers' Association was represented by C. C. Castle, Walter L. Conwell, K. G. Hequembourg, and George Keegan. The technical press was represented by Hugh M. Wilson and H. J. Kenfield. The committee had an excellent opportunity of inspecting the facilities afforded at Chicago, because the convention of the American Railway Engineering & Maintenance of Way Association was being held in Chicago at the time of the meeting. The meeting rooms at Congress Hotel and the exhibits at the Coliseum were inspected. It was the general sentiment of the committee that the convention should be held in the Central West if any city in that territory possessed the hotel and exhibit facilities necessary to accommodate those who would be in attendance at the convention.

After considering the facilities in Chicago the committee visited Minneapolis, St. Louis and Rochester, N. Y. It will prepare a report upon the facilities of these cities for submission to the American Electric Railway Association at an early date.

AN AUTOMATIC COMMUTATOR GRINDER

The Phillips Manufacturing Company, New York, is placing upon the American market an automatic commutator grinder which is widely used abroad for truing commutators in position on generators, motor-generator sets, rotary converters, etc. The accompanying cut shows the device applied to a 1500-kw rotary converter in New York City. An important feature of this machine is its speed, because the grinding wheel can be geared to run as high as 2500 r.p.m. The grinding spindle is direct-driven by means of a rubber-friction wheel which is run from the revolving commutator to obviate the necessity for a



Commutator Truing Device Applied to a 1500-kw Rotary Converter

separate motor. This spindle is carried by a strong slide and is absolutely rigid. The bearings are very long and the spindle and drum are balanced to permit high-speed running without vibration. In operating, the grinding spindle moves to and fro across the face of the commutator without breaking and tearing the mica or dragging the copper. The grinding mechanism is automatically reversed at each end. It can also be constructed so that stops can be set for grinding the surface right

up to the connecting wires and back to the edge. Means are provided for the refined adjustment of the friction and grinding wheels. It is asserted that this machine will restore the commutator to a perfect curve and, furthermore, that it can be set to remove a given flat spot without wearing off metal elsewhere. The device is particularly adapted for vertical machines of all types which have commutators of 7 in. diameter and upward. A light hand-feed machine also is built by this company to true up commutators from 4 in. to 12 in. diameter and 9 in. deep. The grinding wheels of both types are of a composition which will not pick up particles of copper or mica. A hood is provided to take care of the copper dust in order to avoid short circuits.

INCORPORATION OF J. M. JONES' SONS COMPANY

J. M. Jones' Sons Company, the well-known car builder of Watervliet, N. Y., was duly incorporated under the laws of the State of New York on Feb. 2, 1911. The following directors are named in the certificate of incorporation: John H. Jones, James B. McLeese, Floyd R. Jones and Paul R. Jones. The directors subsequently elected John H. Jones president and treasurer and James B. McLeese vice-president and secretary. The corporation is authorized to buy and sell and also to manufacture all kinds of railroad cars and motor vehicles and all parts thereof and appliances therefor. The location of the principal business office of the company is in Watervliet, N. Y. The firm known as J. M. Jones' Sons has been in the car business for over 25 years, previously being known as J. M. Jones & Company. It is one of the oldest street car building concerns in the United States, if not the oldest. Originally the business was that of manufacturing carriages, but when horse or tram cars were introduced in this country the firm engaged in their manufacture and afterward continued to follow the development of the electric railway car business. The new company is a close corporation, which is controlled by men long connected with the business, who will maintain the high standards of the past. John H. Jones is well known to the street railway fraternity and Mr. McLeese, the office manager, has been with the company since boyhood. Floyd R. Jones and Paul R. Jones are sons of John H. Jones.

REGULATING POLE ROTARY CONVERTERS

Rotary converters are often installed where the service requires variable ratio between the a.c. and d.c. voltage. The Potomac Power Company, of Washington, D. C., has solved the problem by using the General Electric Company's new regulating pole rotary converters. These accomplish the voltage regulation in a very simple manner without the use of complicated apparatus or wiring. They are provided with auxiliary regulating poles, which are so set that one regulating pole adds its flux to that of a main pole, either increasing or decreasing it, and so increasing or decreasing the d.c. voltage. The current in the regulating pole circuit is varied by means of a rheostat inserted in this circuit.

Five of these rotaries, each having a capacity of 1000 kw, have been installed by the Potomac Power Company, three of which are used in railway work for supplying current to the Washington Railway & Electric Company. They give a variation of from 515 volts to 600 volts. By means of these any desired subdivision of load between the various substations of the railway company can be obtained, as by increasing the potential at which the power is supplied by a substation, other conditions remaining the same, its load may be increased, and by reducing the potential its load may be diminished. These machines have the usual shunt and series winding on the main pole and a shunt winding on the regulating pole. The field winding on the main pole gives the usual compounding at any voltage to which the machine is adjusted by the rheostat in the regulating pole circuit. The other two converters are used for lighting at 240 volts to 300 volts.

AUTOMATIC TROLLEY SWITCH FOR HIGH-SPEED INTERURBAN SERVICE

The Railway Materials Company, Chicago and New York, is making the "Rymco" high-speed automatic trolley switch, which is intended to provide a continuous overhead circuit at passing points, regardless of whether the siding or main track is used. The throwing of the track switch lever gives the proper adjustment of a 6-ft. trolley tongue blade. Communication between the track switch and the blade tongue of the trolley switch is accomplished through a bolt riveted to the tongue blade, whose rear end is fastened to the siding wire and which lies almost parallel to this wire when it is not in use, a connecting pull rod and pipe and bell cranks. A metal hood bolted to the double hanger directly over the track switch protects the wearing parts from the weather.

The end of the tongue blade which is brought into contact with the main wire when the siding is to be taken is hollowed on the side to insure good contact. This contact is maintained permanently by adjusting the bolt which is run up through the hood. The bottom of the blade tongue is rounded to conform to the section of the adjoining trolley wire. The ease of installing the tongue is one of the strongest features of this device. The top of the casting is made exactly like a standard trolley ear and is fastened in the same manner. No hinge is required because the necessary lateral movement of the switch blade is obtained through the flexibility of the metal. The rest of the equipment includes rods, clevises, bell cranks, wood strain insulators, turnbuckles and bolts.

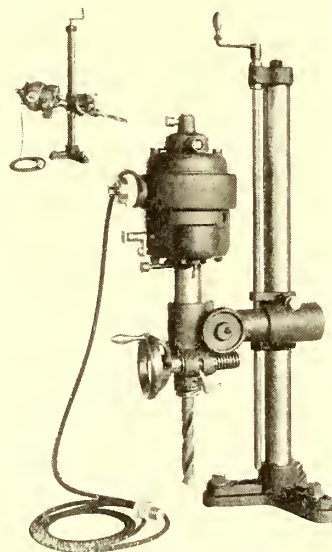
A device of this kind eliminates the necessity of transferring the trolley wheel at sidings. Furthermore when the siding is not to be taken the main line is left absolutely unobstructed so that the wheel may go by without hindrance.

PORTABLE ELECTRICALLY DRIVEN RADIAL DRILL FOR A. C. OR D. C. CIRCUITS

The Lamb Electric Company, Grand Rapids, Mich., is making an electrically driven radial drill either for mounting on the work which is to be drilled or for setting up on a bench as may be most convenient. The capacity in steel is 1 in. and smaller.

According to the type of motor, the weight of the complete equipment varies from 125 lb. to 150 lb.

This machine can be operated in any position; its extreme height is 40 in. The greatest distance from the spindle to the base is 28 in., but this can be made longer or shorter as may be desired. The distance from the column to the center of the spindle is 8¾ in. or longer. The column is 2½ in. in diameter and is made of steel tubing. The hole in the spindle is No. 3 Morse taper. The travel of the spindle is 5 in. It is operated by a rack and pinion, which in turn is operated by a worm and gear. The spindle has



Portable Drill in Two Working Positions

quick return when desired. Two speeds (165 r.p.m. and 230 r.p.m.) can be furnished, the change from one speed to the other being instantly obtained by shifting a knob. The one-speed motors are run at 110 volts and the two-speed motors at 220 volts. Any of these drills can be operated either by a ¼-hp d.c. motor or a ½-hp a.c. motor, whichever happens to be most convenient.

LONDON LETTER

(From Our Regular Correspondent)

Sir Edward Henry, the commissioner of police for London, was a guest at the annual dinner of the Tramways & Light Railways Association and predicted that eventually a great system will result, with the railways as the arteries of general traffic, the tramways as the veins and the motor buses as the capillaries.

At the same meeting Lord Robert Cecil pointed out that the machinery for obtaining statutory powers for smaller enterprises should be simpler than exists at present. H. J. Rodgers, councillor of Newcastle-on-Tyne, a new vice-president of the association, said: "I am connected with municipal tramways, but I do not see why the companies and the municipalities should not pull together. Whether worked for shareholders or by the municipality for the ratepayers, we are a huge business concern. It is only by the two interests pulling together that tramways can be carried on as business concerns, and the effort should be to prevent, as far as possible, municipal tramways from sliding into philanthropic movements."

It is unfortunate that these sentiments are not adopted more extensively by the local authorities who work tramways. As a matter of fact, the pressure put upon the local authorities by the voters who do not pay any direct rates, but who nevertheless form a majority of their constituents, is greater than they can bear. In London, for instance, workmen are carried an ever-increasing distance for a return fare of 2d, and the hours during which these tickets are issued are being lengthened, with the result that last year there was a loss of £50,000 on workmen's cars alone. This loss will be increased to £123,000 a year by the proposal to add another hour to the running of workmen's cars in the morning. The halfpenny fares are another cause of loss all over the country.

Town planning is being widely discussed. The advantages are fully recognized of thoroughfares wide enough for a double line of trams, with sufficient room for vehicles on either side. The principal obstacle in the way of these projects is the cost. Even when this has been overcome the result is not always approved. For instance, the new approach to St. Paul's Cathedral from the south, with its new bridge over the Thames, has a bend in it which will shut out the view of the church if carried out according to the present ideas of the City Corporation. The Institute of Architects has not been consulted, and the president of that body has asked for delay in order to consider the subject more thoroughly. The reconstructed Southwark Bridge, not far distant, if properly designed would answer for some time to come, and might be made a means of connecting the tramways north and south of the river.

The cross-town links between the northern and southern lines are few and far between. The proposal to bring the trams over the new St. Paul's Bridge and carry them underground past the Cathedral to Aldersgate Street seems unnecessarily expensive and risky. The foundations of the edifice depend upon a bed of gravel which is connected with the river and in which the water rises and falls with the tide. A tube below the level of this water-bearing stratum would act as a drain, for the water would percolate along the outside of the tunnels. During the floods in Paris parts of the Metropolitan tube acted as main drains to some of the low-lying parts of the city. Such abstraction of water under St. Paul's would probably endanger the building.

The north to south communications will probably be improved soon in many places. The widening at Hammer-smith Roadway will enable trams to run direct from Putney and places south of it right away to Willesden and beyond. The lines over Vauxhall Bridge to Victoria Station should be taken down Victoria Street and joined with those at the west end of Victoria Embankment. Westminster Bridge Road should be joined to the Blackfriars Bridge approach by trams passing the new County Hall in Belvedere Road. The embankment lines at their east end should be connected with those running up to Pentonville by putting down rails in Farringdon Street, and the network would be complete, especially when the Southwark Bridge trams were

also laid. The London County Council seems rather unfortunate in regard to its subways. Neither Rotherhithe nor Blackwall is used for trams, and the small, single-deck cars which alone can use the narrow, crooked tunnel between Waterloo Bridge and Holborn can hardly be regarded as successful considering the outlay.

The trackless trolley cars at Bradford and Leeds will be watched with interest by other municipalities which are being urged to extend their tramways. The state of the municipal exchequers, the heavy renewals and the unreasonable demands on the municipal corporations make it impossible for them to satisfy the requirements by tram extensions, and the advent of the railless cars is welcomed on account of their comparatively low first cost. Although the trackless vehicles have been running in Austria and Germany for some time, Leeds will be the first to introduce them into the United Kingdom.

The main steam railways with suburban lines in and around the metropolis feel the competition of the trams keenly. The tramways, being for the most part in the hands of local authorities, have to a certain extent been built at the cost of the railways, which are, as a rule, the largest ratepayers in the district served. Moreover, the tramways are worked so as to enter into direct competition with older steam railways and not as feeders to them.

The paper read by Philip Dawson recently before the Institution of Civil Engineers, London, gave a good account of the successful venture of the London, Brighton & South Coast Railway in competition with road cars. Robert Blackwell has been the contractor for a great deal of the work. When the trams first began running the number of passengers on the South London line was cut in two, but in less than 18 months this loss has been made good and the electrification will soon be extended to the branches which run from the Crystal Palace to London Bridge and Victoria Stations respectively. These branches will be ready for the pageant at the Crystal Palace.

The Metropolitan Railway has adopted automatic electric signaling on its Baker Street-Neasden line, as well as on its portion of the Inner Circle. The track circuit arrangements are similar to those on the District Railway and they allow of 50 seconds headway between through trains. At St. John's Wood, Finchley Road and West Hampstead signal cabins have been retained for working crossings and sidings, but for normal working these boxes are closed and full automatic working is used. At Willesden Green a new cabin has been built with an illuminated track diagram. The 23 block sections over the 5-mile stretch average 1200 ft. in length, and automatic train stops are employed throughout. Lamp signals, dwarf signals and semaphore signals are employed. In the two latter forms the line-clear position of the arm inclines upward instead of downward, so that it tends to fall naturally into the horizontal stop position and balance weights can be dispensed with. The gear, comprising electric motor, cut-out, transmission gear, clutch and pneumatic buffer, is fully inclosed. The arm is held in the clear position by an electro-magnet and thus drops to danger if the actuating current fails. All the signals are electrically lighted by two lamps in parallel, but oil lamps can readily be substituted. Automatic train describers have been installed at some of the stations.

The purchase of German rails for a newly acquired route of the Birmingham Corporation Tramways, which is to be converted from the cable to the overhead system, has caused considerable comment. The chairman of the tramway committee said that the saving of £900, or 8 per cent, justified the action of the committee. Only two English tenders were received, and it was suspected that some understanding existed between the English firms. The chairman said that the committee would see that the standard rate of wages was paid which existed in the district where the rails were manufactured. It was not stated what the cost of such supervision would be or whether the hours of work insisted upon in England would be imposed on the German makers. The close inspection necessary during the manufacture of the rails would also add to the expense, so that the £900 difference in contract price between the German manufacturer who secured the order and the English firms will probably be reduced considerably by the time the rails are delivered.

A. C. S.

News of Electric Railways

Progress of the Conferences in Cleveland

At the meeting of the special committee of the Cleveland Chamber of Commerce on March 21, 1911, G. M. Dahl, street railway commissioner, stated that he was unwilling that any changes should be made in the Tayler grant unless the company agreed to expend at least \$2,500,000 for improvements and betterments. Attorney Andrew Squire, acting for the company, said that the company could not guarantee an expenditure of this kind until investors agreed to purchase the stock at par, as the company was unwilling to sell bonds and further depreciate the stock. Arrangements were made for private conferences later in the week.

Both Mr. Dahl and City Solicitor Baker are opposed to an increase in the maximum rate of fare to 5 cents and 1 cent for a transfer. F. H. Goff, chairman, assured them that this would be an opportune time to increase the maximum, if it was shown that the financing could be done more cheaply by such a change. He presented figures prepared by W. S. Hayden, of Hayden, Miller & Company, to show that the company, by selling \$5,000,000 of bonds at a discount of \$150,000, had already lost the price of 5,000,000 car rides. The sale of bonds necessary to take care of the needs of the company during the life of the grant would mean a loss of about \$8,000,000, or 240,000,000 car rides. Mr. Goff said that the value of the franchise was the only thing that a lender recognized as security, and the value of the franchise in Cleveland under a maximum fare of 5 cents and 1 cent for transfers might be \$30,000,000 or \$40,000,000. Mr. Goff suggested that the stock be placed in the hands of trustees under option for city or licensee purchase at any time at 110. Mr. Dahl doubted the possibility of such an arrangement, since the Tayler grant provided for the maximum rate of fare for the last 15 years of the grant in case the franchise was not renewed. He argued that an increase of one cent in the fare would mean \$430,000 a year to the patrons of the company.

Attorney Squire agreed that the city should have the initiative in suggesting improvements and extensions during the first 10 years of the grant, but not during the last 15 years. The city was safeguarded from poor service by the right to renew the grant or name a purchaser for the property.

City Solicitor Baker contended that the city should have the right to compel extensions during the entire life of the grant, subject only to arbitration during the last 15 years of the grant. The company should make extensions at the annual rate of one-fifth of the earnings for the previous year. The city should have the right to seek a market for the stock if the company cannot find one. It should also have the right to name a purchaser at any time. The company agreed to the suggestion that premiums on bonds should be used for betterments, conceded the city's right to take part in labor arbitrations and agreed that the interest fund should be invested in high-grade securities. Mr. Squire objected, however, to the idea of extending the fare charged in the city to the suburbs when they are annexed to the city.

Montreal Street Railway and City to Agree Upon New Franchise

The negotiations between the representatives of the Montreal Street Railway and the City of Montreal have resulted in a compromise whereby the original bill applied for at the present session of the Quebec Legislature to incorporate the Montreal Tramways Company has been passed in amended form. The bill as originally applied for provided that authority should be given to the company to effect a new agreement with the city within the shortest time possible. If, however, the city authorities could not arrive at an understanding with the company the terms of the agreement were to be determined by the Public Utilities Commission for Quebec. The company was also to be given the right to operate in Montreal and suburbs, carry both passengers and freight under the regulations of the Utilities Commission and construct an underground railway.

The grant was opposed because it was felt that the regulation of the railway would be taken out of the hands of the city. The bill as finally passed contains the following provisions: In the event of the property of the Montreal Street Railway, Montreal, Park & Island Railway, Montreal Terminal Railway and Public Service Corporation being acquired, the Montreal Tramways shall have during a period not exceeding 42 years from the sanction of the act the right and power, with the approval of the Quebec Public Utilities Commission, to acquire, construct, equip, maintain and operate, by any power other than steam, tramways in Montreal as they now exist and as extended. This provision is to be subject, however, to a contract being entered into between the city and the company to determine the duration of the franchise, the conditions which the company shall be held to comply with as to the operation, maintenance, equipment, establishment and extension of routes in the different streets and thoroughfares of the city, the rates of fares, the percentage to be paid to the city on the gross earnings of the said company, the share of the cost of paving and maintaining the streets and of removing the snow to be paid by the company, and such other terms and conditions as the city may deem advisable to impose. All differences between the city and the company in regard to the interpretation of the contract shall be submitted to the Quebec Public Utilities Commission for final settlement. The company shall have the right to transport freight and mails at terms to be settled by common accord with the municipalities.

By the terms of the act, therefore, the Montreal Tramways Company secures a 42-year franchise for both freight and passenger traffic in Montreal, the Island of Montreal, Isle Jesus and Isle Bizard, subject to terms and conditions to be agreed upon between the company and the City of Montreal, all differences to be finally adjusted by the Public Utilities Commission.

Negotiations Resumed in Toledo

March 28, 1911, was set to resume negotiations between the City of Toledo, Ohio, and the Toledo Railways & Light Company. The committee of the whole will first decide whether the draft of an ordinance demanding 3-cent fares and making other stringent requirements which was prepared by City Solicitor Schreiber shall be taken as a basis or whether another draft shall be made. Under the suggestions of the Mayor the question of fare was to be left until last for discussion. The valuation of the property will probably form one of the first subjects for discussion.

Carl H. Nau, of Nau, Tanner & Rusk, Cleveland, Ohio, who reported to the city recently in regard to the earnings of the company, has submitted to Mayor Whitlock a series of charts which show how the earnings of the company are dispensed. In this connection the Mayor said:

"Some time ago, in studying the franchise problem, it occurred to me that it might be made a little more clear and simple if it could be shown just how the nickel a passenger gives the conductor for his fare is divided and where each part of it goes. And so I asked Carl H. Nau, the expert accountant who examined the books of the company for the city and made the splendid report, if it would not be possible to show this by diagram. Mr. Nau made a study of the figures and had three diagrams drawn which seem to me to illustrate the whole subject quite clearly. Of course he cannot do it now with absolute mathematical accuracy, because we have not got the valuations. The city at this time has only the data which Mr. Nau gleaned from the books of the company; it has, too, of course, the inventory of the property, but the valuations have not been made and without these valuations it is impossible to speak with that accuracy which should be required when the problem is ultimately resolved. The unknown factors, therefore, must be assumed. Mr. Nau, however, has explained the whole matter and I am sure that most people will share with me the interest I found in his diagrams and explanations."

"It might also be interesting to know that the last time I saw Tom Johnson he said to me that if in the beginning of the street car controversy in Cleveland he had such a report as Mr. Nau made for the city it would have been of an advantage he could not estimate. And men from other cities who have been interested in the street car problem and are students of it have often congratulated the city on the possession of such an illuminating document."

The City Council of Toledo has authorized Cornell Schreiber, City Solicitor, to sue to collect \$29,946, which the city claims is due from the Toledo Railways & Light Company as its portion of the cost of the pavement on Broadway.

The Toledo & Western Railway, which is controlled by the Toledo Railways & Light Company, is making improvements to the track, overhead work, equipment and power system which will cost about \$100,000.

Reasons for Sale of Des Moines Properties

G. B. Hippee, president and treasurer of the Des Moines (Ia.) City Railway, and treasurer of the Interurban Railway, Des Moines, Ia., has issued a formal statement in which the reasons are given for the recent sale to Harris, Forbes & Company, New York, N. Y., of the interest in the railways held by himself. H. H. Polk, N. T. Guernsey and others of Des Moines. Mr. Hippee said in part:

"In 1889 the present company took hold of the various street railways then in existence in Des Moines. About all they purchased was a franchise and a streak of rust. They expended large sums of money, reorganized, rebuilt and placed the company in the front rank, and up to 1905 Des Moines had a street railway which was several years ahead of the growth of the city.

"In 1905 certain patriots concluded that for political and personal reasons it would be policy to attack the street railway. They attacked its franchise and stopped its expansion and retarded its growth, because no money could be raised on a doubtful franchise. After some very expensive litigation and several years in court I suggested to this committee two years ago that one of the great acts for it to accomplish would be to interest itself and aid in the settlement of the street railway controversy; that the controversy was retarding the growth and development of the city, and that no one thing could do so much to promote the growth of Des Moines as good rapid transit.

"Des Moines, however, is made up of a class of people who believe one thing to-day and another to-morrow, so that getting together with them has seemed to be impossible on any basis that would enable the company to live and give good service. It seemed to be the idea of some that they would be better off by getting new men and new ideas interested in the property. To this we acquiesced and made a deal with W. B. McKinley, of the Illinois Traction System, and his associates, but that was no go, and Des Moines lost one of the great opportunities that knocked at its door. Then came the Myers syndicate, but we may let that go with the simple statement that Mr. Myers came and went, but still the street railway controversy went on, not as near an end now as when the negotiations began.

"Lately we offered the city this property and agreed to finance it for municipal operation. Again Des Moines refused to take the property, which it was assured by the experts would pay and pay well. The reason advanced was that the price was too high, but it seemed that private corporations did offer and now would give more for the stock of the company than it was offered for to the city if the company had a living franchise or if the Turner franchise litigation were at an end. Nobody wants to buy a lawsuit and much less pay a premium for the same.

"The interests I represent have been anxious for some time to dispose of their holdings. Life is too short for the slow wheels of the courts to grind out justice. We have made up our minds that it is not well for local people to have financial interests and be connected with the management of a local corporation. So we have sold all our interests to N. W. Harris. I ask your kindest indulgence and consideration for J. R. Harrigan, the new manager. I know that if Des Moines gives him a chance he will more than make good and give first-class service, and I hope that you will not try to discourage the investment of outside capital.

I was elected a member of the Greater Des Moines committee as the representative of the Des Moines City Railway. As I soon will retire from that company I have tendered my resignation as a member of the committee."

Speech of B. S. Josselyn at Annual Reunion in Portland

The yearly reunion of the employees of the Portland Railway, Light & Power Company, Portland, Ore., and their families was held at the Oaks skating rink in Portland on the evening of March 13, 1911. The Oaks rink is a building 400 ft. long and 200 ft. wide, and at least 3000 employees and their families assembled. Lunch was served. B. S. Josselyn, president of the company, made a speech in which he said in part:

"With the daily cares of an institution so large as ours it is impossible to give the individual thought to each of my co-workers that I should like, and it is in gatherings of this sort that I am brought face to face more forcefully than at any other time with the responsibilities of my position in trying to make so many people prosperous and happy. I think it has been proved that my judgment was correct in doing away with the old plan of suspending employees from work for carelessness or infraction of rules and in adopting the merit and demerit system. The Portland Railway, Light & Power Company is probably the largest employer of labor in Oregon and its army of employees is increasing rapidly—due to the phenomenal growth of the community and our necessity of keeping up with the procession.

"The greatest enemy of man is self or selfishness. Had it not been for selfishness there would have been no need of the ten commandments, for not one of them can be violated except through selfishness of some sort. In order to achieve success and happiness we must work as a unit, subjugating self, and have faith in our work.

"Beware of finding fault with others, realizing that we cannot justly judge another, for we do not know the other person's problems as we do our own and without that knowledge our judgment is unfair.

"I am so filled with the conviction of what is necessary to produce harmonious results that I could not pass the opportunity by of telling you what my experience has proved in the hope that it may help many of you who are present to-night.

"I am more impressed than ever with the responsibilities of my position in striving to conduct a corporation which employs so much labor in a manner that will serve the best interests of our community and at the same time make the employees happy and prosperous. I ask that you continue to help me make good not only to the public but yourselves, for without your assistance my efforts will be useless. I hope that these events may occur more frequently in future than in the past and I wish you peace, health and prosperity."

Col. T. S. Williams on the Control of Public Utilities

Col. T. S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, was quoted as follows by the Brooklyn *Daily Eagle* on the subject of the control of public utility corporations in a report of an interview with him which appeared in that paper recently:

"Whether public utilities be owned and operated by the city or continue to be owned and operated by the created instrumentalities of the State, the underlying principle of their control and regulation should always be the best and broadest interests of the people. To project them all upon the government is an experiment which only the most thoughtless would try, at least until government has shown itself more capable of handling the responsibilities it now carries. If public utilities are to continue largely, as at present, in the possession of corporations, they require, both from the corporations and from the government, the most intelligent co-operation and the broadest conception of the welfare of both city and corporation. Such a conception involves large profits for the corporation and abundant conveniences for the people. You cannot expect the investment of the hundreds of millions required to transport the inhabitants of Greater New York properly without the assurance of more than ordinary interest. No more

valuable privilege has been granted in a generation than that to construct and operate the New York subway, and the most liberal concessions of a generation were made to achieve it. But what are all the millions its promoters have made or may make compared with the benefits to the people and the enrichment of their government? It is a fact not known, or, if known, not appreciated, that in the Borough of the Bronx alone during the six years following the letting of the subway contract the assessed value of real estate showed a greater increase than in the 25 years preceding that contract.

"I am not one of those who believe much in the efficacy of laws for the accomplishment of the most substantial reforms. Men will not be good merely because to be bad is illegal and may subject the evildoer to punishment. The most thorough and wholesome reform springs from within and accompanies the evolution of conscience. And the development of conscience as exemplified in the finer distinctions of right and wrong has been in no activity of society so marked in recent years as in the conduct of corporate affairs. Never was the sense of responsibility so keenly felt among those who handle other people's money as it is to-day, and never was there a higher standard of business honor. A wholesome public sentiment will eventually cure, in a natural way, most of the evils from which we may now suffer."

Advertising Campaign in Chattanooga

The Chattanooga Railway & Light Company, Chattanooga, Tenn., has begun a campaign of publicity to show that its efforts have been to aid in the development of the city. It has inserted half-page advertisements in the daily papers. In the initial advertisement, under the head "What We Do for Chattanooga," the company said:

"The company had on its payrolls during 1910 an average of more than 600 employees.

"It employed in its shops an average of 84 men.

"For 1910 these employees received in wages from this company the sum of \$327,223.98, which they used in buying food, clothing, fuel and other goods from the merchants in Chattanooga.

"This company is the largest taxpayer in the city and county. This company believes in building up Chattanooga industries, therefore buys everything possible in Chattanooga. It believes in giving the people of Chattanooga the best transportation and lighting service possible.

"It has done more to build up Chattanooga than any other industry—in its progress, building and expansion. The people follow the car line.

"It carries the people 14 miles for 4 cents, and gives a universal transfer, something no other city in the South does.

"It hands every person who rides on a 4-cent ticket a 20-per cent dividend. This is a greater percentage than paid by any other road in the South.

"It runs larger and better cars and 25 cars of the latest type were purchased during 1910. It increased the maximum number of cars in operation during the rush hours from 60 to 82 during 1910.

"It increased the headway on all lines, giving quicker and more frequent service, and contemplates still more frequent service in the near future.

"It is building the best piece of electric railway in the South—the Rossville short line—between Chattanooga and Rossville, Ga.

"It believes in a bigger, busier and brighter Chattanooga, and will help to make it so."

Inquiry into Physical Property in Maryland

The Public Service Commission of Maryland has adopted the following order, which provides for an inquiry into the physical condition of the properties which are under the jurisdiction of the commission:

"Resolved, that the chief engineer be, and is hereby, directed to take immediate steps for—

"1. The inspection of the physical property of the steam railroads operated in Maryland with reference to the condition of track and roadbed, bridges, tunnels and rolling stock, steamboats where operated under railroad charters,

having reference to the comfort, convenience and safety of passengers and the public, safety appliances, crossings and practices in relation thereto.

"2. The inspection of the properties of all steamboat lines operating between points in Maryland, including vessels, wharves, terminal facilities, safety appliances, life-preserving equipment and other matters and things as they affect safe and adequate service.

"3. The inspection of all electric and street railroads operated in the State, including power supply, tracks and overhead construction, cars, safety appliances, crossings and all other matters and things which affect safe and adequate service by the corporations.

"4. The inspection of the properties of all gas and electrical corporations doing business in Maryland, their instrumentalities and facilities, and the purity and efficiency of their respective products.

"5. The inspection of the plants and property of all water companies doing business in the State with reference to the adequacy of the supply of water and the purity thereof and the general efficiency of the service."

ASSOCIATION MEETINGS

Massachusetts Street Railway Association—Boston, Mass., April 12.

Central Electric Traffic Association—Lima, Ohio, April 12.

Missouri Electric, Gas, Street Railway & Water Works Association—St. Louis, Mo., April 13, 14 and 15.

Iowa Street & Interurban Railway Association—Davenport, Ia., April 20 and 21.

New England Street Railway Club—Boston, Mass., April 27.

Southwestern Electrical & Gas Association—Houston, Tex., April 27, 28 and 29.

Arkansas Association of Public Utility Operators—Little Rock, Ark., May 3, 4 and 5.

Illinois Electric Railways Association—May 26.

Central Electric Accounting Conference, Springfield, Ill., June 10.

Central Electric Railway Association, St. Joseph, Mich.—June 22.

Street Railway Association of the State of New York—Cooperstown, N. Y., June 27 and 28.

New Indiana Line Opened.—Service has been established by the Beach Grove Traction Company over its line between the Traction Terminal Building, Indianapolis, Ind., and Beach Grove.

Traction Situation at Detroit.—A resolution was adopted on March 23, 1911, by the Common Council of Detroit, Mich., which provides for submitting the question of a general revision of the city charter by a charter commission to the people at the April election. The resolution was so worded, however, that the question will not be submitted to a vote in case a bill now pending before the Legislature is made a law. By the terms of this bill the city would be enabled to amend its charter piecemeal. The amendment desired will allow the city to own and operate its own street railway, and the object of the resolution is to prevent delay in case the Legislature does not act.

Spokane Transportation Club.—The Spokane Transportation Club, Spokane, Wash., held its annual banquet in Spokane on Feb. 24, 1911. Waldo G. Paine, traffic manager of the Spokane & Inland Railroad, who is president of the club, was toastmaster. Mr. Paine, in a short address, reviewed the history of the club. Addresses were also made by J. B. Campbell, secretary of the Spokane Merchants' Association, and Robert E. Strahorn, vice-president of the Oregon-Washington Railway & Navigation Company. The officers of the club for the ensuing year follow: Waldo G. Paine, president; A. W. Doland, first vice-president; H. S. Collins, second vice-president; J. W. MacIntosh, secretary, and R. L. Ford, treasurer.

San Francisco's Municipal Railway.—The Board of Supervisors of San Francisco has sold \$93,000 of the bonds of the Geary Street, Park & Ocean Railroad to seven bidders. The total amount offered for sale was \$600,000. The remaining securities to the value of \$507,000 will be sold by the City Treasurer. In regard to the present status of the court pro-

ceedings growing out of the injunction secured by the United Railroad of San Francisco to prevent the city from carrying the new railway down Market Street to the ferries and over Point Lobos Avenue from Thirty-third Avenue to Forty-second Avenue, a letter has been received by the Supervisors from City Attorney Long stating that the city's appeal from the order by United States Circuit Judge Van Fleet granting the injunction would be heard by the Circuit Court of Appeals during the May term. There is nothing to interfere with the reconstruction of the Geary Street, Park & Ocean Railroad as it exists at present. The injunction merely restrains the city from proceeding with work on the municipal line on Market Street, on which the United Railroads operates.

Decision in Regard to Railway Jurisdiction in Washington, D. C.—The District Court of Appeals of the District of Columbia has sustained the Police Court of the District, which recently quashed a case brought by the District Commissioners against a street car motorman who operated a car equipped with an arc headlight. The decision of the District Court of Appeals was handed down by Chief Justice Shepard, who said: "Whatever power the District Commissioners may have had over the operation of street cars in the District, the effect of Section 16 of the act of May 23, 1908, was to transfer the same to the Interstate Commerce Commission in all particulars enumerated therein, which expressly include proper and safe power, equipment, appliance and service. There can be no doubt that a headlight is a part of the safe equipment of a car and a necessary appliance. Complete power of regulation of the same having been conferred by the said section upon the Interstate Commerce Commission, any power which the District Commissioners may have in respect thereof under acts of Congress terminated at once. Former laws by the authority of which the regulation was promulgated were necessarily repealed by Section 16 of the present law, which is utterly inconsistent with and repugnant to them. With the repeal of this authority all regulations dependent thereon ceased to have any further force or operation."

Employers' Liability Law Declared Invalid in New York.—In a decision concurred in by all the judges and handed down by the Court of Appeals on March 24, 1911, the so-called workmen's compulsory compensation act, passed at the last session of the Legislature, has been declared unconstitutional on the ground that the act involved a violation of the constitutional provision against the taking away of property without due process of law. Under the act of 1910 an employer of labor in what have become known as extra-hazardous occupations was liable for all injuries to his employees even though it should be shown that these were not in any way due to negligence or lack of precaution on the part of the employer. The law provided that if the injury was caused wholly or in part through "a necessary risk of the employment or one inherent in the nature thereof," or through the employer's failure to exercise due care or to comply with any law affecting such employment, the employer should be liable to compensate the injured workmen according to a scale fixed in the law. The only exception was where a workman was disabled for less than two weeks or where the injury occurred through the "serious and wilful misconduct of the workman." It is stated that, in order to provide a basis for future progressive legislation along these lines, it would be desirable to have a test case brought which could be carried to the United States Supreme Court, the case in which the present decision was handed down not being of a character which would permit such procedure.

Report to Be Submitted on Dallas Properties.—In announcing that Stone & Webster, Boston, Mass., propose to build an interurban electric railway from Waxahachie to connect with the lines of the Northern Texas Traction Company, Fort Worth, Tex., at Oak Cliff, E. T. Moore, general manager of the Dallas (Tex.) Electric Corporation, said: "Stone & Webster desired to build and operate this new line in connection with the Dallas properties. This would have been an advantage to Dallas and would have enabled the local lines to do more for Dallas than they otherwise can. As repeatedly stated, the investment required cannot safely be made in connection with the local companies under the present franchise conditions. The adjournment of the Legislature without action permitting

the people of Dallas to vote on any franchise readjustment leaves the possibility of co-operation between the local companies and the new line too indefinite for consideration now. It is the purpose of the Stone & Webster management to present to the people of Dallas, within a short time, the full facts concerning the cost, value, present condition and earning power of the Dallas companies under their management, in order that the exact situation may be fully understood by all. It is confidently believed that when the facts are thus disclosed and understood the citizens of Dallas will agree that Stone & Webster are justified in acting without further delay, independently of the Dallas companies, although this does not bring Dallas all that it might wish from the new line, or all which could have been secured had necessary franchise rights been granted."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CALIFORNIA

The California Legislature has decided to submit to the people a constitutional amendment for the creation of a new appointive railroad commission to consist of the three commissioners now in office and two others. According to the new plan the commission will consist of five members who shall be appointed by the Governor, to hold office for six years and to be subject to removal by a two-thirds vote of the Legislature for dereliction of duty, corruption or incompetency. The third measure, Senate constitutional amendment 47, introduced by Burnett, of San Francisco, was adopted by the Senate and similar action will be taken in the Assembly. It gives the Railroad Commission control over all public utilities, including interurban and street railways, canals, pipe lines, plants, etc. The commission will have the right to fix rates to be charged for commodities furnished or services rendered by public utilities. The powers respecting public utilities now vested in the boards of supervisors or the governing bodies of cities and towns shall be retained by them unless a majority of the electors of a county, city or town vote to surrender such powers to the railroad commission. The California Assembly has passed a transfer bill which makes transfers on city and interurban railways good for 90 minutes. Senator Bennett's bill to permit San Francisco to operate its Geary Street, Park & Ocean Railroad down Market Street to the ferry has passed the Assembly. It will now go to Governor Johnson for his signature. A bill for the same purpose has already been signed by the Governor, but its effect was nullified by the omission of two words.

MASSACHUSETTS

The Senate has killed the bill to provide for the equipment of all street-railway cars with lifting jacks. The Senate has accepted the adverse report of the committees on railroads and street railways on the bill to provide for an examination as to the mental capacity of employees of railroads and street railways. A resolve has been introduced into the House to provide for an estimate of the cost of removing the elevated structure of the Boston Elevated Railway between the North Station and Sullivan Square, Charlestown, and to substitute a double-track subway. The committee on street railways has voted leave to withdraw on the bill to substitute limited franchises to street railways carrying freight and express matter for unlimited permits. The bill represented an effort on the part of the Worcester city government to override the jurisdiction of the Massachusetts Railroad Commission. The policy of the commission has been to grant franchises for this service without time limits. The Senate has accepted the adverse report of the committee on street railways on the bill to enlarge the authority of street railways in regard to the issue of preferred stock.

Hearings were held during the week ended March 25, 1911, on the bills to provide for the electrification of steam railroads in the Boston metropolitan district. Various improvement associations appeared on behalf of the bills, and the adverse report of the majority of the joint commission on metropolitan improvements was criticised. The railroads will be heard later. Hearings were also concluded upon the Boston & Eastern bill, which seeks to require the Railroad Commission to issue a certificate of exigency to the incorporators of this company. The petitioners con-

tended that the necessity of the proposed high-speed line from Boston to the North Shore has been demonstrated, and that the Railroad Commission, although admitting the need of the line, has refused to issue a certificate to enable construction to be begun. W. H. Coolidge for the New York, New Haven & Hartford Railroad opposed the Boston & Eastern bill on the ground that the financial standing of the promoters was unknown, and that the plans of the New York, New Haven & Hartford Railroad for a tunnel under Boston Harbor amply meet the transportation needs of the North Shore.

OHIO

The Winters public utility commission bill as reported to the House by the committee on codes will apply mainly to telephone matters. In the cities local city councils will have the right to fix rates of service, but these rates may be reviewed by the commission. The Calvey bill, which would require both ends of street cars to be inclosed, has been placed on the Senate calendar in regular order and will come up near the end of the session. The Senate bill to require steam and electric railways to keep their rights of way free from weeds has been passed by the House and awaits the signature of the Governor. In case the roads fail to observe the requirements of the law township officers may have the work done and collect from the roads the expense and 100 per cent additional as penalty. Under the terms of a bill presented by Senator Dean electric railways would have the same right as steam roads to condemn property.

PENNSYLVANIA

In all likelihood April 4, 1911, will be the time limit placed by the Legislature for the introduction of new bills. The leaders are figuring on adjournment about May 15. Among the important measures affecting electric railways introduced during the week ended March 25, 1911, was one by Senator Fox which provides that any street railway incorporated under the act of 1889 may construct and maintain in streets in boroughs tracks not exceeding 500 ft. in length without the consent of the municipal authorities. However, no section of street thus appropriated shall be occupied by any other street railway and the company must first obtain the written consent of the owners of at least 51 per cent of the number of feet of the land fronting on the portion of the street affected. The act, of course, affects only boroughs in which street railways are now lawfully operated or may be lawfully operated in the future. The bill will permit the electric railways to make short connecting links between existing lines without the delay of getting an ordinance through a borough council.

One of the revenue measures introduced provides for taxing real estate of corporations heretofore exempt from taxation by counties, cities, boroughs, townships and school districts. The real estate of the following corporations is subject to taxation under the measure: Railroads, street railways, canal companies, bridges, gas, pipe line companies, electric light, heat and power companies, water, telegraph, telephone and express companies.

Senator Adams has introduced a bill designed to release street railroads from municipal regulation of the amount of license fees to be paid by these corporations. The Legislature of 1905 enacted the law "providing for the determination by the Court of Common Pleas of the proper county of all disputes as to the reasonableness of the amount of license fees between municipal corporations and telegraph, telephone or light or power companies." Senator Adams seeks to supplement this by extending the provisions of the 1905 act so as to apply to street railways.

The House has passed the bill requiring the semi-monthly payment of wages. The House has also passed the bill empowering viewers to assess against railroads and street railways shares of damages caused by change of grade or highways. Among the bills reported out of committee affirmatively were those making railroads liable for injuries received by employees when there has been negligence on the part of the company and to make train wrecking a felony and prescribing the death penalty where fatalities result.

WASHINGTON

The House has passed the public utilities bill with a few amendments.

Financial and Corporate

New York Stock and Money Market

March 28, 1911.

There was a trifle more activity in the stock market to-day than on any previous day during the week and prices were somewhat stronger. Interborough-Metropolitan continues to sell in small volume, prices being little changed.

The money market continues to be remarkably easy and the banks are having difficulty finding profitable use for their surplus funds. Rates are still low. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{3}{8}$ per cent; 90 days, $2\frac{3}{4}$ per cent.

Other Markets

The Philadelphia market was firmer to-day, in sympathy with Wall Street, and transactions were somewhat increased. Price changes for traction shares were insignificant, although the tone was fairly strong.

There has been little trading in traction shares in the Chicago market during the week. Prices of elevated stock are practically stationary, the terms having been fixed for the merger.

In the Boston market there has been, during the week, moderate trading in Boston Elevated and Massachusetts Electric preferred at former prices. Other tractions have been dormant.

During the past week there has been considerable activity in the Baltimore market in the shares of the United Railways. Prices have advanced slightly and the closing quotation to-day was 18 $\frac{3}{4}$. The bonds of the same company continue to be in demand at former prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	March 21.	March. 28.
American Light & Traction Company (common).....	a293	a293
American Light & Traction Company (preferred).....	a106	a106
American Railways Company.....	43 $\frac{3}{8}$	44 $\frac{1}{2}$
Aurora, Elgin & Chicago Railroad (common).....	a44	44
Aurora, Elgin & Chicago Railroad (preferred).....	a88	88
Boston Elevated Railway.....	a129	a129
Boston Suburban Electric Companies (common).....	15 $\frac{1}{2}$	*15 $\frac{1}{2}$
Boston Suburban Electric Companies (preferred).....	a75	73
Boston & Worcester Electric Companies (common).....	8 $\frac{1}{2}$	8 $\frac{1}{2}$
Boston & Worcester Electric Companies (preferred).....	41	41
Brooklyn Rapid Transit Company.....	77 $\frac{7}{8}$	78 $\frac{3}{4}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84	84 $\frac{1}{4}$
Capital Traction Company, Washington.....	a126 $\frac{1}{2}$	a126 $\frac{1}{2}$
Chicago City Railway.....	a185	a190
Chicago & Oak Park Elevated Railroad (common).....	3 $\frac{1}{2}$	3
Chicago & Oak Park Elevated Railroad (preferred).....	6	7
Chicago Railways, ptcptg., ctf. 1.....	a92 $\frac{1}{2}$	a91
Chicago Railways, ptcptg., ctf. 2.....	a25	a24 $\frac{1}{2}$
Chicago Railways, ptcptg., ctf. 3.....	a9	a10
Chicago Railways, ptcptg., ctf. 4.....	a5	a5 $\frac{1}{2}$
Cincinnati Street Railway.....	132	a132
Cleveland Railway.....	92 $\frac{1}{2}$	*9
Columbus Railway (common).....	96	a96
Columbus Railway (preferred).....	100 $\frac{1}{2}$	a101 $\frac{1}{2}$
Consolidated Traction of New Jersey.....	a76	a76 $\frac{1}{2}$
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a105	a105
Detroit United Railway.....	a70	a69 $\frac{1}{4}$
General Electric Company.....	149 $\frac{1}{2}$	148 $\frac{1}{2}$
Georgia Railway & Electric Company (common).....	a134	a133
Georgia Railway & Electric Company (preferred).....	a91	90
Interborough Metropolitan Company (common).....	19 $\frac{1}{4}$	18 $\frac{3}{4}$
Interborough Metropolitan Company (preferred).....	53 $\frac{3}{4}$	53 $\frac{1}{4}$
Interborough Metropolitan Company (4 $\frac{1}{2}$ s).....	78 $\frac{3}{4}$	78 $\frac{3}{4}$
Kansas City Railway & Light Company (common).....	a24 $\frac{3}{4}$	a24 $\frac{3}{4}$
Kansas City Railway & Light Company (preferred).....	a70	a70
Manhattan Railway.....	a140	a136 $\frac{1}{2}$
Massachusetts Electric Companies (common).....	17 $\frac{1}{2}$	17 $\frac{1}{2}$
Massachusetts Electric Companies (preferred).....	a87	a87
Metropolitan West Side, Chicago (common).....	a23 $\frac{1}{2}$	a23 $\frac{1}{2}$
Metropolitan West Side, Chicago (preferred).....	a69 $\frac{1}{4}$	a69 $\frac{1}{4}$
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	72 $\frac{1}{2}$	a71 $\frac{1}{2}$
Northern Ohio Light & Traction Company.....	43 $\frac{1}{4}$	*43 $\frac{1}{4}$
Northwestern Elevated Railroad (common).....	a23	a23
Northwestern Elevated Railroad (preferred).....	a65	a64 $\frac{3}{4}$
Philadelphia Company, Pittsburgh (common).....	a54 $\frac{1}{2}$	a54 $\frac{1}{2}$
Philadelphia Company, Pittsburgh (preferred).....	a43	a43
Philadelphia Rapid Transit Company.....	a20	a19 $\frac{3}{4}$
Philadelphia Traction Company.....	a84 $\frac{1}{4}$	84 $\frac{1}{4}$
Public-Service Corporation, 5 per cent col. notes (1913).....	100 $\frac{1}{4}$	a101 $\frac{1}{2}$
Public Service Corporation, ctf.s.....	a106	a106
Seattle Electric Company (common).....	a109 $\frac{1}{2}$	a108
Seattle Electric Company (preferred).....	a100	a98
South Side Elevated Railroad (Chicago).....	a70	a71
Third Avenue Railroad, New York.....	103 $\frac{1}{4}$	103 $\frac{1}{8}$
Toledo Railways & Light Company.....	a8 $\frac{1}{2}$	a8 $\frac{1}{2}$
Twin City Rapid Transit, Minneapolis (common).....	a109	a108 $\frac{3}{4}$
Union Traction Company, Philadelphia.....	a47 $\frac{1}{2}$	a47 $\frac{1}{2}$
United Rys. & Electric Company, Baltimore.....	17 $\frac{1}{4}$	19
United Rys. Inv. Co. (common).....	47 $\frac{1}{2}$	*47 $\frac{1}{2}$
United Rys. Inv. Co. (preferred).....	74 $\frac{3}{8}$	75 $\frac{1}{2}$
Washington Ry. & Electric Company (common).....	a36 $\frac{1}{4}$	a36 $\frac{1}{2}$
Washington Ry. & Electric Company (preferred).....	a89	a89 $\frac{1}{4}$
West End Street Railway, Boston (common).....	92 $\frac{1}{2}$	a91
West End Street Railway, Boston (preferred).....	103	a103 $\frac{1}{2}$
Westinghouse Elec. & Mfg. Co.....	67	67
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a120 $\frac{1}{2}$	120 $\frac{1}{2}$

aAsked. *Last sale.

Annual Report of Chicago City Railway

The annual report of the Chicago City Railway for the year ended Jan. 31, 1911, shows the following:

GROSS EARNINGS.

Passenger receipts, including Southern Street Railway.....	\$9,762,274
Receipts from other sources.....	343,168
	\$10,105,443

TOTAL EXPENSES.

Operating expenses, taxes and renewals of combined systems, interest on capital investment of Chicago City Railway and net earnings of Southern Street Railway.....	\$8,596,508
Net earnings of Chicago City Railway.....	\$1,508,935
City's proportion, 55 per cent, as per ordinance.....	829,914
Company's proportion, 45 per cent, as per ordinance.....	\$679,021
Interest on capital, as certified by Board of Supervising Engineers	1,994,939
Income from operation.....	\$2,673,960
Other income.....	439,180
	\$3,113,140
Interest on bonds outstanding.....	1,127,708
Net income.....	\$1,985,432
Dividends	1,800,000
Surplus for twelve months ended Jan. 31, 1911.....	\$185,432
Percentage of net income to capital stock at par.....	11.03

T. E. Mitten, the president, says in his report:

"The completion of work required during the rehabilitation period ended April 15, 1910, has been accomplished.

"Your property has produced a net income of \$1,985,432, from which four quarterly dividends of 2½ per cent have been paid, aggregating a total of 10 per cent upon the \$18,000,000 capital stock, and leaving an amount of \$185,432 surplus earnings for the year.

"Adequate provision being contained in the settlement ordinance, under which we are now operating, insuring the establishment of reserves sufficient to maintain effectually the present physical excellence of the property, there remained, in the opinion of your directors, no reason for longer conserving the large treasury surplus, which as of Jan. 31, 1910, exceeded the par value of the capital stock to the amount of \$1,319,891. Distribution of a portion of this surplus has therefore been made during the year by the payment of extra dividends, aggregating 6 per cent upon the capital stock."

Annual Report of the Lake Shore Electric Railway.

The following statement shows the results of operation for the last two years of the Lake Shore Electric Railway system, comprising the Lake Shore Electric Railway, the Lorain Street Railroad, and the Sandusky, Fremont & Southern Railway:

	1910	1909
Gross income.....	\$1,206,112	\$1,109,083
Operating and taxes.....	632,533	586,184
Net	573,578	522,899
Interest	417,049	414,950
Surplus	156,528	107,949

E. W. Moore, the president, says in his report in part: "A new 300,000 cir. mil. feeder was strung from the Fremont power house westward for a distance of approximately 2,500 ft., thereby removing the feeder cables from possible danger of high water, the old feeder line having followed the river. The high and low tension systems were completely rebuilt at the Sandusky yards. A large amount of track bonding was done during the year, brazed bonds being used for this work.

"A large corrugated iron culvert was placed under the track near Berlinville. Seven new single end sidings were built during the year. Approximately nine miles of track was lifted and rebalasted with crushed stone.

"The company having ample power for handling its business, no additions were made to the power plant excepting the purchase of one 400-kw rotary which was installed in the Sandusky substation.

"The buildings in Sandusky were altered on account of the re-location of the substation machinery and that portion of the building released was turned over to the shop department, giving us additional needed shop facilities.

"A storage building for the use of the overhead and track departments was built in the rear of the substation at Vermilion.

"All passenger cars used on limited schedules were

equipped for train operation. One new work car body was built at the Sandusky shop. Three straight air equipments were changed to automatic air equipments. Twenty 60,000 lb. capacity 34-ft. flat cars were purchased for use in the crushed stone trade.

"This company was granted a franchise for double-track rights for a period of 25 years over the new concrete bridge across Rocky River, recently built by the Commissioners of Cuyahoga County. This bridge is said to be the largest concrete single arch ever built in this country. A franchise for a period of 25 years was granted this company by the Commissioners of Erie County over the new bridge in course of construction across the river at Huron, Ohio. It is anticipated that we shall be able to use both of these bridges in the early summer, which will materially improve our service.

"During the year the plan adopted at the last annual meeting for converting the \$3,000,000 of preferred stock and accumulations into \$1,000,000 first preferred cumulative 6 per cent stock and \$2,000,000 second preferred non-cumulative 5 per cent stock was carried into effect and the new securities issued therefor. Under the plan the first preferred stock was cumulative from July 1 last with dividends payable quarterly, and dividends have been paid. The plan could not have been carried through except for the hearty co-operation of the stockholders. It is anticipated that both the company and its stockholders will be largely benefited in the future through this rearrangement.

"On the Sandusky, Fremont & Southern Railway Company a siding approximately one mile in length was built from the main line near Castalia to the Wagner Stone Company's quarry. This connection was built on private right-of-way purchased by the company for the purpose of handling crushed stone for commercial purposes."

Detailed earnings and expenses of the Lake Shore Electric Railway for two years compare as follows:

Earnings.	1910	1909
Passenger revenue.....	\$894,215	\$818,263
Baggage revenue.....	2,625	2,512
Parlor, chair and special car revenue.....	5,725	6,621
Mail revenue.....	1,963	1,968
Milk revenue.....	2,489	2,238
Freight revenue.....	66,034	58,596
Switching revenue.....	345	117
Miscellaneous transportation revenue.....	11	43
Station and car privileges.....	2,704	2,683
Parcel room receipts.....	428	363
Storage	72	112
Rent of tracks and terminals.....	1,637	2,209
Rent of equipment.....	5,152	4,897
Rent of buildings and other property.....	758	600
Power	11,267	12,054
Miscellaneous	10,454	6,336
Total	\$1,005,879	\$919,612
Expenses.	1910	1909
Maintenance way and structure.....	\$78,777	\$77,306
Maintenance equipment.....	70,728	65,089
Operation power plants.....	83,357	70,641
Conducting transportation.....	187,025	175,491
General and taxes.....	116,209	108,804
Total	\$536,096	\$497,331

Earnings per car mile on the Cleveland division were 34.54 cents, on the Toledo division 30.32 cents, and on the Sandusky-Norwalk division 31.69 cents. Earnings per mile of road for the entire company were \$5.912 last year, as compared with \$5.408 the preceding year.

Traffic statistics compare as follows:

	1910.	1909.
Per cent of operation.....	53.30	54.08
Car miles.....	3,462,678	3,325,869
Income per mile—cents.....	29.05	27.65
Operation and taxes per car mile—cents.....	15.48	14.95
Net earnings per car mile—cents.....	13.52	12.70
Passengers carried.....	5,429,748	4,951,002
Earnings per passenger—cents.....	18.52	18.57

Gross income of the Lorain Street Railroad was \$175,232, an increase of \$10,761 over the preceding year. Operating expenses and taxes were \$96,437, an increase of \$7,584.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Eli West, receiver of the Columbus, Delaware & Marion Railway, has announced that the interest on the first mortgage bonds of the company, due on Nov. 1, 1910, will be paid on or before May 1, 1911, at the office of the Cleveland Trust Company, Cleveland, Ohio.

Evansville (Ind.) Electric Railway—E. R. Barnard, Philadelphia, Pa., offers for subscription at a price to yield 6 per cent first mortgage 4 per cent gold bonds of the Evansville Electric Railway, dated May, 1901, and due May, 1921; principal and interest payable at the office of the Farmers'

Loan & Trust Company, New York, N. Y., trustees. The total authorized issue is \$1,200,000, of which the entire amount is outstanding. The bonds are secured by a mortgage on the entire street railway system in Evansville, Ind. except 1 1-3 miles of an interurban line which has been merged with this property.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—The Fort Wayne & Northern Indiana Traction Company, which was organized recently to succeed the Fort Wayne & Wabash Valley Traction Company, as noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 25, 1911, page 350, has organized by electing directors as follows: Hugh J. Pritchard and William A. Tucker, New York; Randall Morgan and John J. Collier, Philadelphia; Hugh J. McGowan, Indianapolis; Henry C. Paul and James M. Barrett, Fort Wayne; Harry E. Vordemark, Arthur H. Mohr and Frederick H. Schmidt. Mr. Pritchard and Mr. Tucker are new members of the board. The officers of the Fort Wayne & Wabash Valley Traction Company were elected in the same capacities as with the Fort Wayne & Northern Indiana Traction Company.

Hudson & Manhattan Railroad, New York, N. Y.—The Hudson Companies has notified the holders of its 6 per cent gold bonds, due Oct. 15, 1911, that the offer of the extension of the notes until Oct. 15, 1913, by their exchange into the new 6 per cent notes of the company, maturing on Oct. 15, 1913, with a cash payment of \$15 with respect to each \$1,000 note, will be withdrawn on April 1, 1911.

Illinois Traction Company, Peoria, Ill.—Mackay & Company, New York, N. Y., offer for subscription a limited amount of Illinois Traction Company's 6 per cent cumulative preferred stock at 93 and accrued dividend to net the investor 6.45 per cent.

Indianapolis, New Castle & Toledo Electric Railway, Indianapolis, Ind.—The property of the Indianapolis, New Castle & Toledo Electric Railway has been ordered sold by Judge Vinson Carter, of the Superior Court, to satisfy mechanics' liens amounting to about \$25,000 and to pay bonds amounting to \$2,998,437.50 held by the Knickerbocker Trust Company, New York, N. Y. The date of the sale has not been set.

Kokomo, Marion & Western Traction Company, Kokomo, Ind.—Gross income in 1910 was \$261,485 as compared with \$233,863 in 1909. Of the 1910 earnings \$99,420 was received from the interurban railway department, \$62,146 from the city railway department and \$99,919 from light and power. Operating expenses in 1910 were as follows: Interurban, \$44,490; city railway, \$30,531; light and power, \$38,364; total, \$113,385. Gross income, less operating expenses, was \$148,100. Fixed charges last year aggregate \$66,810. A special reserve fund for depreciation was established on Jan. 1, 1909, and during the year beginning on that date \$20,253 was set aside for that purpose. A similar amount was set aside in 1910. The surplus for 1910 after provision for charges and depreciation was \$61,037 as compared with \$49,678. Dividends of 3 per cent were paid on the common stock during 1910, and after provision for miscellaneous charges the net surplus for the year was \$28,878 as compared with \$39,432 in the previous year. Passenger earnings per car mile in the interurban department were 23.4 cents in 1910 and 22.1 cents in 1909.

New Orleans Railway & Light Company, New Orleans, La.—The New Orleans Railway & Light Company has declared a quarterly dividend of 1¼ per cent on its preferred stock, payable on April 10, 1911. This places the stock on a 5 per cent basis. The last previous declaration by the company was 2½ per cent on Jan. 1, 1911.

Seattle (Wash.) Electric Company.—The Seattle Electric Company has declared in connection with the usual quarterly dividend of 1¼ per cent on its common stock an extra dividend of 2 per cent, payable on April 15, 1911. The semi-annual dividend of 3 per cent on the preferred stock is payable on April 1, 1911. The company has paid 6 per cent per year on its preferred stock since October, 1901, and 7 per cent on the common stock since 1909.

Southwestern Street Railway, Philadelphia, Pa.—Judge Holland in the United States Circuit Court at Philadelphia has filed a decree authorizing a resale of the Southwestern Street Railway, which has been in the hands of receivers for several years.

York (Pa.) Railways.—The stockholders of the York Railways have authorized an issue of \$700,000 of one and two-year 6 per cent collateral trust gold notes secured by a pledge of the 5 per cent gold bonds of the company.

Dividends Declared

American Cities Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Chicago, Ill., quarterly, 1½ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Central Pennsylvania Traction Company, Harrisburg, Pa., 3 per cent.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Citizens' Railway & Light Company, Muscatine, Ia., 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Columbus, Ohio, quarterly, 1½ per cent, preferred.

Denver & Northwestern Railway, Denver, Col., quarterly, 2 per cent.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., 3 per cent, preferred.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred; quarterly, ¾ of 1 per cent, common.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Northwestern Elevated Railroad, Chicago, Ill., quarterly, 1 per cent, preferred.

Ottawa (Ont.) Electric Railway, 2½ per cent.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common.

Porto Rico Railways, Ltd., Ponce, Porto Rico, quarterly, 1¼ per cent, preferred.

Quebec Railway, Light & Power Company, Quebec, Que., 1 per cent.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, \$3.00.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., quarterly, \$1.25, preferred.

Western Ohio Railway, Lima, Ohio, quarterly, 1½ per cent, second preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
Im., Feb. '11		\$112,296	\$75,912	\$36,385	\$35,834	\$551
1 " " '10		103,399	63,267	40,133	32,154	7,979
8 " " '11		1,167,950	669,238	498,712	272,745	225,966
8 " " '10		1,063,190	586,167	477,023	241,692	235,331
CENTRAL PARK, NORTH & EAST RIVER RAILROAD.						
Im., Nov. '10		\$53,201	\$49,847	\$3,354	\$2,663	\$690
CONEY ISLAND & BROOKLYN RAILROAD.						
Im., Nov. '10		\$108,994	\$74,575	\$34,419	\$32,275	\$2,145
HOUGHTON COUNTY TRACTION COMPANY.						
Im., Jan. '11		\$23,256	\$16,020	\$7,227	\$6,540	\$686
1 " " '10		25,340	15,156	10,183	6,341	3,842
12 " " '11		309,391	166,466	142,925	77,897	65,028
12 " " '10		321,745	171,971	149,775	74,369	75,405
METROPOLITAN STREET RAILWAY.						
Im., Nov. '10		\$1,159,952	\$658,538	\$501,414	\$322,806	\$178,609
NORFOLK & PORTSMOUTH TRACTION COMPANY.						
Im., Feb. '11		\$1,400,080	\$788,008	\$612,071	\$500,919	\$111,153
1 " " '10		1,284,257	725,121	559,135	513,141	45,995
NEW YORK & QUEENS COUNTY RAILWAY.						
Im., Nov. '10		\$88,427	\$85,293	\$3,134	\$26,499	\$23,365
PENSACOLA ELECTRIC COMPANY.						
Im., Jan. '11		\$22,369	\$13,243	\$9,126	\$6,166	\$2,960
1 " " '10		20,608	12,158	8,450	4,785	3,665
12 " " '11		274,864	160,690	114,174	61,913	52,260
12 " " '10		247,188	141,995	105,583	53,009	52,574
SEATTLE ELECTRIC COMPANY.						
Im., Jan. '11		\$478,729	\$276,670	\$202,059	\$110,404	\$91,665
1 " " '10		467,700	310,390	157,310	105,649	51,661
12 " " '11		5,599,218	3,179,069	2,420,149	1,312,085	1,108,064
12 " " '10		5,919,065	3,454,635	2,464,430	1,250,074	1,214,356
THIRD AVENUE RAILROAD.						
Im., Nov. '10		\$283,418	\$142,310	\$141,109	\$56,639	\$84,469
TWIN CITY RAPID TRANSIT COMPANY.						
Im., Feb. '11		\$576,935	\$395,485	\$271,450	\$140,079	\$131,371
1 " " '10		536,955	281,618	255,337	140,229	115,107
2 " " '11		1,195,874	642,279	553,595	280,158	273,437
2 " " '10		1,120,917	584,250	536,668	280,485	256,209

Traffic and Transportation

Interstate Commerce Commission Orders Reduction in Fare

In the case of the complaint filed with the Interstate Commerce Commission to require the Washington, Alexandria & Mount Vernon Railway, Washington, D. C., to substitute a 10-cent fare for the 15-cent single fare which it charges between Washington and Four Mile Run, St. Elmo, St. Asaph, Mount Ida and Del Ray, the commission has filed an opinion in which it says in part:

"This petition puts in issue the reasonableness of defendant's single-trip fare from Washington, D. C., to Four Mile Run, St. Elmo, St. Asaph, Mount Ida and Del Ray, in Virginia. The gravamen of the complaint is that the fares mentioned are equal to those applying from Washington to Alexandria, Va., although the distance to Alexandria is about two miles more than the average distance between Washington and the group of towns above mentioned, which are intermediate to Alexandria.

"The defendant's tracks extend from Twelfth Street and Pennsylvania Avenue, Washington, through a portion of Virginia to Alexandria and Mount Vernon. The distance from the terminus in Washington to the terminus in Alexandria is 7.5 miles. From the Washington terminus to Four Mile Run the distance is 4.1 miles. The distance to Del Ray, the farthest point named, is 5.5 miles. The average distance to the several points involved is said to be 5 miles.

"The passenger fares are based upon a group or zone system. The first zone extends from the Washington terminus to the south end of the highway bridge, a distance of about 1.5 miles, and within this zone the single-trip fare is 5 cents. The second zone extends from the south end of the highway bridge to Addison, a further distance of 2 miles. The single-trip fare between this zone and Washington is 10 cents. The remainder of the line to and including Alexandria constitutes a third zone of about 4 miles. The single-trip fare between this zone and Washington is 15 cents. There is no station between Addison and Four Mile Run. Although passenger fares are established to and from Four Mile Run, there is little demand for such fares; and the next station beyond, which is St. Elmo, is the first station within the Alexandria zone to and from which there is travel.

"In addition to the single fare of 15 cents defendant has established the following round-trip and commutation fares between Washington and points in the Alexandria zone: Round trip, 25 cents; 8 single trips, 90 cents; 25 single trips, \$2.50, and 52 single trips, \$4.05, good within a calendar month and not transferable. Applied to the average distance of 5 miles between Washington and the stations mentioned in the complaint the fares above specified produce approximately the following revenue per passenger mile: Single trip, 3 cents; round trip, 2.5 cents; 8 trip, 2.25 cents; 25 trip, 2 cents; 52 trip, 1.5 cents.

"Apparently the road has been economically and efficiently managed, and the service rendered by it to the communities along its line seems to be adequate and convenient. At present it operates 73 northbound and 72 southbound trains per day.

"As has been noted, the average distance from Washington to Four Mile Run, St. Elmo, St. Asaph, Mount Ida and Del Ray is about 5 miles. An examination of the fares of other suburban lines entering Washington shows that generally for similar or even greater distances the single fare is 10 cents. That fare would give defendant substantially the same revenue per passenger mile as it receives under the 15-cent fare to Alexandria. The defense presented by the company may, in a general way, be divided into three heads. First, it is asserted that the passenger travel from the complaining towns is light and therefore a somewhat higher fare is justified than would be maintained if the traffic were of greater density. Second, that any reduction in fares is unwarranted because 'it is only within the last few years that the stock of this railroad has ever paid any dividends, and those paid have been very meager, and have recently been reduced, if not abandoned altogether.' Third, it denies in its answer that it is subject to the act to regulate commerce.

"Defendant estimates that during 1909 there were 55 passengers per day, or 20,075 trips for the year, between Washington and the group of stations in question, as compared with about 575 passengers per day, or 200,000 trips per year, between Alexandria and Washington. Defendant argues that the passenger revenue derived from these small communities does not pay for the service rendered and that they are the beneficiaries of the facilities provided to accommodate the heavy passenger travel between Washington and Alexandria. This may well be true and yet have no bearing upon the reasonableness of the present charge. Certainly it ought not to be expected that these communities should bear an undue portion of the cost of a transportation service designed and for the most part used to meet the requirements of other and larger communities; nor does the fact that defendant, in order to furnish adequate service to the large cities at its termini, operates through these towns many more trains than are necessary to their needs warrant the exaction of a charge in proportion to the frequency of the service incidentally furnished. It might well be assumed that inasmuch as the present service must be maintained to accommodate the travel between Washington and Alexandria any additional traffic secured from the intermediate points is in the nature of a net gain to the carrier.

"An examination of the defendant's annual reports to the commission for the years in which such reports have been made (1908, 1909 and 1910) fails to indicate that its financial condition is so distressing as is suggested in its brief. The total capital issued against its 19 miles of line up to June 30, 1910, is \$3,950,000, or \$207,894.74 per mile of line, composed of \$2,450,000 of 5 per cent bonds secured by a mortgage on the entire property, of which \$115,000 is held in the treasury, and \$1,500,000 of capital stock. Neither the amount of money invested in the property devoted to the service of the public nor the consideration received from the sale of stocks and bonds is disclosed, and, in the absence of explanation, this seems plainly a case of gross over-capitalization. Assuming that the actual investment in the property is \$50,000 per mile of line, or \$1,000,000 in all, the earnings in 1910 were sufficient, after laying aside a surplus, to return about 16 per cent upon the investment. Again, assuming that all of the 20,000 trips between Washington and the communities involved had been under a 10-cent fare, and none of such trips under round-trip or commutation fares, the net loss to defendant would have been \$1,000; and it would still have been able to meet interest charges on its large capital, pay all operating expenses, declare a dividend of 2 per cent on its stock and lay aside a surplus of more than \$52,000.

"Although defendant asserts in its answer that it is not subject to the act to regulate commerce, the point is not mentioned in its brief, and we do not understand that it seriously presses the matter. It files tariffs and statistical reports in accordance with the act and seems heretofore to have considered itself subject to the jurisdiction of the commission.

"It is our opinion, and we so find, that defendant's single-trip fare of 15 cents for the transportation of passengers from Washington to Four Mile Run, St. Elmo, St. Asaph, Mount Ida and Del Ray is unjust and unreasonable, and that for the future it ought not to exceed 10 cents. An order will be entered accordingly. From complainant's testimony and brief we infer that he intended to attack the fares from the Virginia points to Washington, although the language of the petition does not specifically mention those fares, but we assume that defendant will reduce them in accordance with our conclusion herein."

In its order to the company the commission says:

"It is ordered that the above-named defendant be, and it is hereby, notified and required on or before May 1, 1911, to cease and desist, and for a period of two years thereafter to abstain, from charging, demanding, collecting or receiving its present single-trip fare of 15 cents for the transportation of passengers from Washington, D. C., to Four Mile Run, St. Elmo, St. Asaph, Mount Ida and Del Ray, Va., or from Washington to any of said points, which said fare is found by the commission in its report to be unreasonable.

"It is further ordered that said defendant be, and it is hereby, notified and required on or before May 1, 1911, to establish and for a period of two years thereafter to main-

tain and apply to the transportation of passengers from Washington, D. C., to Four Mile Run, St. Elmo, St. Asaph, Mount Ida and Del Ray, in Virginia, or from Washington to any of said points, a single-trip fare not in excess of 10 cents, which said fare is found by the commission in its report to be reasonable."

Accidents in New York City in January

The Public Service Commission of the First District of New York has made public a summary of accident reports for January, 1911, as compared with January, 1910, and January, 1909. The report also shows the total number of revenue passengers carried by the street railways for the same periods and the total number of revenue car miles operated. While the total number of accidents on street railways has increased 64.5 per cent, the car miles operated have increased 9 per cent and the number of revenue passengers carried has increased 6 per cent. On all railroads, including both steam railroads and street railways, the total number of accidents for January, 1911, was 4799, as against 4413 in January, 1910. On street railways the total number in January, 1911, was 4428, as against 4143 in January, 1910. The total number killed on all roads was 20, as against 33 in January, 1910. Of the 20 killed in January, 1911, 12 were on street railways and 8 on other railroads, as against 19 on street railways and 14 on other roads in January, 1910. The total number of revenue passengers carried on the street railways in January, 1911, was 131,200,000, as against 123,860,742 in January, 1910, an increase of 7,339,258, or about 6 per cent. The total number of revenue car miles operated by the street railways in January, 1911, was 25,250,000, as against 23,066,576, an increase of 2,183,424, or about 9 per cent. A summary of the accidents on street railways follows:

	January, 1911.	January, 1910.	January, 1909.
Car collisions.....	85	113	105
Persons and vehicles struck by cars.....	1,323	1,195	821
Boarding.....	653	509	467
Alighting.....	513	410	431
Contact electricity.....	20	26	23
Other accidents.....	1,834	1,890	1,556
Totals	4,428	4,143	3,403
INJURIES.			
Passengers.....	1,742	1,426	1,279
Not passengers.....	470	421	393
Employees.....	293	367	258
Totals	2,505	2,214	1,930
SERIOUS (INCLUDED IN ABOVE.)			
Killed.....	12	19	10
Fractured skulls.....	1	3	4
Amputated limbs.....	1	3	4
Broken limbs.....	25	21	27
Other serious.....	104	106	85
Totals	143	152	130

REVENUE PASSENGERS CARRIED AND REVENUE CAR MILES OPERATED IN JANUARY, 1911, 1910 AND 1909.

	Revenue. Passengers.	Revenue Car Miles.
January, 1909.....	113,354,174	22,204,921
1910.....	123,860,742	23,066,576
*1911.....	131,200,000	25,250,000

*The figures for January, 1911, are approximate, as they involve an estimate of a very small portion of the traffic.

Conference in Regard to Traffic to New York State Fair

Representatives of the New York State Fair Commission and the railroad and electric railways which carry visitors to the State Fair at Syracuse, N. Y., were before the Public Service Commission of the Second District recently in an endeavor to make more satisfactory arrangements in relation to fares to and from Syracuse and in regard to the terminal facilities at the fair grounds. Among those who participated in the conference were Raymond A. Pearson, Commissioner of Agriculture, and all of the members of the State Fair Commission; L. F. Vosburgh, general passenger agent, and Harry Parry, Buffalo, and W. S. Randolph, Albany, general agents of the New York Central & Hudson River Railroad; George A. Cullen, general passenger agent of the Delaware, Lackawanna & Western Railroad, and W. C. Gray, operating manager, and T. H. Mather, chief engineer of the Syracuse, Lake Shore & Northern Railroad.

The proposition of the State Fair Commission that the round-trip tickets now sold at 15 cents should be inter-

changeable on steam and electric railways was opposed by Mr. Vosburgh and Mr. Cullen. Mr. Cullen stated that the New York Central & Hudson River Railroad would be very glad to put in effect an 8-cent fare for a single trip to or from the ground instead of the 15-cent round trip and 10-cent single-way fares. Mr. Vosburgh agreed with him that this would be satisfactory to his company and that such a rate would be adopted if the electric railways adopted the rate. He pointed out that interchangeable tickets would complicate accounting and congest incoming evening trains, whereas at the present time the New York Central & Hudson River Railroad's service was operated without cause for complaint and received its share of the business.

The members of the State Fair Commission all stated that they believed the 8-cent fare proposition an improvement over the present arrangement and approved the adoption of this plan. The representatives of the Syracuse, Lake Shore & Northern Railroad present said that they were not empowered to pass upon the fare proposition. The commission recommended the adoption of the 8-cent fare proposal by the Syracuse, Lake Shore & Northern Railroad and asked Mr. Gray to urge upon the representatives of his company the adoption of the plan. If the Syracuse, Lake Shore & Northern Railroad accedes to this request the arrangement will go into effect at the next fair.

Through Interurban Service from Detroit to Kalamazoo

As a result of traffic arrangements between the Detroit United Railway and the Michigan United Railway a through limited service will be placed in operation between Detroit and Kalamazoo on April 4, 1911. The lines of the Michigan United Railway are chiefly operated on the third-rail system, and among the details worked out was the equipment of the interurban cars of the Detroit United Railway so that they would operate over the tracks of the Michigan United Railway. The schedule has been approved by the operating departments of both companies. Under the new arrangements limited cars for Kalamazoo will leave Detroit at 6:10 a. m. and every two hours to 4:10 p. m., and limited cars for Detroit will leave Kalamazoo at 6:45 a. m. and every two hours to 4:45 p. m. All the cars will stop at such important centers as Ypsilanti, Ann Arbor, Jackson and Battle Creek. The new service will also include a through limited car between Detroit and Lansing via Jackson that will leave Lansing at 6 a. m. for Detroit and leave Detroit at 6:10 p. m. for Lansing. The running time between Detroit and Kalamazoo will be five hours and five minutes and between Detroit and Lansing three hours and 55 minutes. All the limited runs will be made without change of cars and the schedule is so arranged as to conform with the limited schedules of the other lines of the Detroit United Railway. Under the new schedule passengers from Toledo, Saginaw, Flint and Port Huron will travel all the way by electric railway with only a short wait at Detroit.

Transfer Ordinance in Louisville.—An ordinance to increase the transfer privileges on street railways in Louisville introduced in the Council has been referred to the committee on railroads.

Atlantic Shore Railway Removes Office.—The general offices of the Atlantic Shore Railway will after April 3, 1911, be located at the Town House, Kennebunkport, Maine. The post office address of the company will be Kennebunk, Maine.

Car Capacity Ordinance in Minneapolis.—The ordinance passed by the Council of Minneapolis to limit the capacity of street cars to one and one-half times the seating capacity of the cars will become effective on April 15, 1911. The Twin City Rapid Transit Company has begun to post notices in its cars which state their seating capacity.

Inquiry into Service of New York & Long Island Traction Company.—The Public Service Commission of the First District of New York has ordered an inquiry into the service on the Mineola division, the Jamaica-Hempstead division and the Jericho Turnpike division of the New York & Long Island Traction Company. The hearings will begin on March 31, 1911.

Increase in Wages in Winnipeg.—The Winnipeg (Man.) Electric Railway has advanced the wages of its employees 2 cents an hour, effective on April 1, 1911. The following is the new scale of wages: 23 cents an hour for first six months; 25 cents an hour for second six months; 26 cents an hour for second year; 28½ cents an hour for third year; 29 cents an hour after three years.

Request for Station on Rochester & Eastern Rapid Railway.—The Public Service Commission of the Second District of New York has received a petition from residents near the "Marsh Road" stop on the Rochester & Eastern Rapid Railway, Rochester, N. Y., requesting that a station or shelter be erected at this stop. The complaint has been served on the company and an answer required within 20 days.

Front Platform Rule in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has posted in the cars of certain of its surface lines a large placard which reads: "No passengers allowed to ride on front platform of closed cars except policemen in uniform, firemen in uniform, employees with platform passes or in uniform. Motormen are held responsible for the enforcement of this rule and passengers are requested to observe this rule."

Accidents on Interstate Electric Railways.—The Interstate Commerce Commission has issued Bulletin No. 37, which contains a summary of railroad accidents during July, August and September, 1910. The total number of collisions and derailments was 78, and 46 persons were killed and 458 injured. The total number of train accidents was 85, the total number of persons killed was 148, and the total number injured was 1,150.

Wreck on Indiana Line.—Eastbound passenger car No. 606 on the Connersville division of the Indianapolis & Cincinnati Traction Company's line collided head-on with a regular freight car near Fountaintown on the afternoon of March 18, 1911. The 30 persons in the passenger car were thrown out of their seats. According to the report of the freight crew the two cars had orders to meet at Fountaintown. The freight car became disabled and stopped for repairs. It had run only a short distance toward Fountaintown when the collision with the passenger car occurred. The Railroad Commission is investigating the cause of the collision.

Additional Elevated Stations in New York.—The Public Service Commission of the First District of New York has directed that an inquiry be held as to the advisability of ordering the Interborough Rapid Transit Company to build an additional station on the Ninth Avenue elevated line at Eighty-seventh Street and Columbus Avenue, and on the Second Avenue elevated line at 105th Street, and also of rebuilding and possibly relocating the station on the Second Avenue line at Allen and Rivington Streets. The inquiry will also cover the questions of requiring additional stairways at eight stations on the Second, Third and Ninth Avenue lines. The hearings will be held before Commissioner Eustis beginning on April 6, 1911.

Hearing on Commutation Rates in Maryland.—At the hearing before the Public Service Commission of Maryland on the petition of the citizens of Catonsville and Govans for an order to require the United Railways & Electric Company, Baltimore, Md., to restore commutation-rate privileges which were withdrawn recently on the plea that their continuance was a violation of the Maryland Public Service Law, the attorney for the complainants pointed out that the Constitution provided that State laws could not be passed which would impair the validity of a contract already established. The commutation privileges were withdrawn following a complaint from a number of suburbs not enjoying the privilege, which declared that they were being discriminated against. Ordered by the Public Service Commission to answer the complaints, the company withdrew all the commutation rates on the ground that they violated the law. At the hearing before the commission the willingness of the company to comply with the complainants' demands was maintained, but counsel for the company declared that the company saw no legal way in which it could restore the rates on the line in question without making the commutation privilege applicable to all its lines.

Personal Mention

Mr. Richard Yates, formerly Governor of Illinois, has been appointed attorney for the Illinois Traction System at Springfield, Ill., to succeed Mr. George Gilespie, resigned.

Mr. John O'Connell, purchasing agent of the Central Pennsylvania Traction Company, Harrisburg, Pa., has been elected treasurer of the company to succeed William J. Calder, deceased.

Mr. F. Van Vranken, superintendent of the southern division of the Pacific Electric Railway, Los Angeles, Cal., has been appointed assistant superintendent of the Los Angeles Railway Corporation under Mr. John J. Akin, superintendent.

Mr. O. B. Coldwell, electrical engineer of the Portland Railway, Light & Power Company, Portland, Ore., has been elected first vice-president of the Oregon Society of Engineers, which has just been organized in Portland with a charter membership of 160.

Mr. J. F. Starkey has been appointed traffic manager of the Lake Shore Electric Railway with headquarters at Sandusky, Ohio, effective April 1, 1911. Mr. Starkey was formerly district passenger and freight agent of the Indiana Union Traction Company at Anderson, Ind.

Mr. G. W. Harlan, who has been appointed general manager of the Colorado Railway, Light & Power Company, Trinidad, Col., to succeed Mr. Franklin P. Wood, was manager of the company from 1903 to 1906 and has been connected with various lighting plants in Illinois and Arkansas.

Mr. Martin Plunkett has been appointed master mechanic of the Choctaw Railway & Lighting Company, McAlester, Okla. Mr. Plunkett has had 10 years' experience in the mechanical department of the Illinois Traction System and its subsidiary properties, part of that time as master mechanic.

Mr. W. C. White, formerly superintendent of the Los Angeles-Pacific Company, Los Angeles, Cal., will remain in control of the lines formerly operated by this company under the plan of organization of the consolidated company in Los Angeles by which the lines are grouped in three divisions.

Mr. William H. Tucker, for several years superintendent of motive power of the Northern Ohio Traction & Light Company, Akron, Ohio, has resigned to become superintendent of the electric light plant of the City of Jacksonville, Fla., effective May 1, 1911. Mr. Tucker was formerly manager of the Jacksonville (Fla.) Electric Company.

Mr. J. V. H. Torner has resigned as division shop foreman of the Beloit shops of the Rockford & Interurban Railway, Rockford, Ill., and has been appointed shop foreman of the Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., in charge of the company's shops and car-houses, reporting direct to the general superintendent.

Mr. A. S. MacAndrew has been appointed master mechanic of the Joliet & Southern Traction Company, Plainfield, Ill., to succeed Mr. W. H. Crabbe, resigned. Mr. MacAndrew was formerly master mechanic of the Bloomington car shops of the Illinois Traction System in charge of maintenance and light repairs to cars that lay over there, some of which were operated on the a.c.-d.c. line and some of which were operated on the d.c. line between Decatur and Bloomington.

Mr. J. B. Bowray, formerly superintendent of the Northern division of the Pacific Electric Railway, Los Angeles, Cal., has had his jurisdiction with the consolidated electric railways at Los Angeles, Cal., extended through the addition of the Glendale line and the Pasadena city line to his division. Besides these lines Mr. Bowray will be in charge of the Mountain division, Glendora, Covina, Sierra Madre, El Molino, Pasadena Short Line, South Pasadena, Annandale, Oak Knoll and San Gabriel lines.

Mr. William Hutchinson, engineer-in-chief railway and tramway construction New South Wales Government Railways, is on a visit to this country inspecting electric railway systems. He arrived in New York via Vancouver about three weeks ago and visited several cities on his way East.

He plans to sail for London about the middle of this month and will return by way of southern Europe to Australia. The New South Wales Government Railways owns and operates the local tramway system in Sydney.

Mr. A. F. Elkins, who was elected president of the Central Electric Accounting Conference at the regular meeting of the conference held on March 11, 1911, in Springfield, Ohio, was born in Butler County, Ohio, in 1875. Mr. Elkins' entire business career has had to do with accounting. He has been auditor of the Columbus, Delaware & Marion Railway since June, 1904. Mr. Elkins has always been active in the affairs of the Central Electric Accounting Conference and his election as president of the conference was in recognition of the service which he performed in the interest of the conference in his former office of secretary and treasurer of the conference.



A. F. Elkins

As president of the conference Mr. Elkins succeeds Mr. S. C. Rogers, whose resignation from the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, to become secretary and treasurer of the Youngstown Dry Goods Company was noted in the *ELECTRIC RAILWAY JOURNAL* some time ago.

Mr. Thomas McCaffery, formerly general superintendent of the Pacific Electric Railway, Los Angeles, Cal., has been appointed superintendent of the southern half of the consolidated electric railways at Los Angeles, including the Whittier, Santa Ana, Long Beach, Newport, Huntington Beach, San Pedro, Wilmington and the Point Firmin lines. Mr. McCaffery will have charge of the operation of the lines of the Pacific Electric Railway around the harbor and the operation of the city lines in Long Beach and the Watts local line.

Mr. John McCarthy, who has been division supervisor of the Harrison division of the Public Service Railway, Newark, N. J., for the last five years, was presented with a silver service on March 6, 1911, by the employees of the division with which he is connected as a token of their esteem. Mr. McCarthy was also presented with a gold locket by the supervisors of the other divisions of the company. Mr. Newton W. Bolen, superintendent of transportation of the Public Service Railway, made the presentation speeches.

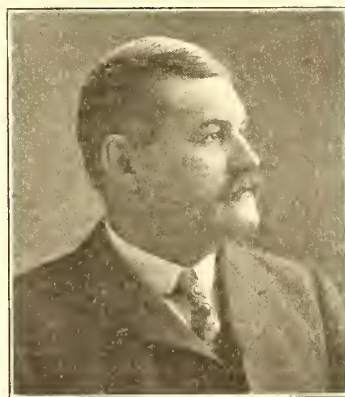
Mr. Edward E. Strout has been elected vice-president of the Nahant & Lynn Street Railway, Lynn, Mass., to succeed Mr. Thomas A. Kelly, who has been elected president of the company. Mr. Strout's railroad experience commenced in 1890, when he constructed the power plants for the Boston & Northern Street Railway in Lynn and Chelsea, the power plant for the New York, New Haven & Hartford Railroad at Nantasket, Mass., and the power plant at Woburn, Mass. In 1905 he constructed the Nahant & Lynn Railroad. Mr. Strout is a member of the firm of Strout Brothers, Lynn, Mass., masons, builders and general contractors.

Mr. Thomas A. Kelley has been elected president of the Nahant & Lynn Street Railway, Lynn, Mass., to succeed William Lacroix, deceased. Mr. Kelley was formerly vice-president of the company. Mr. Kelley was born in Lynn on Nov. 30, 1865, and after attending the public schools entered the employ of a small store. A short time later he went to work for the Patrick Lennox Company, Lynn, and then entered the firm of Thomas Green & Company as junior partner. After the death of Thomas Green the firm continued under the name of Kelley & Green. Later Mr. William A. Green sold his interest to Mr. Kelley and since that time the business has been conducted under the firm name of Thomas A. Kelley & Company, with offices in Boston, Rochester, Chicago, Cincinnati and St. Louis, and plants in Lynn and Yardsley.

Mr. C. R. Moore has been appointed superintendent of transportation of the Springfield (Ill.) Consolidated Railway and has entered upon his duties with that company. With the exception of two years during which he served as superintendent of construction of the American Light & Water Company, Kansas City, Mo., Mr. Moore has been connected with street and interurban railways for 17 years, serving in the capacities of motorman, inspector, superintendent of construction, dispatcher, etc. He has been connected with the Cincinnati Street Railway, Cincinnati, Lawrenceburg & Aurora Electric Street Railway, Cincinnati, Georgetown & Portsmouth Railway, Indianapolis & Northwestern Traction Company, Illinois Traction System and the Terre Haute, Indianapolis & Eastern Traction Company. Mr. Moore resigned from the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., to become connected with the Springfield Consolidated Railway.

Mr. E. C. Deal has resigned as manager of the North Carolina Public Service Company, Greensboro, N. C., to become general manager of the Augusta Railway & Electric Company and the Augusta-Aiken Railway & Electric Company, Augusta, Ga., on April 1, 1911, to succeed Mr. James R. League, resigned. Mr. Deal is a native of Atlanta, Ga. He is 34 years old and gained his early experience with the Georgia Electric Light Company, now the Georgia Railway & Electric Company, Atlanta, Ga., which he served in various capacities from 1894 to 1898. Mr. Deal then entered the employ of Stone & Webster, Boston, Mass., and was connected with the properties operated by them in Baltimore, Seattle, Brockton and Terre Haute. He left Stone & Webster in 1904 to enter the employ of the Gas & Electric Company of Bergen County in New Jersey as chief engineer in charge of the company's properties in more than 40 municipalities in northern New Jersey. After this company was absorbed by the Public Service Corporation of New Jersey, Mr. Deal was made superintendent of the electric properties of the Public Service Corporation in central New Jersey. He resigned from this company in 1908 to become connected with the banking house of W. N. Coler & Company, New York, N. Y., as general manager of the North Carolina Public Service Company and engineer of other public service properties owned by W. N. Coler & Company. The property of the Augusta Railway & Electric Company and the Augusta-Aiken Railway & Electric Company has recently been acquired by a syndicate in which Redmond & Company and J. G. White & Company, Inc., New York, N. Y., are interested.

Mr. Franklin Woodman, the newly elected president of the New England Street Railway Club, began his street railway service with the Metropolitan Street Railway, Boston, as a starter in 1877.



F. Woodman

He next became clerk to the division superintendent. Four years after he entered the service of the Metropolitan Street Railway. Mr. Woodman was appointed superintendent of the Roxbury division of the West End Street Railway. This position he held for eight years, when he was chosen superintendent of the Union Street Railway, New Bedford. After two and one-half years with the Union Street Railway Mr. Woodman

was made superintendent of the Lowell, Lawrence & Haverhill Street Railway, Haverhill, Mass., and remained with that company until it became a part of the Boston & Northern Street Railway system in 1899, when he was made general manager of the Merrimack Valley division of the Boston & Northern Street Railway. He remained in this position until the fall of 1901. Early in 1902 Mr. Woodman was appointed general manager of the New Hampshire Electric Railways, Haverhill, Mass., and has continued in that capacity since that time.

OBITUARY

Charles Wallace Hunt, president of the C. W. Hunt Manufacturing Company, West New Brighton, N. Y., died March 27, 1911, at his home. Mr. Hunt was born at Candor, N. Y., 70 years ago. He was a noted inventor of conveying machinery, one of his principal inventions being the automatic or counter-weighted railway. Mr. Hunt always took an active interest in engineering association affairs. He was a past-president of the American Society of Mechanical Engineers and a member of many other engineering and civic bodies.

Stanley Robison, who with his brother, Frank DeHaas Robison, was interested in the Cleveland (Ohio) City Railway before the Cleveland City Railway and Cleveland Electric Railway were consolidated, died in Cleveland on March 24, 1911. Mr. Robison was born in Dubuque, Ia., and was graduated from Northwestern University, Evanston, Ill., in 1879, as a civil engineer. Besides being interested in the Cleveland City Railway, Mr. Robison was for two years receiver of the Ft. Wayne (Ind.) Consolidated Electric Railway. Both Mr. Robison and his brother later became identified with professional baseball and Stanley Robison at the time of his death owned the franchise of the St. Louis National League team.

F. L. Hart died on March 23, 1911, at Jamaica, N. Y. Mr. Hart was born in Brooklyn, N. Y., in 1861. He was graduated from the Brooklyn Polytechnic Institute and after a short business connection with the Wright Engine Works, Newburg, N. Y., and with the United States Electric Lighting Company, Newark, N. J., he was appointed engineer in charge of installing and operating the electric plant of the New York & Brooklyn Bridge. Then for seven years he was superintendent of operation of the 125th Street line of the Third Avenue Railroad. He then resigned to join the engineering force of the Metropolitan Street Railway, New York. He remained with that company two years and then accepted the position of manager of the Baltimore City Passenger Railway, where he remained six years. He then became general manager of the Washington Railway & Electric Company, Washington, D. C., but two years later he entered the employ of the firm of Thomas Basshor, Baltimore, contracting engineers. About two years later his health began to fail and he returned to New York and made his home with his father and brother in Brooklyn. Mr. Hart was a member of the American Society of Mechanical Engineers.

Meeting of Executive Committee Arkansas Operators.—The executive committee of the Arkansas Association of Public Utility Operators met in Little Rock, Ark., on March 15, 1911. The following members were present: D. A. Hegarty, vice-president and general manager of the Little Rock Railway & Electric Company, Little Rock, Ark.; Byron C. Fowles, general manager of the Pine Bluff (Ark.) Corporation; W. L. Wood, vice-president and general manager of the Texarkana Gas & Electric Company, Texarkana, Ark.; Edw. T. Hardin, general superintendent of the Hot Springs Water, Gas & Electric Company, Hot Springs, Ark.; W. C. McGuire, general manager of the Wilson Water & Electric Company, Arkadelphia, Ark.; W. R. Herstein, of the Electric Supply Company, Memphis, Tenn.; Frank Grayson, of the St. Louis Car Wheel Company, St. Louis, Mo. The date and place of the annual convention was set for May 3, 4 and 5, at Little Rock, Ark. Papers were assigned to different members of the association covering the operation of railways, gas, electric light, natural gas and water companies. The committee for the entertainment of delegates and guests follows: D. A. Hegarty, chairman; S. A. Stearns, manager of the Arkansas Home Water Company, Little Rock, Ark.; E. C. Beach, manager of the Pulaski Gas Light Company, Little Rock, Ark.; F. C. Bragg, of the Electric Construction Company, Little Rock, Ark.

The Chicago Railways Company has put into trial service two of its large double-end pay-as-you-enter cars that have been equipped with mechanically operated doors at the entrance sides. On one car a door mechanism furnished by the Pay-Within Car Company has been applied, and on the other is a mechanical door-operating mechanism designed and built in the railroad company shops.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Alberta (Alta.) Electric Railway, Calgary, Alta.—Incorporated in Canada to build an electric railway from Calgary to Banff, Medicine Hat, Long Coulee, Lethbridge, Macleod and Wood Mountain. Capital stock, \$10,000,000. Headquarters, Calgary. [E. R. J., Jan. 14, '11.]

***Turlock Traction Company, Modesto, Cal.**—Incorporated in California to build a 4-mile electric railway between Turlock and Denair. Capital stock, \$500,000. Incorporators: S. N. Griffiths, Fresno; A. M. Morton, Lloyd Griffiths, A. C. Chatom and D. R. Shafer, of Turlock.

***Maysville Public Service Company, Maysville, Ky.**—Application for a charter has been made in Kentucky by this company to build an electric railway in Maysville. Capital stock, \$150,000. Among the incorporators are: A. M. J. Cochran, R. A. Cochran, W. H. Cox, H. Ficklin and Samuel Hall, all of Maysville.

Peaks Island Railroad, Portland, Maine.—Application for a charter has been made in Maine by this company to build an electric railway on Peaks Island. Capital stock, \$100,000. Directors: Arthur H. Moulton, Edgar E. Rounds, Geo. F. Kavanaugh, Geo. C. Ricker, W. C. Wheldon and H. H. Sturgis, all of Portland. [E. R. J., March 25, '11.]

***Virginia, Eveleth & Gilbert Traction Company, Duluth, Minn.**—Chartered in Minnesota to build an electric railway to connect Virginia, Eveleth and Gilbert. Capital stock, \$25,000. Incorporators: W. M. Prindle, E. B. Merrill and G. T. Eagling.

***Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.**—Chartered in Missouri to build an electric or steam railway in Missouri. Capital stock, \$720,000. Directors: Ward S. Arnold, Chicago, Ill.; H. Grant Peabody, William A. Medill, George Townsend and George S. Beardsley, of Kansas City.

***Durham & Danville Railway, Durham, N. C.**—Application for a charter has been made by this company in North Carolina to build a 51-mile electric or steam railway between Durham, N. C., and Danville, Va., via Durham, Orange, Person and Caswell Counties. It is expected to obtain power from the Southern Power Company. Capital stock, \$250,000. Incorporators: C. C. Wake, C. M. Carr, H. E. Satterfield, J. F. Wily, W. F. Carr, W. B. Guthrie and J. L. Moorehead. Headquarters, Durham, N. C.

***People's Electric Railway, Muskogee, Okla.**—Incorporated in Oklahoma to build an electric railway in Muskogee. Incorporators: W. M. Patterson, Samuel Spaulding, J. B. McDonald, W. R. Robison, T. H. Martin and J. H. Huckleberry, all of Muskogee; G. W. Risser, Oklahoma City.

***Independent Developing Company, Pittsburgh, Pa.**—Chartered in Pennsylvania to build urban and interurban electric railways between Duquesne and Glassport and to take over the Duquesne & Dravosburg Street Railway and the Duquesne Annex Land Company. The plans include the immediate construction of about 3 miles of track to connect Duquesne Annex and Dravosburg and the probable continuation to Glassport.

***Greenville & Nolachucky Railway, Chattanooga, Tenn.**—Chartered in Tennessee to build a steam or electric railway from a point on the Southern Pacific Railway, 2 miles east of Greenville, to Walton. Capital stock, \$100,000.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company has received a franchise from the City Council to build its lines in Montgomery. This company will build 25 miles of track in Montgomery and extend it eventually to other towns. Charles G. Abercrombie, general manager. [E. R. J., Feb. 25, '11.]

Vallejo, Cal.—The Vallejo & Northern Railways has received a franchise from the supervisors to build its tracks along Front Street to the Main Street wharf in Vallejo. T. T. C. Gregory, Suisun, president. [E. R. J., Feb. 25, '11.]

Whitehall, Ill.—The Alton, Jacksonville & Peoria Railway, Jerseyville, has received an 18-month extension of time on its franchise to build its tracks through Whitehall.

Hobart, Ind.—W. P. Hood and associates have received a 50-year franchise from the Town Board to build an interurban railway between Hobart and Cary. A company is being organized with a capital stock of \$100,000 to build the line. [E. R. J., June 6, '08.]

Vincennes, Ind.—The Vincennes-Interstate Traction Company have asked the County Commissioners for a 50-year electric railway franchise in Vincennes. W. Funkhouser and C. W. Battin, Evansville, are interested. [E. R. J., March 25, '11.]

Rockville, Md.—The Washington, Westminster & Gettysburg Railway has received a franchise from the Montgomery County Commissioners to build through Montgomery County, from below Four Corners to Burnt Mills, Cloesville and Sandy Springs. The company has also received a franchise to build through Westminster.

Hastings, Minn.—The St. Paul Southern Electric Railway, St. Paul, has received a franchise from the City Council to build its tracks through Hastings. The line will connect St. Paul, Hastings, Red Wing and Lake City. W. L. Sonntag, general manager. [E. R. J., March 18, '11.]

Bogota, N. J.—The Public Service Railway, Newark, has asked the Borough Council for a 50-year franchise to build its tracks over the Queen Anne Road in Bogota.

New Rochelle, N. Y.—The Westchester Electric Railroad, Mount Vernon, has received a franchise from the Common Council to double-track its line on North Avenue, between Huguenot Street and Mayflower Avenue, in New Rochelle.

Richfield Springs, N. Y.—The Oneonta & Mohawk Valley Railroad, Oneonta, has received a franchise from the Council to connect its tracks with the Delaware, Lackawanna & Western Railroad tracks in Richfield Springs. Work will begin as soon as the weather permits.

Lock Haven, Pa.—The Lock Haven & Jersey Shore Railroad has received franchises from the City Council to build its tracks through Lock Haven. It will connect Lockport, Dunnstable, Pine Creek, Charlton, Woolrich and Avis. L. M. Patterson, Lock Haven, president. [E. R. J., March 25, '11.]

New Castle, Pa.—The New Castle, New Wilmington & Sharon Electric Railway has received a 6 months' extension of time on its franchise from the City Council in which to begin work on its proposed 15-mile electric railway to connect New Castle, Bethel, Sharon, New Wilmington, Middlesex and Meadville. James Campbell is interested. [E. R. J., Sept. 24, '10.]

Greenwood, S. C.—The Greenville, Spartanburg & Anderson Railway has received a 60-year franchise from the City Council to build its tracks through Greenwood.

Seattle, Wash.—George W. White and associates have asked the County Board for a franchise to build an electric railway from Seattle to Lake Burien, a distance of 4 miles. [E. R. J., Jan. 14, '11.]

Altoona, Wis.—The Chippewa Valley Railway, Light & Power Company has asked the City Council for a franchise to build its tracks through Altoona.

TRACK AND ROADWAY

Arkansas Valley Interurban Railway, Little Rock, Ark.—This company has let contract for 40,000 ties to be used on the extension from Sedgwick to Newton and from Newton to Halstead. O. A. Boyle, Wichita, Kan., general manager.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—This company will build a 22-mile extension from Victoria to Deep Cove.

Vernon, B. C.—The Couteau Power Company has completed arrangements for building an electric railway from Vernon to Lumby. A. E. Ashcroft, Vernon, B. C., is interested.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has awarded the contract to S. F. Hobler, Sanger, for grading its line. The contract for construction and equipment has been awarded to the Hudson Counties Company, New York, which has sublet the

entire contract to the Pinkerton Construction Company, Philadelphia. John B. Rogers, 52 Eleventh Street, San Francisco, chief engineer. [E. R. J., Sept. 10, '10.]

Tidewater & Southern Railroad, Stockton, Cal.—This company advises that construction has begun on its 44-mile electric railway to connect Stockton, Atlanta, French Camp, Escalon, Modesto, Cens and Turlock. The company will furnish power for lighting, and will operate 9 cars. Capital stock, authorized, \$1,000,000. Officers: K. C. Brueck, Stockton, president; J. A. Coley, vice-president; Byron A. Bearce, Stockton, secretary, treasurer and general manager, and J. H. Wallace, chief engineer. Headquarters, Stockton. [E. R. J., Dec. 17, '10.]

Shore Line Electric Railway, New Haven, Conn.—The contract has been awarded by this company to the Pierson Engineering & Construction Company, New Haven, for the construction of 2 miles of track between Branford and Bristol.

Tampa, Fla.—C. W. Alton, Anderson, Ind., is considering plans to build an electric railway from St. Petersburg to Tampa, Fla.

Augusta (Ga.) Railway & Electric Company.—This company has contracted with J. G. White & Company, Inc., New York, N. Y., to build an extension of one mile and to reconstruct considerable track.

Chicago, Ottawa & Peoria Railway, La Salle, Ill.—Andrew Ward & Son, Oak Glen, has been awarded the contract by this company for excavation and grading work for the 23-mile extension from Joliet to Morris. Driscoll & McCalman, Decatur, has been awarded the contract for the concrete work.

Rockford (Ill.) City Traction Company.—This company, which was incorporated recently, was organized to operate the electric railways in Rockford controlled by the Union Railway, Gas & Electric Company. In this way the city lines in Rockford will be segregated from the Rockford & Interurban Railway. [E. R. J., March 25, '11.]

Cincinnati, Madison & Western Traction Company, Indianapolis, Ind.—This company will soon award contracts for the construction of 41 miles of track. A subsidy tax of \$100,000 has been voted the railway. It will connect Hanover, Madison, Scottsburg and Lexington. J. E. Greeley, Louisville, president. [E. R. J., Aug. 20, '10.]

Eastern Indiana Traction Company, Richmond, Ind.—This company is being organized to build a line from Richmond, Ind., to Cincinnati, Ohio, via Liberty, Brookville and Harrison, Ohio. The proposed capitalization is \$1,000,000. Those composing the committee in charge of organization are: A. M. Gardner and Paul Comstock, Richmond; E. R. Beard, Liberty; R. L. Head, Brookville, and F. J. Brinkman, Harrison, Ohio. [E. R. J., Dec. 31, '10.]

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—This company is planning the expenditure of \$500,000 in the improvement of its line.

Henderson (Ky.) Interurban Railway.—H. U. Wallace & Company, Chicago, are making surveys for the proposed electric railway to connect Henderson, Owensboro, Uniontown, Morgan Field, Sebree, Dickson and Providence. The following officers have been elected: Malcolm Yeaman, Henderson, president; E. F. Wheaton, Nashville, Tenn., vice-president and general manager; T. W. Argue, Henderson, secretary and treasurer; H. C. Wallace, engineer. [E. R. J., July 2, '10.]

Brandon, Man.—The city engineer has been instructed to prepare plans for a municipal street railway.

Fristoe, Mo.—E. E. Trippe, Fristoe, and B. O. Taylor, Bosworth, are said to be interested in a plan to build an electric railway from Warsaw to Springfield, via Cross Timbers. Surveys will soon be made.

Kansas City, Ozarks & Southern Railway, Kansas City, Mo.—This company is considering plans for building an extension from Kansas City to Forsyth and Hollister, via Brown Branch, Bradleyville, Kisee's Mills, Kirbyville and Mansfield. It would follow Beaver Creek and cover about 35 miles.

Keansburg, N. J.—Judge W. W. Ramsay, William Gehlhaus and Richard Carr plan to build an electric railway in Keansburg. It will be built by private capital.

Millville, Tuckahoe & Ocean City Electric Transportation Company, Millville, N. J.—Surveys are being made by this company for its proposed line between Millville and Ocean City. E. W. Bush is interested. [E. R. J., Sept. 3, '10.]

Ocean City (N. J.) Electric Railway.—Plans have been completed by this company to build a branch from Thirty-fourth Street to Beesley's Point, in Ocean City. The work is to be completed before summer.

Long Island Railroad, New York, N. Y.—This company has begun double-tracking and electrification, which it is expected will be completed from Woodside to Port Washington within 18 months.

New York, N. Y.—The contract has been awarded to Snare & Triest Company, New York, for the installation of the electrical equipment of the conduit tracks, and the construction of the track extension on the plaza of the Queensboro Bridge, over the East River, between the boroughs of Manhattan and Queens.

Cleveland, Alliance & Mahoning Valley Railway, Alliance, Ohio.—This company announces that 30 miles of the proposed line has been financed and that work will be begun at once. Of this 25 miles between Ravenna and Alliance and 5 miles between the terminus of the Corlett local line in Cleveland and the Randall race tracks will be built first. It will connect Cleveland, Alliance and Mahoning. [E. R. J., Jan. 14, '11.]

East Liverpool Light & Traction Company, East Liverpool, Ohio.—It is said here that this company and the Ohio Scenic Railway have made plans for double-tracking the lines of the Tri-State Traction Company between Follansbee, W. Va., and Steubenville, Ohio, this spring. The Tri-State Traction Company will be taken over by the above-named companies in April.

Lake Erie & Northern Railway, Brantford, Ont.—The Railway Committee of the Canadian House of Commons has passed a bill authorizing this company to build its railway from Port Dover, Ont., on Lake Erie, via Simcoe, Waterford, Brantford and Paris, thence to Galt, with a branch to Paris, Glenmorris and Ayr. W. P. Kellett, Brantford, general manager. [E. R. J., Jan. 14, '11.]

Guelph (Ont.) Radial Railway.—This company will receive bids for the construction of the St. Patrick's Ward extension. J. J. Hackney, general manager.

***Albany, Ore.**—G. E. Fosbroke, St. Paul, is considering plans for building an electric railway from a point about 18 miles east of Sutherlin down the valley to Albany.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company has begun the relaying of rails on the important lines in the business section of Harrisburg. The cost is about \$25,000.

Lock Haven & Jersey Shore Railroad, Lock Haven, Pa.—This company advises that surveys are being made and that construction will begin within two months on its proposed electric railway to connect Lock Haven, Clinton, Courtney and Jersey Shore. Contracts have not yet been awarded. The company will also furnish power for lighting purposes. Capital stock, authorized, \$150,000. L. M. Patterson, Lock Haven, president. [E. R. J., March 25, '11.]

West Penn Railways, Pittsburgh, Pa.—This company has awarded to O'Connor & Madigan, Connellsville, Pa., the contract for grading and concrete work of a 3-mile extension from Bettmer to Vance Mills. The laying of tracks from Juniata to Bitner has begun. The company is also considering plans for building an 8-mile extension from Leisenring to Uniontown, a 7-mile extension from Greensburg to Jamison and a 3-mile line from Masontown to Martin Station.

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—Work has been begun to connect the lines of this company and those of the Sunbury & Selinsgrove Street Railway in Sunbury.

Moose Jaw Electric Railway, Moose Jaw, Sask.—This company advises that it has begun construction and that all contracts have been awarded except those for buildings and small operating supplies, which are being advertised for now, for building this 6-mile railway within the limits of Moose Jaw. Its power station and repair shops will be located in Moose Jaw, and it will operate 6 cars. Capital stock, author-

ized, \$500,000; capital stock, issued, \$127,000. Officers: A. A. Dion, 35 Sparks Street, Ottawa, president; Newton J. Kerr, vice-president; D. R. Street, Ottawa, secretary and treasurer; A. H. Dion, Moose Jaw, superintendent, and J. B. McRae, Citizen Building, Ottawa, chief engineer.

Regina Municipal Railway, Regina, Sask.—Bids will be received by the City Commissioners until April 5, 1911, for the construction of the initial 7 miles of this municipal street railway. L. A. Thornton, city engineer.

***Murfreesboro, Tenn.**—J. E. Manson, D. M. Peebles, R. T. Batey and associates are considering plans to construct an electric railway between Nashville, Murfreesboro and Nolensville.

Nashville Railway & Light Company, Nashville, Tenn.—This company has filed an amendment to its charter, authorizing the extension and construction of several new lines.

***Union City, Tenn.**—Citizens of Union City are considering plans for building an electric railway from Union City to Gibbs, to connect with the Illinois Central Railroad.

***Dallas, Tex.**—Stone & Webster will build an interurban electric railway from Waxahachie to connect with the lines of the Northern Texas Traction Company at Oak Cliff. Engineers have been put in the field to check the surveys made in 1906.

***Houston, Tex.**—W. S. Kirkham, Houston, is said to be making plans for constructing a 5-mile electric railway from the terminus of the Liberty Avenue line, Houston, to Port Houston. McCarthy & Son are the engineers.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—Plans are being made by this company for remodeling its building at Eighth Street and J Street, in Sacramento.

Illinois Traction System, Champaign, Ill.—This company has completed and opened for service a new depot on Salisbury Street, North St. Louis.

Southern Traction Company, St. Louis, Ill.—This company will soon decide on a location for building several interurban stations along its Rock Island South line. The structures will be 1-story and of brick construction.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company will begin in April the construction of its new car house on Nicollet Avenue, between Thirty-first and Thirty-second Streets, in Minneapolis. The new building will cover the entire block eventually. Club rooms will be provided for the men.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has awarded the contract to B. J. Jobst for building a pavilion at Lake Manawa. The structure will be 60 ft. x 145 ft. The dancing floor will be of hard maple and will measure 50 ft. x 90 ft.

Exeter, Hampton & Amesbury Street Railway, Exeter, N. H.—This company has moved into its new quarters in the Wood Block, in Exeter. The building will contain the main office, the display room and the manager's private office. On the ground floor are the work room and store rooms.

Piedmont Traction Company, Gastonia, N. C.—This company will spend \$500,000, it is said, building freight and passenger depots and warehouses in Charlotte. W. C. Lee, Charlotte, vice-president. [E. R. J., Sept. 10, '10.]

Northern Ohio Traction & Light Company, Akron, Ohio.—Work on the new car house of this company, just south of Akron, will be begun about May 1, according to present plans. It will entail a cost of about \$200,000.

Ohio Electric Railway, Cincinnati, Ohio.—This company has awarded contracts for the construction of a 2-story passenger station at Columbus. The building will be 190 ft. x 90 ft., and will cost between \$150,000 and \$160,000. The waiting rooms, express and baggage departments will all be on the ground floor.

Scioto Valley Traction Company, Columbus, Ohio.—Plans for this company's new passenger and freight station to be erected at Chillicothe call for a 1-story building to be located on Main Street. The structure will be in two sections, the waiting room, 20 ft. x 30 ft., and the storeroom, 27 ft. x 50 ft. The freight department composes the rear portion of the station and is 25 ft. x 70 ft. [E. R. J., March 18, '11.]

Portland Railway, Light & Power Company, Portland, Ore.—Contracts have been awarded and construction will begin soon on a storehouse to be constructed by this company on East Water Street, between Hawthorne Avenue and East Clay Street, in Portland. The structure will be 100 ft. x 200 ft., of reinforced concrete construction. It will have a basement and 2 stories at the beginning, with the initial work made to receive 2 more stories as soon as the need for the additional space shall develop. The building will be used as the general emergency headquarters of the company, and will contain complete club rooms for the linemen.

Moose Jaw Electric Railway, Moose Jaw, Sask.—Bids will be received until April 1 by this company at the office of R. G. Bunyard, Bank of Commerce Building, Moose Jaw, for building a carhouse in Moose Jaw.

Richmond & Henrico Railway, Richmond, Va.—This company has awarded the contract to P. J. White & Son for building its car houses in Fulton. Work will begin at once. The cost is estimated to be about \$35,000.

Twin City Electric Company, South Bend, Wash.—This company will build a carhouse in South Bend during April. [E. R. J., March 18, '11.]

POWER HOUSES AND SUBSTATIONS

Holley Electric Railway, Porterville, Cal.—This company has purchased a site in Strathmore for a power house which is to be the main distributing station of the Holley power lines which run from Porterville. H. H. Holley, Porterville, manager. [E. R. J., July 23, '10.]

Augusta Railway & Electric Company, Augusta, Ga.—The Augusta Railway & Electric Company and the Augusta-Aiken Railway Company have contracted with J. G. White & Company, Inc., New York, N. Y., for the extensions and improvements to their power houses and power systems, which will cost approximately \$500,000. The power house extension is planned for two 2500-kw steam turbines, one of which, with the necessary boilers and auxiliaries, will be installed this year. A 7½-mile transmission line will be built from the power house in Augusta to the power house of the Augusta-Aiken Railway, near Clearwater, S. C., and a 500-kw motor generator set will be installed at this point and a 300-kw set in the present substation near Aiken. The wires in Augusta will be placed underground on three of the principal streets. This will involve laying about three miles of conduits.

Indianapolis, Columbus & Southern Traction Company, Seymour, Ind.—A contract will soon be awarded by this company for building a dam in Driftwood River, constructing a canal 6 miles in length and equipping a power house in Columbus.

Michigan United Railways, Detroit, Mich.—This company is considering plans for building a power plant with a capacity of 6000 kw and a substation in Jackson.

Cape Breton Electric Company, Ltd., Sydney, N. S.—This company will build extensions to its power house in Sydney. Through Stone & Webster it has awarded the contract to the Allis-Chalmers Company for one 500-kw turbo-generator, 2300-volt A. C. H. C. Foss, general manager.

Lehigh Valley Transit Company, Allentown, Pa.—This company has ordered, through Ford, Bacon & Davis, one new switchboard and equipment from the General Electric Company.

Moose Jaw Electric Railway, Moose Jaw, Sask.—This company will receive bids until April 1 for the building of a power house at Moose Jaw. A. A. Dion, 35 Sparks Street, Ottawa, president.

Northern Texas Traction Company, Fort Worth, Tex.—A new power house to be located on Calhoun Street, Fort Worth, is being planned by this company.

Twin City Electric Company, South Bend, Wash.—This company will begin construction in April of a power plant to be located in South Bend.

Pan-Handle Electric Railway & Power Company, Spokane, Wash.—This company is considering plans to build a 30,000-hp. power plant on the Priest River, in Northern Idaho. Victor M. Smith, New York, is interested.

Manufactures & Supplies

ROLLING STOCK

Jacksonville (Fla.) Electric Company expects to purchase 10 passenger cars.

Tri-City Railway, Davenport, Ia., has ordered 14 Brill 39-E trucks from the American Car Company.

Georgia Railway & Electric Company, Atlanta, Ga., is building six additional passenger cars in its own shops.

Sioux Falls (S. D.) Traction System expects to purchase either several storage battery cars or several gasoline motor cars.

Easton (Pa.) Transit Company has ordered three 20-ft. 8-in. semi-convertible car bodies from The J. G. Brill Company.

Holyoke (Mass.) Street Railway has ordered three 14-bench open car bodies from the Wason Manufacturing Company.

Metropolitan Street Railway, Kansas City, Mo., it is reported, expects to build 50 new passenger cars in its own shops during 1911.

New York State Railways, Rochester, N. Y., has ordered from the General Electric Company 15 G.E.-219, four-motor equipments.

Central California Traction Company, San Francisco, Cal., has ordered two Brill 27-MCB-3 trucks, through Pierson, Roeding & Company.

British Columbia Electric Railway, Victoria, B. C., has ordered three Simplex dump cars from the Simplex Self-Cleaning Car Company.

Cape Breton Electric Company, Sydney, N. S., has purchased from the Canadian General Electric Company two two-motor car equipments.

Lancaster & York Furnace Street Railway, Lancaster, Pa., has purchased three trailer flat-car bodies, 33 ft. long, mounted on Brill 55-D trail trucks, from The J. G. Brill Company.

Wilmington & Philadelphia Traction Company, Wilmington, Del., has ordered through J. G. White & Company from the General Electric Company six G.E.-88, four-motor equipments and 16 G.E.-88 two-motor equipments.

San Juan Light & Transit Company, San Juan, P. R., has purchased four Simplex dump cars, equipped with Westinghouse air brakes, M.C.B. draft rigging and automatic couplers from the Simplex Self-Cleaning Car Company.

Boise (Idaho) Railroad, noted in the ELECTRIC RAILWAY JOURNAL of March 25, 1911, as having ordered two closed cars through Pierson, Roeding & Company, ordered these cars through Henry Levis & Company.

New York State Railways, Rochester, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of March 25, 1911, as being in the market for 15 30-ft. 11-in. semi-convertible, pay-as-you-enter cars, has ordered these cars from the G. C. Kuhlman Car Company.

Scranton (Pa.) Railway, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, as having ordered 10 cars of the pay-within type from the Cincinnati Car Company, has specified the following details for these cars:

Type of car.....	double truck	Couplers	Tomlinson
Bolster centers.....	18 ft.	Curtain fixtures.....	Forsyth
Length of body.....	30 ft.	Curtain material.....	Pantasote
Over vestibules	41 ft.	Gongs	Dedenda
Width over sills.....	8 ft. 2 in.	Hand brakes	Peacock
Sill to trolley base.....	8 ft. 5½ in.	Heating system	Consol.
Height, top rail to sills,		Headlights	arc
	2 ft. 7¾ in.	Motors	4 G.E.-88B
Body	steel sides	Push button signal.....	Cons. buz.
Interior trim	cherry	Roofs	turtle-back
Underframe	composite	Sanders	O. B.
Air brakes	West.	Sash fix.....	Nat. Lock W. Co.
Bolsters	steel plate	Seats	H. & K.
Bumpers,		Seating material.....	rattan
		Step treads.....	Universal
		Trolley retrievers	Ideal
		Control system	K-28
		Trucks	Taylor

TRADE NOTES

Q M S Company, Plainfield, N. J., has received an order to furnish Stanwood steps for the 100 new cars of the Los Angeles Railway.

Theodore L. Condron, Chicago, Ill., civil engineer, states that he will carry on under his own name the engineering business lately carried on by Condron & Sinks.

Link-Belt Company, Chicago, Ill., has moved its Boston sales office from 84 State Street to 131 State Street. Lawrence Spillan will be in charge of the new office.

Ackley Brake Company, New York, N. Y., reports receipt of an order for a large number of Ackley adjustable brakes from the Yokohama Electric Railways, on which system this brake is standard.

Electric Storage Battery Company, Philadelphia, Pa., has declared a regular quarterly dividend of 1 per cent on both its preferred and common stock, payable April 1, 1911, to stockholders of record March 25, 1911.

W. B. Dickson, first vice-president of the United States Steel Corporation, has resigned and will retire from office on May 1, 1911. Mr. Dickson has been connected with the steel corporation since its organization in 1901.

Heywood Brothers & Wakefield Company, Wakefield, Mass., has received an order through J. G. White & Company to furnish pressed steel seats for the 22 new cars of the Wilmington & Philadelphia Traction Company.

A. Eugene Michel, New York, N. Y., advertising engineer, announces that W. F. Schaphorst, of the mechanical engineering department of the New Mexico College of Mechanic Arts, has resigned to become a technical writer on his advertising staff.

Dossert & Company, New York, N. Y., announce a large increase in their business for February, 1911. Among some of the large orders recently received for connectors is one from the Sao Paulo (Brazil) Tramway & Light Company and another from the Rio de Janeiro (Brazil) Tramway, Light & Power Company.

Republic Iron & Steel Company, Pittsburgh, Pa., has elected Thomas J. Bray, formerly vice-president, president of the company, to succeed Tracy W. Guthrie, resigned. Henry S. Round, formerly secretary and treasurer, has been elected vice-president and treasurer, and Richard Jones, Jr., general manager, will also act as secretary.

Toronto (Ont.) Railway is asking inventors and others interested in life-saving devices to submit to the company plans, rough drawings or models of any device to be used upon cars for the prevention of accidents. All communications on this subject should be addressed and plans and models submitted to the master mechanic of the company.

Sanitary Rag Company, Kalamazoo, Mich., has just completed its new five-story steel factory containing approximately 75,000 sq. ft. of floor space. The company employs 150 people in producing its washed wiping cloths and has a daily capacity of 100,000 lb. Several large orders for this product have recently been received, among which is one from the United States Government for all government departments. The cloths are very carefully made and are thoroughly washed and sterilized to prevent any possible impurities.

National Car Advertising Company, New York, N. Y., reports that it has recently secured the lease of the advertising privileges of the cars of the Lehigh Valley Transit Company, Allentown, Pa., and of the Binghamton (N. Y.) Street Railway. Both are to use the company's "Auto-scope," by which the advertising cards are kept in motion, a plan by which the advertising company claims that their advertising value is increased. This device has been in use for some time past on the following railways: Fairmont Park Transportation Company, Northampton Traction Company, Easton & Washington Traction Company, Montgomery Traction Company and the Atlantic & Suburban Traction Company.

Prepayment Car Sales Company, New York, N. Y., which was noted in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911, as having been formed by the merging of the Pay-As-You-Enter Car Corporation and the Pay-Within Car Company, at a recent meeting elected the following officers and directors: Duncan McDonald, of the Pay-As-You-Enter

Car Corporation, president; A. H. Englund, of the Electric Service Supplies Company, vice-president; Harold Rown-tree, vice-president of the National Pneumatic Company, treasurer; J. B. Burdette, president of the Pay-Within Car Company, secretary; Thomas W. Casey, of the Pay-As-You-Enter Car Corporation, general manager, and the following directors: W. D. Baldwin, president of the Otis Elevator Company, and R. L. MacDuffie, vice-president of the Railway Improvement Company.

ADVERTISING LITERATURE

Nelson Valve Company, Philadelphia, Pa., has issued a number of circulars describing different styles and types of valves manufactured by the company.

Duplex Metals Company, Chester, Pa., has issued a circular calling attention to the reduction in price of copper-clad steel wire, which took effect on March 22, 1911.

General Electric Company, Schenectady, N. Y., has issued Bulletins Nos. 4815 and 4817 on "Motor Drive for Metal Working Machinery" and the "G.E.-214 Railway Motor."

Graphite Lubricating Company, Bound Brook, N. J., has issued a circular letter calling attention to the merits of the "Bound Brook" graphite and bronze bushings and bearings.

Railway Improvement Company, New York, N. Y., has issued a circular letter calling attention to the large saving in power brought about by the use of the Coasting Time Recorder.

Fletcher Manufacturing Company, Dayton, Ohio, has issued Catalog No. 565, containing illustrations and price lists of electrical construction supplies which the company manufactures.

Edward E. Early Company, Canton, Ohio, has issued a circular pertaining to "Early's Commutator Cement." In connection with this circular the company has also issued a partial list of users of the cement.

Burton W. Mudge & Company, Chicago, Ill., has issued a folder on the Adams motor car for track work. The car, which has a seating capacity for three persons, contains a 4½-hp motor and is capable of making a speed of from 3 to 45 m.p.h.

Sherwin-Williams Company, Cleveland, Ohio, is distributing in pamphlet form a reprint of the address delivered before the Cleveland Advertising Club on the "Use and Abuse of Trade Journal Advertising," by Richard W. Western, who is connected with the advertising department of the company.

Waterbury Company, New York, N. Y., has issued in pamphlet form a reprint of the article that appeared in the *ELECTRIC RAILWAY JOURNAL* of Feb. 25, 1911, on "The Simultaneous Installation of Seven High-Tension Submarine Cables," which were installed for the Union Railway across the Harlem River.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued sections Nos. 317, 319 and 578 of its perpetual Catalog No. 3001, on "Type D Indicating Meters for Direct Current," "Types H. HA and HB Edgewise Switchboard Meters for Direct Current" and "Type A Over-Voltage Relays for Direct-Current Circuits."

American Steel & Wire Company, Chicago, Ill., has published the "American Wire Rope News" for February, 1911. The issue contains articles on "Wire and Wire Rope on Aeroplanes," "Reclamation of Mississippi Valley Alluvial Lands," "Misuse of Wire Rope and Thimble Protection," "Use of Non-Spinning Hoisting Rope on Bucket Machinery" and "Heavy Duty for Wire Rope in Quarries."

United States Electric Company, New York, N. Y., has issued Bulletin No. 701, with the title "Some Preventable Accidents," in which three of the collisions reported in the latest train accident bulletin of the Interstate Commerce Commission are analyzed and shown to have been preventable had this company's system of dispatcher's control of semaphore or train-order boards been in use. The Gill selector is the essential piece of apparatus in this system. It causes a signal when set to report itself audibly to the dispatcher and it cannot be restored to the proceed position until electrical permission so to do has been given by the dispatcher, although the dispatcher may clear the signal without the intervention of the train crew or agent.

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CONTENTS.

The Place of Meeting of the 1911 Convention.....	623
Little Improvements that Save Money.....	623
Standard Signal Aspects.....	624
Transfers in the Census Report.....	624
Reclaiming and Reworking Scrap.....	625
New Pay-As-You-Enter Cars for Baltimore.....	626
Terminal Improvement of Ohio Electric Railway, at Dayton, Ohio.....	628
The Seating and Curtain Departments of the Brooklyn Rapid Transit System.....	629
Report on the Elimination of Freight Surface Tracks in New York.....	630
Three-Phase Locomotives for the Giovi Line, Italy.....	631
New transfer system.....	632
Report of the Standardization Committee of the Central Electric Railway Association.....	633
Hearing by Massachusetts Commission on Petition for Lower Fares..	634
Meeting of the Committee on Passenger Traffic.....	635
Suggested Transfer Law.....	635
Plans for Railroad Electrification in Chicago.....	635
Lectures to Employees at Kansas City.....	636
Investigation of Public Service Commission.....	636
La Salle Street Tunnel Chicago Railways Company.....	636
Through Routes and Joint Rates Between Electric and Steam Lines..	637
Report of Committee on Schedules.....	639
Cost of Stopping an Interurban Car.....	640
Entries for St. Louis Fender Tests.....	640
Trolley Wire Splicer.....	640
Removable Grid Rheostats.....	641
Direct Drive Gasoline Car.....	641
Applying a Jack at an Angle.....	642
Semi-Steel Pay-as-You-Enter Rolling Stock for Milwaukee.....	642
News of Electric Railways.....	643
Financial and Corporate.....	647
Traffic and Transportation.....	650
Personal Mention.....	651
Construction News.....	652
Manufactures and Supplies.....	655

The Place of Meeting of the 1911 Convention

During the next few weeks the city in which the 1911 convention of the American Electric Railway Association is to be held will have to be selected. The committee which has been investigating this matter has visited the five places which are now being most seriously considered, namely, Minneapolis, St. Louis, Chicago, Rochester and Atlantic City. Of these Atlantic City undoubtedly possesses the best combination of exhibit hall and hotel accommodations, and, in a sense, its selection would be the easiest choice for the executive committee to make. To go West would probably involve some sacrifice of hotel comforts or of exhibit features, or possibly of both, but we believe that this sacrifice would be worth while if it would enable the association to hold its convention next October in the Central States, a district which it has not visited since 1906, the year of the Columbus convention. In other words, we consider that the choice of Atlantic City would be unwise unless the committee should find upon further investigation that the facilities for holding the convention in a city in the Central West are totally inadequate. Three reasons stand out prominently in favor of a Western convention this year. The first is that the Eastern members of the association would benefit greatly by a trip to the West, where they would have an opportunity of inspecting the important electric railway work in that territory. The second is that those who have canvassed the situation most carefully are of the opinion that there would be a larger attendance of Western delegates and a larger attendance of railway men in the aggregate at such a convention than if the association should meet in Atlantic City. The third reason for a choice of a convention location away from the Atlantic seaboard this year is that it would emphasize the national character and scope of the American Electric Railway Association. The Western members of the association have gone East for the national convention during three years out of the last four. They have at home important railway systems of which they justly feel proud and the choice of a Western city this year would be a proper recognition of the services which these members have done in advancing the progress of the art.

Little Improvements That Save Money

On almost every electric railway there arise at one time or another some unusual complaints, or even damage suits, because of a trifling defect in the car equipment which could hardly have been foreseen by the most careful mechanical department. In one instance complaints were received from passengers whose clothing had been soiled by their leaning against freshly oiled air brake spindles. This odd trouble was eliminated by attaching a plate which is raised to cover the side cavity in

the top of the spindle whenever the brake valve is not in use at the conductor's end. On another line damage claims were made by patrons whose clothing had been torn by exposed screws or by nails which had worked up through the seats. These cases were remedied by using countersunk screws in every part of the inside woodwork accessible to passengers and by tucking the rattan seat coverings over the seat frames so that the nails could be inserted into the bottom members. A different field for minor improvements is in the protection of parts subject to greatest use. For instance, one company has found that wooden strips on the long edges of rattan cross seats will save wear and avoid unsightliness. A second company finds it worth while to guard the wooden risers of its platform steps by copper sheathing. Protective schemes of this kind are especially desirable on cars where the furnishings are of high quality.

Standard Signal Aspects

The joint committee on block signals of the Engineering and Transportation & Traffic Associations has begun work on the preparation of a comprehensive examination of many phases of the problem of signals for electric railways. The committee will not confine its report to any type of signal or principle of signaling. It now plans to discuss signals controlled by trolley contacts, track trips, short track-setting sections and continuous track circuits. In addition to this information a portion of the report will be devoted to dispatchers' signals. One striking fact brought out at the meeting of the signal committee at Chicago reported in our issue last week was the wide diversity in the means for displaying the indications. This diversity is far greater with the so-called "trolley signal" apparatus than it is with the signals commonly installed on steam roads. Nevertheless, a large diversity in the means of displaying indications has also been found on the steam railroads, and an association of steam railway signal engineers for several years has been at work attempting to standardize steam railway signaling practice, in so far as the signal aspects are concerned. It is stated that on some steam roads, during the run over one engine division, the locomotive driver has to read, understand and interpret correctly and quickly the meaning of more than 100 aspects, indicating how his train should be run. The variety of patterns carried in stock by the manufacturing companies which have been making signals for the steam railroads for many years is also an object lesson in favor of standardization. Through the whims and individual ideas of different railroad signal engineers, hundreds of pieces of apparatus differing only in small details have been designed to accomplish practically the same results. Of even greater importance than the saving in cost of manufacture due to the use of standard parts is the increased safety of operation under a system of signals in which only a few indications are used and each indication has but one meaning no matter where the signal is located. This comment in regard to uniformity in signal indications and aspects is intended as a note of warning to the electric railways which have purchased or are considering the purchase of block signals. It has been the aim of the Railway Signal Association to reduce all the necessary signal aspects to a uniform and simple series, and the American Electric Railway Association can do no better than to approve and thereby promote the general use of these standard aspects as a first step in advancing the art of signaling for electric railways.

TRANSFERS IN THE CENSUS REPORT

The statistics of transfer passengers given in the special census report on street and electric railways, 1907, show the steady march of increase in this traffic. An interesting table gives the percentages of the total traffic represented by fare, transfer and free passengers respectively, and a partial comparison with the corresponding results shown in the 1902 census. The comparison is not complete, however, because the number of free passengers in 1902 was not computed separately, and, if included in the returns for that year, was probably added to the transfer traffic.

While the fare passengers represented 78.1 per cent of the total traffic in 1907, they amounted to 81.8 per cent in 1902. The transfer traffic amounted to 20.9 per cent in 1907 and 18.2 per cent in the earlier period. The proportion of free traffic in 1907 is given as 1 per cent. While the development of inter-urban railways produced some part of the greater fare traffic of 1907, the proportion of the total contributed by these lines is not believed to have affected materially the statistics based on the results for the country as a whole.

If we take the complete figures of fare and transfer passengers carried in the United States during the fiscal year 1907, as reported by the Census Bureau, we find a basis for comparison that illuminates further the value of the returns in these respects. It is the practice of companies to show the percentage which the transfer traffic constitutes of the fare traffic, rather than the percentage of the total traffic, and we suggest amendment of future census reports so as to give the results in this way. The transfer traffic amounted in 1907 to 26.8 per cent of the total number of fare passengers. In this computation we disregard the total of free passengers reported in 1907. The inclusion of that total would add 1.3 per cent to the ratio. It is mentioned because of the possibility that the free traffic may be reported in the transfer traffic shown in the 1902 census. The report for 1902 showed that the transfer traffic reached the aggregate of 22.3 per cent of the fare traffic.

This increase in the period of five years is in complete accord with the tendencies reported by all of the companies which have not taken definite steps to restrict the use and abuse of their transfer privileges. While the number of fare passengers increased 55.9 per cent, the number of transfer passengers increased 87.8 per cent. If we include the total number of free passengers in the transfer traffic for 1907, because of the possibility that the 1902 figures may have included similar returns, it may be shown that the increase in transfer traffic reached the still larger figure of 96.9 per cent.

Such figures as these afford one of the most valuable indices that it is possible to secure of an unmistakable tendency of the industry. The electric railway companies and the public are equally concerned in the results set forth in the census report upon which these computations are based. It should be remembered, however, that these returns, which are the last records available for the country as a whole, are now three or more years remote from the present day. Notwithstanding the isolated efforts at various points in the country to restrict the great development in the use of transfers and the accompanying illegal increase in this traffic, there continues to be a rate of increase in most localities which is out of all proportion to the development of the fare traffic.

Unless radical corrective steps are put in force throughout

the country generally, the next census of electric railways will show a still greater and disproportionate development in transfer traffic, which, except in isolated instances, yields no direct revenue to the companies furnishing the service.

RECLAIMING AND REWORKING SCRAP

It is astonishing how large an amount of money can be saved if a company carefully watches its scrap pile. Nearly all roads, both steam and electric, practise the redemption of scrap materials in some way or other, but investigation shows a wide diversity in the methods followed. Hence it seems worth while to call attention to some definite means that have been found successful in utilizing old materials. This subject of saving valuable scrap may appear commonplace to some officers, but we have seen enough laxity on certain roads to warrant us in speaking plainly about the general need for more care of old material if all opportunities for economy are to be grasped.

The extent to which the mechanical departments of steam roads go in the reworking of old material was recently set forth in a paper and discussion on that subject before the Western Railway Club in Chicago. Generally speaking, every large steam road has a well-defined organization for collecting and working over old material so as to increase its life. Fortunately the electric roads have less old material with which to deal, but the scrap on electric roads has a considerably higher intrinsic value than that which accumulates on steam roads. Practically all electric roads, except the smallest, recast their scrap copper and brass, utilizing it again in the form of trolley wheels, car fittings and parts of electrical equipment. We have yet to call upon a road which makes a practice of reclaiming scrap materials and is not enthusiastic about the results obtained.

It is obvious that a few dollars spent in sorting and grading scrap material will repay manyfold in better prices when the scrap is sold. To afford facilities so that this sorting can be done continuously a proper arrangement of bins or scrap compartments in which the materials may be placed and kept under lock and key is quite necessary.

A brief statement of some of the means taken by steam roads to effect economies by reclaiming scrap are of interest. The Illinois Central Railroad, whose reclaiming department yields between \$9,000 and \$10,000 a month, has built a small re-rolling mill at a cost of about \$4,000 and has equipped this mill for reclaiming and re-rolling scrap iron usually obtained in the form of truss rods, center pins, bridge members and arch bars. The re-rolled iron which is the product of this mill is superior to merchant bar because of the further refining done during re-rolling. This iron is used principally for making bolts and the net saving per ton is more than \$12. In the scrap department of the Illinois Central Railroad a saving of \$2,000 a month is obtained by relining journal bearings. Air hose that has been chafed or cut is made usable again by means of splicing with special nipples and clamps, thus bringing about a saving of 46 cents per hose on 150 sections of hose per month. A paint mill has been built because it has been found that by reworking the accumulation of paint skins and slops a paint well suited for freight cars and passenger-car roofs is obtained at a saving of \$22 per barrel of

paint paste. The skins are boiled in raw oil and shaded with red oxide of iron. Good economy results from straightening I-section brakebeams that have been bent in service. Formerly these were discarded because it was known that the reheating preparatory to straightening greatly reduced the strength of the material. Now such beams, after they have been straightened, are reinforced by attaching a 2-in. x 2¼-in. angle with six rivets, and are said fully to meet specifications for strength. A new brakebeam costs about \$2.40, weighs about 167 lb. and has a scrap value of 75 cents. The cost of straightening and reinforcing is 45 cents for material and 19 cents for labor. In six months during the summer of 1910 10,233 beams were straightened and reinforced. The large steam roads find it economical also to make car cleaner, make and repair springs, re-tire steel wheels, make their own brass castings and, in general, reclaim all material that warrants the expense, taking into consideration the quality of the article after it has been turned into usable stock.

How far the electric roads can go in this work of reclamation depends largely on the size of the road, but no road is too small to neglect the opportunity for economy easily obtainable by watching its scrap pile. It would be desirable in any event to have all the scrap collected at frequent intervals and brought to a single storeroom where one competent shopman could select the material which was serviceable for re-use. This method is successfully followed in the Syracuse shops of the Syracuse Rapid Transit and Oneida Railways.

The electric railways on the Pacific Coast pay considerably more for metals than do the roads in the East and have for some time been giving attention to the utilization of scrap. The Pacific Electric Railway has been successful in making axles from selected wrought-iron scrap. When an old car is dismantled the scrap wrought iron and steel are carefully sorted into bins in the company's storehouse, their value being credited to the destroyed car. The storkeeper receives this material at scrap value and issues it to the blacksmith shop at an increase of 2 per cent for the cost of handling. Preparatory to making billets the scrap wrought iron is cut into pieces about 16 in. long and bound into packs weighing about 175 lb. After having been heated in an oil furnace these packs are worked under a power hammer until a billet has been formed. Seven such billets are required for making a 6-in. axle, and the metal, by the time it is shaped, has been so reworked that it has a very tough fiber and a high elastic limit. Similarly the scrap steel is reworked into shape suitable for filler blocks for use in building special track work.

The economy obtainable from the refiltering of oil is generally recognized. In fact, there are few progressive electric railways of importance without oil and waste saving apparatus, either of the convenient turbine type or of various forms of steam heated tanks with filtering and settling compartments for different classes of oil. One steam road, which reclaims journal-box waste and oil in large amounts, goes even farther. The vat in which the waste is cleaned collects a heavy mud which later is put in barrels. A series of screens is installed in these barrels so that the oil may be drained out of the mud. From the residue on the screens a substantial amount of babbitt is reclaimed.

The foregoing examples of how some companies have increased the economy of operation by reclaiming materials that otherwise would be sold for scrap form an object lesson in economy that is well worth recognition.

NEW PAY-AS-YOU-ENTER CARS FOR BALTIMORE

On Dec. 25, 1910, the United Railways & Electric Company of Baltimore placed in service upon its Gilmore Street line the first of a lot of 60 prepayment, semi-convertible cars received from The J. G. Brill Company to replace an assignment of open and closed cars. The general dimensions of the new car are as follows: Length of platform, 5 ft. 8½ in.; length over the corner posts, 30 ft. 8 in.; length over all, 43 ft. 9 in.; maximum width, 8 ft. 5 in. The exterior of the car is similar in design to many of the semi-convertible cars now in operation



Baltimore Prepayment Car—Rear Platform

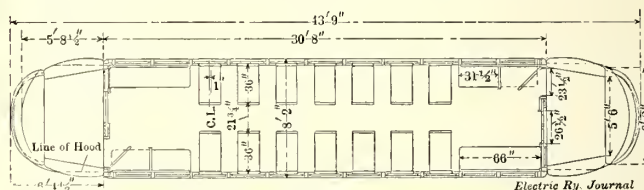
in Baltimore, but the new type represents a careful study of conditions to be met in the adaptation of pay-as-you-enter cars to service requirements. This study was made possible by the rebuilding in the shops of the railway company one year ago of 32 standard city semi-convertible cars for use as prepayment cars.

One detail which received most attention was the length of platform, which is 5 ft. 8½ in. It was found that this length was the maximum possible to operate successfully over any or all of the Baltimore lines. A careful consideration of the platform area and the proper arrangement of the devices lo-

end. The exit and entrance doors are separated by a narrow bulkhead in front of which the conductor and his fare box are located.

The seating of the car is an arrangement of four longitudinal seats extending the length of the first two windows at each corner, the rest of the car being furnished with 14 transverse reversible spring rattan seats 36 in. wide. The aisle space between these transverse seats is 21¾ in. The longitudinal seats at the two diagonal corners where the swinging door is located have a portion of this seat arranged to fold downward to permit the opening inward of the swinging door. The total seating capacity of the car is 42 passengers, 28 on the transverse seats and 14 on the longitudinal seats. The transverse seats, which were made by the Hale & Kilburn Manufacturing Company, are fitted with pressed-steel pedestals, wall and aisle plates. This type represents a saving of approximately 25 lb. per seat over a seat of similar dimensions made up with malleable iron castings.

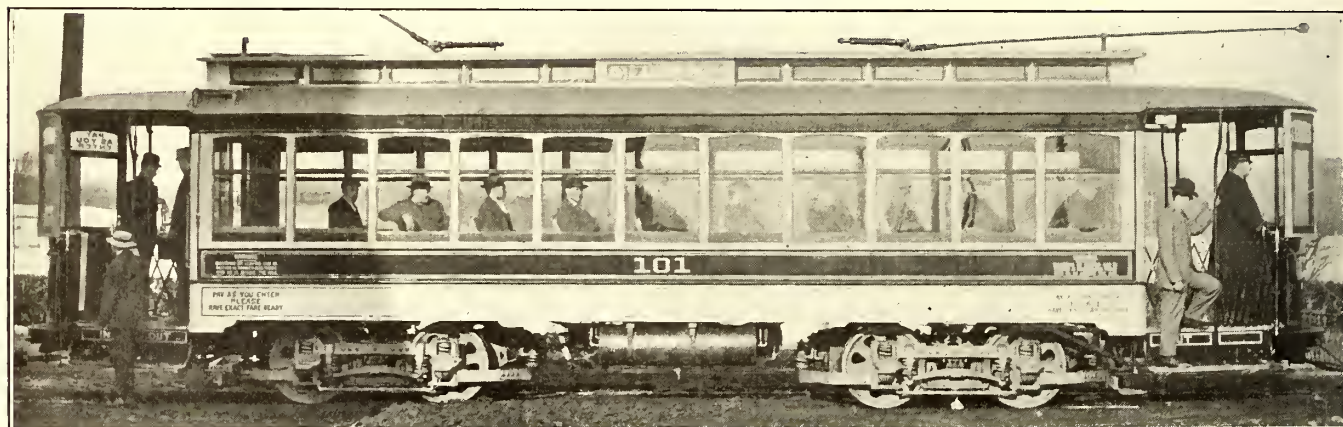
The ceilings, both side and center, are covered with agasote, which has been sanded smooth and, after being painted light buff color, has a neat ½-in. aluminum black-edged stripe. The cars are supplied with Hunter illuminated destination signs in the side of the monitor deck, as well as in the ends.



Baltimore Prepayment Car—Seating Plan and General Dimensions

The diagrams on page 628 show the car-wiring schemes for all equipments except the push-button circuit. Wires are run in conduit for the heaters, although at the present writing no heaters are installed. At each intermediate post there is supplied a pearl push button connecting with a monitor bell at each end for passengers to signal to the conductor. This circuit is operated by three dry cells. All the lights of the car are placed in grooved moldings. Each platform has two lights on the transverse center of the hood, arranged to burn simultaneously with the front headlight.

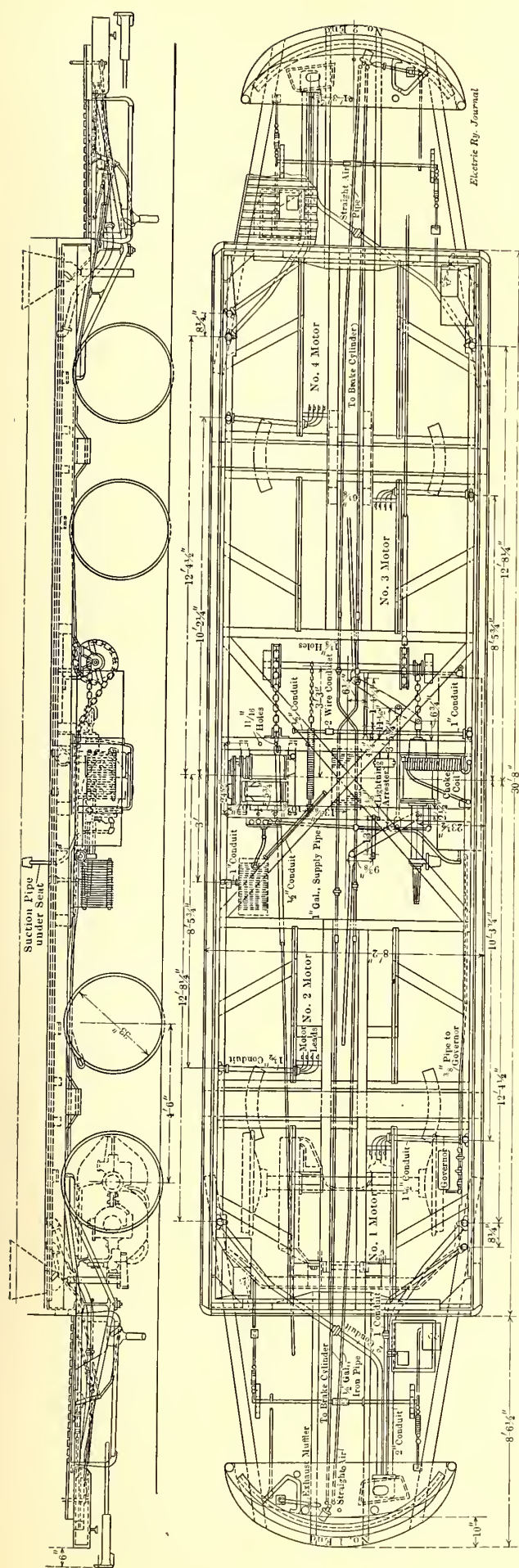
The interior finish of the car is natural cherry. The interior



Baltimore Prepayment Car—Side View of Car in Service

cated thereon has produced a platform space which meets successfully the most exacting conditions of the service. The platforms are not entirely inclosed, as vestibule doors are not used, but the openings where required are closed by standard lazy-tong gates. The entrance to the car proper is gained by a pair of sliding doors which give a 26½-in. opening. On the extreme left is a single door with 23½-in. opening which swings inward for emergency exit. The regular car-body exit is formed by the double sliding doors on the right at the front

moldings are very plain so as to require the least work in keeping the car clean. The curtains are of pantasote, supplied with either the Curtain Supply Company's ring fixture No. 88 or the National Lock Washer Company's National cam fixture. Each car is supplied with one Brill fare box of a type designed especially for the United Railways & Electric Company. This box has no registering mechanism, as the registration of fares is accomplished with two International R-7 registers of the railway company's standard type. A register



Baltimore Prepayment Car—Plan and Side View, Showing the Location of the Electrical and Braking Apparatus, Power Wiring Conduits, etc.

rod, which passes through the car, communicates by a small rod at either end with one of the registers; the standard practice of the railway company is to use the forward register. The fare box is carried upon a sliding railing, so that when the car is reversed the railing can be raised up out of the way and the fare box carried to the other platform. This railing serves at the same time to form a barrier for dividing the passengers who board and leave the car.

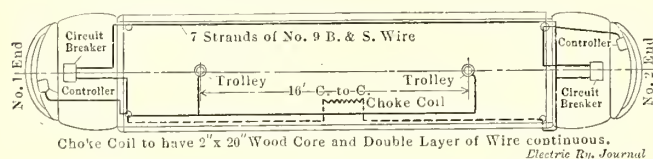
Careful study has been given to obtaining a car of minimum weight. To this end the platform supports, instead of being of wood reinforced with heavy angles, are made of light channel irons, so arranged that they will carry with a large factor of safety all the loads placed upon them. The wooden sills have been reduced in size from 4¼ in. x 8¾ in. to 2¾ in. x 6⅞ in. At the same time the sill plate has been increased from ⅜ in x 15 in. to 5/16 in. x 16½ in. The sill plate by means of a drop forged corner iron is held by rivets to the end sill, which is a 10-in. channel. The center knees are securely riveted to the end sill, by means of a ⅜-in. gusset plate, thus forming a very substantial and stiff underframe. The post construction also represents the latest design of the car builder. It is a skeleton post which, instead of having a solid upper part, is made in two pieces framed together to produce the required shape. At the same time unnecessary material in the center of the wide part of the post is omitted. A further saving in weight has been made by the omission of center stringers running the entire length of car. These stringers are usually covered with a heavy angle iron extending from the bolster out to the end of the platform in order to support the platforms. Instead of these timbers, short timbers are used to distribute the forces acting on the bolster. The floor boards are all hollow back, which also reduces the weight.

The car is equipped with four sand boxes of the "Dumput" type, two of which are placed beneath platforms and two in the corner of the car under the longitudinal seat. Both sand boxes at each end are operated simultaneously by means of a hand lever connected to a rocker shaft. The hand brake rigging is a carefully designed scheme of chain sheaves which does away with an elaborate system of levers and produces excellent hand brake rigging with a slight saving in weight. The car body complete with foundation brake rigging, etc., weighs approximately 15,830 lb.

The cars are mounted on a pair of Brill 27 GE-I trucks. A study of the possibilities of reduction of truck weight led to the adoption of a cast-steel truck bolster. Another material gain was obtained by using short pieces of heavy angle iron for truck motor supports. The journal boxes are of a type specially designed for the railway company, using its standard check plates and bearings. The back of the box is fitted with an M. C. B. wooden dust guard. The journal box lids are of the pressed-steel type, which, after careful test, have given most excellent results. The axles are Coffin-treated steel, $4\frac{1}{2}$ in. in diameter, with $4\frac{7}{8}$ -in gear seats and 4-in. journals. Solid gears are used and are pressed on with from 45 tons minimum to 60 tons maximum pressure. The wheels are cast iron 33 in. in diameter and of a type that is standard on all the double-truck equipment. The brake shoes are arranged to be used with the separable shoe heads and have steel backs of the American Electric Railway Association's standard design. The truck brake rigging is the United Railway & Electric Company's standard slide brake. The approximate weight of the two trucks is 12,800 lb.

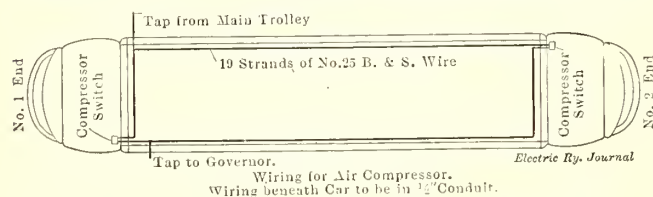
The selection of the motor equipment received exhaustive consideration before the specifications were prepared. It was found that the grades, running time, schedules to be met and the fact that the rail is very gummy during the greater portion of the year were conditions which produced high temperatures within the motors. Hence there was required for the motor a larger amount of reserve power than could be obtained with but two motors of the standard types. A very important part in the consideration as to whether four or two motors should be used was the fact that the reliability of service obtained from four motors was most marked as compared with that

from two motors. It was therefore thought best to sacrifice some gain in weight reduction in favor of a high standard of reliability. The electrical equipment consists of four Westinghouse 101-B-2 motors, operated by two K-28-B controllers. These motors have some special features required by the railway company's specifications, the most prominent of which are the field coil terminals, brush holder design and an im-



Baltimore Prepayment Car—Power and Lightning Arrester Circuit

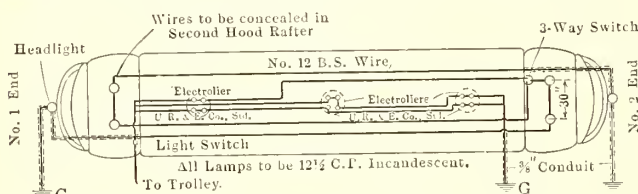
proved method of lubrication for the axle bearings. The controllers also include some special features, namely, a special ground connection on the back of the controller case, a liberal shunt for motor cut-out switches and a wiring arrangement whereby the motor fields are always ahead of the motor armature in either forward or backward motion. The resistance as furnished consists of the railway company's standard patterns



Baltimore Prepayment Car—Compressor Circuit

arranged in two boxes of 25 grids each. Fifteen-tooth special grade pinions are used in connection with 69-tooth solid gears. The gear cases are of sheet steel put together by the oxyacetylene process.

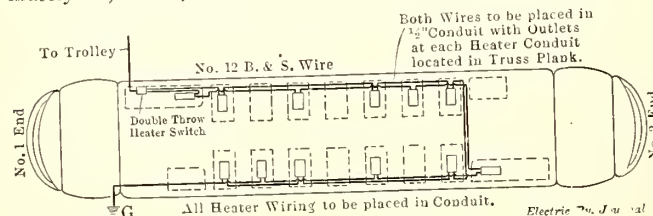
The cables within the car are placed in the transite-lined cable box running the length of the car. The leads of the cables running the controller, motor, resistance and ground are



Baltimore Prepayment Car—Headlights and Lighting Circuit

placed in conduit, extending below the floor or platform of the car. Special fittings were designed by the railway company to connect the conduit to the cable box.

Two standard Westinghouse circuit breakers altered to meet the specifications of the railway are a part of this equipment. There are also one Westinghouse lightning arrester and one choke coil. The complete electrical equipment weighs approximately 12,800 lb., which includes the conduit and fittings.



Baltimore Prepayment Car—Heater Circuit

The air brakes are the Westinghouse Traction Brake Company's SM-3 equipment. In connection with this equipment a type F automatic slack adjuster is furnished. The use of slack adjusters has made it feasible to change from daily to weekly brake inspections. Both the "G" governor and "DIEG"

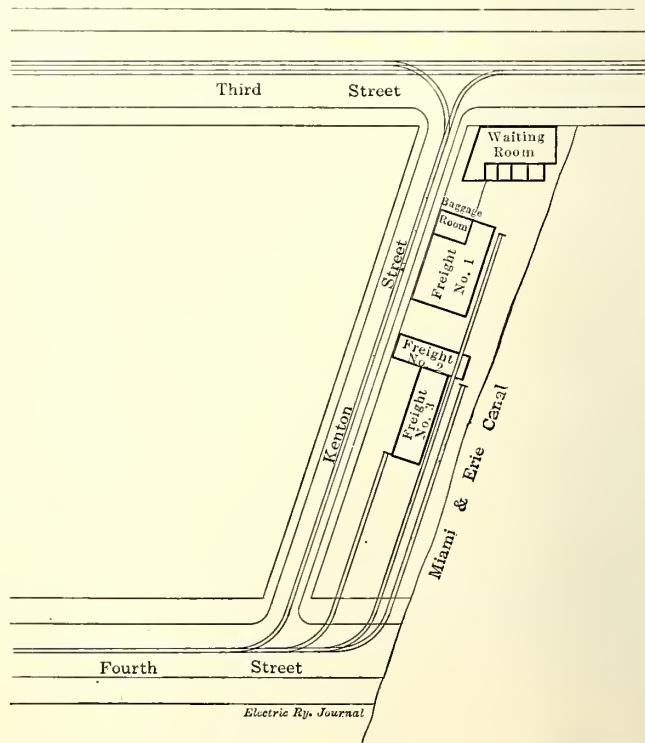
compressor have a number of small details introduced in their construction, as required by the railway company's specifications. The motorman's valve is fitted with a special guard of home manufacture to prevent grease getting on clothing of passengers while standing on the rear platform. The brake cylinder is 10 in. in diameter. The total weight of the air brake equipment, including all of the pipes and fittings, is approximately 1650 lb.

The installation of the complete electrical and air-brake equipments was made at the shops of the United Railways & Electric Company. As promptly as the cars were received from the builder they were turned out completely equipped at the rate of three a day. The complete car weighs, without passenger load, 43,080 lb., as compared with 45,000 lb., the weight of the pay-as-you-enter cars remodeled by the Baltimore company. The new cars weigh 1026 lb. per seated passenger. Notwithstanding the additional weight of the slack adjuster and conduit fittings, there is a net saving of 1920 lb., as compared with the rebuilt cars. This saving is distributed as follows: 1120 lb. in the car body, 600 lb. in the trucks and 200 lb. in the electrical equipment.

The complete specifications, covering all details in connection with the car body, trucks, electrical and air brake equipments, were prepared under the direction of A. T. Clark, superintendent of rolling stock and shops, subject to the approval of William A. House, president.

TERMINAL IMPROVEMENT OF OHIO ELECTRIC RAILWAY AT DAYTON, OHIO

The Ohio Electric Railway has completed a new terminal station at Dayton, Ohio. The layout of the new terminal arrangement is shown in the accompanying illustration. The property on which the passenger station and freight house are now located is in Kenton Street, extending between Third and Fourth



Layout of Dayton Terminal of Ohio Electric Railway

Streets. There were some old buildings on the property when it was purchased, and these have been converted into a passenger station. A warehouse that was on the property has been converted into a freight station, and additional platforms and sheds with tracks adjoining sufficient to accommodate the

freight and express business for several years have also been constructed.

In connection with the new terminal arrangements the Ohio Electric Railway has acquired from the People's Railway and the City Railway of Dayton an interest in certain tracks on Third Street and Jefferson Street, and has constructed new tracks forming a loop connecting the Kenton Street property with the different divisions of the system. Under the new arrangement the freight and passenger cars of the Cincinnati-Dayton division, Dayton-Union City division, Dayton-Richmond division and Dayton-Columbus division enter the new terminal on Kenton Street, effecting a saving in operating expenses and affording additional accommodation to the patrons of the various lines. Before the construction of the terminal and the connecting tracks there was no physical connection between the several divisions of the Ohio Electric Railway at Dayton. The new improvement eliminates the necessity, which passengers were under previously, of traveling several blocks to make the connecting car on which to continue their journey.

The foregoing information has been received through the courtesy of F. A. Healy, secretary and treasurer Ohio Electric Railway.

THE SEATING AND CURTAIN DEPARTMENTS OF THE BROOKLYN RAPID TRANSIT SYSTEM

The Brooklyn Rapid Transit System does all building and repairing of rattan seats and chairs at the East New York shops and all curtain and miscellaneous leather work at the Thirty-ninth Street shops in conformity with its policy to specialize the work of the mechanical department as much as practicable.

SEATING DEPARTMENT

Long experience with the troubles incident to rattan seats has led to several improvements in construction which may be of interest to other electric railways which have not enjoyed the benefits of expert labor for this class of maintenance.

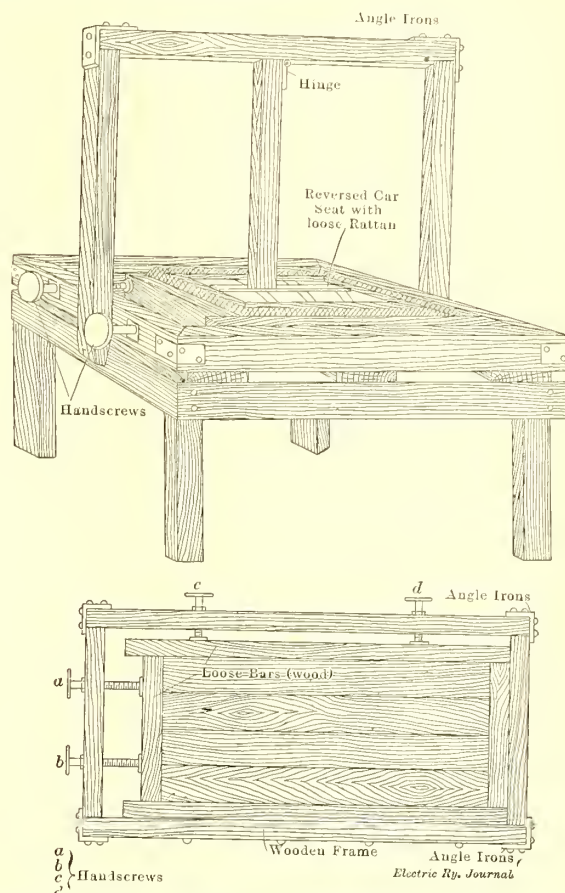
The rattan seats, as originally purchased, were made very much alike except that in one form the strips of flat spring steel to which the spiral springs were attached were carried over the top of the wooden frame and nailed thereto; in the other form the steel strips terminated in a groove $\frac{1}{2}$ in. deep and $\frac{1}{4}$ in. from the outside of the frame, the nails being tacked



A Portion of the Curtain Department

through the side of the frame. In the first construction the nails would gradually work their way up and eventually manifest themselves by penetrating the rattan and tearing the clothing of passengers. The second construction gave little trouble from nails, but in both cases the steel strips would break at the

bends and their sharp, jagged edges would rip the rattan and cause even more damage than the nails. The seats, as now rebuilt, give absolutely no trouble from either of these sources. Furthermore, the new construction makes it possible to avoid considerable waste in spring steel because it is possible to use shorter lengths and these are often made up from old springs which formerly were discarded.



Press for Stretching Rattan Over the Seat Before Nailing

As shown in the sketch on page 630, the strips are riveted to the spiral springs as before, but they are carried only to within $\frac{1}{2}$ in. to 1 in. of the side frames. The edges of these strips are bent back beforehand by a special machine, so that there is no possibility of sharp edges cutting through the seating. Over each spring steel strip there is copper-riveted a strip of canvas. This canvas is glued to the framework and carried around and nailed to the bottom of each side piece. As the nails are in the bottom of the frame their working out can do no damage. After these canvas strips have been installed the entire seat area is covered with a single piece of glued canvas which is tucked over and nailed to the bottom of the end-frame pieces. This large canvas cannot be tucked over the side frames because of the limited clearance afforded by the seat rails. Finally, as a cushion for the rattan, a piece of cow-hair felt, $\frac{1}{2}$ in. thick, is glued to the large piece of canvas. In order to economize material the cow hair is sometimes glued on in two or three pieces. Where one piece is used glued retaining strips of canvas are nailed on at the ends only, but otherwise a strip of canvas is placed over each joint in the felt and the ends of the strip are tacked to the underside of the framing to prevent the shifting of the felt.

When the seat is ready for its covering of rattan it is placed in a press which is supplied with a bed of the proper size. One end and one side piece of the bed frame are adjustable, each being operated by means of a pair of screws, as shown in the sketch on this page. The seat covered with the loose rattan is placed upside down in the bed. Then the screws are applied while the seat springs are compressed from above by a hinged lever which presses against a cross-bar placed over the

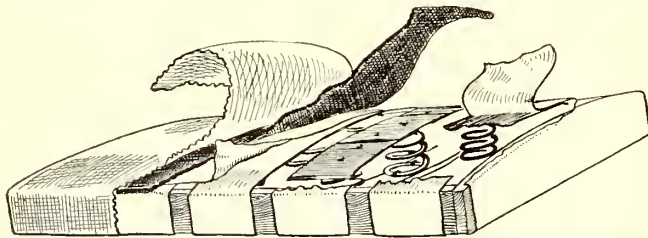
seat slats. Thus the entire seat is under compression to permit the rattan to be properly tightened for nailing.

The company has not found it necessary to make any material changes in the construction of seat backs. The cow-hair felt used for the backs is $\frac{1}{4}$ in. thick.

CURTAIN AND MISCELLANEOUS LEATHER DEPARTMENT

The department for the manufacture and repair of car curtains and for miscellaneous cloth sign and leather work is located at the Thirty-ninth Street shops. Formerly these activities were divided between the Fifty-second Street shop, which took care of the surface cars, and the Thirty-ninth Street shop, which served all the elevated cars. The consolidated shop not only manufactures and repairs car curtains, but also makes leather sleeves for platform guard chains, hand straps, fire-extinguisher straps, curtains for roller-type destination signs, mail bags, money bags, canvas aprons for snow sweepers, etc. All curtains are furnished with Hartshorn spring rollers and are made of pantasote. The fixtures are of the Curtain Supply Company's latest designs. In the repair of curtains the No. 88 ring fixture is now being installed to replace less efficient designs. The work of the department has been so successful that the company no longer buys complete curtains, except where they form an integral part of a lump bid for new cars.

The hand straps which are made by this department are usually furnished simply as finished thongs, the rivets being inserted at the depot, where the straps are installed on the rods. As an indication of the amount of work done by this department it may be stated that about 150 curtains a day are renewed, in addition to which the department manufactures over 2000 curtains a year. During the past winter over 100 roller-type destination signs were rehabilitated for as many single truck cars. For hood use this form of sign has been largely superseded by a removable illuminated wooden block sign which was devised by the mechanical department. The construction and efficiency features of this sign were described and illustrated in the *ELECTRIC RAILWAY JOURNAL* of June 26, 1909.



Construction of Brooklyn Rattan Seat

It is the endeavor of the company to keep its curtain equipment in the finest possible condition. Consequently, curtains are repainted at definite intervals, even when they are otherwise in good condition. During the past winter, for instance, all of the curtains on the 452 air-brake cars, comprising 33 per car, were coated with pantasote paint. This work was done after some experiments with four or five varieties of this paint. Previously it was the custom to use two coats to secure a glossy finish, but it has been found possible to attain the same results with one coat by adding a thinning solution of japan drier. The freshly painted curtains are hung on rollers and permitted to dry for 10 hours, although they are fairly dry for use in little more than half that time.

The principal equipment of this department consists of one

Wheeler & Wilson, one Singer and four Davis sewing machines. The last four machines are operated by shafting from one compressor motor and each is furnished with two pedals to permit any desired variations in speed. Female operators are employed for this class of curtain work.

A very important feature in connection with the operation of this department is the scrap collecting and handling system. The inspection and maintenance depots must send to this central shop all discarded curtain and other material which it uses, no matter in what condition such articles are. In this way it is possible to reclaim many springs, rods, screws, pieces of curtain cloth, etc., which otherwise would go to the scrap heap as waste.

REPORT ON THE ELIMINATION OF FREIGHT SURFACE TRACKS IN NEW YORK

The New York Central & Hudson River Railroad operates along the western or Hudson River water front of Manhattan Borough, New York, a surface steam railroad which practically is used entirely for freight traffic. In response to long-continued agitation that the tracks of this line should be placed either underground or overhead, a report on the merits of such changes was made on March 27 to the New York Board of Estimate and Apportionment by the borough officers. This report was based on an investigation by E. P. Goodrich, consulting engineer, Borough of Manhattan, and Harry P. Nichols, engineer in charge division of franchises, Board of Estimate and Apportionment. The principal points brought out were the following:

An elevated railroad along the water front, from Sixtieth Street downtown to the Battery, the most southerly part of Manhattan Island, for the common use of all of the railroads is not now required.

An elevated railroad along the water front from Sixtieth Street downtown to Canal Street, for the exclusive use of the New York Central Railroad, is not warranted by the traffic reasonably to be expected.

An elevated railroad for freight purposes should not be constructed on Manhattan Island except as a last resort and when all other methods have failed to give necessary relief. In any final scheme it would be desirable that the New York Central & Hudson River Railroad should have direct rail connection between its Sixtieth Street yards and its Thirtieth Street freight yards.

For the district lying between Sixtieth Street and Spuyten Duyvil, the most northerly part of Manhattan Island, the plan heretofore proposed by the New York Central, of eliminating grade crossings by carrying city streets over its tracks at its present grade, except between West 129th and West 138th Streets, where the grade of the railroad should be raised and the tracks carried on a viaduct, is, generally speaking, the plan that should be approved and required by the city.

For the district lying between Sixtieth and Thirtieth Streets a four to six-track subway under Eleventh Avenue should be built by the New York Central Railroad for its own use. For the district south of Thirtieth Street the committee suggests the use of so-called unit water terminals, to consist of twin float-bridges connected with a double-decked pier on which cars shall be landed at the water level and raised on a ramp to the second story, and from which they shall be led on a bridge at right angles across the water-front thoroughfare (West Street) to terminal warehouse buildings and terminal yards to be located on the opposite side. Nine such unit water terminals will be sufficient to handle the combined business of all the railroads at present carrying freight to and from the west side of Manhattan Island south of Thirtieth Street. These would replace 24 piers now used for railroad purposes south of Thirtieth Street.

In this connection it may be interesting to add that on March 31, R. P. Bolton, a New York engineer, submitted to the Public Service Commission of the First District an esti-

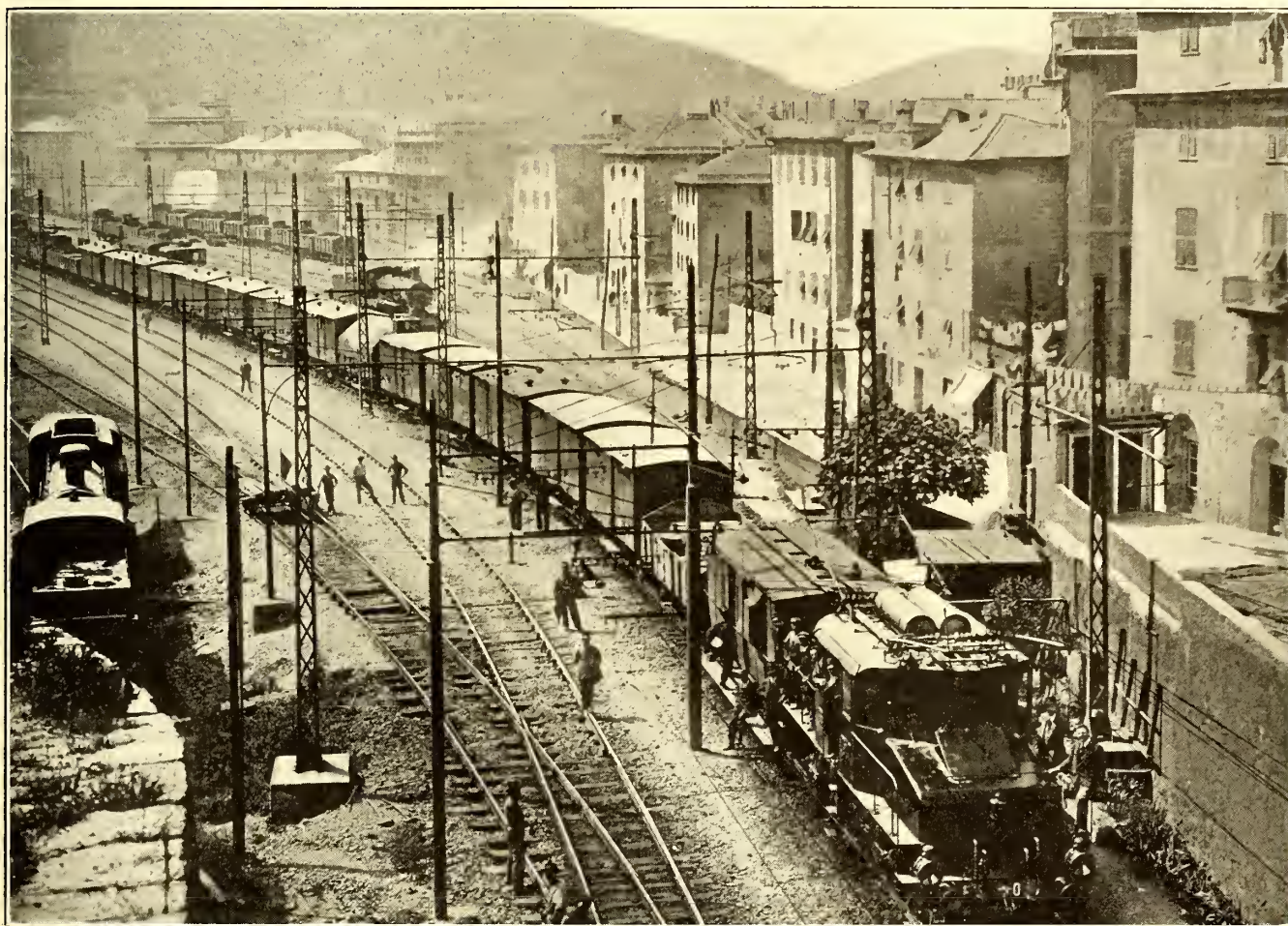
mate, according to which the New York Central & Hudson River Railroad could electrify its Hudson River water front trackage from Spuyten Duyvil to Fiftieth Street for \$2,211,017. Mr. Bolton figured the cost of the electrification of the tracks at \$387,000, transmission and distribution of current \$250,000, substations and batteries \$679,000, rolling stock \$573,000, with charges for engineering, superintendence and miscellaneous to make the total of \$2,211,017. These figures were submitted in a case brought against the railroad company wherein it was asserted that its operation by steam along Riverside Park constituted a public nuisance.

THREE-PHASE LOCOMOTIVES FOR THE GIOVI LINE, ITALY

The Giovi tunnel is situated between the stations of Pontedecimo and Busalla on the line between Genoa and Milan. The

a normal operating speed of 28 m.p.h., but it can also be used for passenger service. The locomotive has also a 14-m.p.h. speed for switching and for regenerating energy when the train is running down hill. In considering the capacity of the locomotive, however, only the higher speed should be considered, since this is the normal one. The locomotive weighs only 60 tons, but its mechanical construction is such that the weight can be increased to 75 tons by means of ballast.

During the tests a train of 418 tons, exclusive of locomotives, was taken at 28 m.p.h. from Pontedecimo to Busalla, a distance of $6\frac{1}{2}$ miles with a maximum grade of $3\frac{1}{2}$ per cent, an average grade of 2.7 per cent and a minimum curve radius of 1200 ft. After this the train was taken back at 14 m.p.h., the locomotive being connected for regenerating power. The time allowed for one round trip was 140 minutes. After 20 hours of such continuous operation one round trip was made without forced ventilation of the motors with a temperature rise of the motors



Three-Phase Electric Locomotive and Train, Giovi Railway

traffic is very heavy, as this is the most important line between Genoa, the greatest shipping center, and Milan, the greatest manufacturing center of Italy. Electrification became necessary on account of the impossibility of coping with the increase in traffic with steam locomotives and of improving the artificial ventilation of the tunnel owing to its great length. The three-phase system at 15 cycles as adopted on the Valtellina and Simplon tunnel lines was employed. The first order from the Italian State Railways to the Italian Westinghouse Company was for 40 locomotives for freight service, 25 of which were for the Giovi line and 15 for the Savona-San Giuseppe line from Savona to Turin, which is being electrified at present. The first locomotives were completed in July, 1908, at the Westinghouse Vado Ligure Works. Upon completion they were employed for a time in the Valtellina lines, pending completion of the Giovi tunnel electrification.

The new Giovi locomotive is built for freight service and has

considerably less than 75 deg. C. The one-hour motor rating for the same temperature was 720 hp per motor, corresponding to a total tractive effort at the wheel circumference of 19,500 lb. During the test this rate was exceeded. A train of 380 tons, exclusive of the locomotives, can be accelerated to 28 m.p.h. in less than 200 seconds by two locomotives, one pushing and one pulling, on a grade of $3\frac{1}{2}$ per cent and on a curve of 1200-ft. radius. The maximum starting torque is such that they can slip the wheels of the locomotive with its weight increased to 75 tons.

The motors are three-phase, 3000-volt, 15-cycle machines arranged to run in cascade and parallel, giving two synchronous speeds of 112½ r.p.m. and 225 r.p.m. Intermittent speeds are obtained by inserting rheostats in the circuit. The motors have double bearings, the outer one of which is built into the main locomotive frame and takes the thrust of the connecting rods and is provided with springs to take up all the motion or

changes of position due to shocks on locomotive frame, etc. The inner bearing carries the rotor and has for its function only the maintenance of the air-gap. The motors are mounted from below by means of a hydraulic jack. The complete change of a motor, including the connections to the side rods, may be easily made in two hours.

The control system contains a number of interesting features. Since the starting resistances are water rheostats it was necessary to design the secondaries of the motors for low potential; this was also desirable in order to have low potential on the slip rings. The low-potential secondaries require, however, the possibility of connecting one of the motors in cascade. The switch performing this re-connection of one of the stators from high voltage to low voltage is the only switching mechanism in the system, which has numerous contacts for heavier current. Since it is always operated without current, the care and cost of maintenance are very low. Furthermore, it may be operated by only two relays. The wiring needed in connection with the potential changing switch is reduced to a minimum by mounting the switch directly on the motor and handling it as a unit therewith. The switch extends into the cab of the locomotive from below and may be readily inspected by removing the protecting cover.

The use of water rheostats has proved very satisfactory. The water tank extends below the cab for air cooling. The height of water in the rheostat is regulated by air pressure. The regulating mechanism extends into the cab proper for convenient inspection.

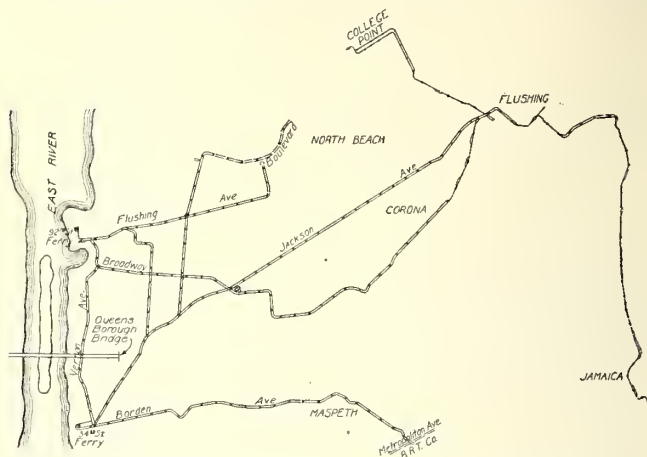
The only switch that is interrupted under current is the primary switch, but even for this switching conditions are very favorable because the current to be interrupted in the primary of induction motors with a wound secondary may be reduced practically to the magnetizing current by first inserting resistance into the secondary and then breaking the primary current. The excellent feature of the primary switch of the Giovi locomotive is that it serves as both an interruption switch and a reversing switch without requiring any additional contacts for reversal; this is accomplished simply by rotating the movable contact parts through a certain angle in order to reverse the motor.

The master control switch has two levers. One of the levers has four definite positions, corresponding to the two forward and backward speeds. The second lever controls the current taken by the motors. Every position of this lever determines positively the certain maximum current to be taken by the motors. Whenever the motor tends to take a current larger than corresponding to the lever position, resistance is automatically inserted into the secondary; the lever acts on the armature of a small induction regulator and thereby regulates the secondary potential of the regulator. The induction regulator secondary is connected to one coil of a relay which is wound in opposition to a second coil, the current of which is proportioned to the motor current. Whenever the effects of the relay coils are balanced the armature is in the middle position and the motor currents remain unchanged. As soon as the motor current increases the armature is attracted by the one coil and closes the relay circuit, which increases the resistance in the secondary. The fact that each locomotive can be set for a maximum current would make it possible to use the locomotive in multiple without a special multiple control; nevertheless a multiple control arrangement is provided. The multiple-control system not only permits the operation of locomotives of different wheel diameters in multiple and equally loaded, but also permits the loading of them differently with any desired ratio of load distribution. This is quite advantageous, as it is frequently desirable to keep the drawbar pull of a pulling engine within certain limits and let the pushing engine take care of the greater part of the load.

NEW TRANSFER SYSTEM

The New York & Queens County Railway has recently adopted a new form of transfer which prevents a passenger, upon payment of one fare, from riding more than once upon any line or returning to the issuing line, and limits the passenger to a ride in the general direction of his initial trip.

The general arrangement of the railway system is fan-



Map of New York & Queens County Railway

shaped, with its principal railway terminal at the Long Island City ferry to New York, and as transfers were issued at the intersection of every radial line with every crosstown line it was possible for a passenger to transfer from line to line and return to the issuing line and to his starting point and repeat the operation. To overcome this difficulty the company has recently introduced a form of transfer which is made up of a main stub or contract and detachable coupons. The main stub carries the name of the issuing line, the date, time limit and in some cases the point at which a passenger may transfer. The coupons attached to the body of the transfer may be one or two in number and entitle the passenger to transfer to any line indicated upon the coupon at the point designated. A coupon is not valid for passage apart from the body of the ticket upon which the time limit has been punched, so that every passenger who boards a car will pay a cash fare or surrender a transfer or the proper coupon.

When a passenger presents a transfer with coupons attached and desires to be transferred to still another line the conductor to whom it is presented detaches the proper coupon (either No. 1 or No. 2 as the case may be) and returns the remainder of the transfer to the passenger, provided another transfer point is marked upon it and the passenger re-

<p>DUTCH KILLS— Outbound NEW YORK</p> <p>P.M.</p> <p>This coupon denotes that hour punched on body of transfer is P. M.</p> <p>FEB 17 1911</p> <p>1 TO 5</p>	<p>NEW YORK & QUEENS COUNTY RAILWAY CO. DUTCH KILLS—Outbound NEW YORK</p> <p>FEB 17 1911</p> <p>Good only for a continuous trip if presented at transfer point indicated before time canceled. Coupons to be detached by conductor only. Rep. Patent, No. 81,240, March Pat. No. 15, 1910.</p> <p>To JAMAICA or COLLEGE POINT SHUTTLE CARS at FLUSHING BRIDGE</p> <table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td> </tr> <tr> <td colspan="5">00451</td> <td colspan="7"></td> </tr> </table> <p>IF NO P. M. COUPON ATTACHED HOUR PUNCHED IS A. M.</p>	1	2	3	4	5	6	7	8	9	10	11	12	00451												<p><i>Not good if detached</i></p> <p>To HAVESWOOD or CULVER CARS at BORDER & VERNON AVE</p> <p>To STEINWAY CARS OUT'D at STEINWAY & 5'WAY</p> <p>To STEINWAY CARS OUT'D at STEINWAY & FLUSH AVE</p> <p>To FLUSH, COLLEGE POINT or CORONA CARS OUT'D at WOODSIDE BARN</p> <p>FEB 17 1911</p> <p>5 00451</p>	<p><i>Not good if detached</i></p> <p>To 34th ST FERRY CARS IN'D at BRIDGE PLAZA</p> <p>To BROADWAY CARS IN or OUT'D at 2d AV & BROADWAY</p> <p>To FLUSHING AVE CARS OUT'D at FLUSHING & NEWTOWN AVE</p> <p>FEB 17 1911</p> <p>5 00451</p>
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Transfer New York & Queens County Railway, with Coupons for Detachment When a Change of Cars Is Made

quests the transfer for further use. From this it will be seen that a passenger may ride on four different lines for one fare; first, on the line on which he pays his fare; second, on one of the lines named on the first coupon; third, on one of the lines named on the second coupon; and fourth, on a line named on the body of the transfer. But they must be in the same general direction.

On outbound cars a green transfer is issued. On inbound cars a red transfer is issued. The transfers are printed for each day and have a p. m. coupon that is detached if the time indicated is an a. m. hour. The time limit allowed upon issuing is one and a half hours. At the end of each half trip the conductor places the transfers received in an envelope, upon the outside of which he records the number of transfers received and the number issued by him. This envelope is placed in a compartment leading to a locked box and remains exposed until the end of the next half trip, when it is dropped into the box.

The transfer used is illustrated herewith and is a combination of the Pope patent p. m. coupon and the Smith patent fare coupon. Mr. Smith, who designed the system, had charge of the transfer penalty litigation in the law department of the New York City Railway, and believes that this system gives the very liberal privileges that the New York statute requires and at the same time provides against abuses of the privilege. The system has been in effect for more than a month on the New York & Queens County Railway and has given satisfaction to both operating and auditing departments.

REPORT OF THE STANDARDIZATION COMMITTEE OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

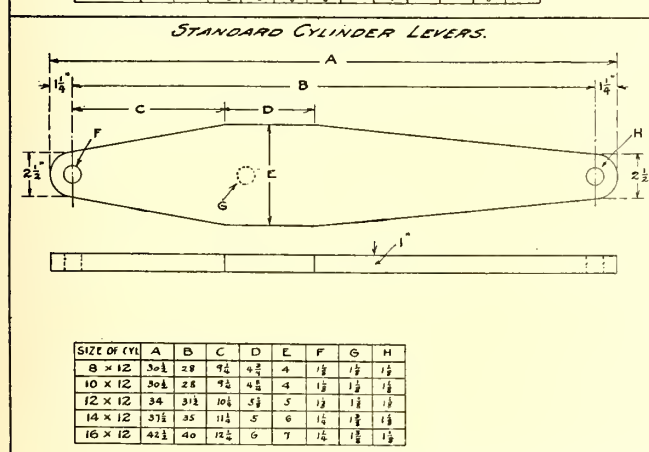
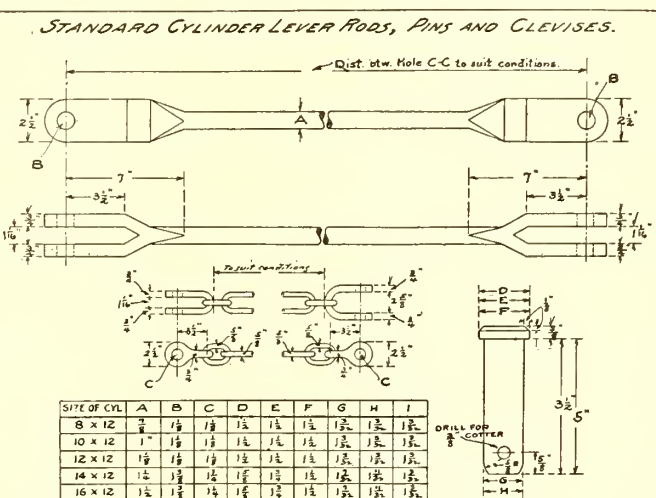
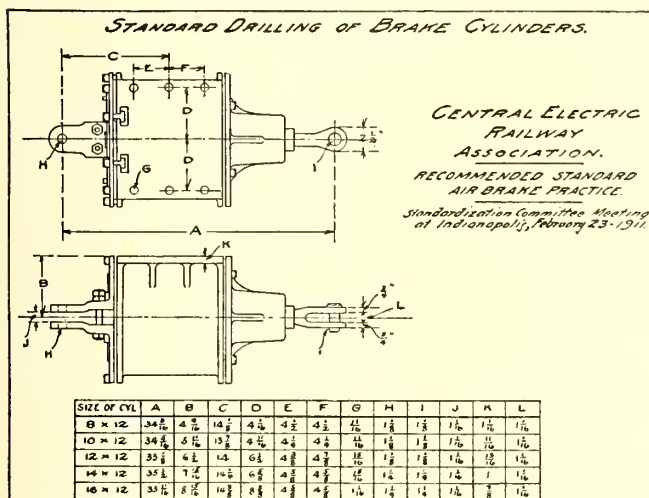
A drawing showing the proposed standards as regards the size of cylinders, length of piston travel, maximum and minimum

at the next meeting of the association, to be held June 22.

With this is a report of the meeting of the standardization committee held at Indianapolis on Feb. 23. Those present at this meeting were H. H. Buckman, chairman, L. W. Jacques, L. M. Clark and W. H. Evans, all members of the committee. In addition, representatives were present from the following manufacturing concerns: National Brake & Electric Company, Westinghouse Traction Brake Company, Allis Chalmers Company, J. G. Brill Company and Standard Truck Company. The report says:

"Considerable discussion was had on the subject of standardization of air brake equipment as to the parts in general and in detail. It was found that the manufacturers differed considerably in the character of the air brake compressor cradle suspension, and it was decided on a motion that this subject be held over until a future meeting. In the meantime the matter would be investigated among the different companies. It was upon motion decided that a blueprint be prepared covering all the dimensions of brake parts which have been discussed and decided upon at this meeting which are recommended for adoption as standard, this covering the weights of cars and the size of cylinders for same, the air pressure recommended, the piston travel, maximum and minimum variation in air brake pressure, governor settings, etc.

"As a result of the discussion and deliberation of the committee at this time such a print has been prepared and is hereby submitted with the recommendation that it be adopted as



STANDARD AIR BRAKE SCHEDULE.				
SIZE OF BRAKE CYLINDER	LIGHT WEIGHT OF CARS.			
	50 LBS CYL. PRESSURE		60 LBS CYL. PRESSURE	
	90 PER CENT	100 PER CENT	90 PER CENT	100 PER CENT
8 x 12	29000 or less	26000 or less	35000 or less	32000 or less
10 x 12	29000 to 42000	26000 to 34000	35000 to 50000	32000 to 45000
12 x 12	42000 to 58000	38000 to 53000	50000 to 70000	45000 to 63000
14 x 12	58000 to 75000	53000 to 68000	70000 to 90000	63000 to 81000
16 x 12	75000 and above	68000 and above	90000 and above	81000 and above

100% of weight of wheels on rail to be used for Motor Axles.
 90% " " " " " Trailer
 50 lbs. Cylinder Pressure to be used for Automatic Air Brake calculations.
 60 " " " " " Straight " " "
 Governor adjustments, minimum 85 lbs.; maximum 100 lbs.; Auto Air Brake Equip.
 " " " " " 65 " " " Straight " " "
 Brake Pipe Pressure Standard, " " for Automatic Air Brake Equipment.
 Standard Standing System Travel 4 in. " all

Proposed Standard for Air Brake Equipment, Central Electric Railway Association

air pressures, governor settings, etc., of air brakes recommended by the standardization committee of the Central Electric Railway Association is published herewith. These standards were presented to the association by the committee at the meeting held at Columbus on March 23, and, as stated in the last issue of this paper, copies are being sent to the members of the association so that the subject can be considered

standard. Further adopted on resolution that we recommend as standard a total truck leverage ratio of 6 to 1 for long base trucks with inside hung motors and a ratio of 9 to 1 for short wheelbase trucks having outside hung motors.

"The question of determining the adoption of a standard sign or national insignia for electric traction railway material was considered, but was deferred until a future meeting.

HEARING BY MASSACHUSETTS COMMISSION ON PETITION FOR LOWER FARES

The Massachusetts Railroad Commission gave a hearing at Boston on March 31 upon the petition of citizens of Holliston for a reduction of the fare between Holliston and South Framingham on the Milford & Uxbridge Street Railway. W. M. Prest, of Boston, represented the petitioners and Wendell Williams, Milford, Mass., appeared on behalf of the company with William Adams, its superintendent. The petitioners contended that the fare should be reduced from 10 cents to 7 cents on the line in question. Prior to the beginning of the hearing the company informed the petitioners that their request for a 7-cent fare practically reopened the case of last summer, when the commission decided that the existing charges were not unreasonable, and, in order to enable some definite issue to be raised, submitted the following questions to the petitioners with the approval of Chairman Hall, of the commission:

"1. Was the company at the time of its increase of fare between Holliston and South Framingham justified in attempting to secure additional earnings by increasing its fares at some point or points?

"2. Was from Holliston to South Framingham a reasonable and proper point at which the fare should be increased in order to yield additional income?

"3. If not, at what point or points on the company's road should fares be properly increased for this purpose?

"4. Would the proper method of increasing its income be to change its unit of fare from 5 cents to 6 cents over the entire road, or, if over a portion of it, what portion?

"5. Does the increase from 5 cents to 10 cents between Holliston and South Framingham yield more additional income than the company is entitled to?

"6. Will an increase from 5 cents to 7 cents between Holliston and South Framingham yield all the additional income to which it is justly entitled?

"7. If part of the additional income required ought to be secured by an increase of fare at some other point or points than between Holliston and South Framingham, please state at what point or points."

The petitioners did not undertake to answer the above inquiries, but confined their efforts mainly to a discussion of the company's earnings and expenses as derived from returns to the board, from figures prepared by the company for recent months, and to the cross-examination of Mr. Adams.

Mr. Williams stated that the petitioners desired a 7-cent fare for a distance of about 6 miles, the fare having been 10 cents since June 1, 1910, and previously for some years 5 cents. An extended hearing was given by the board upon a petition protesting against the raise from 5 cents to 10 cents, and by an order passed in October, 1910, as a result of the hearing and subsequent careful investigation of the board the increase of fare was held not to be unreasonable. Mr. Williams said that the company knew of no change of situation or additional facts bearing upon the question that could justify the board in changing its determination.

Mr. Williams submitted two statements showing the comparative earnings and expenses, with charges, for the two years, 1911 being partly estimated. He contended that these figures showed conclusively that the financial condition of the company was not such as to warrant a decrease in fares. It was possible that the total net earnings for the fiscal year 1911 might equal nearly or quite 6 per cent on the common stock of the company, but if a 6 per cent dividend should be declared nothing would be left for depreciation. The company could not safely pay 6 per cent even if the earnings should amount to that. There were many things to be provided for, including new cars and expenditures resulting from decay and obsolescence. If the company could not be permitted to accumulate something for this purpose it was a question how the road could be maintained. The company was now operating 10 single-truck side-seat cars 16 years old which ought to be replaced by new

and modern cars at an expense of about \$50,000. "This is but one instance," said Mr. Williams. "From where is the money to come for such purposes unless from accumulated earnings?"

The statement submitted by the company showed the following dividend record for the last six years: 1905, nothing; 1906, nothing; 1907, 3 per cent; 1908, 1 per cent; 1909, 3 per cent; 1910, 4 per cent; an average of 1.83 per cent. Counsel argued that stockholders are entitled to a larger return than this, and that it would take many years of substantial dividends to make a reasonable average. He said that the proper administration of the company required an annual surplus of about \$25,000, but under present conditions this was impossible to realize. Even a 5 per cent dividend paid from the estimated earnings of 1911 would leave a surplus of only \$4,000. About 36 miles of track are now in operation on the road. Mr. Williams said:

"If it is assumed, as we contend it must be, that the company is entitled to its present income, the only question is whether or not it is discriminating by imposing an unreasonable fare between Holliston and South Framingham. A table of fares is submitted which shows that it is not excessive as compared with the fares on other street railways between places similarly situated, or as compared with other points on this railway. The road must be considered at a whole, as has been frequently suggested by the board. In any country street railway system there are certain fare zones that are not self-sustaining and could not be made so without very excessive fare. Other points must make up to a degree for these losses. That there are other points on the road that would seem to be entitled to a reduction of fares if earnings warranted can be seen by an examination of the tables."

Mr. Williams said that there was a strong feeling in the company's territory against any discriminatory reductions in fares, and he submitted petitions signed by the selectmen of Hopkinton, Mendon, Hopedale, Uxbridge, Medway and Milford against the reduction desired.

The reason for the former existence of a 5-cent fare was the acute competition between the street railway and the Boston & Albany Railroad. Mr. Williams stated that this competition had turned a profitable portion of the street railroad into an unprofitable one for a long period. If there were no other reason, the danger of inviting such competition again would be a sufficient reason for not reducing the fare as long as it was not excessive as compared with other fares. In closing, he said:

"The petitioners have not been consistent. At their first hearing their contention was that the increase of fare was unjust because many of the residents of Holliston traveled back and forth daily to South Framingham. This difficulty was met by a suggestion from the board and a workmen's ticket was introduced by the company. The petitioners have now changed their tactics entirely, and no longer deem the regular daily travel important, but want a fare substantially equal to the workmen's ticket for everybody."

In the examination of Superintendent Adams the point was brought out that the company had been obliged to face an unusual outlay last year between the disputed municipalities in connection with State highway construction. Wages have been raised from 22½ cents to 25 cents per hour, making the operating cost about \$8,000 per year higher with the same service. The price of copper had declined, as contended by the petitioner, but the company had had no occasion to buy copper, and hence had not reaped any benefit from the reduction. Rails and coal were no cheaper this year. Mr. Adams also stated that the operating expenses of the company per car mile, 17.4 cents, include taxes, thus disposing of the petitioners' claim that as an average of 16 cents per car mile would be a proper figure for a country road, not including taxes, the respondent's costs were high. While the returns of the company showed that economies had been effected in recent years, there appeared to be little further opportunity for extensive savings, although from time to time small gains in efficiency may be anticipated. The board closed the hearing at the conclusion of the arguments.

MEETING OF THE COMMITTEE ON PASSENGER TRAFFIC

The meeting of the Transportation & Traffic Association's committee on passenger traffic was held at 29 West Thirty-ninth Street, New York, on March 31. Those present were L. D. Pellissier, secretary, treasurer and claim agent Holyoke Street Railway (chairman); Frank Caum, general manager Scranton Railway, and F. G. Buffe, publicity manager Illinois Traction Company. T. A. Cross, general manager United Railways & Electric Company, Baltimore, Md., and J. E. Gibson, general superintendent Kansas City Railway & Light Company, were unable to be present.

Mr. Pellissier, in opening the meeting of the committee, stated that the executive committee of the Transportation & Traffic Association had instructed the committee to devote its attention this year to the consideration of the development of "every-day business," rather than the development of park or summer business, as the latter subject had been discussed pretty thoroughly by committees of the association in previous years. He then referred to a suggestion made at the last convention by M. C. Brush, of Boston, that the railway companies should "co-operate with the secretaries of chambers of commerce and manufacturers' associations in different localities in endeavoring to bring to their communities manufacturing and other business interests having resources that would encourage the laboring class of people to come there." In further discussion of this point Mr. Brush said that he believed the financial return from expenditures along such a line would be far greater than that obtained from an effort to induce 500 people to go to a park.

A general discussion then followed on the subject of boards of trade. Mr. Buffe stated that the Peoria Board of Trade had recently been reorganized. Peoria has about 65,000 population, and its Board of Trade now consists of about 1000 members. The dues have recently been reduced to \$6 a year and the board now includes practically all of the active business men in Peoria who take an interest in the city, whether they are engaged in business on their own account or are on salaries. The local railway company has about 26 employees who are members of the board and are taking an active interest in its activities. Meetings are held frequently and the secretary is a man who has had long experience as a traffic manager on a steam railroad. This secretary keeps in touch with those new industries which might locate in Peoria and urges them to do so. He also corresponds with the different national organizations and presents to them the advantages of Peoria as a convention city. Among other recent work of the Peoria Board of Trade, Mr. Buffe mentioned that it had been largely instrumental in the erection of a large hotel in the city. Members of the Board of Trade had subscribed for stock in the hotel largely because they had felt that it would be of benefit to the City of Peoria.

Mr. Pellissier stated that the Board of Trade in Holyoke had also recently been reorganized and now has about 1000 members. The dues are \$5 per year. At Holyoke also the Board of Trade has been instrumental in securing the selection of that city for several large conventions.

Mr. Caum stated that at Scranton the dues of the Board of Trade were \$25 per year, and the board had a smaller membership than those mentioned in other cities.

A discussion followed as to the amount of additional traffic which a railway company would gain when a convention was being held in a city, and it was decided to incorporate in the data sheet this year some inquiries in regard to boards of trade and their influence in encouraging the growth of the cities in which they are located.

Other points which were considered in their bearing upon the development of "every-day business" were the establishment by a railway company of an industrial department or land department for encouraging the location along the line of different industrial plants. It developed that the Illinois Traction Company had a department of this kind. Other subjects dis-

cussed were advertising for "every-day business"; traffic circulars, their cost and method of distribution; newspaper advertising, whether purchased on the cash or mileage basis; theater and other all-the-year advertising; company publications; the stimulation of traffic through the offer by merchants of free railway tickets to customers who purchase a certain amount of goods; the free advertisement of theaters and other traffic producing attractions in or on the cars; and different forms of commutation rates.

SUGGESTED TRANSFER LAW

Secretary Donecker of the American Electric Railway Association has just issued a circular calling attention to the transfer law suggested at the last convention of the Transportation & Traffic Association by L. S. Hoffman, general solicitor Public Service Railway of New Jersey. At a recent meeting of the executive committee of the American Association the subject was discussed and the secretary was directed to place a reprint of this law in the hands of each member-company with a statement that it bore the official sanction of the association and a recommendation that the member companies should make a strong effort to place this suggested remedy on the statute books of their respective States, particularly where no law on the subject already exists. The proposed law follows:

"No transfer ticket or written or printed instrument giving or purporting to give the right of transfer to any person from a public conveyance operated upon one line or route of a street surface, elevated or underground railroad to a public conveyance upon another line or route of a street surface, elevated or underground railroad or from one car to another car upon the same line of street surface, elevated or underground railroad, shall be issued, sold or given except to a person lawfully entitled thereto. Any person who shall issue, sell or give such a transfer ticket or instrument aforesaid to a person not lawfully entitled thereto, and any person not lawfully entitled thereto who shall receive, with intent to use for passage, or who shall use or offer for passage any such transfer ticket or instrument, or shall sell or give away such transfer ticket or instrument to another with intent to have such transfer ticket used or offered for passage after the time limited for its use shall have expired, shall be guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine not exceeding \$100 or by imprisonment for a term not exceeding six months, or both."

PLANS FOR RAILROAD ELECTRIFICATION IN CHICAGO

The commission on electrification of the Chicago Association of Commerce held a meeting on April 1. A sub-committee, composed of Milton J. Foreman, W. A. Gardner and Harrison B. Riley, had prepared a report on the scope of the investigations which are to be made. These investigations are to be made according to the following plan: (1) The necessity for electrification; (2) the mechanical feasibility considered from a scientific standpoint and with all the engineering possibilities, impossibilities and problems; (3) the financial feasibility of the undertaking, whether the cost is prohibitive and whether the results will in every way be commensurate with the cost. Permanent officers for the electrification commission were elected as follows: Chairman, Jesse Holdom, lawyer; vice-chairman, T. E. Donnelly, chairman of city smoke commission, and secretary, F. H. Rawson, president Union Trust Company. The finance committee will be made up of Mr. Holdom, Howard G. Hetzler, president of the Chicago & Western Indiana Railroad, and Darius Miller, president of the Chicago, Burlington & Quincy Railroad. The sub-committee appointed to select a chief engineer and a corps of assistants was not ready to report. The committee expects to make definite arrangements for headquarters and to report about these at a meeting to be held on April 14.

LECTURES TO EMPLOYEES AT KANSAS CITY

The Metropolitan Street Railway Company of Kansas City, Mo., has initiated the plan of providing regular weekly lectures on train service to its employees. W. C. Harrington and S. M. James, the assistant general superintendents of the company, are the officials upon whom this duty for the most part devolves. The lectures are brief and straight to the point and seem to have a good effect on the men. The following are a few excerpts from Mr. Harrington's talk on March 9 before the men at the Ninth and Brighton carhouse:

EXTRACTS FROM TALK

"Care is the first requisite of successful train service. To please the passenger and to please the company for which you work you must be careful. To be careful does not mean that you must be careful only in following the rules and regulations. It means that you must be careful to see that all is clear before you start the car or give a signal for its starting. To be careful that you make your time-point and reach the terminal on time is of no avail if you maim several persons in doing so. Be careful of the passenger first of all, and then be as careful as you can to live up to the rules. No man or set of men can make a set of rules to run the world or a part of the world. Neither can a man make a rule to run a street railway without the co-operation of the men who operate the cars. If the rule says that a stop should be made at a certain point and you stop at that point and have an accident just before you get to that point you observe the rule of your company—but you break a greater rule, the rule of public safety. Do your best and listen to the word of the other fellow who has been through it all before and you will succeed.

"Another thing I should like to impress upon your minds is: You must live within your means. If you spend more than you earn you set a bad example. You may have the funds and the bank account to draw from, but that is not good for the young man who is just starting in. If some new man sees you cutting a dash he will begin wondering where you get the funds, and not knowing will probably guess wrong.

"You are not heroes in the performance of your duties, but you are in a position where you may be called upon any moment to prove yourself a hero. If you stop a runaway horse you are a hero. If you prevent an accident you are just performing your duty, but your duty at times calls for more heroism than does the stopping of many runaways.

"And as a parting subject I should like to place the question before you: 'Do you believe that practical men are made in a shorter time in any place in the country than they are here?' We often hear of men obtaining regular runs in a month or two in some other place, but we rarely ever heard of the place being close at hand. Now, let me tell you, the only reason for advancing a man is good service. If some man fails to render good service he is let out and the man who can render the service is advanced. If we hear of men advancing at a rapid rate it is safe to say that the company which is advancing them so fast is also letting others out at a wholesale rate.

"Do your work, do it right and no man can let you out of this service without a cause, while Mr. Egan is at its head."

INVESTIGATION OF PUBLIC SERVICE COMMISSION

In connection with the investigation which John N. Carlisle is making of the New York Public Service Commission, First District, at the request of Governor Dix, announcement was made that a public hearing would be held at the Engineering Societies Building, New York, on April 4. When this meeting occurred Mr. Carlisle announced that it had been called to afford an opportunity to any who desired to make complaints regarding the work of the commission. He had received a letter on the subject from F. W. Whitridge, receiver of the Third Avenue Railroad, which he said he would make a part of the record. Mr. Whitridge's letter said in part:

"As a receiver of the Third Avenue Railroad, I have been attacked, regulated and harassed by the Public Service Commission of the First District in a way which is explained in my replies to the communications of the commission. All of these have been printed and are public property. I have never taken the initiative in attacking the commission at any time, and practically the whole of my writings in respect to it are in the nature of replies. I do not care to take the initiative now, but if there is any assistance which I can give you, I am entirely at your service."

Mr. Carlisle then asked if any of the few who were present wished to appear. As there was no response, he said he would wait a few minutes before adjourning the hearing. As no one appeared to testify, Mr. Carlisle made a brief statement regarding the progress of his work. He said that he had been directed by Governor Dix to make the investigation into the affairs of the First District commission. He had talked with the employees in order to become familiar with their duties, and had examined the work of the commission. An auditor from the Second District commission was now making an investigation of the books of the First District commission. The work of examination of the commission would be continued, Mr. Carlisle said, until its completion, when a report would be made to the Governor. Among those who attended the hearing were Travis H. Whitney, secretary, and L. T. Harkness, assistant counsel of the First District commission.

LA SALLE STREET TUNNEL OF CHICAGO RAILWAYS

The steel tubes of the new La Salle Street tunnel of the Chicago Railways Company were successfully lowered to the river bed on April 2. These tubes, it will be remembered, were built of steel plates and were floated to the location of the tunnel. There are two tubes, each 278 ft. long, built as a single structure and each of sufficient diameter to accommodate an elevated railroad car of the type operated in Chicago. In order to sink these tubes successfully into place in a trench which had been dug in the river bed, the controlling dams at Lockport on the Drainage Canal were closed seven hours in advance of the tube lowering. This allowed the water in the Chicago River to come to rest so that the long steel tubes could be lowered into place between the headings which had been built on opposite sides of the river. The submersion of the steel-tube structure, which weighs about 3000 tons, was accomplished by pumping water into the tubes. Two barges carrying steel girders were placed on opposite sides of each end of the tubes, and by means of donkey engines and cables supported from the girders, the downward movement of the full length of the steel structure was controlled. Now that the tubes are in place in the river bed the work of completing the approaches will be hastened and it is expected that within a few months the cars of the Chicago Railways Company will be running through the new tunnels.

LONDON, BRIGHTON & SOUTH COAST ELECTRIFICATION

W. Forbes, general manager London, Brighton & South Coast Railway, has denied in the *London Times* the statement generally published that that company has decided to completely electrify its lines, consisting of some 480 miles of track. The facts are that, encouraged by the success which has attended the electrification of its South London line, the company is now engaged in equipping for electric traction an additional 15 miles of railway. This is the only work at present authorized, although Mr. Forbes states that it will almost certainly be followed by the electrification of certain other short sections. Beyond this, however, there is no present intention of proceeding with any scheme of general electrification.

An Edison-Beach single-truck storage-battery car has been put in operation on the York and Dauphin Streets line in Philadelphia. It weighs 13,100 lb. and has a seating capacity for 26 passengers. Mayor Reyburn participated in the trial trip.

THROUGH ROUTES AND JOINT RATES BETWEEN ELECTRIC AND STEAM LINES

A decision upholding the principle of through routes and joint rates between electric interurban and steam railroads on non-competitive interstate traffic was rendered by the Interstate Commerce Commission on March 14, 1911. The case involves the Cincinnati & Columbus Traction Company as complainant and the Baltimore & Ohio Southwestern Railroad and the Norfolk & Western Railway as defendants.

The interurban company was organized in Ohio in 1901 and its line as constructed in 1910 extends from Norwood, a suburb of Cincinnati, to Hillsboro, 53 miles. The mileage is wholly in Ohio. This company asked an order from the commission requiring the steam railroads "to establish connections and joint rates for the interchange of interstate traffic."

Commissioner Harlan wrote the report of the commission, which says that the defendants, before contesting the issue on the general merits, interposed objections of a technical nature. These he discusses in part as follows:

"1. The legal right of the complainant to demand a physical connection with the defendants is questioned. Decisions of the Supreme Court of Ohio are cited to show that interurban electric railways are classified in that State as street railways, and are controlled by other statutes than those relating to steam railways. With respect to the matter of fences, gates, crossings, clearances, liability to employees and track elevation the requirements imposed on electric lines under the local laws are said to differ materially from those imposed on steam roads. The State courts, as we are advised, have definitely held that the laws relating to steam railroads are not to be understood as being applicable to electrically operated roads unless that intention expressly appears. One statute to which special reference is made contains a provision as follows:

"'Steam railroad companies as between themselves, and interurban and electric railroads as between themselves, shall afford reasonable and proper facilities for interchange of traffic between their respective lines, for forwarding and delivering passengers and property, and shall transfer and deliver without unreasonable delay or discrimination cars, loaded or empty, freight or passenger, destined to a point on their own or connecting lines.'

"The defendants contend that under this provision the complainant, being an interurban and an electrically operated line, is expressly precluded from demanding a track connection with either of the defendant steam lines and is also precluded from demanding an interchange with them of equipment and traffic. But under the laws of Ohio the complainant seems to be a common carrier of persons and property and is actually engaged in the transportation of both classes of traffic. It also carries express matter. On its line are shippers and towns that desire, in addition to the local service, access to and from interstate points on the public highways operated by the defendants; and in this proceeding we are asked to open these highways to their interstate traffic by requiring the defendants to connect their lines with the line of the complainant and to establish with it through routes and joint rates. Under the act to regulate commerce as amended express power is given us to grant such relief. A local law under which an electrically operated railway may have no right to demand a switch-track connection and interchange of traffic with a steam railway may be controlling in so far as it relates to traffic moving wholly within the State; but it cannot be permitted to operate as an impediment to the movement of interstate traffic after the Congress has legislated upon the subject by specifying the grounds upon which interstate shippers may demand such connections and interchange of traffic.

"2. It is also contended that the proper parties complainant are not before us, and that we are therefore without jurisdiction to order the relief asked. The petitioner made application to the defendants for a switch-track connection and, being refused, instituted this proceeding upon its own complaint. The

petitioner, at a subsequent hearing, filed with the commission two letters addressed to the complainant, one by a general merchant at Marathon, and the other on behalf of a lumber company of Hillsboro, both being points on the line of the complainant. The writers of these letters had given testimony tending to support the general allegations of the complaint. An application that they be made co-complainants, prepared by the attorney of the complainant on the authority of these letters, is also of record. To this application the defendants objected, insisting that the letters and application cannot be regarded as having the force and effect of making the two shippers co-complainants in the proceeding. They also contend that no application in writing for a switch-track connection has been made by these shippers to either of the defendants, and that the petition must therefore be dismissed.

"The letters of these two shippers, in connection with their testimony and their petition to be made co-complainants, seem to us not only sufficient for all practical purposes to bring them before us as co-complainants and to serve as their application in writing for a switch-track connection, but sufficient to give the defendants full notice and to advise the commission of their interest in the questions at issue. On the other hand, the testimony offered by the defendants seems to cover the entire ground, and in making these objections it is not suggested that any additional testimony is required by the presence on the record of these two shippers as co-complainants or that further testimony is in fact available. Inasmuch as the whole situation is fully disclosed and we are in a position to protect the legal and substantial rights of all the parties in interest, we think we may fairly find, as we do, that the necessary parties complainant are before us and that all the requirements of the act, in order to give us jurisdiction of the subject matter, have been observed. Moreover, if the record when closed was defective on these grounds the defect may be held to have been cured by recent amendment to the act."

The decision then takes up the merits of the case, saying in part:

"The first inquiry is whether a switch connection, using the language of the act, 'is reasonably practicable and can be put in with safety and will furnish sufficient business to justify the construction and maintenance of the same.' On this point we think the record leaves no room for doubt. A physical connection with the defendant the Baltimore & Ohio Southwestern Railroad at one time existed at Madeira and also at Hillsboro Junction. At the same time there was also a connection with the line of the Norfolk & Western Railway at the latter point. They were put in when the line of the complainant was under construction, and were removed after its completion, apparently in accordance with a previous understanding to that effect. It is not to be doubted that it is reasonably practicable to restore these connections at those points or to put connections in elsewhere, or that when restored or put in elsewhere they can be operated with safety. Nor can it be doubted that there will be sufficient traffic to and from points on the line of the complainant reasonably to compensate the defendants for constructing, maintaining and operating such switch connections with the complainant.

"The complainant also demands through routes and joint rates to and from all interstate points reached by the defendant lines and their connections. (a) We may not require any railroad involuntarily to embrace in a through route substantially less than the entire length of its road between the *termini* of the proposed through route. (b) We may not establish through routes and joint rates between a steam railroad and a street electric passenger railway that does not transport freight in addition to its passenger and express business. The first of these limitations must, of course, be observed in all cases; the second has no application in connection with this complaint.

"This is the first occasion upon formal complaint that we have had to examine the amended provision. But one point that seems to be entirely clear is that, although the complaint was filed before the amendment became effective, we can act only under the authority that we now have. We gather also

from a careful reading of the amended clause that it was the purpose of the Congress to widen the scope of our powers to establish through routes and joint rates rather than to narrow them, and to leave in the commission full discretion to act in such cases in the light of all the facts and circumstances and according to what may seem wise, fair, reasonable and equitable in each case. We shall dispose of this complaint with that understanding of the extent of our authority.

"For a distance of about 6 miles eastwardly from Norwood the line of the complainant not only parallels the line of the Baltimore & Ohio Southwestern Railroad, but practically adjoins the right-of-way of that defendant. A few miles farther to the east it approaches and at Perintown practically adjoins the right-of-way of the Norfolk & Western Railway and parallels that road for a few miles to Stonelick, at which point it is only about a mile distant from the Norfolk & Western Railway. Its station at Norwood also immediately adjoins the stations of the defendants, the Baltimore & Ohio Southwestern Railroad and the Cincinnati, Lebanon & Northern Railway. For a distance of 4 or 5 miles out of Hillsboro, its eastern terminus, the complainant's line again parallels the tracks of the Baltimore & Ohio Southwestern Railroad, the rights-of-way of the two lines being immediately adjoining. It was at a point about $1\frac{1}{4}$ miles west of Hillsboro that the line of the complainant was formerly connected by a switch track with the line of the Baltimore & Ohio Southwestern Railroad and also with the line of the Norfolk & Western Railway. On that end of the line are the villages of Hoagland, Fairview and Allensburgh, which are, respectively, $1\frac{1}{2}$ miles, 1 mile and 3 miles distant from a station on the line of the Baltimore & Ohio Southwestern Railroad, but much more distant from any station on the Norfolk & Western Railway. They are small communities with no commercial enterprises of such character that they may be said not to be reasonably well served at this time, so far as interstate shipments are concerned, by the Baltimore & Ohio Southwestern Railroad. Among all the witnesses that testified none resided at any of these places, and therefore the record discloses no complaint of inadequate transportation facilities at these points or the need of additional facilities. At the western end of the line are Madisonville, Madeira, Milford, Perintown, Stonelick and Boston, some of which are practically within a stone's throw of either the Baltimore & Ohio Southwestern Railroad or the Norfolk & Western Railway. Boston, the most distant of the points last mentioned, is about 5 miles by the country roads from Batavia and something less from Baldwin, stations on the Norfolk & Western Railway; it is not less than 8 miles from the nearest station on the tracks of the Baltimore & Ohio Southwestern Railroad. Dodsonville, toward the eastern end of the complainant's line, is also 4 or 5 miles distant by wagon road from any station on the Baltimore & Ohio Southwestern Railroad and as much as 8 miles from the nearest station on the Norfolk & Western Railway. Between that point on the east and Boston on the west are a number of towns and villages that are located from about 5 miles to as much as 10 or 12 miles by wagon road from the nearest stations on the lines of one or the other of the defendants.

"Under the principles announced in *Chicago & Milwaukee Electric Railroad Company vs. I. C. R. R. Company*, 13 I. C. C. Rep., 20, we would not open through routes and establish joint rates for Norwood or Hillsboro because both places now reach all interstate points over each of the defendant lines. Moreover, through routes and joint rates between interstate points and Norwood and Hillsboro, in connection with the complainant's line, could not lawfully be required under the act as lately amended. Nor should we open through routes and establish joint rates between interstate points and Madisonville, Madeira or Hoagland over the complainant's line in connection with the Baltimore & Ohio Southwestern Railroad, because those points are already served by the latter line. Nor should we under the views announced in that case open through routes and joint rates to and from Fairview, Allensburgh, Milford, Perintown and Stonelick, all those points being within a short and reason-

ably convenient distance of stations on one or the other of the defendant lines. On the other hand, under the disposition made of a similar complaint in *Cedar Rapids & Iowa City Railway & Light Company vs. C. & N. W. Railway Company*, 13 I. C. C. Rep., 250, we are of the opinion that the defendants may properly be required to join with the complainant in opening through routes and establishing joint rates between interstate points and Boston, Monterey, Hartman, Marathon, Quinn's Crossing, Vera Cruz, Fayetteville, St. Martins, Stringtown and Dodsonville. None of these towns is within less than approximately 5 miles and two or three are 10 miles or more by the country roads from any station on the defendant lines. To say that such places are already reasonably well served by either of the defendants is to announce the definite proposition that a wagon haul of from 5 to 10 miles is not an improper burden to put upon an interstate shipper. But in such a view we are not ready to concur as a fixed rule, even when the country roads are so good as the roads in this territory are said to be. While we have little sympathy with, and will not ordinarily lend our aid to, an effort by one road to secure traffic that is reasonably tributary to another road by compelling the latter to join with it in through routes and rates, we shall not permit the theory as to what traffic is tributary to a road to be pushed to such an extreme as to impose an undue burden upon shippers. Confining our ruling to the special facts of the case and to the points last mentioned, we think the prayer for through routes should be granted.

"But, besides contending that the country traversed by the line of the complainant has been adequately served by one defendant for not less than 50 years and by the other for not less than 25 years, the defendants also assert that the combined traffic to and from this territory is very light, and that the little revenue received from it ought not to be taken from them by a line that should never have been built; that, considering the transportation requirements of this district and the facilities offered by the defendants, the complainant's line is one that would not have been allowed to be constructed under a system of laws, prevailing in some of the States, that requires previous official sanction when a railroad enterprise is proposed and a line laid out; and that 'one of the questions involved is whether the owners of a line of railway thus unwisely projected and built can demand a division with the older lines at their expense and without any compensating advantage to the community in general traversed by the several lines.' In this connection the defendants state that no dividends have ever been paid on the outstanding stock of the complainant company, that its line is operated at a heavy annual deficit, and that it is not earning even operating expenses, but is approaching bankruptcy. Figures are also given purporting to show that the freight rates on the lines of the defendant railroads to the territory in this vicinity produce 'not more than 1.3 per cent profit on the investment.' Excluding Hillsboro and Greenfield, the general district has lost both in wealth and population since 1860. It is said, generally speaking, to be an infertile and very poor farming country, not producing enough grain and feed to supply the local demand. And most of the lumber, it seems, has been cleared off.

"The defendants object to through routes and joint rates with the complainant on still other grounds. It is insisted that its right of way is unfit for the operation of such trains as are used on the regular lines. Referring to the matter of ballast, the line of the complainant is said to be a 'one coat' road and without any ballast in some places, while in others the fills have been much washed. We are also told that the bridges in some cases have no sufficient margin of safety and are largely made from material discarded by the regular lines as second-hand stuff, to be sold and not used; that the trestles are subject to the same general criticism; that the grades are steep and the curves sharp; that while operation is possible it is thought to be dangerous; that such freight cars as the complainant has were purchased of the Cincinnati, Hamilton & Dayton Railway from among those condemned as no longer fit for use on that line, and that if put upon either of the defendant lines they would

be 'crushed like eggshells.' Finally it is said that the clearances on the complainant line are not such as are required by the local law of steam roads, although regular line equipment can get through; that for 5 miles the line runs on public streets; and that at Madisonville there are two curves so sharp that freight cars with standard couplers cannot make the turn, shackle bars being required. The right-of-way is from 20 ft. to 60 ft. wide, and at no place on complainant's line are there track scales. It has 9 box cars, 2 flat cars, 4 gondolas and 1 stock car, and is therefore not in a position to exchange any equipment with the defendants or to furnish any equipment for joint use.

"We think that much of this criticism as to the physical condition of the line of the complainant is the reflection of a special view in which the requirements of steam lines with respect to their roadbed and bridges were taken as a basis of comparison. Giving due weight to the testimony of witnesses on each side of the controversy, but basing our conclusions more largely upon our own investigations, we think the complainant will have no difficulty in moving regular line equipment over its road. We do not understand that it is equipped for operating long freight trains. But, whatever may be the facts with respect to all the details of that nature referred to in the record, we assume that the self-interest of the complainant will be sufficient to lead it to make the necessary arrangements so to conduct its operations as to be able to move traffic over its line with safety. This we think it can do, and this we doubt not it will do. We attach no importance, therefore, to the suggestion that the cars of the defendants will not be safe on the line of the complainant, or to the suggestion that if an order is entered requiring the defendants to join in through routes and through rates with the complainant an undue burden will be placed upon them under the so-called Carmack amendment to the act, because of the condition of the complainant's roadbed and bridges.

"In conclusion we find that the complainant is entitled to a switch connection with the line of the defendant the Baltimore & Ohio Southwestern Railroad at Madeira, and to a switch connection at or near Hillsboro with the line of that defendant as well as with the line of the Norfolk & Western Railway. We shall not here specify the exact points at which the connections are to be made. In case, however, the parties cannot promptly reach an agreement on that matter an order will be entered. We also find on the special facts of the case that the record justifies an order requiring the defendants to join with the complainant in establishing through routes so that shippers on the line of the complainant at points between and including Boston on the west and Dodsonville on the east may have access to and from interstate points under through billing and through charges. The suggestion made on the brief of the complainant is that the joint rates, when established, ought not to be greater than the 'maximum consisting of the present tariffs to Hillsboro and Madeira, respectively, and the carload rates upon the complainant's line.' Certainly this demand, as we understand it, is within reason from every point of view. We agree, however, with the defendants in saying that the case does not seem to justify putting them at the expense of reprinting their tariffs and getting the concurrence of their connections in new joint through rates to and from local points on the complainant's line. This may be avoided if the complainant will file its local rates with this commission. This will make them applicable under our rules on through interstate movements.

"As the complaint seems to have been abandoned by the petitioner so far as the Cincinnati, Lebanon & Northern Railway is concerned, we have not considered that line in reaching the conclusions herein expressed.

"On the assumption that the parties will have no difficulty in carrying these findings into effect by agreement among themselves we shall enter no order at this time. Upon being advised of their failure to agree the necessary order will be entered."

MEETING OF COMMITTEE ON SCHEDULES AND TIMETABLES

The American Electric Railway Transportation & Traffic Association's sub-committee on the construction of interurban schedules and timetables met at Cleveland on Wednesday, April 5. Those present were J. J. Doyle, general superintendent Washington, Baltimore & Annapolis Electric Railway; F. H. McEwen, superintendent Oneida Railway, Utica, N. Y., and H. C. Donecker, secretary of the American Electric Railway Association. Numerous data on the subjects mentioned were collected last year. This material has been worked up in tentative form by the committee, which will make a special study of details, among which are standard meets, adjustment of terminal leaving time, number of trains and miles of tracks operated, time allowed for connections at junction points, branch service, average schedule speed of local and limited trains, number of trains daily and other points that are necessary in the adjustment of standard schedules. Freight train operation, signal equipment and timetable changes were also discussed. The new subjects taken up include different forms of timetables used, methods of showing station names, different standard timetables for single and double track operation, the advisability of indicating different classes of trains, whether schedules should read up and down, best style of timetables for working purposes and for public use, system of numbering trains for Sunday service, the preservation of train numbers by hours regardless of timetable changes, and arrangement of special instructions in timetables. From the timetables filed the committee hopes to develop certain standards for recommendation. Because of the great amount of material on hand a two-day meeting will be held, in all probability on April 20 and 21, to complete the work.

ANNUAL REPORT OF THE BERLIN SYSTEM

The report of the Grosse-Berliner Strassenbahn, Berlin, Germany, for the fiscal year ended Dec. 31, 1910, shows that the company declared a dividend of 8½ per cent on about \$25,000,000 capital. During the year it placed in service 100 double-truck motor cars and 24 trailers, giving a total of 675 double-truck motor cars, 917 single-truck motor cars and 1036 trailers. The trail cars seat 24 passengers and carry a platform standing load of 16. The number of passengers carried during 1910 was 427,700,000 as against 396,610,000 in 1909. The gross earnings in 1910 were 40,771,185 marks (\$10,192,796) and in 1909, 37,779,274 marks (\$9,444,818). The distances run were 97,227,676 car km (60,281,159 car miles) and 91,038,384 car km (55,823,798 car miles). The gross earnings per car kilometer were 42 pfennigs (16.8 cents per car mile) as against 41.5 pfennigs (16.6 cents per car mile) in 1909. The operating expenses formed 55.58 per cent of the gross earnings as against 54.82 per cent in 1909. There were carried 4.4 passengers per car km (7.04 passengers per car mile).

The total number of persons employed was 10,596. Since July 1, 1905, 464 employees have been pensioned, and since Jan. 1, 1907, provision has been made for 100 widows of employees. The income of the sick benefit fund was 565,466 marks (\$141,366). The expenses were distributed as follows: Physicians' treatment, 124,575 marks (\$31,144); medicines, 79,814 marks (\$19,953); sick benefit payments, 296,709 marks (\$74,177); funeral expenses, 9033 marks (\$2,258); sanatorium and hospital expenses, 57,034 marks (\$14,258); miscellaneous, 11,294 marks (\$2,823), and management, 11,920 marks (\$2,980).

The trackage amounted to 534.5 km (331.4 miles). The sum of 500,000 marks (\$125,000) was assigned to the track and roadway depreciation account and 525,000 marks (\$131,250) was placed in the depreciation fund for renewal of rolling stock. Under agreement with Berlin and neighboring municipalities the company paid to them 2,786,430 marks (\$696,607) from its gross earnings. In addition, Berlin received 1,120,002 marks (\$280,000) from the company's net earnings.

COMMUNICATION

COST OF STOPPING AN INTERURBAN CAR

NEW YORK, March 10, 1911.

To the Editors:

In an article entitled "Automatic Block Signals for Electric Railways," which was printed in the *ELECTRIC RAILWAY JOURNAL* of Feb. 11, 1911, W. K. Howe says:

"Based on information furnished by an official of one of the large interurban lines of the country it was found that the cost to stop and start an ordinary 40-ton car running at 40 m.p.h., including power wear and tear on brakeshoes, brake rigging and trucks, is approximately 3 cents per stop, based on a cost of $1\frac{1}{4}$ cents per kw-hour."

Mr. Howe's estimate of 3 cents per stop is certainly conservative, as will be seen from the following calculation of the electrical energy required to start a 40-ton car from rest and attain a speed of 40 m.p.h.

The potential energy of a 40-ton car moving at a speed of 40 m.p.h. is

$$\frac{40 \times 2000 \times 40^2 \times 1.467^2}{2 \times 32.2} = 4,270,000 \text{ ft. lb.}$$

When the car is in motion all that energy will have to be dissipated before the car can be brought to a standstill, but it will not be necessary to employ an equal amount of outside energy in order to overcome it, for the greater part will be dissipated in track, journal and wind resistance. In the case of a car at rest, however, the full amount of energy will have to be supplied from the outside in order to attain a speed of 40 m.p.h.

The amount of electrical energy necessary to put into the motors in order to produce the specified amount of potential energy will be considerably greater, however, for the reason that a large part of the energy will be wasted in heating the motors and in overcoming rheostatic and other losses and the inertia of rotating parts. In any given case where the condition of line and equipment is known these losses can be obtained and the power input accurately figured. In general it will be found that the average accelerating efficiency of a railroad motor is about 82.5 per cent and that the inertia of the rotating parts is equivalent to about 10 per cent of the total weight of the car.

According to these assumptions, we have:

$$\text{Input} = \frac{4,270,000 \times 1.1}{2,655,000 \times 0.825} = 2.15 \text{ kw-hours,}$$

which, at 1.25 cents per kw-hour at the third rail, amounts to 2.68 cents.

It will be seen then that the power consumed in starting alone is very nearly 3 cents. If to this be added the power consumption due to braking and the increased wear and tear of roadway and equipment due to both the total cost of a stop will be much higher, probably not below 5 cents, or 0.125 cent per ton.

As stated above, the power consumption due to starting and stopping a train can in any given case be calculated to the desired amount of precision, but the additional wear and tear of the roadway and equipment due to acceleration and braking and the wear of brakeshoes and brake rigging due to stopping is more a matter of opinion than of mathematical computations, and it would be interesting as well as instructive to have the opinion of practical railroad men on this matter, for the problem is becoming more and more important as the street and suburban railroads are progressing. The problem may have an important bearing in deciding upon the proximity of stations, the advisability of introducing express service, the amount to be spent on eliminating curves and grade crossings and the maximum speed to be employed.

In the New York Subway about 1,800,000 car trips per year are made over four tracks. The average weight of a loaded car is about 42 tons, but the maximum speed is somewhat

below 40 m.p.h. Since each car stops and starts twice at each stopping point during a round trip, the annual cost of a stopping point—even at the low figure that Mr. Howe assumes—would be:

$$1,800,000 \times 2 \times 0.03 = \$108,000,$$

which is equivalent to a capitalization of \$2,160,000.

P. SACHS.

ENTRIES FOR ST. LOUIS FENDER TESTS

The following is a list of the entries of fenders and wheelguards for the tests to be conducted by the Board of Public Improvements, St. Louis. The conditions under which these tests will be conducted were published in the issue of this paper for March 18:

- April 10-11. Benj. L. Ingram, Mount Vernon, Ill.
- " 12-13. Seeley Automatic Wheelguard, New York.
- " 14-15. Albert Doss, St. Louis.
- " 17-18. Parmenter Fender & Wheelguard Company, Boston.
- " 19-20. Wonham, Sanger & Bates, New York.
- " 21-22. Electric Traction Supply Company, St. Louis.
- " 24. A. J. Berg, Chicago.
- " 25-26. John T. Hodgins, St. Louis.
- " 27-28. J. H. Davis, St. Louis.
- April 29-May 1. H. W. Bodendieck, Harvel, Ill.
- May 2-3. R. S. Mills, St. Louis.
- " 4-5. John M. Gomes, St. Louis.
- " 6-8-9. Eclipse Railway Supply Company, Cleveland.
- " 10-11. Jasper Blackburn, St. Louis.
- " 12-13. A. Petrequin, East St. Louis.
- " 15-16. Ira P. Clark, Decatur, Ill.
- " 17-18. J. H. Surtin, St. Louis.

TROLLEY WIRE SPLICER

The Westinghouse Electric & Manufacturing Company has placed on the market a 20-in. trolley-wire splicer known as the "Cleveland" type. A feature of the splicer is the method of securing the wire, by the use of a tapered and slotted chuck fitting snugly around the wire. The chuck is threaded on the



Trolley Wire Splicer

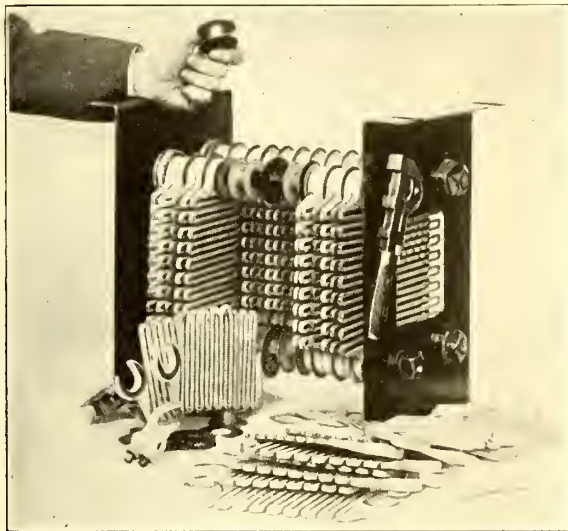
inside, and when inserted in the tapered hole in the splicer firmly grips the wire. The greater the tension on the wire the firmer the grip becomes, and it is impossible to pull the wire out of the splicer. The chuck is easily removed, however, when it is desired to take up slack wire. The boss is detachable so that it can be removed if suspension is not required. The approaches are so proportioned that smooth underrunning is obtained.

REVISION OF NATIONAL ELECTRICAL CODE

At a meeting of the electrical committee of the Underwriters National Electric Association, held in New York, March 22 and 23, a number of changes were made in the Underwriters' code of installation rules, but no changes were made in those rules affecting the wiring of cars and carhouses. New specifications for rubber-covered wire were approved, but they probably will not become operative for a year in order to allow manufacturers and dealers to dispose of their stocks of wire made under the old specifications. The American Electric Railway Engineering Association was represented at the meeting of the committee by Norman Litchfield, secretary.

REMOVABLE GRID RHEOSTATS

Ease in repairing is one of the strong features of the RG rheostats recently placed on the market by the General Electric Company. In the ordinary forms the grids are strung on the supporting tie rods like beads on a string and the replacement of one or more injured grids necessitates the unmounting of the whole rheostat and the removal of practically all the other grids. In the RG rheostats this trouble is avoided by slotting



Method of Carrying and Removing Grids

the supporting bosses at the top and bottom of the grids so that each grid can be slipped on or off the tie rods without disturbing any of the others. This valuable feature has been obtained without sacrificing any other essential qualities. The grids are of the best grade cast iron and are coated with a compound to prevent rusting. By arranging them in two sections several decided advantages are obtained over the usual single section type. For instance: The potential between any two grids on the same tie rod is cut down to one-half of what it would be in the latter case, while shorter convolutions of larger cross-section give more rigid grids which are less liable to breakage and short-circuit. Furthermore, the design of the grid supports not only permits the secure mounting of the grids, but also effectually protects their insulation. This is accomplished by incasing the tie rods in mica insulating tubes over which are placed a series of metallic spools. In mounting the grids the slotted bosses are slipped over the spools, and, therefore, do not abrade the mica tubes inside. The inclination of the slots prevents the grids from falling out after being slipped into position. All that is necessary to secure the grids firmly in position is to tighten the nuts on the ends of the tie rods. The taps or connections are made by means of separate detachable terminals, which may be inserted between any two grids to provide the proper resistance at each step of the controller. Each terminal is equipped with two sets of screws for fastening the leads and preventing them from working loose under shock and vibration.

The frame end pieces are of pressed steel to give the minimum weight with maximum strength. The use of these rheostats should greatly reduce the delays due to break-downs since a few extra grids and a wrench carried on the car will

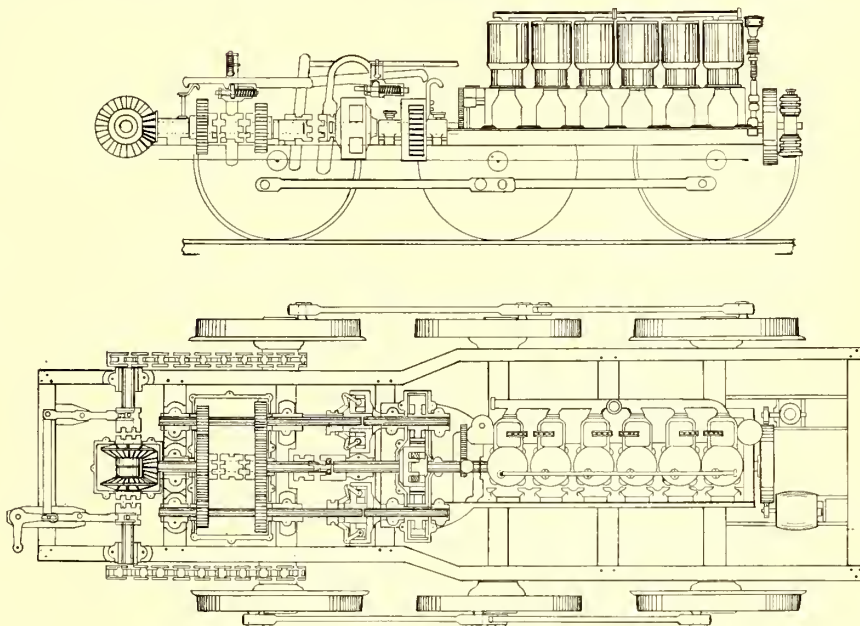
provide immediate relief. The only work required is to loosen the nuts on the ends of the tie rods, remove the injured grid, slip in a new grid and then retighten the nuts.

DIRECT DRIVE GASOLINE CAR

The accompanying engraving shows a transmission and control system for gasoline motor cars recently patented by Louis P. May, New York. The engine is of the marine six-cylinder type and drives the central shaft of the three shafts shown in the plan. This shaft is in two parts, which are in engagement only on direct drive and for full speed of the car. The engine is started by compressed air. The two jackshafts are then thrown into engagement with the engine shaft by means of internal expansion clutches which are operated by the movement of the master lever. Further movement of this lever throws into engagement the first-speed gears, which up to that time had been running free, then throws in the second-speed gears, the power in each case being transmitted from engine around main shaft and through the gears on jackshafts which are continually in mesh. Finally, when the master lever is thrown into direct drive, the dog clutch between first and second-speed gears and the friction clutches on the jackshafts automatically disengage, so that the power is transmitted directly through the main shaft to the pinion and main gears on the cross shaft, shown in the plan. When the power is shut off by disconnecting the main shaft, the dog clutch immediately engages with the low-speed gear so that the mechanism is ready to start again. All these movements are secured by one movement of the lever in a forward or rear direction.

In the car shown the engine will deliver 150 brake hp at 600 r.p.m., which, with 36-in. drivers, corresponds to a car speed of 36 m.p.h., but the engine will speed up to 700 r.p.m., a speed corresponding to a car speed of 42 m.p.h.

The truck shown is designed for locomotive use, as the inventor believes in separating the power from the passenger car and using the latter as a trailer. The trailer may be lighted by electricity, equipped with air brakes and heated by hot water from the engine. All gears are incased and run in



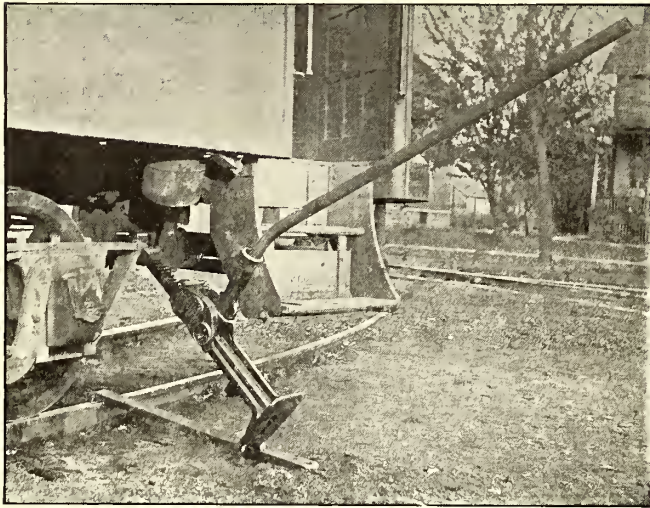
Side Elevation and Plan of Direct Drive Gasoline Car

oil and the bearings on main driver are of the "rollway" type. The motor car weighs about 15 tons and will pull standard freight cars on the road.

The Durham (N. C.) Traction Company has contracted with the B. M. Rollins Company, Kankakee, Ill., to install a No. 3 coaster at its park at Durham for use by May 1, 1911.

APPLYING A JACK AT AN ANGLE

The accompanying illustration shows a Barrett wrecking jack used in connection with a jack hook which is hooked over the rail. The foot of the jack rests against a bolt which is run through the hook to permit the jack to be held at the desired



Wrecking Jack Applied at an Angle

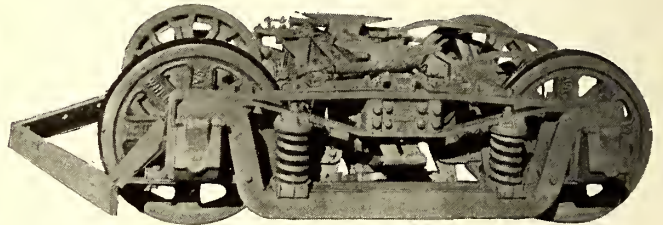
angle. Thus the head of the jack bears against the truck frame so that the entire car can be lifted and swerved over in the direction intended. This hook attachment was devised by an electric railway shopman who has found it very serviceable in handling cars.

SEMI-STEEL PAY-AS-YOU-ENTER ROLLING STOCK FOR MILWAUKEE

The St. Louis Car Company has shipped 50 cars recently to the Milwaukee Electric Railway & Light Company and the rest of the order for 100 is being rapidly completed. As shown in one of the accompanying views, these cars are of the double end and pay-as-you-enter type, they are handsome in appearance and embrace some very practical features. The main

$\frac{3}{8}$ -in. bevel plate on the outside for the bottom or compression member. The "T" on the inside forms the side sill. The cross sills are of the truss type with a 4-in. special channel laid flat on top over the flooring sheet, which is No. 14 steel. This construction allows the 4-in. channel center sills to run in one length from end sill to end sill and to support the latter on malleable iron strut castings. A 4-in. x $\frac{1}{2}$ -in. plate is provided for the tension member of the truss. The end sill is a 10-in. channel to which the side girder and center sills are rigidly connected. The bolsters are truss type steel plate filled with malleable iron. The trap doors are of steel plate and filled with the flooring composition. This flooring composition is Karbolith. It is held to the floor sheet by angle clips.

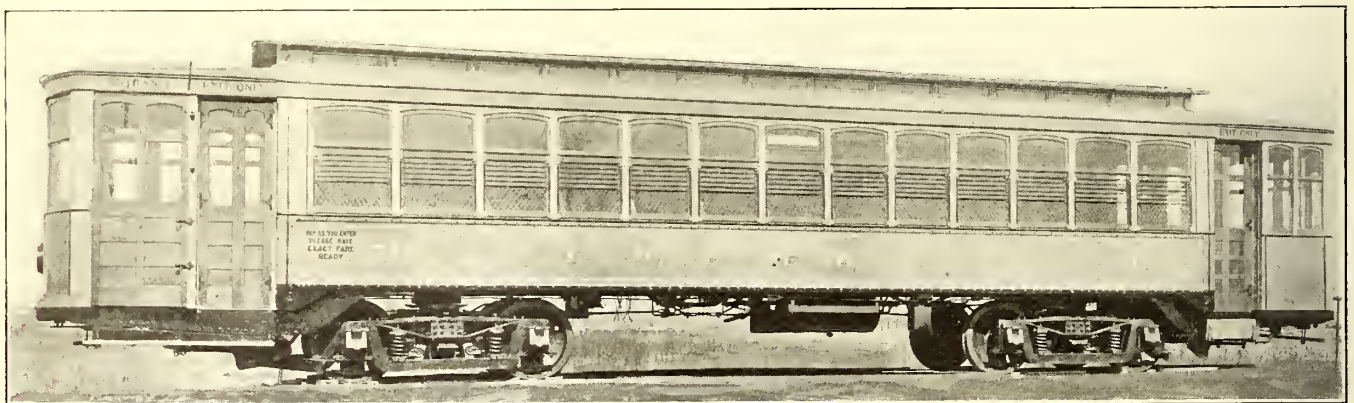
The platforms are of the drop type supported in the center by two 4-in. x $\frac{1}{2}$ -in. plate knees bent into shape and connected to the car floor center sill channels and bolted to the wood sills



Truck for Milwaukee Pay-as-You-Enter Car

$2\frac{1}{4}$ -in. x 4-in. for floor support. The side knees are of built-up construction and consist of $\frac{3}{16}$ -in. plate with 2-in. x 2-in. x $\frac{1}{4}$ -in. angles riveted to the top and bottom to form a double cross.

Each end of the car is fitted with two doors sliding by each other in a pocket. The vestibules are of the pay-as-you-enter type with the necessary rails spacing entrances and exits. The exit doors are opened outward and are double to give a clear opening of 23 in. The doors at the motorman's right hand and at diagonally opposite ends of car are operated mechanically by the motorman in connection with folding steps. The doors at motorman's left hand and at diagonally opposite ends of car are operated mechanically by the conductor. The entrance doors at the platform are double folding and are arranged to fold against the front of vestibule. The vestibule side which is opposite the entrance doors has two windows.



Latest Design of Closed Vestibule Type Pay-as-You-Enter Car of Semi-Steel Construction for the Milwaukee Electric Railway & Light Company

dimensions are 35 ft. over the corner posts, 49 ft. 6 in. over the vestibules, 50 ft. over the buffers, 8 ft. 7 in. over the widest part, 8 ft. $6\frac{1}{4}$ in. over the belt rail.

The construction is of the "semi-steel" type, as the side of the car below the window sill forms a girder in connection with the side sill and the bottom frame. The girder plate is of steel 28 in. x $\frac{3}{16}$ in. for the full length of the car with inside and outside bevel edge $2\frac{1}{4}$ -in. x $\frac{3}{8}$ -in. plate for the tension member and a 4-in. x 4-in. x $\frac{1}{2}$ -in. "T" on inside and a $2\frac{1}{4}$ -in. x

The cars are equipped with the car builder's latest type of reversible seats covered in rattan. The seating capacity is 52. The inside finish of the car consists of quarter-sawn oak of neat and sanitary design. The car bodies are mounted on Milwaukee special type M. C. B. trucks made by the St. Louis Car Company and shown in one of the accompanying illustrations. The cars are equipped with four GE-216 motors and National air brakes. All of these cars are being constructed under license of the Pay-As-You-Enter Car Corporation.

News of Electric Railways

Program of Meeting of the Iowa Street & Interurban Railway Association

The annual convention of the Iowa Street & Interurban Railway Association will be held at Davenport, Ia., on April 20, 21 and 22, 1911, coincident with the meeting of the Iowa Electrical Association. The sessions of both associations will be held at the Coliseum. In connection with the conventions there will be an exhibit of electrical apparatus. The following papers will be read at the sessions of the Iowa Street & Interurban Railway Association:

Paper, "The Use of Wood Preservatives—Is the Expense Justified by the Results Obtained?" by C. W. Rhodes, St. Louis, Mo.

Paper, "Legislation—The Detrimental Effect of Useless Legislation on Utility Corporations and the Communities Which They Serve," is still to be assigned.

Paper, "Things Worth While in Shop Practice," by Jacob W. Gerke, master mechanic of the Tri-City Railway, Davenport, Ia.

Paper, "Development of the Auxiliary Load for Railway Power Plants," by J. C. Young, contracting agent of the Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.

Paper, "Effective Methods of Handling Snowstorms," by Frank S. Cummings, traffic manager and chief engineer of the Inter-Urban Railway, Des Moines, Ia.

Paper, "Steel or Steel-Tired Wheels vs. Cast Iron," by a representative of the engineering department of the Carnegie Steel Company.

Excellent entertainment features have been arranged. The supply men will give a smoker at which both professional and amateur talent will appear, and a theater party will be given by the Tri-City Railway. There will also be a rejuvenation of the Sons of Jove. To carry out the program of this society J. F. Dostal will attend from Denver and Mr. Strickland and W. N. Keiser, Dubuque, Ia., will be present. Both the Iowa Street & Interurban Railway Association and the Iowa Electrical Association have extended invitations to the officers of public utilities in Illinois to attend, and many from that State are expected.

Annual Convention of the Southwestern Electrical & Gas Association

The seventh annual convention of the Southwestern Electrical & Gas Association will be held in Houston, Tex., on April 27, 28 and 29, 1911. The headquarters of the association will be in the Municipal Auditorium, where the meetings will be held. It is suggested that applications for hotel reservations should be made direct to the hotel at which the attendant at the convention desires to stop. The executive committee has adopted a standard badge for the association, with the idea that this badge will remain a permanent one. All members and member companies will be entitled to badges free of charge. Extra badges will cost 50 cents each. Advance copies of the "Question Box" and the souvenir program will be distributed from the office of the registrar on the first day of the convention. The following tentative program of papers has been prepared:

"Industrial Development of Fuel Gas," by R. L. Soper, secretary of the Dallas (Tex.) Gas Company.

"Investigation and Care of Return Currents," by George H. Clifford, general manager of the Northern Texas Traction Company, Fort Worth, Tex.

"Boiler Economy and the Application of Flue Gas Analysis," by M. L. Hibbard, engineer of the San Antonio Gas & Electric Company, San Antonio, Tex.

"Cause and Prevention of Accidents," by C. W. Kellogg, Jr., manager of the Texas securities department of Stone & Webster, Dallas, Tex.

"Light-Weight Cars, Their Construction and Operation," by R. T. Sullivan, general superintendent of the Houston (Tex.) Electric Company.

"Steam Consumption in Water-Gas Plant," by L. B. Moorhouse, superintendent of the gas department of the

San Antonio Gas & Electric Company, San Antonio, Tex.

"Development of Electric Power Business," by P. A. Rogers, commercial agent of the Dallas Electric Light & Power Company, Dallas, Tex.

"Practical Tests for Railway Equipment," by H. Fink, Jr., mechanical engineer of the San Antonio (Tex.) Traction Company.

"Naphthalene," by W. H. Riblet, superintendent of manufacturing of the Houston (Tex.) Gas Company.

Discussion: Street railway, electric and gas sections of the "Question Box."

The following entertainment program has been arranged:

April 27

2:00 p. m.—Opening of the electrical show.

4:00 p. m.—Reception for visiting ladies at the Houston Country Club.

8:00 p. m.—Reception by "supply men" and exhibitors to visiting members and ladies at the electrical show in the auditorium.

April 28

11:00 a. m.—Electrical show opens for the day.

8:00 p. m.—Rejuvenation of the "Sons of Jove."

April 29

10:00 a. m. to 3:00 p. m.—Boat trip on the Buffalo Bayou to the San Jacinto Battlefield.

8:00 p. m.—Reception at the electrical show.

April 30

10:00 a. m.—Trip to the City of Galveston and the new causeway on the new Galveston-Houston Interurban.

It is proposed to hold an electrical exhibition in the Municipal Auditorium at Houston in connection with the convention, and this feature is in charge of a committee appointed from the active and associate members residing in Houston. No admission charge will be made, and it is intended to advertise the electrical show in the cities near Houston. Those who desire space at the show are requested to communicate with M. B. Wheeler, 602 Preston Boulevard, Houston, Tex.

It is suggested that those who propose to attend the convention should communicate with D. G. Fisher, 1316 Commerce Street, Dallas, Tex.; Sam A. Hobson, manager of the Fort Wayne Electrical Works, St. Louis, Mo., or Milton Mill, 915 Olive Street, St. Louis, Mo., for information in regard to transportation facilities or sleeping car reservations.

Minneapolis Company to Contend Right of City to Order Extensions and Regulate Service

The Twin City Rapid Transit Company, which controls the Minneapolis Street Railway, has decided to contest the right of the City of Minneapolis to order extensions and to prescribe regulatory rules of service and has brought suit in the United States District Court at Minneapolis to restrain the city from enforcing the provision of the ordinance of March 10, 1911, ordering new lines and extensions and the ordinance of Feb. 10, 1911, known as the "strap hangers' ordinance," penalizing the company for admitting into street cars more passengers than one and one-half the number for which seats are provided. In its application for a restraining order the company asserts that action in the courts is the only way in which the property of the company and the stockholders can be protected and that the city ordinance for extensions and new lines and the order prescribing service rules are unreasonable.

W. J. Hield, vice-president and general manager of the company, has explained the action of the company in carrying the matter to the courts as follows:

"The orders of the City Council covering new lines and service requirements on these as well as on existing lines have been given the most careful study and consideration, and in applying to the court for relief it was after reaching the conclusion that in this way only could the property and the rights of the stockholders be protected.

"Section 3 of the service ordinance reads as follows:

"That whenever any passenger shall be admitted into

any of said cars in excess of the carrying capacity thereof, as in this ordinance defined, said Minneapolis Street Railway shall forfeit and pay to the City of Minneapolis the sum of fifty (50) dollars for each and every passenger so admitted, said amount to be recovered in a civil action by said city in the municipal court thereof unless payment thereof be voluntarily made within five days after demand therefor by the city attorney. Provided that such payment shall not be required in any case wherein another car on the same line, proceeding on the same track and in the same direction and containing fewer passengers than the carrying capacity thereof, shall at the time be within 300 ft. of the point where said excess passenger is admitted.'

"From the standpoint of practical operation compliance with this order seems unreasonable. Conditions frequently arise which make it impossible for us to have cars of the same line within a distance of 300 ft. of each other and this would appear to be necessary if we are to escape the penalties of the ordinance.

"In the matter of new lines and extensions it seems to us that the contract between the city and our company is clear and, while the Council has put a time limit for test purposes on about nine miles of line, it is the declared intention of that body to follow this with similar orders covering in the aggregate more than 40 miles of trackage, all of which has already been ordered and is now of record in the office of the city clerk. This would increase our total mileage by approximately 25 per cent, with little, if any, increase in revenue. The question as to the rights of the company is one which must sooner or later be met and this question could be determined in the shortest time by application to the Federal Court."

In the *ELECTRIC RAILWAY JOURNAL* of Feb. 18, 1911, page 311, the statement was published which Mr. Hield made in regard to the opinion filed with the city clerk by Judge Daniel Fish, city attorney of Minneapolis, who held that the city had power to order and enforce the construction of new lines and to regulate street railway service.

Conferences of Cleveland Chamber of Commerce Concluded

Throughout the investigation of the needs of the Cleveland Railway by the special committee of the Cleveland Chamber of Commerce the officials have emphasized the point that some plan should be adopted that will maintain the value of the stock at 100 cents on the dollar to the end of the grant so as to attract investors and protect owners of stock in case the city takes over the property or names a purchaser for it.

The sub-committee of the special committee has gone over points of disagreement with Street Railway Commissioner Dahl. Its report indicates that Mr. Dahl and the company agree upon the idea of removing from the grant the sections which require the company to dispose of its property at an appraised value and 10 per cent additional at the end of the grant, if the city decides to purchase or name a purchaser. This, the committee believes, would obviate the necessity of amortizing franchise and paving values and would overcome the objections to the provisions requiring that improvements and extensions be maintained at 70 per cent of the reproduction value.

Mr. Dahl also proposed a plan to build up a general surplus, effective only after the expiration of the 10-year period in case the city does not renew the grant at that time. He believes this would make unnecessary the establishment of a reserve at this time and would allow the fare to remain unchanged. Mr. Dahl also insists that the city shall have the right to initiate improvements and extensions. The company wants the right limited to the first 10 years so that it will always have the opportunity to make up for expenditures during the last 15 years of the life of the franchise. In case the franchise is renewed, as anticipated, every 10 years the city would continue to have the right demanded. The commissioner objects to a change in the maximum rate of fare, but wants the suburban towns to enjoy all the rights as to fare that the city has, except when the life of the franchise becomes less than 15 years. The company does not object to this. City Solicitor Baker asked that the grant be changed so that the city might name a purchaser at any time at par, without agreeing to

operate at a lower rate of fare. Both Commissioner Dahl and the company objected to this.

At the regular meeting of the committee on the afternoon of March 28, 1911, Chairman F. H. Goff questioned Commissioner Dahl as to whether there had been waste in the management or operation and received a negative reply. He did make this statement, however: "The plan will fail under this ordinance or under the ordinance as framed with the changes unless the disposition of the operators makes no difference in the success." He said that the condition of the maintenance and operating funds is now such as to make arbitration imminent.

City Solicitor Baker objected to allowing the street railway commissioner to have final power to deal with the company on so many points. He had profound confidence in the present street railway commissioner, but a man might be placed in the office who would not have the same pride in handling the business that the present commissioner has. The Mayor or the City Council should be a court of last resort in matters which he mentioned. Mr. Dahl pointed out that the commissioner is appointed by the Mayor and may be dismissed by him.

At a meeting of the committee on March 30, probably the last one, Mr. Dahl, in support of his contention that \$2,500,000 of bonds should be sold at once after the passage of amendments, read a letter from Judge Tayler, written 10 days before his death, bearing upon the sale of bonds. It follows in part:

"In the case of the Cleveland Railway there is not the slightest reason why it should not obtain all the money that can reasonably be needed and invest it in equipment or other improvements which the public traffic demands. The fallacy of the position taken by the Cleveland Railway is that no money ought to be raised except by selling stock, and as the ordinance does not permit the stock to be sold at less than par, therefore, they say, 'We can raise no money.'

"I have always contended that it was unsound as well as extravagant to undertake to raise money by selling stock. The stock of the Cleveland Railway is an irreducible debt drawing 6 per cent per annum and, since that burden can never be reduced, it ought never to be increased.

"The bonded indebtedness of the Cleveland Railway is very low, only about 33 1-3 per cent of its value. The money necessary for improvements ought to be raised by the sale of bonds. This is a reducible debt if there is any necessity for reducing it. At all events if 6 per cent had to be paid on bonds now 5 per cent or 4 per cent might be all that would be necessary to pay upon them in a few years from now."

The deliberations of the committee will be held in private and its report will be made to the full body of the Chamber of Commerce. If approved the recommendations of the committee will then be made to the city administration. Any changes in the grant will be submitted to a referendum vote.

Report of Commission on Proposed Settlement Ordinance in St. Louis

The Public Service Commission of St. Louis made a report on Feb. 24 expressing the opinion that, in view of the following conclusions, the proposed settlement ordinance of the United Railways Company, an abstract of which was published in the issue of the *ELECTRIC RAILWAY JOURNAL* for March 18, 1911, page 471, should not be passed:

"The payments proposed to be hereafter made in lieu of the mill-tax and the franchise taxes are fixed arbitrarily without consideration or regard to the adequacy or reasonableness of the amounts of such payments.

"It does not properly provide for adequate service either now or hereafter.

"It grants valuable rights without proper safeguards.

"It would barter away important rights to regulate the service for 37 years to come."

The commission declared that it would be better to postpone action until the completion of the investigation of the affairs of the company on which it is now engaged, saying:

"The commission will then know the amount of invest-

ment of the company upon which it is entitled to earn a return, the amount of its gross earnings, the amount properly to be deducted therefrom for operating expenses, depreciation fund, return on investment, etc., and thus be able to advise whether a proposed license tax or franchise tax would be reasonable or not."

The commission says in part:

"We would suggest as matters worthy of consideration in this connection that the street railway companies in Chicago are now operating under a franchise whereby the city receives 55 per cent of the revenue of the company after the payment of operating expenses and certain fixed charges. In Cleveland the street railway companies operate under a grant whereby the rate of fare varies with the net earnings of the company, the fare decreasing as the business of the company increases, and thus the people in this instance share directly and immediately with the company the excess of earnings over a fair return to the company.

"The commission further suggests that, inasmuch as there is a possibility of the construction of a subway in the city during the term of the proposed franchise, provision should be made for the temporary removal or change of such tracks of the company as might interfere with the construction of such subway.

"One of the principal claims to consideration advanced by the advocates of the bill is that the street railway service in the City of St. Louis will be greatly improved as the result of its passage. The commission fails to see where this object will to any appreciable extent be secured or assured under the bill.

"Inasmuch as the city has the power to regulate the company in the performance of its duties to the public and to punish the company for failure to perform its duty, it is incomprehensible that a tribunal created to pass upon the derelictions of the company, in which the company is to be judged, has equal voice with the city in determining the guilt of the company. We do not see any reason why the company should have any representation on such tribunal created especially to judge it. The guilt or innocence of the company is a question not for arbitration, but for determination by the city, either in the police court, where other violations of ordinances are tried, or in such other tribunal as the city may designate.

"There is also provision in the ordinance for the construction in the near future of certain new tracks. These provisions are somewhat loosely drawn. At any rate, the building and operation of this track would be a comparatively small factor in the solution of our transportation problem. The question of adequate transportation in St. Louis, while depending partly on installation of track, is largely a question of more cars and more frequent or better arranged trips. In short, it is a question of having more money spent on the service.

"Section 1 seems to make doubtful the issuance of a transfer on a transfer, or more than one transfer for one cash fare, as it forbids the issuance of a transfer to any one except a passenger who has paid a cash fare, whereas even now in certain instances transfers are issued by the conductor to a passenger who gives him not a cash fare, but a transfer from another line.

"We recommend that the improper or dishonest use of transfers should be punished, but question whether a maximum fine of \$100 is not excessive for this offense, which involves the dishonest use of a transfer valued at less than 5 cents."

Armistice in Detroit

At a meeting of the franchise committee of the Common Council of Detroit, Mich., on March 29, 1911, the proposal of the Detroit United Railway to better and extend its lines was approved, and the city will not demand an increase in rentals until 1915, when several other franchises expire. On Feb. 6, 1911, Mayor Thompson asked J. C. Hutchins, president of the company, if some plan could not be developed to improve the service. Two days later Mr. Hutchins stated that the company would do everything possible to carry out the Mayor's wishes. It was finally arranged that certain improvements should be made under a special permit that should in no way be construed as a franchise or an extension or renewal. A tacit understanding was

reached, however, that no increase should be made in the rentals for operating over streets where franchises have expired until further and more important grants expire in 1915.

The improvements will consist in double-tracking Mack Avenue from Baldwin Avenue to the easterly city limits, double-tracking the Chene Street line north of Gratiot by building tracks on Grandy Avenue, constructing a double track on Hamilton Boulevard from Holden Road to the northerly city limits and transforming the Brush line and Beaubien line into a loop by the construction of a connecting line. The City Council adopted a resolution on May 3, 1910, giving the company the permission to do this work.

The company is now paying the city \$300 a day to operate over routes where franchises have expired and suit has been brought to increase this to \$500. This suit will take its course in the courts. The company will also continue its fight for a decision that the per diem payment is in lieu of all other city taxes. In all, the improvements and extensions comprise about eight miles of track. In addition the company had planned to spend about \$600,000 for new cars, additional power and other improvements. The franchise committee has instructed Corporation Counsel Hally to prepare a resolution embodying the permit for the construction work and the matter will be brought before the Common Council at its next meeting. The Detroit United Railway and the Detroit, Jackson & Chicago Railway plan to purchase a new right-of-way out Michigan Avenue to the Washtenaw County line so that the public roadway may be broadened. The County Commissioners are aiding in the purchase of the right-of-way from farmers.

Proposed Railway in Bermuda.—Maxwell Greene, Hamilton, Bermuda, reports that the case of the Bermuda Electric Company was laid over by the Colonial Parliament for six months or until a new Parliament shall be elected and convened. The company plans to build an electric railway on a right-of-way along the highways, to connect St. George, at the eastern end of the island, with Somerset and Ireland Island, at the western end, with loops in the City of Hamilton and its vicinity. A Canadian company is to finance the work.

Columbus Dynamiter Convicted.—Alfred N. Strader, charged with dynamiting the South High Street carhouses of the Columbus Railway & Light Company, Columbus, Ohio, during the strike last summer, was found guilty on March 31, 1911. The minimum penalty is 10 years in the penitentiary. A motion for a new trial has been filed. Hugh Cavanaugh, convicted of placing dynamite on the Westerville car tracks during the strike, was sentenced to serve 10 years in the penitentiary by Judge C. M. Rogers, on March 27, 1911.

San Francisco's Municipal Railway.—The issue of \$600,000 of 4½ per cent municipal bonds, recommended to be issued by the public utilities committee of the San Francisco Board of Supervisors for the reconstruction of the Geary Street, Park & Ocean Railroad as a municipal enterprise, was offered for subscription on March 20, 1911, but only \$93,000 of the bonds were disposed of at par and interest as follows: \$25,000 to the Mutual Savings Bank of San Francisco, \$10,000 to the First Federal Trust Company, \$2,000 to John Callahan, \$1,000 to Ralman Seidl, \$25,000 to John McGahey, \$25,000 to William Caesar and \$5,000 to Charles Fisher. It is announced that the remaining \$507,000 will be sold "over the counter" at par. The bonds mature at the rate of \$35,000 yearly on July 1 from 1915 to 1934, inclusive.

Franchise Negotiations in Toledo.—At a meeting of the committee of the whole of the City Council of Toledo, Ohio, March 31, 1911, Mayor Brand Whitlock was selected to represent the city in the negotiations with the Toledo Railways & Light Company, and April 4 was selected as the date for the first meeting. Albion E. Lang, president of the company, and counsel will represent the company. Opinion at the meeting of the Council was divided in regard to the question of leaving the rate of fare in the tentative ordinance as drawn by City Solicitor Schreiber. The Mayor said some time ago that the administration would agree to leave this matter to the last for consideration, but some members of the Council favor the plan to leave in the Schreiber ordinance

the clause demanding a fare of 3 cents. It is uncertain whether the Schreiber draft will be used as a basis for the negotiations. Mayor Whitlock explained that the tentative franchise was in the nature of memoranda.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The bill to give the Railroad Commission power to employ men to prevent the crowding of cars on subway and suburban railways has been ordered to a third reading in the House. The bill to place the ventilation of electric cars under the regulation of the district police has been referred to the next Legislature. The bill to give boards of aldermen or selectmen power to revoke the franchises of street railways which do not fulfil agreements has been reported with leave to withdraw by the committee on street railways. The committee on metropolitan affairs has reported no legislation necessary on the report of the joint commission on metropolitan improvements upon steam railroad electrification within the Boston district. A number of bills providing for the electrification of railroads are pending at the present session, but the indication is that the whole electrification situation will be determined largely by the attitude of the Legislature upon the bill to authorize the New York, New Haven & Hartford Railroad to purchase the Boston, Revere Beach & Lynn Railroad and build a tunnel for electrified service under Boston Harbor. If the latter bill passes it will mean the beginning of electrification at Boston, with the likelihood of extensions to many suburban points within the near future, so far as the New Haven lines are concerned.

NEW JERSEY

The Edge employers' liability bill, which was passed by the Senate, as noted in the *ELECTRIC RAILWAY JOURNAL* of March 25, 1911, was passed by the Assembly on April 3 and has been signed by Governor Wilson. This is the first of the reform measures urged by the Governor which has been enacted. The Egan public utility bill to create a new commission, which was passed by the House on March 4, was killed in the Senate on March 22. Finally the committee of the Senate which is considering the public utility measures caused a substitute measure to be drafted and this was passed by the Senate by a vote of 16 to 1 on April 4. The new measure replaces Senate bills Nos. 5, 14, 19 and 30. It doubles the appropriation of the commission, making the sum at its disposal \$100,000, confers rate-making powers on the commission and provides that no commissioner shall hold any official position or own any of the securities of the companies which come under the supervision of the commission.

NEW YORK

After the deadlock in regard to the election of a Senator to succeed Chauncey M Depew was broken on March 31, 1911, by the election of James A. O'Gorman, the Legislature adjourned until April 17, 1911, so as to permit repairs to the Capitol necessitated by the recent fire. A bill to subsidize electric railways has been introduced by Assemblyman Lansing, of Rensselaer. The bill provides for using the funds of the State Highway Commission to build electric or steam roads for the benefit of towns. Upon the petition of 51 per cent of the taxpayers of any town the supervisors are empowered to investigate and report to the Public Service Commission their recommendation on the petition. If the report is favorable and the Public Service Commission grants a certificate of necessity the State Highway Commission is to supervise the construction of the road, 50 per cent of the cost to be paid from the funds of the State Highway Commission, 35 per cent by the county and 15 per cent by the town in which the road is situated. The title of the bill says it is an act to provide for highways to be known and designated as street-surface railways.

A bill similar to that introduced recently in the Senate by Senator Thomas C. Harden, which makes it mandatory on the part of the Public Service Commission and the Board of Estimate to include an Eastern District spur in the proposed comprehensive subway system, has been introduced in the House. A bill has been introduced to ex-

tend for three years beyond the time now fixed in the railroad law the time within which a domestic railroad in existence on March 1, 1911, may begin the construction of its road. A similar extension is also given to any such railroad corporation in the time fixed for the completion of its road. Assemblyman Fry has introduced a bill in the Assembly to amend the Greater New York charter in relation to granting franchises to railroads in the city of New York so that the Board of Estimate and Apportionment shall be required, in granting a franchise to any railroad in New York City, to stipulate a 5-cent carfare for a continuous ride for each person, with transfers good at all crossings and intersecting points of the same company without further charge. At the hearing before the Senate Railroad Committee on Senator Wainwright's bill to limit the rate of fare on the New York, New Haven & Hartford Railroad from New York to points in Westchester county to the basis between Boston and points within a radius of 25 miles of that city, the company opposed the bill on the ground that it would mean severe loss in revenue. Assemblyman Egan has introduced a bill to require the Manhattan (Elevated) Railway within three years to extend its line along a prescribed route.

PENNSYLVANIA

Representative Alter offered in the House on April 3, 1911, the administration measure to create a public service commission of five members and repeal the Act of May 31, 1907, creating a State Railroad Commission of three members. The bill covers 63 printed pages and gives the commission power to inquire into and pass upon complaints against all railroads, street railways, express, baggage transfer, telegraph, telephone, electric light, water, water power and other companies doing a quasi-public business.

There are six articles and 94 sections to the bill. Every public service company would be required to post all tariffs and schedules in its offices and stations for the convenience of the public at least 10 days before same become effective and to permit the joint use of any conduits, subways, station or terminal facilities by two or more companies where the public service is not impaired. Railroads and street railways would be required to furnish sufficient facilities properly and safely to handle their patrons, and to add to their equipment or make such changes in their equipment and facilities as may be reasonably required by the commission after investigation and within a reasonable period. All public service corporations would have the right of appeal to the commission from the application of any regulation of that body deemed oppressive or unjust, and to obtain additional rights and franchises or transfer or merge its interests with other corporations provided the commission should deem it beneficial to the public welfare. Public service companies would be prohibited from issuing stocks, except for money, labor performed or property actually received, and before so doing would have to obtain a certificate from the commission to that effect. Neither would they be allowed to control the capital stock of another corporation without the approval of the commission or issue stocks or bonds to cover reorganized companies without the approval of the commission.

The commissioners would be appointed by the Governor, subject to confirmation by the Senate. One of the commissioners is required to be learned in the law, another in economics, another in the business of common carriers. Each commissioner must be at least 25 years of age and a resident of the State for at least one year. No person would be eligible to the office of commissioner who is identified with a carrying corporation. The first appointments to the commission would be for one, two, three, four and five years, respectively, from July 1, 1911, but their successors are each to be appointed for five-year terms. The Governor is to designate the chairman of the commission when making the appointments. Each commissioner would receive a salary of \$8,000 per year. The principal office of the commission is to be at the Capitol, Harrisburg, but branch offices are to be maintained in Philadelphia and Pittsburgh.

The right of appeal to the Supreme Court is given in the bill. The commission is to report in regard to its work in detail to the Governor on or before the second Monday of January of each year.

Financial and Corporate

New York Stock and Money Market

April 4, 1911.

Wall Street is still awaiting the decisions in the trust cases, and pending these there is little disposition to make any important commitments on either side of the market.

The bond market continues to be satisfactory and there are ready sales for all issues that pass successfully the close scrutiny of the educated investor of the present day. Money is plentiful and cheap. Rates to-day were: Call, 2@2½ per cent; 90 days, 2¾@3 per cent.

Other Markets

There have been some considerable blocks of traction shares sold during the past week in the Philadelphia market, but the trading has been sporadic and far from a general movement.

In the Boston market only Boston Elevated and Massachusetts Electric have been in the dealing and these are not so freely offered as heretofore.

There was no market in Chicago to-day on account of the election and for the week previous tractions were almost wholly absent from the list.

In Baltimore there has continued to be fairly good trading in both the stock and the bonds of the United Railways and the price of the former has slightly advanced.

Quotations as compared with last week follow:

	March 28.	April 4.
American Light & Traction Company (common).....	a293	a295
American Light & Traction Company (preferred).....	a106	a107
American Railways Company.....	a44½	a43¾
Aurora, Elgin & Chicago Railroad (common).....	44	a44
Aurora, Elgin & Chicago Railroad (preferred).....	88	a88
Boston Elevated Railway.....	a129	a129½
Boston Suburban Electric Companies (common).....	*15½	a16
Boston Suburban Electric Companies (preferred).....	73	73
Boston & Worcester Electric Companies (common).....	8½	a10
Boston & Worcester Electric Companies (preferred).....	41	43
Brooklyn Rapid Transit Company.....	78¾	78¾
Brooklyn Rapid Transit Company, 1st ref. conv. ss.....	8¼	8¼
Capital Traction Company, Washington.....	a126½	a126½
Chicago City Railway.....	a190	190
Chicago & Oak Park Elevated Railroad (common).....	3	3
Chicago & Oak Park Elevated Railroad (preferred).....	7	7
Chicago Railways, pteptg., ctf. 1.....	a91	a90
Chicago Railways, pteptg., ctf. 2.....	a24½	a24½
Chicago Railways, pteptg., ctf. 3.....	a10	a10
Chicago Railways, pteptg., ctf. 4.....	a5½	a5
Cincinnati Street Railway.....	a132	132
Cleveland Railway.....	92½	94¾
Columbus Railway (common).....	a96	*96
Columbus Railway (preferred).....	a101½	*101½
Consolidated Traction of New Jersey.....	a76½	a76½
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a105	a105
Detroit United Railway.....	a69¾	a71
General Electric Company.....	148½	148½
Georgia Railway & Electric Company (common).....	a133	a133
Georgia Railway & Electric Company (preferred).....	90	a91
Interborough Metropolitan Company (common).....	18¾	19
Interborough Metropolitan Company (preferred).....	53¾	53¾
Interborough Metropolitan Company (4½s).....	78¾	78¾
Kansas City Railway & Light Company (common).....	a24¾	22¼
Kansas City Railway & Light Company (preferred).....	a70	70
Manhattan Railway.....	a136½	138
Massachusetts Electric Companies (common).....	17½	a17¾
Massachusetts Electric Companies (preferred).....	a87	88
Metropolitan West Side, Chicago (common).....	a23¾	23¾
Metropolitan West Side, Chicago (preferred).....	a69¾	69¾
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	a71½	71¾
Northern Ohio Light & Traction Company.....	*43¼	*43¼
Northwestern Elevated Railroad (common).....	a23	23
Northwestern Elevated Railroad (preferred).....	a64¾	63¾
Philadelphia Company, Pittsburgh (common).....	a54¼	a53¾
Philadelphia Company, Pittsburgh (preferred).....	a43	43
Philadelphia Rapid Transit Company.....	a19¾	19½
Philadelphia Traction Company.....	84¼	84
Public Service Corporation, 5% col. notes (1913).....	a101½	a100½
Public Service Corporation, ctf. s.....	a106	a106
Seattle Electric Company (common).....	a108	a107
Seattle Electric Company (preferred).....	a98	a98½
South Side Elevated Railroad (Chicago).....	a71	71
Third Avenue Railroad, New York.....	103¾	a104
Toledo Railways & Light Company.....	a8½	a8
Twin City Rapid Transit, Minneapolis (common).....	a108¾	a108½
Union Traction Company, Philadelphia.....	a47½	a46¾
United Rys. & Electric Company, Baltimore.....	19	18¾
United Rys. Inv. Co. (common).....	*47½	a46
United Rys. Inv. Co. (preferred).....	75½	a74½
Washington Ry. & Electric Company (common).....	a36½	a38
Washington Ry. & Electric Company (preferred).....	a89¾	a89½
West End Street Railway, Boston (common).....	a91	a90
West End Street Railway, Boston (preferred).....	a103½	a103
Westinghouse Elec. & Mfg. Co.....	67	a67
Westinghouse Elec. & Mfg. Co. (1st pref.).....	120½	121

aAsked. *Last sale.

Annual Report of the North American Company

A comparative statement of the income account of the North American Company for the years 1910 and 1909 follows:

	1910.	1909.
Interest received and accrued.....	\$712,902	\$556,842
Dividends received.....	1,357,304	1,153,539
Profits and compensation for services.....	34,797	313,036
Total.....	\$2,105,003	\$2,023,417
Salaries, legal expenses, net rentals and all other expenses of administration.....	\$80,547	\$104,029
Taxes.....	5,657	5,239
Interest and commissions paid and accrued.....	107,477	128,194
Sundry accounts written off and reserves.....	57,937	.....
Net decrease in book value of assets.....	.....	79,079
Total.....	\$251,618	\$316,541
Net income.....	\$1,853,385	\$1,706,876
Credit balance of undivided profits at close of previous fiscal year.....	3,662,987	3,445,776
Total.....	\$5,516,372	\$5,152,653
Dividends paid and accrued during year.....	1,489,665	1,489,665
Credit balance of undivided profits at close of fiscal year.....	\$4,026,707	\$3,662,988

James Campbell, the president, says in the report, in part:

"The stocks owned by the company are principally those of street railway, electric light and gas companies, whose management and general policy are under the supervision of the North American Company.

"The company has during the year acquired the stock and indebtedness of the Suburban Electric Light & Power Company and consolidated it with the King Electric Company, of St. Louis, Mo., the stock of which had been previously acquired by this company.

"The bonds owned by this company are the following: Milwaukee Light, Heat & Traction Company refunding and extension mortgage 30-year 5 per cent bonds, \$5,000,000 par value; Racine Gas Light Company consolidated mortgage 30-year 5 per cent bonds, \$287,000 par value; Kenosha Gas & Electric Company first mortgage 5 per cent bonds, \$45,000 par value; Detroit Edison Company 10-year convertible 6 per cent bonds, \$221,000 par value.

"Loans and advances consist of money loaned to individuals and corporations upon their notes, with ample collateral security, together with advances to subsidiary companies.

"The company has subscribed to \$500,000, principal amount, of 5 per cent bonds, and \$200,000, par value, of common stock, of the Mississippi River Power Company, a corporation now vested with the title to the franchise for the development of the water power at Keokuk Rapids on the Mississippi River, and in whose name the title to the completed property will rest. The financing of the Keokuk water-power enterprise has been carried through by Kidder, Peabody & Company and Stone & Webster, in association with other well-known bankers. The financial plan provides for the issue of \$16,000,000, principal amount, of bonds, \$6,000,000, par value, of 6 per cent preferred stock, and \$16,000,000, par value, of common stock.

"As was stated in the annual report of this company for the fiscal year ended Dec. 31, 1909, of the \$5,000,000, par value, of five-year 5 per cent collateral trust notes, dated May 1, 1907, \$2,584,000 had been canceled, leaving outstanding \$2,416,000. This company has acquired by purchase during the fiscal year of 1910 \$495,000 additional notes, leaving outstanding in the hands of the public \$1,921,000.

"This company has no contingent liabilities, except an instrument of guaranty, dated March 1, 1906, executed to the Trust Company of America, as trustee under the first mortgage of the West Kentucky Coal Company, whereby it has guaranteed the payment by that company of the interest upon \$2,000,000, par value, of its first mortgage bonds and of the sinking fund payments pertaining thereto; \$57,000, par value, of these bonds have been retired through the sinking fund, leaving \$1,943,000, par value, outstanding.

"The combined gross revenues of the Milwaukee group of properties showed an increase over the previous year of 12.6 per cent; operating expenses, taxes and reserves an increase of 18 per cent; gross income an increase of 0.81 per cent; interest charges an increase of 1.64 per cent, and net income a decrease of 0.54 per cent. Increased operating expenses, caused by the higher standard of wages and increased cost of materials prevailing generally throughout

the country, and increased expenses of maintenance absorbed practically all the increase in gross revenue. There has been expended during the year on additions to the physical property of these companies the sum of \$1,431,790.

"The gross revenue of the United Railways Company of St. Louis showed an increase over the previous year of 4.2 per cent; operating expenses, taxes and reserves an increase of 12.5 per cent; gross income a decrease of 10 per cent; interest charges a decrease of 0.16 per cent, and net income a decrease of 31.5 per cent. The increase in operating expenses is partly due to increased wages and higher cost of materials and supplies, and partly due to an increase in the appropriation for depreciation reserve. The charge to operating expenses for depreciation during the year 1910 was increased to 10 per cent of the gross revenue, experience having shown that this proportion of the gross revenue is required to provide for the present annual rate of depreciation of the property. There has been expended during the year on additions to physical property the sum of \$325,792.

"It has for many years been the policy of this company, in the direction of the affairs of its subsidiaries, to appropriate annually out of the earnings of these companies sums of money for maintenance and depreciation of the physical properties as large as seemed justified by experience and good judgment. Your board of directors feels that the statements of earnings of subsidiaries are on a very conservative basis, and that dividends are not being paid to this company at the expense of the complete preservation of the physical properties of the subsidiaries. The proportion of gross revenue expended on maintenance and appropriated for depreciation out of revenue is set forth in the accompanying tabular statement:

Name of Company.	Per Cent of Gross Revenue Expended or Appropriated for:		
	Maintenance.	Depreciation.	Total.
Milwaukee companies:			
Railway departments.....	11.3	9.9	21.2
Gas, electric light and steam heat departments	6.15	8.12	14.27
United Railways Company of St. Louis..	13.67	10.0	23.67
Union Electric Light & Power Company..	4.95	16.0	20.95
*St. Louis County Gas Company.....	2.9	6.5	9.4
*Suburban Electric Light & Power Company	7.10	10.85	17.95
†Detroit Edison Company and subsidiaries.	6.45	10.23	16.63

*These companies have no generating plants.

†The board of directors of the Detroit Edison Company appropriated out of surplus account \$310,000, for depreciation reserve, and these figures have been computed on the basis of applying this entire amount to the year 1910.

The principal assets, as shown by the balance sheet as of Dec. 31, 1910, are: Stocks, \$22,029,053; bonds, \$5,085,106; loans and advances, \$7,430,673.

A consolidated income account for the fiscal year ended Dec. 31, 1910, for the Milwaukee Electric Railway & Light Company, Milwaukee Light, Heat & Traction Company, Milwaukee Central Heating Company, Racine Gas Light Company, Kenosha Gas & Electric Company and Watertown Gas & Electric Company, and a statement of the United Railways Company of St. Louis for the same period follow:

YEAR ENDED DEC. 31, 1910			
	Milwaukee Group of Properties.	United Railways, St. Louis.	
Gross revenue	\$6,428,710	\$11,580,841	
Operating expenses, taxes and reserves.....	4,382,611	7,906,103	
Gross income	\$2,046,099	\$3,674,739	
Interest accrued	1,278,719	2,793,743	
Net income	\$767,380	\$880,995	
Preferred stock dividends	270,000	409,580	
Balance	\$497,380	\$471,415	

Catskill (N. Y.) Traction Company.—Herman C. Cowen has secured control of the Catskill Traction Company through the purchase of the holdings of W. C. Wood, president of the company. Mr. Cowen and P. G. Coffin have been elected directors of the company to succeed L. G. Hechinger, East Orange, N. J., and N. J. Conway, South Woodstock, Vt., and John Conway, South Woodstock, Vt.

Central Park, North & East River Railroad, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has signed an order permitting the Central Park, North & East River Railroad to file an appeal to the United States

Court of Appeals from the final decree of foreclosure and sale order by the Circuit Court. Judge Lacombe has also directed that all parties in the suit be cited to appear in the Circuit Court of Appeals on April 15, 1911, and show cause why the final decree of foreclosure and sale should not be reversed or modified.

Des Moines (Ia.) City Railway.—The new officers of the Des Moines City Railway and the Inter-Urban Railway follow: President, A. W. Harris; vice-president, treasurer and general manager, J. R. Harrigan; secretary, N. T. Guernsey; N. W. Harris, A. W. Harris, J. R. Harrigan, N. T. Guernsey, Edw. P. Smith, G. P. Hoover, Andrew Cooke, directors.

Indianapolis, New Castle & Toledo Electric Railway, Indianapolis, Ind.—April 22, 1911, has been set as the date for the sale of the property of the Indianapolis, New Castle & Toledo Electric Railway under foreclosure.

Jacksonville (Fla.) Traction Company.—The Jacksonville Traction Company, which was incorporated recently under the laws of Massachusetts with an authorized capital stock of \$1,500,000, of which \$1,000,000 is common stock and \$500,000 is 6 per cent cumulative preferred stock, will succeed the Jacksonville Electric Company, the stock of which will be exchanged share for share for the stock of the Jacksonville Traction Company, or the holders of the stock of the Jacksonville Electric Company will be paid \$100 a share in cash for their holdings. The Jacksonville Traction Company will have an authorized issue of \$5,000,000 of first consolidated mortgage 5 per cent bonds, of which \$1,250,000 will be reserved to take up a like amount of the bonds of the Jacksonville Electric Company which mature in 1927, \$750,000 will be sold for additions and improvements, and the remaining \$3,000,000 will be issued at not less than 80 per cent for permanent additions and improvements. Stockholders of the Jacksonville Electric Company have been asked to deposit their stock with the State Street Trust Company, Boston, Mass., on or before April 12, 1911, on which date a special meeting of the stockholders has been called to authorize the transfer.

Northern Ohio Traction & Light Company, Akron, Ohio.—On April 3, 1911, W. E. Hutton & Company, New York, offered for subscription at 97½, to yield 6.15 per cent, the unsold balance of \$1,000,000 of the 6 per cent cumulative preferred stock of the Northern Ohio Traction & Light Company. As stated in the ELECTRIC RAILWAY JOURNAL of March 4, 1911, page 396, the proceeds of the issue will be used to finance improvements.

Northwestern Elevated Railroad, Chicago, Ill.—On March 29, 1911, the Chicago *Record-Herald* said that the deal which has long been pending for the consolidation of the elevated railroads of Chicago had been perfected, but that Mr. Blair had refused to divulge the details or the basis on which the stocks of the separate companies would be taken over. The National City Bank of New York, it was said, would furnish \$22,000,000 of capital. In the East Mr. Blair was quoted as having denied that the merger of the companies had been completed. Likewise it was also stated in the East that the statement to the effect that the National City Bank of New York has underwritten the stock and bond issues, amounting to approximately \$22,000,000, was premature.

Old Colony Street Railway, Boston, Mass.—The Railroad Commission of Massachusetts has approved an issue of 2920 shares of additional common stock by the Old Colony Street Railway at \$100 per share, as fixed by stockholders, for meeting cost of necessary additions and improvements. The company petitioned for permission to issue 3000 shares.

Public Service Corporation of New Jersey, Newark, N. J.—Gross revenues for the year ended Dec. 31, 1910, of leased and controlled companies were \$29,205,194, an increase of \$2,644,743 over the preceding year. Of the total last year \$1,532,348 was income from securities and miscellaneous sources. Operating expenses and taxes aggregated \$14,611,300 and bonds, interest and rentals of leased and controlled companies amounted to \$10,558,243. Fixed charges of the Public Service Corporation of New Jersey were \$1,835,356, leaving net income of \$2,200,295. Against this amount there were charged for reserves \$125,000 by the Public Service Corporation and \$5,000 by the River-

side & Fort Lee Ferry Company. From the remaining surplus of \$2,070,295 dividends of 5 per cent or \$1,250,000 were paid on the capital stock. Of the total earnings last year \$13,308,726 was received from the railway properties as compared with \$12,114,412 in the previous year. The number of passengers carried in 1910 was 341,398,688, of which 258,746,130 were revenue passengers and 82,652,558 were carried on transfers and passes. In the preceding year the total number of passengers carried was 319,720,235, of which 238,171,257 were revenue passengers and 81,548,978 were carried on transfers and passes. Passenger receipts per car mile were 30.29 cents in 1910 and 29.08 cents in 1909. Passenger receipts per car hour were \$2.60 in 1910 and \$2.50 in 1909. The company built 4.57 miles of railway extensions during 1910. Thomas N. McCarter, the president, refers in the annual report to the Board of Public Utility Commissioners of New Jersey as follows: "It is a pleasure to say that the commissioners have entered upon their duties seriously and with a due regard to the importance of the interests to be supervised by them and that the relations of the companies owned by this corporation with said commission have been and are both cordial and agreeable." The directors of the Public Service Corporation of New Jersey declared a quarterly dividend of $1\frac{1}{2}$ per cent on the \$25,000,000 stock of the company on March 31, 1911, thus increasing the annual rate from 5 per cent to 6 per cent.

Quakertown (Pa.) Traction Company.—The time limit for the holders of the \$300,000 of bonds of the Quakertown Traction Company to accept the offer of the Lehigh Valley Traction Company to exchange the bonds expired on March 25, 1911, and it was announced that a sufficient number of bonds had been deposited to assure the approval of the plan.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—The directors of the Quebec Railway, Light, Heat & Power Company have declared an initial dividend of 1 per cent on the capital stock of the company, payable April 15, 1911, to stockholders of record on March 31, 1911.

Southwestern Street Railway, Philadelphia, Pa.—The sale of the property of the Southwestern Street Railway under foreclosure, to which reference was made in the *ELECTRIC RAILWAY JOURNAL* of April 1, 1911, page 613, has been fixed for April 21, 1911.

Somerset Water, Light & Traction Company, Somerset, Ky.—The property of the Somerset Water, Light & Traction Company, sold under foreclosure recently, has been transferred to the United Water, Light & Traction Company. The following officers have been elected by the new company: O. H. Waddle, president; M. O. Curd, vice-president; J. H. Gibson, treasurer; George G. Waddle, secretary, and J. L. Waddle, general manager.

Springfield & Xenia Railway, Xenia, Ohio.—Gross earnings in the year ended Dec. 31, 1910 were \$71,440 as compared with \$65,827 in the preceding year. Operating expenses and taxes were \$53,395 as compared with \$51,685. Net earnings were \$18,045 against \$14,142. The number of car miles operated last year was 244,148 as compared with 242,480 in the preceding year. Gross income per car mile was 29.26 cents in 1910 and 27.15 cents in 1909. The number of passengers carried was 442,337 in 1910 and 396,451 in 1909. The gross revenue per passenger was 16.15 cents last year and 16.6 cents in the preceding year.

Third Avenue Railroad, New York, N. Y.—The United States Circuit Court of Appeals has handed down an order affirming the decision of Judge Lacombe in the United States Circuit Court overruling the claims of the American Surety Company and the State of New York against the Third Avenue Railroad. The decision of Judge Lacombe affirmed the report of Howard Taylor, special master appointed in the case, to the effect that the claims of the American Surety Company for \$44,561 and of the State of New York for \$2,543 were not entitled to preference or priority in the distribution of funds in the hands of Receiver Whitridge or in the proceeds of the foreclosure sale. On the other hand, Judge Lacombe held that the mortgage representing \$40,381,173 has the priority.

Washington & Rockville Railroad, Washington, D. C.—The Washington & Rockville Railroad has been placed in

the hands of George Weems Williams, Baltimore, Md., as receiver, by Judge Morris, of the United States Court, on the application of the Washington Railway & Electric Company, by which the road is leased.

Dividends Declared

Auburn & Syracuse Electric Railroad, Syracuse, N. Y., quarterly, $1\frac{1}{2}$ per cent, preferred.

Boston (Mass.) Suburban Electric Companies, quarterly, \$1, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, $1\frac{1}{8}$ per cent, preferred; quarterly, $1\frac{1}{8}$ per cent, common.

Dallas (Tex.) Electric Corporation, 3 per cent, first preferred; 2 per cent, second preferred.

Fort Smith Light & Traction Company, Fort Smith, Ark., quarterly, $1\frac{3}{4}$ per cent, preferred.

Lancaster County Railway & Light Company, Lancaster, Pa., quarterly, $1\frac{1}{4}$ per cent, preferred.

Louisville & Northern Railway & Light Company, Louisville, Ky., quarterly, $\frac{3}{4}$ of 1 per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, quarterly, $1\frac{1}{4}$ per cent, preferred.

Milwaukee Electric Railway & Light Company, quarterly, $1\frac{1}{2}$ per cent, preferred; quarterly, $1\frac{1}{2}$ per cent, common.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, $1\frac{3}{4}$ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, $1\frac{1}{2}$ per cent.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, $1\frac{1}{4}$ per cent, preferred.

West Pennsylvania Traction Company, Pittsburgh, Pa., quarterly, $1\frac{1}{2}$ per cent, preferred.

Wheeling (W. Va.) Traction Company, quarterly, 1 per cent.

Youngstown & Ohio River Railway & Light Company, Youngstown, Ohio, quarterly, $\frac{3}{4}$ of 1 per cent, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
Im., Feb. '11	\$21,053	\$12,988	\$8,065	\$8,175	\$110
1 " " '10	18,702	11,900	6,801	7,922	\$1,121
2 " " '11	44,167	26,566	17,601	16,347	1,254
2 " " '10	39,786	24,138	15,648	15,908	\$260

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.

Im., Jan. '11	\$80,805	\$48,268	\$32,537	\$29,720	\$2,817
1 " " '10	71,032	48,133	22,900	29,794	\$6,895

DALLAS ELECTRIC CORPORATION.

Im., Jan. '11	\$155,180	\$77,998	\$77,182	\$27,422	\$29,759
1 " " '10	118,721	80,752	37,969	26,407	11,562
12 " " '11	1,485,777	948,391	537,386	310,049	227,337
12 " " '10	1,336,591	836,444	500,146	335,379	164,767

EAST ST. LOUIS & SUBURBAN COMPANY.

Im., Feb. '11	\$168,680	\$92,970	\$75,710	.....	.....
1 " " '10	175,234	94,765	80,469	.....	.....
2 " " '11	357,404	189,609	167,795	.....	.....
2 " " '10	363,427	193,082	170,345	.....	.....

GALVESTON-HOUSTON ELECTRIC COMPANY.

Im., Jan. '11	\$111,166	\$68,147	\$43,019	\$29,604	\$18,325
1 " " '10	96,631	67,615	29,017	23,141	5,875
12 " " '11	1,327,521	797,275	530,246	291,776	238,470
12 " " '10	1,211,739	717,649	494,090	265,007	229,083

KOKOMO, MARION & WESTERN TRACTION COMPANY.

Im., Dec. '10	\$23,091	\$9,992	\$13,098	\$7,164	\$5,934
1 " " '09	21,441	9,144	12,297	6,940	5,357
12 " " '10	261,485	113,385	148,100	85,973	62,127
12 " " '09	233,863	99,546	134,317	83,638	50,678

MONTREAL STREET RAILWAY COMPANY.

Im., Feb. '11	\$330,738	\$227,604	\$103,133	\$41,974	\$61,159
1 " " '10	303,977	204,256	99,722	39,875	59,846
5 " " '11	1,830,922	1,135,988	694,934	182,783	512,151
5 " " '10	1,656,040	996,194	659,854	171,911	487,935

NORTHERN OHIO TRACTION & LIGHT COMPANY.

Im., Feb. '11	\$172,413	\$104,865	\$67,545	\$44,357	\$23,187
1 " " '10	146,207	92,513	53,693	43,292	10,402
2 " " '11	358,684	211,772	146,912	88,786	58,126
2 " " '10	311,151	187,014	124,137	86,583	37,554

PORTLAND RAILWAY, LIGHT & POWER COMPANY.

Im., Feb. '11	\$478,263	\$241,442	\$236,821	\$124,715	\$112,106
1 " " '10	393,076	190,313	202,763	111,081	91,682
2 " " '11	989,887	512,055	477,832	248,225	229,607
2 " " '10	824,087	382,201	441,886	230,233	211,653

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.

Im., Feb. '11	\$83,126	\$48,635	\$34,491	\$19,276	\$15,215
1 " " '10	79,271	47,519	31,752	17,967	13,785
2 " " '11	174,114	99,861	74,253	38,569	35,684
2 " " '10	168,579	98,525	70,054	35,884	34,170

Traffic and Transportation

Interurban Depot at Cleveland Proposed

An elaborate plan has been announced for an interurban depot at Cleveland. D. H. Burnham, a prominent Chicago architect, has made tentative plans for the structure and will be financially interested in it. The May Department Stores Company, the Bailey Company, the Higby Company and other companies, through their individual officers and representatives, have agreed to aid in financing. The plan is to occupy the entire block bounded by the Public Square, Superior Avenue, West Third Street and Champlain Avenue with a structure which will combine an interurban terminal, a hotel and an elegant office structure. The site is now occupied by the Forest City House, the old Higby stores and several smaller buildings. The hotel portion will be 12 stories high and will open on the Public Square. The office structure, which will occupy the Superior Avenue side and extend back through the block, will be 16 stories high. Through the structure between Superior Avenue and Champlain Avenue there will be four tracks for the entrance of interurban cars flanked by waiting rooms, ticket offices, parcels rooms, baggage rooms and the other accessories. The entrance to the station will be from the Public Square and also from West Third Street. On the south side of the block space will be arranged for a train shed. There will be an underground walk under the tracks and provision will be made for subway terminals in case tracks are brought into the center of the city under ground. It is estimated that the structure will cost \$4,500,000. A. S. Taylor, of V. C. Taylor & Sons, has charge of the leasing work. At a meeting of the directors of the Electric Depot Company in the offices of the Cleveland Railway on March 31, 1911, it was decided not to build a station on land where the interurban freight station is located, but the terminal facilities of the proposed building will be taken over. A. E. Akins, first vice-president of the Cleveland, Southwestern & Columbus Railway, is the president of the depot company, and Henry J. Davies, secretary and treasurer of the Cleveland Railway, is secretary.

Service Order on Long Island.—The Long Island Electric Railway has been ordered by the Public Service Commission to reduce the headway of cars between 6 a. m. and 9 a. m. and between 5 p. m. and 7 p. m. from 20 minutes to 10 minutes on the Jamaica-Far Rockaway division.

Fares Between Los Angeles and Santa Monica.—An agreement has been reached between the Los Angeles-Pacific Company and the residents of Santa Monica by which the company will place on sale a 30-ride family book, good for 90 days, for \$4.50; a 90-ride family book, good for 90 days, \$7; a 54-ride individual book, good for calendar month, \$5.50.

Complaint About Insufficient Guards in New York.—The Public Service Commission of the First District has adopted a complaint order directing the Interborough Rapid Transit Company to answer a complaint to the effect that there are not enough platform guards on the stations in the rush hours in the subway and at the Twenty-third Street station of the Third Avenue elevated line.

Changes in Routing at Detroit.—Frank H. Croul, police commissioner of Detroit, Mich., has suggested to the Detroit (Mich.) United Railway a number of changes in the routing of cars to relieve congestion on Woodward Avenue and other downtown streets during the rush hours. A. D. B. Van Zandt, of the company, is reported to have said that the proposed changes had not yet been analyzed.

Milk Service by the Chicago & Southern Traction Company.—A new milk train is being run every morning by the Chicago & Southern Traction Company northward from Kankakee, collecting milk at the smaller stations and delivering it to Chicago Heights, Harvey, Blue Island and Chicago. The promotion of the milk business is in the hands of Robert J. Barnett, traffic agent of the company.

Prepayment Cars in San Francisco.—On March 19, 1911, the United Railroads of San Francisco placed 10 new pay-as-you-enter cars in operation on its Sutter-Jackson Street line. The Cliff House line is being equipped with similar

cars and other lines will also be equipped as fast as the cars are received. Eighty of these cars have been ordered for delivery within the next six months, and the cars now in service will probably be rebuilt as pay-as-you-enter cars.

Transfers in Louisville.—T. J. Minary, president of the Louisville (Ky.) Railway, has issued a statement with reference to the ordinance proposed in the Council of Louisville which provides for so-called universal transfers. Mr. Minary said that in his opinion universal transfers are now being given, the only thing guarded against being the return of a passenger to the starting point on the payment of only one fare.

Concession to Retain Interurban Station.—Merchants of Anderson, Ind., in the vicinity of the Union Building have agreed to pay the rent of the basement of that building for the use of the Indiana Union Traction Company as a station in order to prevent the station from being moved to some other locality. The train caller will be stationed on the sidewalk and announce trains through a megaphone. Freight and baggage will be handled by a small elevator which will be built through the sidewalk at the building line.

Designating Service on Illinois Traction System.—On April 16, 1911, Easter Sunday, when the new spring uniforms are worn for the first time by the employees of the Illinois Traction System, Peoria, Ill., a new system for designating the length of service of each man will be adopted. Three years of service with the company will entitle a trainman to one stripe on his left sleeve and five years of service will entitle a man to a star. When a man has served eight years he will be entitled to a star and a stripe and when he has served 10 years he will be entitled to two stars.

Northwestern Elevated Railroad Improves Service.—The train service between the Loop district in Chicago and Evanston, operated by the Northwestern Elevated Railroad over its four-track elevated structure between the downtown district and Wilson Avenue and thence over the double-track line leased from the Chicago, Milwaukee & St. Paul Railroad northward through Evanston to Central Street, where connection is made with the Chicago & Milwaukee Electric Railway, has been improved by a reduction in the headway of trains operated during the rush hours and by the omission of the stop formerly made at Sheridan Road. The headway of Evanston through trains is now eight minutes during rush hours. These five-car trains make all stops in the Loop district of Chicago. No stops are made, however, between Kinzie Street and Argyle, 6.6 miles. The total run of these trains is approximately 12 miles and the schedule time 45 minutes. By the omission of the Sheridan Road stop the Evanston trains are relieved from carrying any passengers destined for points on the elevated and busier section of the road.

Tact.—In an article which he contributed to the March issue of the *Tramway Bulletin*, which is published in the interest of the employees of the Denver City Tramway, Charles B. Wells, superintendent of transportation of the company, said: "I want to talk to you a little about tact. Some of us seem to be born with it, and others acquire it by sad experience, and we have to endure many of the slings and arrows of misfortune before we learn to realize what a valuable asset it is. A man who possesses the subtle arts of tact and diplomacy is universally thoughtful and kind. There is an air of refinement about him that won't brush off. Theorize about this a little, then try it out on your family. If it works practise it on the passengers and on your other friends. Was I wrong when I spoke about the passengers as your friends? They should be, shouldn't they? How much easier it is to 'jolly' a big load of your friends out of the 'pit' than the same sized crowd who care nothing for you! If an accident occurs or any difficulty arises, who will have the least trouble in securing witnesses or reaching an amicable settlement—the man of kindly nature who possesses tact or the one who doesn't employ it? We have many men on this system who are tactful to a remarkable degree. I know it; and it does make me feel some proud and chesty when one of the company's patrons takes the pains to tell me what an efficient conductor and what a fine fellow this one or that one is, and how his attentive and agreeable manners are appreciated by the passengers."

Personal Mention

Mr. J. B. Warner has been appointed superintendent of the Platte Street power house of the Denver (Col.) City Tramway.

Mr. Norman Read has been appointed electrical engineer of the Denver (Col.) City Tramway in charge of all matters pertaining to the construction and operation of power for the entire system.

Mr. A. W. Harris has been elected president of the Des Moines (Ia.) City Railway and the Inter-Urban Railway, Des Moines, Ia., to succeed Mr. G. B. Hippee and Mr. H. H. Polk, respectively.

Mr. Tudor Jones has been appointed traveling auditor of the Indiana Union Traction Company, Anderson, Ind., to succeed Mr. Alva E. Moore, who has been appointed division freight and passenger agent of the company.

Mr. J. R. Harrigan, vice-president and general manager of the Des Moines (Ia.) City Railway and the Inter-Urban Railway, Des Moines, Ia., has also been elected treasurer of these companies to succeed Mr. G. B. Hippee.

Mr. W. G. Evans, president of the Denver (Col.) City Tramway and first vice-president of the Denver & Northwestern Railway, has been elected president of the Denver, Northwestern & Pacific Railway, Denver, Col., to succeed David H. Moffett, deceased.

Mr. John F. Stevens has resigned as president of the United Railways and the Oregon Electric Railway, Portland, Ore., having retired as president of the Astoria & Columbia River Railroad, Oregon Trunk Railway, Pacific & Eastern Railway and Spokane, Portland & Seattle Railway, with offices at Portland.

Mr. Edward C. Thomas has been appointed advertising manager for the Pacific Electric Railway, Los Angeles, Cal., and all lines operating in connection with that company. Mr. Thomas was formerly general agent of the passenger department of the Los Angeles & Redondo Railway, which has been merged with the Pacific Electric Railway.

Mr. Alva E. Moore has been appointed division freight and passenger agent of the Indiana Union Traction Company with headquarters at Anderson, Ind., to succeed Mr. Joseph F. Starkey, who has been appointed traffic manager of the Lake Shore Electric Railway at Sandusky, Ohio, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 1, 1911. Mr. Moore was formerly traveling auditor of the Indiana Union Traction Company.

Mr. Herman C. Cowen has been elected president of the Catskill (N. Y.) Traction Company to succeed Mr. W. C. Wood. Mr. Cowen was born in Emporia, Kan., and was educated in the public schools of that State, at the Missouri State University and at Lafayette College. He turned his attention to the cement industry and in 1898 was appointed superintendent of the Catskill Cement Company, a position he held until October, 1909, when the company's holdings were purchased by the Alpha Cement Company. Mr. Cowen is president of the Catskill Board of Trade and a director in the Catskill National Bank.

Mr. E. W. Olds, whose resignation as superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was noted in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911, was presented with a diamond scarfpin by Mr. John I. Beggs, retiring president of the company, at one of the regular weekly meetings of the officers of the company. Mr. Beggs expressed deep regret at the retirement of Mr. Olds from the company and concluded by making the presentation on behalf of himself and his associates. The employees of the department with which Mr. Olds was so long identified also signified their esteem by waiting on Mr. Olds at his office in the Kinnickinnic shops and presenting him with a gold watch and an album containing photographs and autographs of most of the shopmen and photographs of the shops and scenes in the vicinity of them. The presentation speech in this case was made by Mr. Howard A. Mullet, who succeeds Mr. Olds. As previously stated in the *ELECTRIC RAILWAY JOURNAL*, Mr. Olds resigned from the Milwaukee Railway & Light Company to sever his connection with the street

railway industry and make his permanent home in California.

Mr. Carl Raymond Gray has been elected president of the United Railways and the Oregon Electric Railway, Portland, Ore., to succeed Mr. John F. Stevens, resigned. Mr. Raymond was formerly first vice-president of the St. Louis & San Francisco Railroad, with offices in St. Louis, Mo., and also succeeds Mr. Stevens as president of the Astoria & Columbia River Railroad, Oregon Trunk Railway, Pacific & Eastern Railway and the Spokane, Portland & Seattle Railway, with offices at Portland. Mr. Gray was born on Sept. 28, 1867, and was educated at the Arkansas Industrial University. He entered railway service in 1882 as a telegraph operator with the St. Louis & San Francisco Railroad, and has served continuously with that company since that time. He has filled the positions of telegraph operator and agent, clerk in the transportation department, commercial agent, division freight agent, division superintendent, superintendent of transportation, general manager, second vice-president and general manager and first vice-president.

Mr. A. C. Adams, whose appointment as superintendent of motive power of the Oregon Electric Railway and the United Railways, Portland, Ore., was mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911, was born at Everett, Kan., on Feb. 6, 1866. He was educated in the public schools and began his railway work in August, 1884, as a machinist's apprentice on the Missouri Pacific Railway. In October, 1887, Mr. Adams became connected with the Chicago, Rock Island & Pacific Railway as a machinist and was later pit foreman, roundhouse foreman, general foreman and master mechanic of the company. He resigned from the Chicago, Rock Island & Pacific Railroad in September, 1906, and in November, 1906, was appointed master mechanic of the Chicago, Burlington & Quincy Railway. A year later Mr. Adams became connected with the Delaware, Lackawanna & Western Railroad as master mechanic. In November, 1908, he was appointed master mechanic of the New York, New Haven & Hartford Railroad, which position he resigned to become superintendent of motive power of the Spokane, Portland & Seattle Railway, the Oregon Electric Railway and the United Railways, Portland, Ore. While he was actively engaged in railway work Mr. Adams supplemented the training which he received in the public schools by completing the mechanical course of the International Correspondence Schools, of Scranton.

OBITUARY

George C. Webster, formerly president of the Indianapolis & Greenfield Traction Company, Indianapolis, Ind., now merged with the Terre Haute, Indianapolis & Eastern Traction Company, is dead. Mr. Webster was 66 years old.

George Bowers Caldwell, for many years connected with the engineering department of Westinghouse, Church, Kerr & Company as one of the chief mechanical engineers, died March 31, 1911, at Yonkers, N. Y. His connection with this company began in 1893, and he was identified with the design and construction of the Kingsbridge power station of the Third Avenue Railroad, and supervised the design and installation of the Long Island Railroad's electrification, including the power house at Long Island City. His last work was in charge of design and construction of the mechanical and electrical features of the Pennsylvania Terminal Station in New York City.

Col. Dwight B. Wilson, superintendent of power and construction of the Denver (Col.) City Tramway, is dead, having succumbed to injuries which he received at the central power station of the company on Feb. 3, 1911. Col. Wilson was born on March 5, 1848, in Lewiston, Maine. He enlisted in the civil war as a private under General B. F. Butler and located at Greeley, Col., in 1887, as an architect and builder. In 1892 he became connected with the Hallack Lumber Company, Denver, Col., as architect and superintendent of building. In 1895 he was appointed commissioner of highways for Denver. In the fall and winter of 1900 and 1901, when the Denver City Tramway began to build its present central station, Colonel Wilson was made superintendent of construction, and when the station was completed he was made superintendent of power, his jurisdiction extending over all stations and carhouses.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Lee Street Terminal Company, Montgomery, Ala.**—Incorporated in Alabama to build electric and steam railways in Montgomery. Capital stock, \$80,000. Officers: W. J. Hannah, president; S. H. Roberts, vice-president; J. M. Winchester, treasurer, and F. B. Powell, secretary.

***Peoria & Milwaukee Electric Railway, Springfield, Ill.**—Application for a charter has been made in Illinois by this company to build an electric railway. As yet the route of this line has not been laid out.

***Nortonville (Ky.) Traction Company.**—Application for a charter has been made by this company in Kentucky to build an electric railway in Nortonville. Capital stock, \$100,000. Incorporators: Frank E. Mohr, Columbus, Ohio; Frank G. Hoge, Nortonville, Ky., and T. F. Callard, Hopkinsville, Pa.

***Manitoba Power Company, Winnipeg, Man.**—Incorporated in Manitoba by the Dominion government to build electric railways and take over the charters of several Manitoba power companies. Capital stock, \$5,000,000.

***Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B.**—Incorporated in New Brunswick to build an electric railway in Moncton. The company plans to have about five miles of track completed this year.

Pine Brook Electric Railway, Caldwell, N. J.—Incorporated in New Jersey to build an 11-mile electric railway to connect Caldwell, West Caldwell, Montville, Hanover, Fox Hill and Denville. Capital stock, \$110,000. Incorporators: Alexander Dallas, William L. Kerris, H. A. Dallas and Peter Beaton, Montville; Edward J. Duffy, Newark; H. H. Picking, East Orange, and Stanley Gedney, South Orange. [E. R. J., March 11, '11.]

***Charlotte & Norwood Railway, Charlotte, N. C.**—Application for a charter has been made in North Carolina by this company to build a steam or electric railway to connect Troy, Mount Gilead and Fayetteville. Incorporators: M. C. Mayer, D. P. Hutchison, N. S. Alexander, C. G. Creighton, J. A. Hancock, A. Little and J. F. Shinn.

***Hills & Dales Railway, Van Buren, Ohio.**—Incorporated in Ohio to build electric railways. Capital stock, \$25,000. Incorporators: William Stroop, Edwin P. Mathews, Clayton; Albert C. Rice and O. J. Emrick.

***Springdale & Long Lake Railway, Portland, Ore.**—Application for a charter has been made in Oregon by this company to build a railway in Stevens and Spokane Counties, Washington. Headquarters: Portland, Ore. Capital stock, \$10,000. Incorporators: Franklin Griffith, F. J. Lonergan and J. F. Phelan.

Tarentum, Brackenridge & Butler Street Railway, Tarentum, Pa.—Chartered in Pennsylvania to build a 2-mile electric railway in the vicinity of Tarentum. The contract for engineering work has been awarded to McKelvey & Hines, Pittsburgh. Capital stock, \$100,000. Officers: McKinstry Griffith, president, and Otto Sontam, J. M. Griffith, C. H. Battey and F. Flaggemeir, Tarentum; C. N. Schad, Saxonburg, and J. C. Smith, Brackenridge, directors. [E. R. J., Jan. 18, '11.]

***Southwestern Traction Company, Temple, Tex.**—Application for a charter has been made in Texas by this company, ostensibly the successor to the Belton & Temple Traction Company. Capital stock, \$165,000. Incorporators: A. F. Bentley, P. L. Downs, W. S. McGregor, W. G. Haag and W. G. Bentley.

FRANCHISES

Calgary, Alta.—The Alberta Electric Railway has asked the City Council for a franchise to build its tracks through Calgary. It will connect Calgary, Medicine Hat, Lethbridge, McLeod and Wood Mountain. [E. R. J., April 1, '11.]

***Revelstoke, B. C.**—The Dominion Securities Company, Revelstoke, has been organized, it is reported, to build an electric railway in Revelstoke.

Los Angeles, Cal.—Paul Shoup has asked the Council for a franchise to connect the Pacific Electric Railway line on Sixth Street with the Los Angeles Pacific line on Hill Street.

Napa, Cal.—Theodore Bell, representing the Napa & Lakeport Railroad, San Francisco, has asked the Trustees to extend its franchise one year in which to build its line in Napa. It will extend down the west side of Napa Valley to San Rafael. [E. R. J., Sept. 5, '10.]

Stockton, Cal.—The San Joaquin Valley Electric Railway has received a franchise from the Board of Supervisors to build its tracks along McKinley Avenue, from Stockton to Franch Camp.

***Hobart, Ind.**—The Gary, Hobart & Eastern Traction Company has received a franchise from the Council to build its tracks through Hobart. This proposed railway will connect Gary and Hobart and be extended eventually to Goshen. U. P. Hord, Hobart, is interested.

Cherryvale, Kan.—D. H. Siggins, president of the Union Traction Company, Coffeyville, has received a franchise from the City Council to build a line to the eastern limit of Cherryvale.

Caledonia, Mich.—The Grand Rapids, Hastings & Battle Creek Interurban Railway, Grand Rapids, has received a franchise from the Common Council to build its tracks through Lake Street in Caledonia. A. C. Sekell, Grand Rapids, local representative. [E. R. J., Dec. 19, '08.]

St. Louis, Mo.—The Southern Traction Company has asked the City Council for a franchise to operate its line across the Free Bridge and over downtown streets in St. Louis.

Albany, N. Y.—The United Traction Company, Albany, has received a franchise to double-track its line on Hamilton Street, from Dove Street east to Philip Street, in Albany. Work will begin early in the spring. This company will also apply for a franchise to double-track its line on Hudson Avenue to South Pearl Street.

Skaneateles, N. Y.—The Auburn & Syracuse Electric Railroad, Syracuse, has received a franchise from the Council to double-track its line from Auburn to Skaneateles. The double-tracking will then extend from Syracuse to Auburn.

White Plains, N. Y.—The Hudson River & Eastern Traction Company, Ossining, has asked the Board of Trustees for a franchise over certain streets in White Plains.

***Warren, Ohio.**—Henry Orth has asked the County Commissioners for a franchise to build an electric railway between Warren and Bloomfield, via Champion, Bristolville, Bristol and Bloomfield.

Meaford, Ont.—The People's Railway, Berlin, will ask the Council for a franchise to build its tracks in Meaford.

Ottawa, Ont.—The Imperial Traction Company, Hamilton, has been authorized to build from Hamilton to Guelph, Berlin, Stratford, London, Woodstock and Brantford, and back to Hamilton, with extensions to Niagara Falls and Sarnia. L. B. Howland, Toronto, is interested. [E. R. J., Feb. 18, '11.]

Spartanburg, S. C.—The Greenville, Spartanburg & Anderson Railway will ask the City Council for a 60-year franchise to build its tracks through Spartanburg.

Centralia, Wash.—The Twin City Light & Power Company, Chehalis, has received a franchise from the City Council to extend its tracks on Tower Avenue and Third Street, in Centralia, to the city limits on the west.

***Cle Elum, Wash.**—Paul L. Richards, Tacoma, will ask the City Council for an electric railway franchise in Cle Elum. A similar franchise will be requested from the City Council of Roslyn. This is part of a plan to build an electric railway between Cle Elum and Roslyn.

TRACK AND ROADWAY

Birmingham & Shades Mountain Electric Railway, Birmingham, Ala.—Preliminary arrangements have been made by this company to build its 4-mile electric railway from Birmingham to the top of Shades Mountain and construction will begin shortly. It will be built by the High Point Land Company, of which Eugene Fies, Birmingham, is president. [E. R. J., Nov. 14, '08.]

British Columbia Electric Railway, Vancouver, B. C.—This company has completed and placed in operation its Burnaby branch. This line forms the connecting link between Vancouver and the Chilliwac branch.

Red Bluff, Cal.—C. L. Donohoe, Willows, is interested in a projected railway to connect Woodland, Colusa, Willows, Orland, Corning, Red Bluff and Redding. A meeting will be held in Willows shortly, at which the preliminary details will be arranged. The proposed road is intended to connect at Woodland with the Vallejo & Northern Railway.

***San Bernardino, Cal.**—J. D. Armstead, representing Los Angeles and Eastern capitalists, is promoting a proposed railway direct from San Bernardino to San Diego via Hemet and Escondido.

Bridgeport & Danbury Electric Railway, Bridgeport, Conn.—Morton F. Plant, of New York and New London, has written this paper that he is in no way connected with this company, as stated in newspaper reports and reported in this paper for March 25, 1911.

Jacksonville (Fla.) Traction Company.—This company, which has been incorporated under the laws of Massachusetts with a capital stock of \$1,500,000, will succeed the Jacksonville Electric Company. [E. R. J., March 11, '11.]

***Palatka, Fla.**—A company is being organized for the purpose of building a 20-mile electric railway between Palatka and Summer Haven.

***Citrus Southern Electric Railway, Sanford, Fla.**—It is reported that this company will award contracts this year for building its 45-mile railway between Sanford, Orlando and Kissimmee. T. K. Miller, Orlando, president; J. J. Brophy, Winter Park, vice-president and engineer.

Gary & Southern Traction Company, Crown Point, Ind.—This company has announced that the work of building the 12-mile extension from Gary to Crown Point will be resumed at once.

Evansville & Southern Indiana Traction Company, Evansville, Ind.—This company contemplates building its extension from Patoka to Vincennes during the present year. The line will bridge White River at Hazleton or Decker in order to get into Vincennes. Eventually the company will build as far north as Sullivan, Ind.

Indianapolis & Delphi Traction Company, Indianapolis, Ind.—This company advises that it is securing right-of-way and construction will begin as soon as preliminary arrangements have been completed on this proposed electric railway to connect Carmel and Delphi via Westfield, Sheridan, Frankfort, Forest, Burlington and Flora. The company's power station will be located at Indianapolis at present. Capital stock authorized, \$10,000. Officers: Edward Thistlewaite, Sheridan, president; Morris E. Cox, Westfield, secretary, and Henry E. Smith, Indianapolis, general manager. [E. R. J., March 18, '11.]

South Bend, Richmond & Southeastern Traction Company, Richmond, Ind.—This company is considering plans to build an electric railway to connect Richmond, Liberty, Union City, Brownsville, Brookville and Harrison. Among those interested are F. C. Charles, Chas. W. Jordan, A. Jenkins, A. H. Bartel, B. B. Johnson and Paul Comstock. [E. R. J., Dec. 31, '11.]

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company will shortly begin work on extensive improvements on its lines in South Bend. The directors at their annual meeting provided for these improvements. The principal lines will be double-tracked and a new transfer center established, which will materially assist in relieving the congestion at the interurban station.

***Southeastern Interurban Railway, Vincennes, Ind.**—This company, it is said, will award contracts for the construction of its proposed electric railway from Vincennes to Jasper as soon as the surveys are completed. George B. Hazleton, Vincennes, president.

Forest City & Mason City Railway, Forest City, Ia.—This company has completed preliminary arrangements and will award contracts on May 1 for building this 30-mile electric railway between Mason City and Forest City via Fertile. A. L. Sherrin, Watertown, S. D., president. [E. R. J., March 18, '11.]

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—Work will be begun at once by this company

to build an extension from Lundgren to Lehigh. From Lehigh to Webster City the company will use the tracks of the old Crooked Creek Railroad, which it is electrifying. When this new line is completed the company will establish direct service between Webster City, Lehigh and Des Moines.

Wichita Railroad & Light Company, Wichita, Kan.—Plans are being made by this company to build an extension from Wichita to Hutchinson, through Burrton and Halstead and extending along the south side of the Santa Fe line.

***Brandon, Man.**—James D. McGregor, Brandon, has written the Council stating that he was authorized, on behalf of an English company, to make a proposition to finance and build the proposed street railway, upon the basis that after all expenses of operation of plant and interest on the cost were paid the profit would be divided between the city and company.

Springfield & Western Railroad, Springfield, Mo.—This company advises that it has completed its preliminary surveys between Springfield and Joplin. This is part of a plan to build a 90-mile electric railway to connect Springfield, Joplin, Paris Springs, Mount Vernon, Monett, Pierce City, Wentworth, Plano and Doamond. M. M. Hollenback, Springfield, chief engineer. [E. R. J., Dec. 10, '10.]

United Traction Company, Albany, N. Y.—The Public Service Commission, Second District, has received a petition from this company asking for permission to construct a double track on Hudson Avenue, between Grand and South Pearl Streets, in Albany, also to construct an additional track on Hamilton Street between Dove and Phillip Streets.

***Dartmouth, N. S.**—A. C. Pyke and Robert Stanford are said to be interested in the promotion of an electric railway in Dartmouth out to Cow Bay. Application for a charter will soon be made.

Illinois Central Electric Railway, Canton, Ohio.—This company will receive bids for constructing a 7-mile extension from Norris to Farmington.

Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.—Carlin & Company, Chicago, have been awarded the contract by this company to build the roadbed and bridges of its proposed 25-mile electric railway to connect Cleveland, Alliance and Mahoning. Construction will begin at once. [E. R. J., April 1, '11.]

Ottawa, Smith's Falls & Kingston Electric Railway, Ottawa, Ont.—This company is making preliminary arrangements for building its proposed electric railway from Ottawa, via Manotick, Kars, North Rideau, Merrickville, Kilmarnock, to Smith's Falls. From here a branch line is projected to Lenark village, through Perth. The road crosses the Rideau here and runs through Lombardy, Portland, Elgin, Morton, Seeley's Bay, Brewer's Mills, to Kingston. F. A. Heney, Westboro, is interested. [E. R. J., Nov. 26, '10.]

Mount Hood Railway & Power Company, Portland Ore.—This company has completed and placed in operation its 12-mile extension between the Troutdale branch and Lusteds. Another contract for 10 miles of grading and construction has been let, to extend beyond Lusteds to Sandy.

Ephrata & Lebanon Street Railway, Ephrata, Pa.—All rights-of-way have been secured and it is said that construction will soon begin on this 23-mile electric railway to connect Lebanon and Ephrata via Iowa, Reistville, Schaeffers-town, Kleinfeltersville, Hopeland, Clay and Lincoln. George D. Krause, Lebanon, president. [E. R. J., Sept. 17, '10.]

Southern Cambria Railway, Johnstown, Pa.—This company is grading its extension to Ebensburg, a distance of 10.85 miles.

Lock Haven & Jersey Shore Railroad, Lock Haven, Pa.—This company advises that engineers are now at work locating the route of its proposed 12-mile electric railway to connect Lock Haven, Jersey Shore, Avis, Dunstable, Charleston, Lock Port and Woolrich. The power station will be located in North Fork. Officers: L. M. Patterson, Lock Haven, president; C. E. Covert, Harrisburg, secretary; W. Harry Baker, Harrisburg, treasurer, and George Roberts, Lock Haven, chief engineer. [E. R. J., April 1, '11.]

Montgomery County Rapid Transit Company, Norristown, Pa.—This company is to extend its line from Skip-pack through the Perkiomen Valley to Schwenksville, Green Lane and Pennsburg, instead of through the North Penn Valley.

Allegheny & Northwestern Railroad, Philadelphia, Pa.—Construction on this 21-mile electric railway to connect Evans City and Harmarville via Mars, Valencia and Bakers-town, will be resumed this month.

Reading (Pa.) Transit Company.—This company proposes to ask permission to build two tracks on the new Penn Street bridge and to extend them to Wyomissing. There is also a rumor that a branch will be built from a point on the Mohnton line to connect with the Womelsdorf road in the vicinity of Wyomissing.

Philadelphia & Western Railroad, Upper Darby, Pa.—This company has contracted with the John A. Kelly Company, Philadelphia, Pa., to prepare the grade for the construction of a branch from the western end of its present line to a point in the main line of the Pennsylvania Railroad between Strafford and Devon.

Tioga Traction Company, Wellsboro, Pa.—James F. Fisher, Williamsport, is making surveys from Wellsboro to Mansfield, a distance of 15 miles, for this proposed electric railway to connect Wellsboro, Middlebury, Chatham, Covington and Mansfield. George F. Keagle, Avis, general manager. [E. R. J., March 11, '11.]

***Bristol (Tenn.) Belt Line.**—This company is planning the electrification of a line from Bristol to Big Creek Park, a distance of 10 miles.

Grand Belt Interurban Railway, Gallatin, Tenn.—This company advises that construction will begin as soon as financial backing has been secured for this 30-mile electric railway to connect Nashville, Goodlettsville and Gallatin. Capital stock authorized, \$50,000. Bonds authorized, \$500,000. Officers: C. H. Fidler, Gallatin, president, and S. R. Lewis, Gallatin, secretary and treasurer. [E. R. J., April 9, '10.]

***Henderson, Tenn.**—William Lee, J. W. Stewart, Henderson; N. B. Hardman and L. P. Jones, Sardis, plan to build an electric railway to extend from Henderson or Jackson and running east to some point on the Tennessee River, thence up the river to Savannah.

Trinity Valley Traction Company, Dallas, Tex.—This company advises that surveys have been completed and all local details adjusted, and plans for the construction have been adopted. The company expects to be in the market during the summer and fall for the necessary construction materials. This 118-mile electric railway will connect Dallas, Waxahachie, Ennis, Corsicana and Palestine. W. W. Clopton, Corsicana, secretary. [E. R. J., Nov. 19, '10.]

Cache County Amusement Company, Logan, Utah.—This company advises that construction will begin about July 1 on this 50-mile electric railway to connect Preston, Idaho, Franklin, Richmond, Lewiston, Smithfield, Hyde Park, Greenville, Logan, Providence, Millville, Hyrum, Wellsville and Paradise. No contracts have been awarded as yet. The power station and repair shops will be located at Logan. Headquarters, Logan. Capital stock authorized, \$100,000; capital stock issued, \$57,000. Officers: Job White, Salt Lake City, president; J. W. Wiscomb, vice-president; W. J. Phillips, Salt Lake City, secretary, and Leo Nielson, Logan, treasurer. [E. R. J., Oct. 15, '10.]

Graham (Va.) Electric Railway.—This company advises that construction will begin within 18 months on its proposed railway in Graham. The company will furnish power for lighting purposes. Capital stock authorized, \$50,000. J. F. Dudley, Graham, president. [E. R. J., March 18, '11.]

Norfolk & Portsmouth Traction Company, Norfolk, Va.—This company is considering plans for building a mile extension from Powhatan Avenue and Forty-third Street, Norfolk, to Tanner's Creek, and extending its Ocean View line about 2 miles to East Ocean View.

Bellingham-Skagit Railway, Bellingham, Wash.—The Stone & Webster Engineering Corporation has begun the construction of this 60-mile electric railway to connect Bellingham, Sedro, Woolley, Burlington, La Conner and Mount Vernon. Charles M. Drummond, president. [E. R. J., Jan. 28, '11.]

SHOPS AND BUILDINGS

Los Angeles & Redondo Railway, Los Angeles, Cal.—This company will enlarge its car house at Redondo Beach to accommodate not less than 150 passenger cars. At present the capacity of the car house is 30 cars. The shops will be removed to new quarters.

Southern Pacific Railroad, Los Angeles, Cal.—This company will build a series of new stations in North Berkeley, Northbrae, Albany and West Berkeley, according to plans for the new electric loop service which will be in operation this fall. A union station may be built at Hopkins Street terminal in Northbrae. A second station will be built at once at the corner of Solano Street, near Colusa Avenue, the contract having been awarded to R. Trost. The structure will cost \$16,872. A third station will be located in Main Street, near San Pablo Avenue, Albany. In West Berkeley a series of stations will be built at the principal cross streets. One at Dwight Way, another at Adeline and Shattuck Avenue and one near University Avenue.

Rockford & Interurban Railway, Rockford, Ill.—This company has moved all its machinery from the local repair shops to its new shops in Rockford. In the future all repair work will be done here.

Tri-City Railway & Light Company, Davenport, Ia.—This company is said to be considering plans for building a car house and repair shops in Davenport, at Thirty-fifth Street and Fifth Avenue. The cost is estimated to be about \$80,000.

Ogdensburg (N. Y.) Street Railway.—It is reported that this company has awarded the contract to John A. Wert for constructing a new carhouse in Ogdensburg. The company's old carhouse was recently destroyed by fire.

Galveston-Houston Electric Railway, Houston, Tex.—Work on the plans for a carhouse to be erected by this company on Texas Avenue, in Houston, are about complete, and work will be begun within the next four weeks. The structure will be built so as to admit of improvements to it later in the way of extensions and additions. It is expected to build ultimately a large passenger station and office adjoining this carhouse.

POWER HOUSES AND SUBSTATIONS

Rockford & Interurban Railway, Rockford, Ill.—This company plans to build a power plant at Rockford.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—Plans are being made by this company to build a power plant in Fraser.

Elmira, Corning & Waverly Railway, Waverly, N. Y.—This company will begin work upon the new substation to be built at Big Flats this month. Power will be received there through lines from the local public service company's power house.

Galt, Preston & Hespeler Street Railway Company, Ltd., Galt, Ont.—This company has arranged for a supply of power from the Hydroelectric Power Commission in Preston.

Portland Railway, Light & Power Company, Portland, Ore.—This company will construct a building adjacent to its new steam plant which has just been finished on the Clackamas River in Portland. This structure will be 35 ft. x 100 ft., and is from two to three stories high. Its use is for a transmission transformer station. Work will be begun soon. The cost is estimated to be about \$20,000.

Warren & Jamestown Street Railway, Warren, Pa.—This company has purchased a site in Stillwater on which it will build a transformer station. The structure will be 28x38 ft. It will also be equipped with a waiting room for passengers.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—This company will improve its power station in accordance with the suggestions made by E. W. Trafford in his report to the State Corporation Commission.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company will build in the near future a new power house in Racine. The structure will be 1 story, of brick, concrete and steel construction.

Manufactures & Supplies

ROLLING STOCK

Radford (Va.) Water Power Company expects to purchase one or two second-hand closed cars.

United Traction Street Railway, DuBois, Pa., has ordered two Brill 27-G1 trucks from the G. C. Kuhlman Car Company.

Northampton (Mass.) Street Railway has ordered one 14-bench open car body from the Wason Manufacturing Company.

Indianapolis, Crawfordsville & Western Railway, Indianapolis, Ind., is receiving bids for four large interurban passenger trail cars.

San Antonio (Texas) Traction Company has ordered 10 28-ft. 10-in. car bodies, mounted on Brill 27-G1 trucks from the American Car Company.

Arkansas Valley Railway, Wichita, Kan., has ordered five 46-ft. interurban cars, mounted on St. Louis No. 23-B trucks, from the St. Louis Car Company.

Vallejo & Northern Railway, Vallejo, Cal., has ordered one combination open and closed car, mounted on St. Louis No. 47 trucks, from the St. Louis Car Company.

British Columbia Electric Railway, Vancouver, B. C., has ordered three Kuhlman interurban cars mounted on Brill 27-MCB-3 trucks, through Pierson, Roeding & Company.

Third Avenue Railroad, New York, N. Y., has ordered 35 passenger cars for storage battery operation on some of its downtown horse-car lines, from The J. G. Brill Company.

Toledo & Chicago Interurban Railway, Kendallville, Ind., has purchased two 40-ft. trailer freight cars equipped with automatic air brakes and M.C.B. radial couplers, from the Calumet Car Company.

Sand Springs Interurban Railway, Tulsa, Okla., has ordered one 41-ft. baggage and express car, mounted on Brill 57-D trail trucks and two 37-ft. closed trail cars, mounted on Brill 57-D trail trucks from the Danville Car Company.

Utica & Mohawk Valley Railway, Utica, N. Y., has ordered eight GE-219 quadruple-motor with single-end control equipments, and four GE-210 quadruple motor equipments, with single-end type M control, from the General Electric Company.

Salt Lake & Ogden Railway, Salt Lake City, Utah, has ordered through H. A. Strauss, consulting engineer, Chicago, Ill., one 30-ton electric locomotive to be built by the McGuire-Cummings Manufacturing Company. It is designed to handle 400 tons trailing load at 17.5 m.p.h., on an average rising gradient of 0.7 per cent. The locomotive will be of all-steel construction, equipped with four 100-hp, 700-volt G.E. interpole d.c. motors with forced ventilation and double-end multiple-unit control, with Westinghouse combined straight and automatic air brakes.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., noted in the ELECTRIC RAILWAY JOURNAL of March 5, 1911, as having ordered two cars from the Cincinnati Car Company, has specified the following details for these cars:

Type.....	Double truck	Curtain material ..	Pantasote
Length of body..	29 ft.	Destination signs	dash
Over vestibule.....	34 ft. 6 in.	Heating system.....	Cons.
Width over posts.....	8 ft.	Headlights	GE arc
Sill to trolley base..	8 ft. 6 in.	Motors	West. 4
Body	steel	Push button signal..	bat. sys.
Interior trim	cherry	Roofs	turtleback
Underframe	composite	Sanders	Cincinnati
Bolsters	steel	Sash fixtures	Dayton
Bumpers	angle iron	Seating material.....	rattan
Car trimmings.....	bronze	Trolley wheels	Standard
Couplers	Cincinnati	Trucks	Standard
Curtain fixtures.....	Forsyth		

Boise (Idaho) Railroad, noted in the ELECTRIC RAILWAY JOURNAL of March 25, 1911, as having ordered two closed motor cars through Henry Levis & Company, from The J. G. Brill Company, has specified the following details for these cars:

Seating capacity	44	Curtain material..	Pantasote
Weight, body.....	16,000 lb.	Gongs	Dedenda
Length of body....	30 ft. 8 in.	Hand brakes.....	Brill 12-in.

Over vestibule.....	40 ft. 8 in.	Registers	Ohmer
Width over sills..	7 ft. 9½ in.	Roofs	Monitor
Over posts at belt..	7 ft. 11 in.	Sanders	Brill "Dumpit"
Sill to trolley b'ds..	11 ft 6 in.	Seats.....	Brill "Winner"
Body	wood	Seating material.....	rattan
Interior trim	ash	Springs	Brill
Underframe	wood	Step	double
Bumpers	Brill	Trolley base....	U. S. Stand.
Car trimmings	bronze	Trucks, type.....	Brill 27 G-1
Couplers	Brill	Wheels	33-in. cast iron
Curtain fixtures.	Cur. Sup. Co.		

Greenville Railway & Light Company, Greenville, Tex., noted in the ELECTRIC RAILWAY JOURNAL of March 25, 1911, as having ordered 7 cars from the Cincinnati Car Company, has specified the following details for these cars:

Type	single truck	Destination signs ..	Hunter
Length of body.....	21 ft.	Fenders	Eclipse
Over vestibule.....	31 ft.	Gongs	12 in.
Width over posts...	8 ft. 2 in.	Hand brakes	Peacock
Sill to trolley base....	9 ft.	Heating system	Cons.
Body	wood	Headlights	Crouse arc
Interior trim.....	mahogany	Push button signal.	Cons. buz.
Underframe	composite	Roofs	Monitor
Car trimmings	bronze	Sanders	Cin. Car Co.
Couplers	Cinti.	Seats	H. & K.
Curtain fixtures....	Forsyth	Seating material	slats
Curtain material.....	Crown	Trucks	Standard

TRADE NOTES

Ackley Brake Company, New York, N. Y., has received an order from New Zealand for 20 Ackley adjustable brakes.

Victor W. Ellet has resigned as general foreman of the Chicago, Rock Island & Pacific Railroad to accept a position with the Hunt-Spiller Manufacturing Corporation, Boston, Mass.

Perry Ventilator Corporation, New Bedford, Mass., has received an order from the Pittsburgh Railways to supply ventilators for 50 new cars which are being built by the Pressed Steel Car Company.

Wonham, Sanger & Bates, New York, N. Y., have received orders from the Chicago Railways, the East St. Louis & Suburban Railway and the Philadelphia Rapid Transit Company for "Trotter" accelerometers.

J. S. Joseph has severed his connection as erecting engineer for W. A. Day & Company, Chicago, Ill., and has opened an office at 207 Union Bank Building, Chicago, Ill., as manufacturers' agent, handling contractors' equipment and supplies, locomotive cranes and grab buckets.

Barrett Manufacturing Company, Chicago, Ill., has appointed E. J. Caldwell railway representative of the company. Mr. Caldwell for the past 12 years has been connected with the Illinois Central Railroad. During the last six years he has been private secretary to the president.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has declared the regular quarterly dividend of 1¾ per cent on its preferred stock, payable April 15, 1911. The books close April 5, 1911, and reopen April 17, 1911. The remaining dividend due on the assenting preferred stock of 1¾ per cent will also be paid on April 15, 1911.

Buffalo Foundry & Machine Company, Buffalo, N. Y., has recently made an exceptionally large bronze drum casting. The drum is 12 ft. long and 5 ft. in diameter, and is to be used as the drying surface in a vacuum rotary drum dryer. It required 16,000 lbs. of metal to pour the casting, and on account of this large quantity it was necessary to melt the metal in a 48-in. cupola.

Nachod Signal Company, Philadelphia, Pa., announces that it has recently received orders for automatic signals from the Illinois Traction System, East St. Louis & Suburban Railway, Louisville Railway, Southern Wisconsin Railway, St. Joseph Railway, Light, Heat & Power Company; St. Joseph & Savannah Construction Company and the Winona Interurban Railway.

Dailey Construction Company, Evansville, Ind., has been incorporated to do a general construction business, making a specialty of grading electric and steam railway road beds and laying tracks on the same, building bridges, trestles and culverts, constructing viaducts, subways, terminals, etc. T. J. Dailey, Perth Amboy, N. J.; T. J. Galley, Beeville, Texas, and H. E. Myers, South Bend, Ind., are the incorporators.

Electric Service Supplies Company, Philadelphia, Pa., states that it has received large orders for Garton-Daniels lightning arresters from the Rockford & Interurban Railway, Rockford, Ill.; St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.; Chicago Railways, Chicago, Ill.; Birmingham Railway, Light & Power Company, Birmingham, Ala.; Stark Electric Railroad, Alliance, Ohio, and many others.

Canadian Westinghouse Company, Hamilton, Ont., has issued its annual report for the fiscal year ended Dec. 31, 1910, which shows an increase of 40 per cent in business over 1909. The net earnings for the year were \$697,393. After the payment of 7 per cent dividends on the \$4,376,600 capital stock outstanding there was carried to reserve and written off \$200,000. At the close of the year the company's total reserve was \$1,176,000.

Grand Rapids Catenary Company, Grand Rapids, Mich., has been formed to put on the market the catenary bridge construction with wooden poles designed by A. C. Sekell, engineer of the Grand Rapids, Hastings & Battle Creek Interurban Railway. A description of this system of construction appeared in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911. The company has offices at 432 Houseman Building, Grand Rapids.

Baldwin Locomotive Works, Philadelphia, Pa., has issued a report for the year ended Dec. 31, 1910. After paying dividends there was a surplus for the year of \$1,490,680. The total sales amounted to \$29,057,998, with a building cost of \$25,097,273, leaving a manufacturing profit of \$3,360,725. Receipts from other sources amounted to \$1,007,778, making a gross profit of \$4,368,504. The expenditures for maintenance of plant, etc., amounted to \$1,851,822, leaving a net profit of \$2,516,680.

Buckeye Manufacturing Company, Anderson, Ind., which has recently completed extensive additions to its plant, is now manufacturing a 35-passenger capacity railway motor car, driven by a 100-hp Lambert friction-drive gasoline motor. This car is being built under the supervision of W. E. Harrington, of the Railway Motor Car Corporation, the designer, and will be operated on the Railway Valley Railroad at an early date. The Railway Motor Car Corporation, Philadelphia, Pa., is the exclusive sales agent for this type of car.

ADVERTISING LITERATURE

Steel City Electric Company, Pittsburgh, Pa., has issued preliminary bulletin No. D, describing the "Steel City" out-let boxes.

Bruce-Macbeth Engine Company, Cleveland, Ohio, has issued a catalog illustrating and describing the "Bruce-Macbeth" gas engines.

Ideal Electric & Manufacturing Company, Mansfield, Ohio, has issued Bulletin 1031 on "Squirrel-Cage Polyphase Induction Motors."

Highway Improvement News has been published for April, 1911, by the manufacturers of American ingot-iron corrugated culverts.

Comstock Manufacturing Company, Wilkes-Barre, Pa., has issued a folder describing the "Comstock" metallic quick-acting coil former.

Western Electric Company, New York, N. Y., is distributing Bulletin No. 1105 on "Cable-Forming Boards for Inter-Phone Installations."

Randolph Insulator Company, Newark, N. J., has published a booklet on "Rico" third-rail and suspension insulators and "Shaw" abnormal potential dischargers.

J. W. Paxson Company, Philadelphia, Pa., has issued Bulletin No. 21 on wheelbarrows and trucks, suitable for foundries, machine shops, coal and sand handlers, contractors, etc.

James G. Wilson Manufacturing Company, Norfolk, Va., in Catalog No. 34, on "Rolling Doors and Shutters," illustrates several buildings and docks equipped with these devices.

Nachod Signal Company, Philadelphia, Pa., has reprinted in pamphlet form an article which appeared in the *Signal Engineer* on the "Automatic Block Signal System for Electric Railways."

A. B. Sanders & Company, Philadelphia, Pa., describe the large amount of electric rolling stock and power machinery which they have on hand for immediate delivery in Circulars Nos. 100 and 101.

Sanitary Rag Company, Kalamazoo, Mich., has issued a postcard calling attention to the quality of the washed wiping cloths which are manufactured by the company and also to the exceptionally low price at which they are sold.

Best Manufacturing Company, Pittsburgh, Pa., has issued folders Nos. 101 and 102, giving standard tables of dimensions of valves, pipe fittings, bends, etc., and also giving price lists of flanges and flanged fittings.

Electrical Engineers' Equipment Company, Chicago, Ill., has issued Catalog No. 2, on "Electrical Fittings for Power Plants," containing illustrations and giving complete sizes and prices of different kinds of fittings.

Canton Culvert Company, Canton, Ohio, has prepared a catalog on "Acme" corrugated metal culverts, which contains several interesting articles and gives illustrations of culverts that have recently been put in place.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued a folder illustrating and describing the "Mine-A-Phone" system. The folder also contains a list of a few users of the system and a price list of different types of telephones.

O. M. Edwards Company, Syracuse, N. Y., in Catalog E shows a complete line of car window fixtures. The catalog not only illustrates the various kinds of sash locks furnished, but also contains complete drawings, showing the application of fixtures to window openings.

Barrett Manufacturing Company, New York, N. Y., has issued a booklet entitled "Modern Roads—Their Construction and Maintenance." The booklet describes and contains illustrations of roads that have been treated with "Tarvia," and the way in which it is applied.

B. F. Sturtevant Company, Hyde Park, Mass., has published in Bulletin No. 187 a reprint from an article in *Power and the Engineer* on "Economical Fire Room Methods," by F. R. Low, together with a short section upon the apparatus responsible for the results and other interesting information.

Joseph Dixon Crucible Company, Jersey City, N. J., has published "Graphite" for April, 1911. It contains articles on "Transmission Towers," "State Bridge at Danville, Pa.," "The Enduring Crucible," "Why Amorphous Graphite Balls Up," "Oil vs. Graphite in Boilers," "Machine Molding vs. Hand Molding," "The Real Cost of Painting."

MacGovern, Archer & Company, New York, N. Y., have issued Bulletin No. 22 for April, 1911. The bulletin, which is the first issued devoted entirely to cars and car equipment, contains specifications and illustrations of a large number of cars on hand for immediate delivery, and also a list of controllers, motors and car equipment.

Heath & Milligan Manufacturing Company, Chicago, Ill., has issued the March, 1911, number of "Co-operation and Expansion." The publication contains interesting articles on "Increasing Spring Sales," "Pure Paint," "Substitutes," "An Attractive Opportunity to Get Aggressive Co-operation," "Meeting the Situation" and "Protecting Dilapidated Brick Buildings."

Goldschmidt Thermit Company, New York, N. Y., in its publication, "Reactions," for the first quarter of 1911 prints among others illustrated articles on "Improving the Quality of Thermit Steel," "Large Crank-Shaft Repairs," "Joining Trolley Rails on Bridges," "Tightening Stays in Iron Structures," "Making Small Castings of Thermit Steel," "Welding Cast Iron," "Alloys of Manganese," and "Around the Railroad Shops."

Electric Service Supplies Company, Philadelphia, Pa., has issued Catalog No. 4, on "Protected" rail bonds and tools, which is got up very attractively. It contains illustrations of rail bonds for both track and third-rail use which are accompanied by descriptive articles and price lists. The catalog also contains descriptions and illustrations of several different types of "Rail Bond Compressors," "Rail Bond Punches," "Hydraulic Bonding Tools," "Rail Facing Tools," "Bond Drilling Templets" and "Rail Bond Testing Sets."

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CONTENTS.

Reliability of Car Service in New York.....	657
Water Power Conservation Conference.....	657
The Late Mayor Johnson.....	658
Single Phase for Trunk Line Railroads.....	658
Possible Improvements in the Mileage of Steel Wheels.....	659
Office Building and Carhouse of the Denver City Tramway.....	660
Fender Tests in St. Louis.....	662
New Installation of Automatic Block Signals on the San Francisco, Oakland & San José Consolidated Railway.....	663
Hearing on Petition for Additional Transfers in Boston.....	666
Trunk Line Electrification.....	667
Discussion on Public Service Commissions.....	671
Automobile Line Trucks of the Oakland Traction Company.....	671
Operating Record of Hudson & Manhattan Railroad.....	672
Boston Electrification Discussed by Members of Metropolitan Board..	672
Car Pull-Ins in Greater New York.....	674
The Conference on Government Control of Water Powers.....	674
Meeting of Interurban Rules Committee.....	675
Written Examination for Trainmen on Cleveland, Painesville & Eastern Railroad.....	677
Commutator Slotting Tools.....	677
Tomlinson M. C. B. Coupler.....	677
Steam Turbine for Driving Moderate-Speed Machinery.....	678
Pay-As-You-Enter Car Service in San Francisco.....	679
Los Angeles Reinforced Concrete Tie.....	679
News of Electric Railways.....	680
Financial and Corporate.....	686
Traffic and Transportation.....	689
Personal Mention.....	691
Construction News.....	692
Manufactures and Supplies.....	695

Reliability of Car Service in New York

An indication of the efficiency of the surface car operation in the New York metropolitan district is afforded by the monthly comparative reports of car defects published by the Public Service Commission of the First District. The report for February, published elsewhere in this issue, shows that not one of the seven systems compared suffered through defects in car equipment more than 0.85 pull-in per 1000 car miles operated, while one of them had only 0.17 pull-in per 1000 car miles. A study of the figures brings out strongly the superior reliability of the overhead trolley over the conduit plow collector which the railways in Manhattan Borough are compelled to use. Thus 53.27 per cent of the car defects reported by one conduit railway were due to plows alone, whereas the corresponding maximum of overhead current collector troubles was only 3.03 per cent. If the conduit railways had been operated by the overhead system their records would have approached, if not bettered, those of their fellow companies. Other items show wide differences. Thus motor troubles vary in their percentage of cause of pull-ins from 13.42 per cent to 51.25 per cent and car body troubles from 2.78 per cent to 24.79 per cent. Of course, the widely different conditions of service have much to do with these variations. Taken all in all, the small ratios of pull-ins show what can be accomplished by a thoroughgoing maintenance policy even in densely populated cities and in congested streets where the conditions of street railway operation are very arduous.

Water-Power Conservation Conference

The statistics and facts presented at the recent conference in New York on the subject of water-powers disclosed a most startling condition. The agitation for the conservation of our natural resources has brought about a deadlock in the development of water-powers and consequently has resulted, up to the present time, in a much larger depletion of the fuel supply of the country than if the conservation issue had never been raised. It has seemed impossible to reconcile the conflicting interests of the States, which own the beds of the rivers, and of the national government, which has control over navigable streams and forest reservations. At least it has been impossible for a power company in most cases to secure sufficient security of location to warrant the investment required in a power development. Secretary Fisher, who spoke at the conference, did not believe there was any vital point of difference between the States and the nation, and stated that the latter was now seeking information and advice as to the best policy to pursue. The absence of public interest in the question is due to the fact that the slight additional cost for power generated from

fuel makes little general impression, but this indifference on the part of the public should not be a bar to the adoption of some scientific system of tenure which would encourage the development of powers now going to waste. The proper plan, it seems to us, should be a gradual sale of the government rights in the water-powers, by auction if necessary, as the need for the development of a power becomes apparent. We presume that the same arguments will be offered against perpetual ownership of water-powers as have been offered against perpetual franchises for street railways, namely, that no legislature is wise enough to foresee the conditions in force 50 years hence, and that one generation has no right to give or barter away the franchise rights of those which are to follow. But when the rates and services of public utility corporations are controlled and regulated as they are to-day in most States by commissions, there is practically no danger that public rights will suffer greatly under a system of perpetual franchises. The latter, however, does give at least an assurance to investors that the integrity of the capital in the enterprise will be preserved. The limited-term franchise is logical only when the holder of the tenure is able to move his plant at the end of his lease without much loss.

The Late Mayor Johnson

In the death of ex-Mayor Tom L. Johnson of Cleveland the country has lost one of the most interesting, we might say most picturesque, characters that ever were prominently engaged in street railroading. No one we believe, least of all those many individuals with whom he was engaged in hostilities during his stormy career, will deny that he was gifted with great courage and resources, that he possessed marked ability as an inventor and as an organizer, that he was a keen judge of human nature, and that he had the great faculty of being able to attach closely to himself his business associates and those whom he wished to make his friends. On the other hand, few even among his friends, we think, will be disposed to dispute the statement that his greatest financial successes as an owner of electric railway properties did not come to him as an operator but as a promoter of competitive lines in large cities and through the sale of these lines afterward at a large profit to longer established companies. It was indeed on the rock of operation that Mr. Johnson's theory of low fares when put in practice went to pieces. As a fighter and as a leader of the opposition he was unexcelled. If Tom L. Johnson had lived a few centuries earlier than he did, we can easily conceive that his loyalty to his friends, his personal bravery and magnetism and the many other qualities of leadership which he possessed would have raised him to an eminent position among his fellows in an age when might was right. But the disaster in Cleveland irretrievably ruined his political prestige and undoubtedly hastened his death. It is fortunate for the street railways of the country and for the people of Cleveland that the fundamental error of his well-known views on street railway operation was exposed as soon as it was. A policy which had proved successful as a club and as a campaign cry broke down when applied as an economic proposition. No company can long continue to do business at less than cost, and in that cost every element of expense must be included. It is in connection with the demonstration of this truth in Cleveland that Tom L. Johnson will longest be remembered.

SINGLE-PHASE FOR TRUNK-LINE RAILROADS

Before it had half a chance to show what it could do the New Haven single-phase installation was condemned by many engineers as a costly failure. It was indeed an expensive experiment carried out on a large scale, and at first it went through many tests by fire. But, phoenix-like, it has emerged with a record for reliability and efficiency which is cause for pardonable pride on the part of those who staked their money and reputations on its success. Two years ago W. S. Murray, electrical engineer of the New Haven, in a paper read before the American Institute of Electrical Engineers in New York, related freely and frankly the early troubles which developed with the power house, the overhead line and the locomotives. There was nothing in the operating record for eight months of 1908 included in his paper which indicated fundamental or ineradicable faults in any part of the system, although the number and duration of the delays due to electric operation were not small. Last week at the Toronto meeting of the Institute Mr. Murray in a second paper continued his log of electric operation through the year 1909, and a comparison with the previous year seems fully to warrant his belief that the single-phase system is applicable to all conditions of trunk-line electrification. An average of 15 minutes' delay per 100,000 train miles due to electric operation as compared with 21 minutes per 100,000 train miles for steam locomotives is sufficient evidence of the reliability of the electrical apparatus. As to comparative first cost and operating expenses, the author of the paper states that under trunk-line conditions similar to those considered by him the installation cost of the single-phase system would be not more than 85 per cent of that of its next best competitor and that the operating expenses of the two would show an even more favorable ratio.

With the exception of two or three comparatively short tunnel divisions the electrified steam railroads in the United States are still hauling freight trains on main tracks and doing yard switching with steam locomotives. The New Haven will be the first railroad to abandon steam locomotives entirely within its electric zone and haul and switch freight cars with specially designed electric locomotives. One of the early arguments in favor of electrification was that a uniform type of locomotive could be used for all classes of service and that a less number of locomotives, therefore, would be required. But the New Haven will have three widely different types of electric locomotives, just as it now has three types of steam locomotives, for passenger, freight and switching service. The passenger locomotives have a rated capacity of 1000 hp; the freight locomotives have a capacity of 1600 hp and a starting torque sufficient to handle a train of 2160 tons; while the switching locomotives have a capacity of only 600 hp. Tests of a steam switching locomotive in the Harlem River yards showed that the average power developed by a switching locomotive in regular service was only 313 hp while the throttle was open and that the hourly average was only 115 hp. No individual steam locomotive with such a low load-factor can compare in efficiency with a central power station delivering energy simultaneously to passenger and freight road engines and to all the switching engines working in a large yard.

The improvement of the power station load-factor which should follow the use of electric locomotives in freight and switching service is one of the most promising developments of the future. During the passenger service peaks operating re-

quirements make it necessary to exclude freight trains from the main-line tracks and the schedules of freight trains can be adjusted at other times so as to strike a fairly even balance of load. Switching in the yards produces a steady load with only occasional peaks of instantaneous duration.

One of the minor engineering details to which Mr. Murray called special attention was the value of adequate insulation, especially where the insulator is under mechanical strain. In the Hoosac Tunnel the trolley insulators have a dielectric strength of 300,000 volts, although the wires which they support carry only 11,000 volts. The cost of insulators is only a small fraction of the total cost of electrification and money spent for additional protection against breakdowns of the line is the best kind of insurance against interruptions to the service.

The simplicity and efficiency of the New Haven distribution system is one of the best arguments in favor of single phase, and Mr. Murray's paper discusses this point at some length. It will serve in the near future more than 300 miles of single track from the Cos Cob power station. No pressure higher than 11,000 volts is used and the maximum copper feeder cross-section is only 850,000 circ. mil. Under peak-load conditions the potential at the ends of the lines comprising the distribution network will drop to only 9151 volts, which is well within the limit for keeping all trains on schedule time. In this connection it is interesting to note that in the 62 miles of yard track electrification not a pound of copper is to be used with the exception of small-size bonds on one rail of each track. The extensive network of overhead steel catenary and contact wires and the low average power developed by the switching locomotives make possible this considerable saving in first cost without lowering the efficiency of the electrical distributing system.

POSSIBLE IMPROVEMENTS IN THE MILEAGE OF STEEL WHEELS

The wide adoption of the solid rolled-steel wheel for both city and interurban railways has developed certain special problems which, if solved, will add greatly to the value of this type of wheel. These problems may be divided into two classes, those which demand the attention of the wheel maker and those which demand the attention of the wheel user. The product as delivered will be considered first.

One of the first complaints made by the operators of the rolled-steel wheel was that it varied in hardness. Improved methods of rolling have now made hard spots or isolated irregularities negligible, but it is still true that the rate of wear does increase after the first turning. However, if an analysis were made of all the turnings on several hundred wheels operated under the same conditions, it would probably be found that the mileage between turnings began to increase again after passing the original center line of the rim. This result should be expected, because a piece of steel as thick as a wheel-rim would naturally be softer through the center where the rolling process has the least effect. The suggestion has been made that the life of steel wheels can be prolonged if they are heat-treated like gears and axles. It should be borne in mind, however, that the fundamental reasons for heat treatment of gears and axles are considerations not of mileage but of insurance against tooth-stripping and breakage respectively. Again, the

probable lower braking coefficient of a heat-treated wheel might introduce new difficulties in high-speed operation. The manufacturers have also been asked to consider the possibility of a one-wear steel wheel. This appears more attractive than the heat treatment, for, instead of complicating shop operations, it actually would simplify them by eliminating turnings. Furthermore, the one-wear wheel has the great merit of lower weight; as will be appreciated from the fact that a 34-in. rolled-steel wheel weighing 560 lb. suffers a reduction of about 210 lb. when the radial wear has reached 2 in. A one-wear wheel, if commercially practicable, would reduce the weight of the rotating element of a car by at least 100 lb. per wheel. The principal field for immediate improvement in wheel manufacture is in greater uniformity of dimensions and profiles so that the user of a given diameter of steel wheel can place a pair in service without any preliminary truing up on the lathe. This would eliminate much of the flange trouble caused by improperly mated wheels.

It is now proper to consider how the wheel user can get better results if the product delivered is up to the mark. The most important problem in getting the greatest mileage is to find the proper relation between service wear and the additional tread reduction required on the lathe in order to maintain the proper thickness of the flange. This point was discussed at length in H. S. Williams' paper on "Wheel Turning" which was published in the March 25 issue of this paper. Mr. Williams' contention is that "greater mileage can be obtained by a few turnings with deep cuts than from frequent turnings with light cuts." The more general opinion is that it is cheaper, as well as safer, to have many light cuts, provided the expense of wheel-handling is not too great. Thus the Third Avenue Railroad, New York, trues up its wheels every 20,000 miles, the cuts never exceeding $\frac{1}{4}$ in. This practice absolutely avoids flange trouble despite unfavorable track conditions.

The effect of track conditions on effective mileage was clearly brought out in some figures given by J. P. Barnes at the March 22 meeting of the New York Street Railway Association. Mr. Barnes explained that his 37-in. wheels gave less mileage than his 35-in. wheels because the former had to be operated over city tracks designed for chilled-iron wheels; consequently the limit for re-turning was set by the danger of derailment due to thin, sharp flanges and not by considerations of economy. In short, maximum life was out of the question with the best possible wheels if the track was not primarily intended for interurban trucks. There is no question, however, that better results can be obtained from steel wheels if more exact methods are used in the shops. The proper depth of cut should be accurately gaged in advance and not left to be guessed at by the machinist, for an extra $\frac{1}{16}$ -in. cut may mean a loss of anywhere from 6000 miles to 10,000 miles in available life. Since variations in diameter of mismated wheels cause so much flange wear, the wheels on the same axle should not be permitted to vary more than $\frac{1}{32}$ in. in diameter. Other practices which tend to give better results are to space the wheels at absolutely equal distances from the center of the axle; to use anti-friction side and center plate bearings, especially on short wheelbase trucks with outside-hung motors; to apply equal braking pressure on all wheels and to employ brakeshoes which will not sharpen or distort the flange.

OFFICE BUILDING AND CARHOUSE OF THE DENVER CITY TRAMWAY COMPANY

BY JOHN EVANS, CHIEF AND ELECTRICAL ENGINEER DENVER CITY TRAMWAY COMPANY

The growth of the Denver City Tramway Company has been along radiating lines and a majority of the car lines of the system have their terminus at the "central loop" on Fifteenth Street, between Arapahoe Street and Lawrence Street. The car lines that do not terminate at the loop pass within a block or two of it, so that the central loop is the heart of the system. The "interurban loop," which is used by Denver's suburban cars, is located on Arapahoe Street between Fourteenth and Fifteenth Streets, so that the street railway center of Denver is at Fifteenth and Arapahoe Streets.

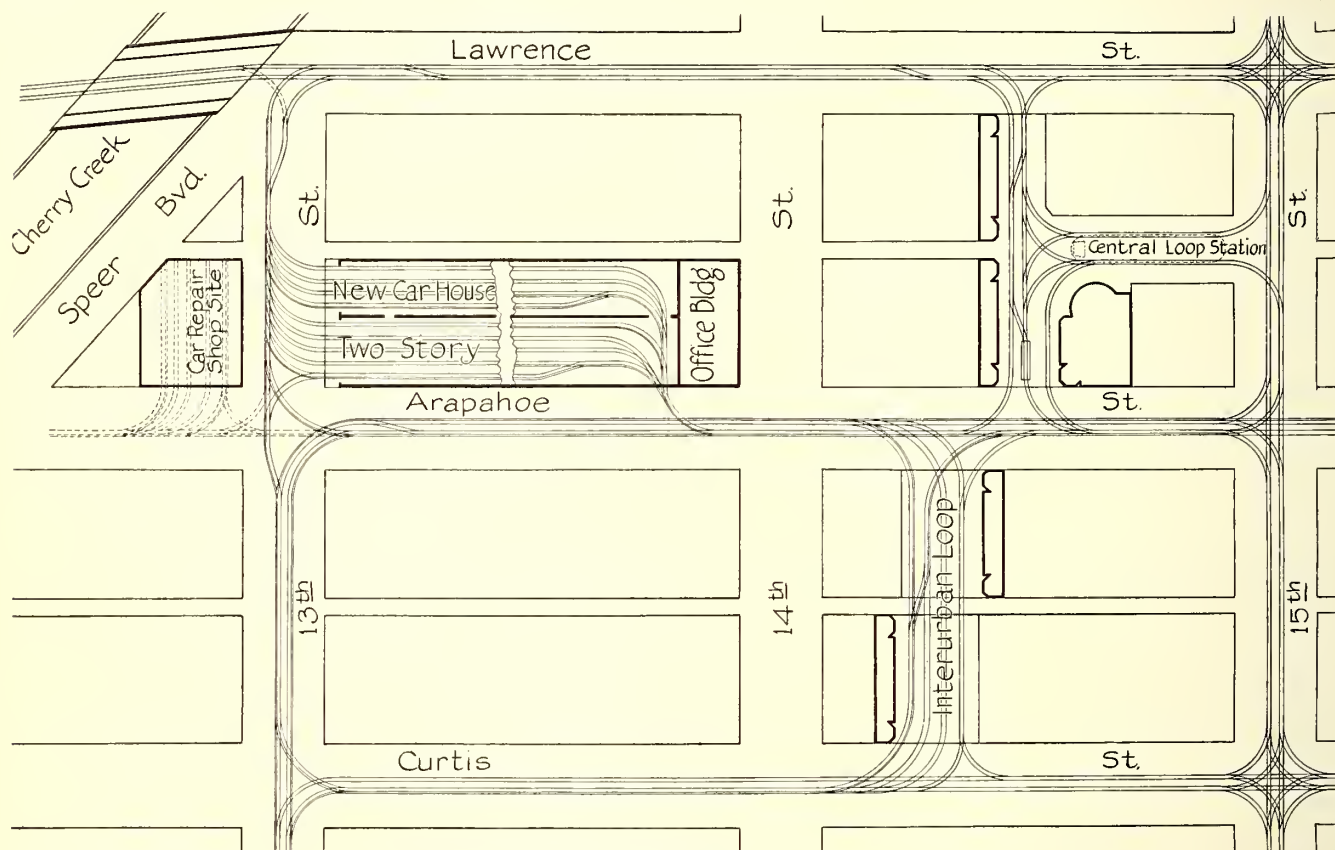
The Tramway company has never lagged behind the growth of Denver, but has been a potent factor in the building of an

trainmen. This is conveniently located in the carhouse and will be equipped with the most desirable features. The Tramway company is fortunate in having a class of trainmen whose desire is to remain with the company. This is probably accounted for by the fair treatment that they receive and the numerous advantages which are placed at their disposal.

The following is a statement of the general character and chief points of interest of the office building and carhouse. The accompanying engravings show the present condition of the building and its location with relation to the central loop and vicinity.

OFFICE BUILDING

This office building will allow the Tramway company to concentrate in a central administration building its now somewhat scattered departments, bringing them much nearer the center of the system. This building is 60 ft. x 125 ft. in ground dimensions and consists of a basement and eight floors. The Tramway company will at present occupy five floors and the



General Plan Showing the Location of the New Office Building and Carhouse in Denver; Also the Location of Important Track Loops

extensive city. With the increased growth of the city and the street railway system the Tramway company felt the advisability of collecting so far as possible under one roof the various departments of the organization. The economy to be effected by the construction of a carhouse in the heart of the city was also apparent, and the company decided upon the erection of a two-story carhouse and an eight-story office building. An ideal site for the purpose was secured on Arapahoe Street between Thirteenth and Fourteenth Streets, one block distant from the interurban and city loops.

The architects for the building are W. E. and A. A. Fisher; the consulting engineers are Crocker & Ketchum; the general contractor is the Whitney-Steen Company; the building was planned and erected under the supervision of the engineering department of the Tramway company. Construction was begun in March, 1910, and the building will be ready for occupancy in May of this year. Fireproof construction has been used and every safeguard against fire has been installed.

Considerable attention has been given to a club room for

remaining three floors will be rented until such time as the increased growth of the organization requires their use by the company.

CONSTRUCTION MATERIALS

The building has reinforced concrete framework. Square steel rods were used as reinforcing and gravel for the concrete. The exterior is finished with "Blackstone" brick of a rich red color, laid with wide joints of black mortar and ornamental white terra cotta. The floors are of structural terra cotta and reinforced concrete combined. The interior partitions are of hollow tile. The public halls will be furnished with Tennessee marble flooring of a light pink shade, and a veined white Arizona marble wainscot to a height of 4 ft., with a base of green Vermont marble. The office rooms will be floored with wood. Wherever there is a fire risk metal window frames are used with wire glass panes.

ARRANGEMENT OF OFFICES

On the lower floor are the offices of the superintendent of transportation and the treasurer; also a room for distributing

lost articles turned in by trainmen; also a large bulletin room used by the trainmen and containing lockers for their use. The second floor will be occupied by the physicians, the Tramway Mutual Aid Society and the legal and claim departments. The third, fourth and fifth floors will be rented as stated above. The auditing department will occupy the sixth floor and the engineering department the seventh floor. The eighth floor will be occupied by the president, directors, vice-president and general manager and the purchasing department.

There are two public elevators, each 5 ft. x 8 ft., and one private elevator. Each floor has two vaults for documents and records. There will be an additional vault in the bulletin room on the first floor, to be used for receiving the daily receipts of the conductors. The conductors will deposit their receipts in this vault by means of a burglar-proof chute leading to a truck in the vault. This truck will be taken daily to the treasurer's office on the same floor, where it will be emptied and replaced in the vault. A large number of the offices are provided with wall safes.

The offices of the treasurer, general manager and auditor will be connected by a pneumatic tube system to expedite the delivery of vouchers and other papers. There will be a public mail chute in the hall on each floor, and a private mail chute connecting some of the departments. The floors occupied by the auditing and the engineering departments each have a private telephone system for communication between the offices on the same floor. The elevator machinery is located in a pent house on the roof. The roof is made waterproof by laying a composition roofing on a concrete slab.

HEATING

A vacuum direct steam heating system will be used throughout the office building. Three 150-hp boilers are installed in the basement. This plant will also heat the carhouse and other buildings of the company at the central loop. The boilers are equipped with chain grates, coal hoppers and ash conveyors.

LIGHTING AND POWER

The office building, carhouse and central loop buildings will receive light and power from the plant in the basement of the

a.c., 60-cycle distributing system for lighting and for power to run a ventilating fan for the carhouse, and power for the pneumatic tube system. The elevators, house pumps, sump pumps and roller doors will be operated by 600-volt d.c., which is the Tramway company's trolley voltage.

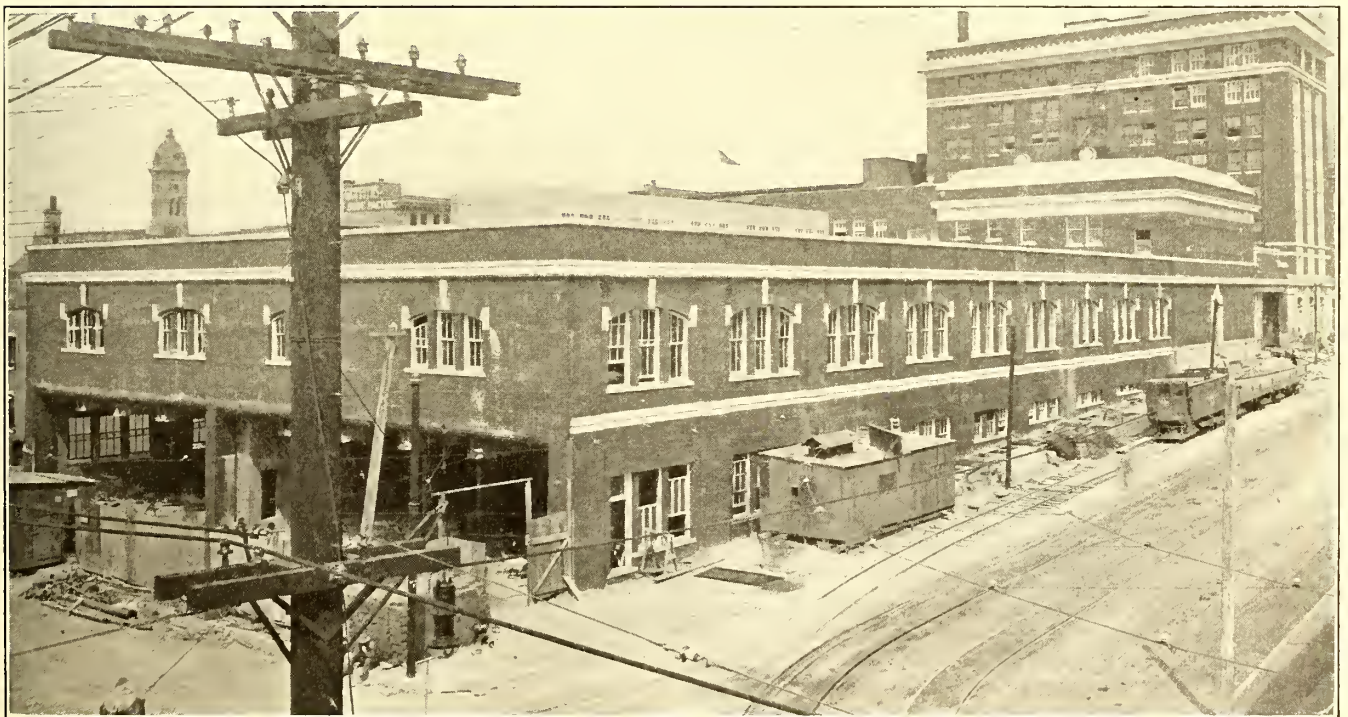
CARHOUSE

The location of the carhouse is most advantageous on ac-



Office Building and Carhouse of the Denver City Tramway Company

count of its proximity to the central loop. This will enable a car to start on its run almost immediately after leaving the carhouse and return to it with the least possible dead mileage



Carhouse Adjoining the Office Building of the Denver City Tramway Company

office building. This consists of two motor-generator sets, one of 40 kva and the other of 75 kva. The motors are driven by 600-volt d.c., supplied by the company's main power plant. This feed connection will be in duplicate to insure continuous operation. The generators will supply a three-wire, 110-220-volt

when taken off duty. A decrease in dead mileage results in a saving of trainmen's time, of wear on rolling stock and of power consumption.

A demand for extra cars on any line can be met much more readily from a centrally located carhouse than from any

of the outlying buildings. Extra crews can be readily obtained if needed.

The carhouse is 125 ft. x 326 ft. in plan. The street surface of Thirteenth Street is 14 ft. lower than Fourteenth Street. This difference in elevation is utilized by making a two-story carhouse and still avoiding the necessity of a car elevator. The tracks enter the lower floor from Thirteenth Street and run down a 0.75 per cent grade, and the tracks enter the upper floor from Arapahoe Street, near the office building, and run up a 0.75 per cent grade toward Thirteenth Street. This arrangement permits a height of 15 ft. 6 in. from top of rail to trolley for the lower floor. The trolley height is 16 ft. 6 in. on the upper floor. This trolley height is sufficient, although the height on street work is 18 ft.

TRACKS

The gage of the Tramway tracks is 3 ft. 6 in., but some of Denver's interurban lines are standard 4-ft. 8½-in. gage. One-third of the tracks in the carhouse will be built with three rails, so as to accommodate cars of either gage, and the tracks are so located that they can all be third-railed should this prove advisable.

There are nine tracks on each floor. Those on the lower floor enter the building from the end and run straight for its entire length. The full length of each track, about 320 ft., is available for car storage. One track runs into the store-room in the basement of the office building to facilitate delivery of supplies. On the upper floor the cars enter the building from the side and the storage capacity is somewhat reduced by the necessary curves and switches.

CAR CAPACITY

The standard Tramway motor car is 43 ft. 6 in. long. The carhouse will accommodate 63 cars of this type on the lower floor and 48 cars on the upper floor, a total capacity of 111 cars. In order to provide for a possible increase in the size of future equipment the tracks have been so located as to accommodate cars 51 ft. long and 9 ft. 1 in. wide. The upper floor is designed for cars weighing 27½ tons and the lower floor is designed for cars weighing 50 tons. The upper floor is for car storage only, but each track on the lower floor is provided with a pit 291 ft. long, so that the cars may easily be inspected. It is not, however, intended to use this building as a general repair shop, but only for inspection and emergency repair work. The Tramway company proposes to build a repair shop on Thirteenth Street, across the street from the carhouse. This shop, together with the carhouse, will enable a large amount of minor repair work to be done near the loop without sending the cars out to the general repair shops. This will reduce to a minimum the length of time that the cars are out of service and also decrease dead mileage.

THIRD FLOOR

There is a partial third floor above the two carhouse floors. This floor contains an auditorium, gymnasium, shower baths, lockers, reading room, barber shop and bowling alleys. The auditorium is 58 ft. x 70 ft. and has a seating capacity of 500. This auditorium will be used for trainmen instruction classes, meetings and entertainments. The gymnasium is 27 ft. x 47 ft. The bowling alley contains four standard alleys and will be well equipped. The gymnasium, shower baths, reading room, lockers and bowling alleys are for the use of the trainmen. These rooms, being on the upper floor, have ample light and air.

CONSTRUCTION DETAILS

The carhouse is of reinforced concrete and steel construction. Reinforced concrete is used wherever practical, but in locations where long spans are desired steel girders have been used. The largest girders are over the Thirteenth Street entrance of the carhouse. One of these has a length of 68 ft and weighs 22 tons. The outside finish of the carhouse is of the same materials as the office building, so that the appearance of the two buildings is harmonious. Their combined length is 386 ft. Each floor of the carhouse is separated into two bays by a brick fire wall. This was done in order to lessen insurance rates. On the lower car floor there is a line of columns between each two tracks. In order to keep a maximum clear-

ance these columns were limited to a width of 12 in.; the largest column is 12 in. x 40 in. in section.

The pits on the lower car floor are 4 ft. 9 in. deep below the top of the rail and 2 ft. 9 in. wide at the narrowest point. Two of the nine pit tracks are three-railed, the others are for the 3-ft. 6-in. gage only, but can be three-railed later if necessary. The pit runways are entirely clear and free from cross braces and other obstructions. The rails are supported by reinforced concrete bents, spaced about 6 ft. apart. The pits are open at the sides between bents and the rails are unsupported except at the bents. This arrangement allows access from one pit to another by passing under the rails; the clear span of the rails is of great convenience in repair work.

The carhouse is completely equipped with automatic sprinklers on both track floors and on the third floor. On the car floors both overhead and aisle sprinklers are provided. These sprinklers are supplied by a 35,000-gal. tank located on the roof.

The carhouse entrances will be provided with steel rolling doors. These doors vary in width from 11 ft. 4 in. to 26 ft. There are 10 of these doors, including one in the fire wall on the upper floor. This fire-wall door is provided with a fusible link and arranged to close automatically in case of fire. The two largest doors are motor-operated, with automatic cut-out. The smaller doors are hand-operated.

The openings in the fire wall and between the carhouse and the office building are provided with sliding steel doors, held open by fusible links. Tanks for motor and journal oil will be provided. These will be connected with self-measuring pumps located at convenient points on both floors.

An indirect, high-pressure steam-heating system is used in the carhouse. Air is heated by passing over steam coils and then forced by a centrifugal blower, 13 ft. in diameter, into the ducts which lead to outlets located in the pits and at the floor level of both floors, and also to outlets on the third floor. The lowest floor level of the office building and carhouse is below the city's sewer level, so that all seepage and wash water will be collected in a carhouse sump and pumped to the sewer level.

The car floors will be lighted by clusters of metal-filament lamps designed to give an intensity of 1 candle-ft. at the floor level. Sockets will be located in the pits so that portable lights may be connected. Current will be supplied by the motor-generator set in the office building. Power for roller doors, ventilating fans and pumps is obtained either from the motor-generator set at 220 volts a.c. or from the power house at 600 volts d.c.

FENDER TESTS IN ST. LOUIS

The series of tests of fenders and wheel guards being conducted by the Board of Public Improvements of the City of St. Louis began on the afternoon of April 11. Owing to a cold drizzling rain and the uncertainty of the time at which the tests were to be begun the attendance was small. Those present at the first test included representatives from the St. Louis railways and connecting railways and the Illinois Safety Appliance Commission.

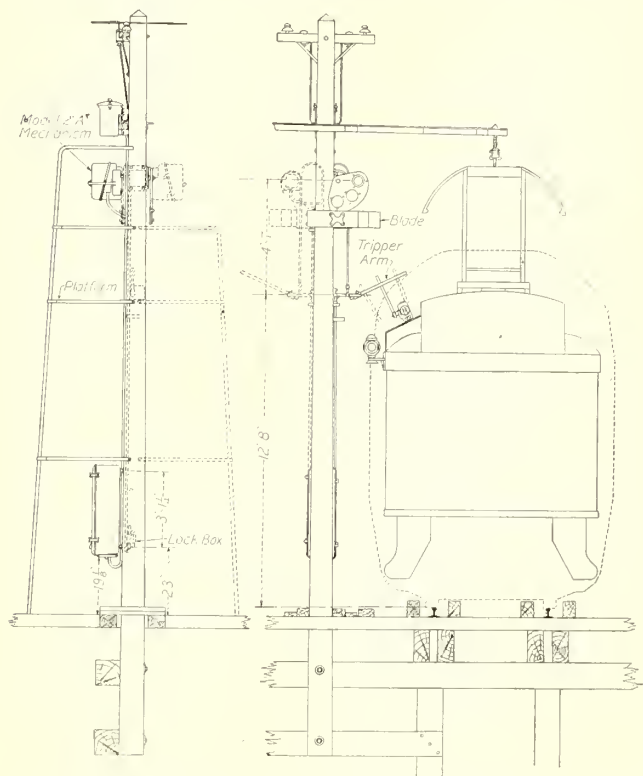
The car used in the test was one of the bridge cars belonging to the Illinois Traction Company. The dummies employed were made of canvas and stuffed with sand and sawdust. One is about 5 ft. 9 in. in height, weighs 200 lb., and is intended to represent a man. The other is about 4 ft. in height, weighs about 50 lb., and is designed to represent a child.

The program of the test as published on page 640 of last week's issue was followed on April 11 by a test of the fender of Benjamin L. Ingram, Mount Vernon, Ill. This fender is of the protruding type with an auxiliary wheel guard. Several tests were conducted with this fender, but no percentages of its performance were made public after the trial.

On April 12 the commission expected to test the Seeley automatic wheel guard, and thereafter either a fender or a wheel guard every two days, as in the official schedule. The rules for the test as published on page 460 of the issue of this paper for March 18 will govern.

The signals user are three-position upper-quadrant semaphores spaced to permit a headway of 45 seconds at the speeds encountered on the various parts of the line. In this connec-

tion it might be stated that trains running from the pier terminus toward the mainland operate first at slow speeds which are gradually increased to about 35 m.p.h. In running from the mainland to the pier terminus the speeds over the 3-mile pier are maintained approximately at 35 m.p.h. These variations of speed require the arrangement of signals indicated



Key Route Signals—Details of Signal Pole and Automatic Stop Mechanism

on the plan, by reference to which it will be noted that the signals are spaced much closer in some locations than in others, this being necessary to maintain the 45-second headway under varying speed conditions. The automatic stop feature is provided by a stop arm operated by the signal mechanism which,

of maintenance and inspection. A photographic view and an elevation drawing of a signal pole showing the outline of a car and its clearance line, together with the position of the signal and the automatic train stop, are reproduced. The signal for the opposite track is indicated by dotted lines. Because of the salt spray which at times reaches the deck of the pier, lead-covered cables were used throughout the signal installation for making connections between transformers and relay boxes and between relay boxes and signal mechanisms. Lead-covered wire was used to make connections between the relay boxes and the rails. The track relays are the General Railway Signal Company's standard polyphase type, as used on a number of other large electric railway systems.

A feature of this installation which differs from the more common forms of signal systems for d.c. electric railways consists in the use of single-rail track circuits—that is, one rail of each track is given up for signaling purposes, the other line of rails being supplemented by a 1,000,000-circ. mil copper conductor to assist in carrying the return propulsion current. This plan of giving up one rail of each of the two tracks for the signal system was found to reduce considerably the cost of installation because the block sections are very short and the use of the large number of reactance bonds which otherwise would be required under such conditions would call for a greater initial expenditure than that required for purchasing and installing the supplementary return cables.

The two junction and terminal interlocking plants which have protected the movements of trains on this road now form a part of the completed signaling system. The signals at these interlockings through which the block system passes are now semi-automatic, electrically operated and under the full control of the towermen.

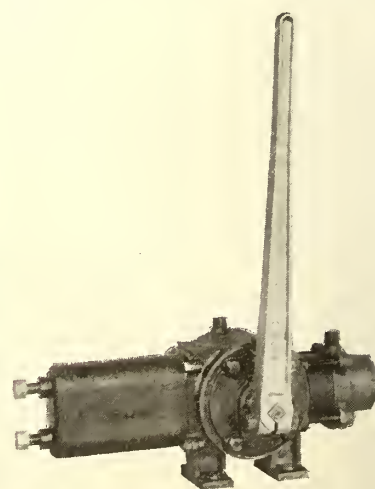
The scheme used for controlling interlocked signals is as follows: All slotted interlocked signals in accordance with the usual custom are normally at stop and assume a 45-deg. position when the proper levers are reversed, the track circuit ahead being unoccupied and the switches properly set. They also assume a 90-deg. position if the next signal ahead is at 45 deg. In addition to these conditions and on account of the use of automatic stops the next signal in the rear is normally at stop, the second signal in the rear being at caution. This arrangement of signals gives the towerman full control of any situation and prevents the unnecessary tripping of the automatic stop valves on a following train in case the signals



Key Route Signals—Signal Bridge at Tower No. 3

when the signal is in the stop position, engages the trip arm of a specially designed valve mounted on the tops of all motor cars.

All signal transformers and relay boxes are located on the line of center poles which support the trolley wires, thus making the parts of the signal equipment easy of access for purposes



Key Route Signals—Automatic Stop Valve

should be allowed to clear up behind a preceding train, and the towerman then should be slightly tardy in putting his signal levers to normal. The automatic signals near the pier terminal are so controlled as to give the towerman full control of approaching trains, permit switching movements against traffic with full automatic stop protection and prevent the towerman

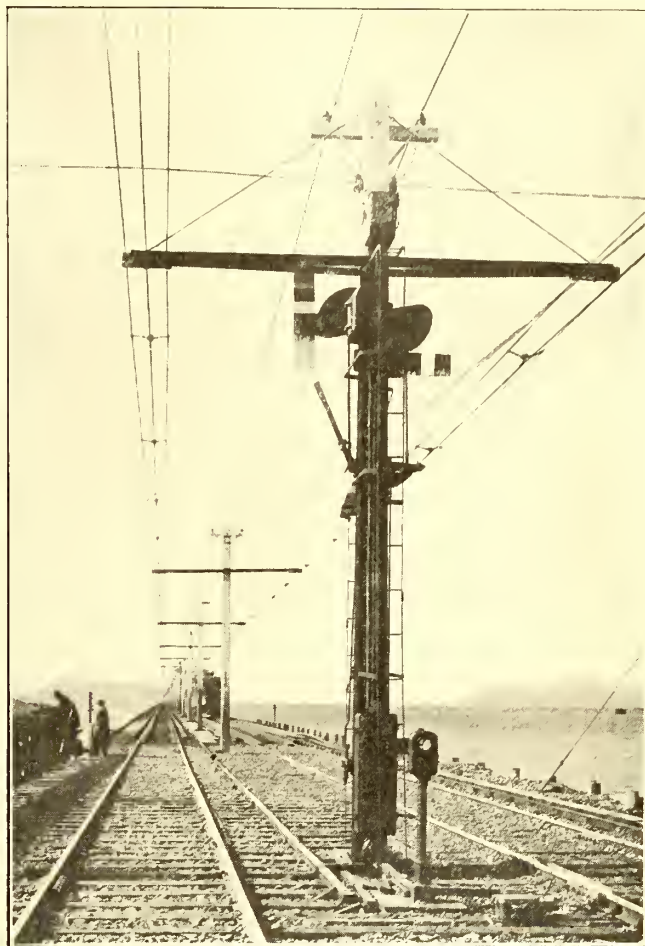
from accidentally tripping the stop valves on approaching trains. All mechanical levers controlling electrically operated signals have been provided with electric locks so connected that a route cannot be released unless the proper signals are at stop and caution. Switch indicators and circuit controllers have been provided on both ends of the two cross-overs on the pier and the indicators show whether or not it is safe to throw the switches, while the circuit controllers will set the proper signals at stop and caution if the track switch is thrown.

AUTOMATIC TRIP FOR TRAIN STOP

The illustration on page 664 shows the appearance of an automatic trip valve as designed by the General Railway Signal Company for providing automatic train stop operation in connection with each of the signals recently installed on the Key Route. The trip valves on the cars are mounted, two per car, on diagonally opposite corners of the car roof, as shown by the engravings, and provision for engaging the stop arm beneath the signal is made by placing the trip arm at an angle, as shown in the engraving of the signal pole and the car outline. The trippers on the cars are designed to reduce the pressure on the train line when a car passes under a signal set at stop. These trip valves mounted on the car roofs are so designed that if tripped the engaging arm will be depressed and held down by the air pressure behind a small piston within the mechanism, the air escaping out of a port which is uncovered when the trip arm is fully depressed. Where the headway is as close as that existing on the portion of the Key Route just protected with signals it would be very awkward if the trips were so designed that it would be necessary for trains to stand still until all of the trips could be restored by hand and the train-pipe pressure raised from zero to full release. To provide against this objection the trips here installed have been designed to be automatically restored by the simple process of reducing the pressure in the train pipe a predetermined amount by use of the motorman's brake valve. When this has been done the trips automatically return to their normal operating positions, and by not allowing a reduction to zero in the train pipe, which would occur before the trips could all be restored by hand, full release pressure can be obtained much quicker, air is saved and the result is that after a train has been stopped it can again be set in motion in a minimum of time.

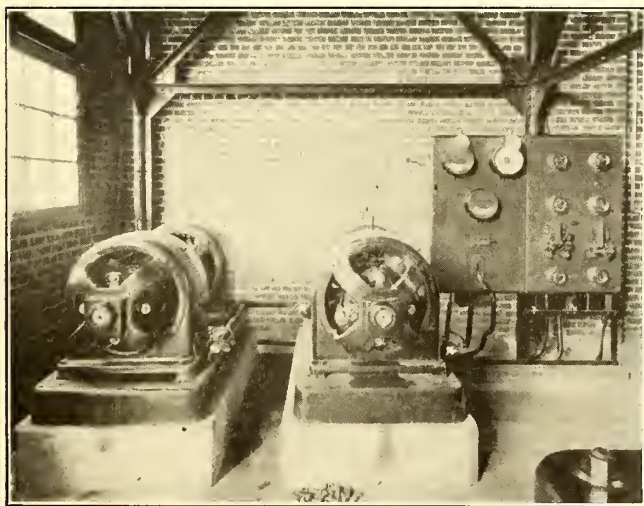
In an installation of this kind it is desirable to take away from the motorman means for affecting the braking distance when a train has been tripped. Otherwise he might, by accident or otherwise, in manipulating his air valve either to charge the train pipe or discharge it, cause his train to overrun the

man is said to be more or less compensated for—that is, if the motorman attempts to offset the effect of the automatic trip by charging his train line the port opening of the trip will open

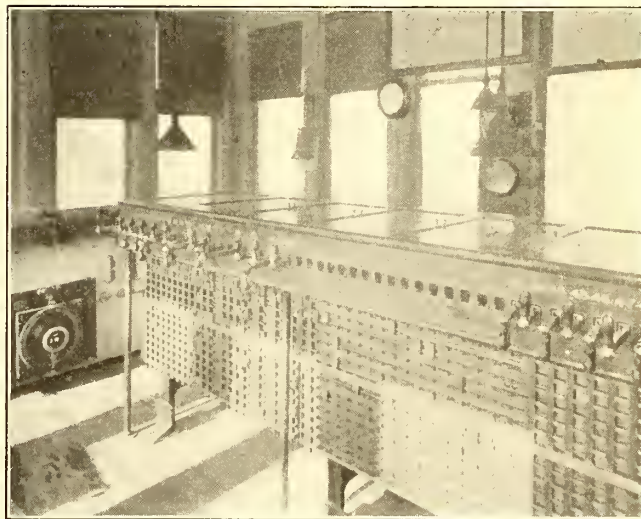


Key Route Signals—Eastbound and Westbound Signals on Same Pole

still wider. On the other hand, if he should attempt to apply the brakes the automatic valve would partly close. These precautions have been effected by connecting a piston to the shaft



Key Route Signals—Motor-Generator Set in Power House for Supplying Signal Current at 1000 Volts



Key Route Signals—All-Electric Interlocking Machine in Tower No. 3

overlap distance in the first instance or cause it to stop too suddenly in the latter case. In the valve designed for the Key Route signal system any such action on the part of the motor-

which carries the trip arm. The shaft operates a rotary slide valve in such a way that when the trip is depressed in the operating direction air comes in behind the piston to hold it against

the spring action until such time as the train-line pressure has been reduced to the predetermined amount. The trip arm will then assume its normal position.

When stop arms are used directly connected to and operated by the semaphore means must be provided to permit operation against current of traffic without permitting the trip arms on the cars to strike every stop arm, as under such operating conditions they will, of course, be in the stop position. Under these circumstances it was not thought advisable to permit the trips to be hooked down, which would mean depending upon human agency to release them before starting to operate with the current of traffic. To meet these objections the trips are so arranged that when a train operates against the traffic the first of the series of stop arms which the trips encounter will cause them to be depressed in the opposite direction from that in which they were depressed when running with traffic, and by the same piston they will be held in such reverse depressed position without permitting the escape of air from the train pipe. When, however, in stopping the train the air pressure has been reduced to a predetermined point all of the trips will again automatically be restored to their normal position ready for service. In other words, in running against traffic the first stop arm encountered will depress all of the trips on the cars in a reverse direction, where they will be held automatically until such time as the train is again stopped, when they will automatically restore to their active position without any attention on the part of the crew or other individuals.

Arrangements are provided whereby the trainmen can "key-by" a signal if it becomes necessary to pass a stop arm in the horizontal position. Depending from the stop arm is a control rod which passes into a cast-iron box mounted on the signal pole at a height of about 4 ft. above the track. When a conductor wishes to key-by a signal in the stop position he inserts in the box a special numbered key which has been furnished him. This key releases the locking mechanism and permits him to hold up the stop arm while his train is passing under. However, his key cannot be removed from the box until the stop arm has again been lowered to the full stop position, so that it will set the trip and operate the air valves on the cars of a following train.

HEARING ON PETITION FOR ADDITIONAL TRANSFERS IN BOSTON

A hearing was given by the Massachusetts Railroad Commission at Boston on April 3 upon the petition of Mayor John F. Fitzgerald, of Boston, for an investigation of the free transfer facilities accorded at certain points on the system of the Boston Elevated Railway Company. The petitioner was represented by Joseph A. Campbell, Boston, and the company by C. S. Sergeant, vice-president, and A. A. Ballentine, of counsel. The petitioners in general asked for additional free transfer facilities in the southern areas of the city proper.

Vice-president Sergeant addressed the board at length upon the transfer problem at Boston, pointing out that the impression that the company has granted free transfers only under compulsion is an entirely mistaken one. Mr. Sergeant said that the road has been much more liberal in general than the law required in arranging free transfers between the elevated train and surface car lines, and in some cases on its own initiative has given free transfers entitling passengers to ride outside the general direction of their journeys. The company understands that by Section 10, Chapter 500, Acts of 1897, the authority of the commission with respect to the ordering of transfer facilities is limited to rides in the same general direction. The company has voluntarily installed free transfer arrangements at some points where the commission is without authority to order such installation. The fundamental principle of the free transfer was stated to be to permit the passenger to ride across the system in one general direction without the payment of an additional fare, but the company has tried to meet the public convenience in local travel by issuing trans-

fers in some cases which are valid on cars running in opposite direction from the cars of the originating line. Complaint had arisen that the company would not issue free transfers good on an intermediate radiating line, but the reason for this was that the two outer radiating lines served the territory well, and the area between the intermediate and the two outer lines was small enough to be readily accessible by a walk from either of the outer lines. At the Dudley Street station, which is a virtual clearing house of surface and elevated traffic, the transfer arrangements are so liberal that traffic originating in one section of the outlying territory is accommodated on a single fare back to that general district through a free bodily transfer at the station and within the inclosure. Such liberal and from many points of view unreasonable accommodations have never been applied to points in the outer sections of the territory, since a fundamental point of operation upon an economic basis presupposes that no passenger can take a car at the center of the city, ride to the outskirts and then return upon the payment of a single-fare unit.

Taking up specific transfer problems, Mr. Sergeant pointed out that the contention that a hardship is suffered by pupils by the absence of a free transfer at the intersection of Massachusetts and Huntington Avenues is easily disposed of. The distance between the intersection of the two avenues and the destination of the pupils is a block, and Mr. Sergeant said that no one but a cripple would wait for an outward car at this point in order to use a free transfer, considering the short distance involved. The fundamental difficulty at this point is the existence of a line of cars which would offer a means of looping back to the originating point on a single fare if a free transfer were in force between lines passing east and west and those running north and south. The company regards such a situation as far more serious on account of its location near the heart of the city than more extensive free transfer arrangements on lines centering at important squares located nearer the outlying districts of the territory served. Mr. Sergeant said that if it were possible to work out a scheme of limited transfers for that district the company would be willing to put the arrangement in force, but he questioned the feasibility of placing distance limitations on transfers. The operating difficulties appear very formidable in view of the magnitude of the traffic. The difficulties of identifying passengers, the problem of ejection without liability of a damage suit, the accounting for and handling of such transfers by conductors, and the use of unlimited transfers, are serious matters.

Mr. Sergeant stated that the company was willing to establish the desired free transfers at Peabody Square and at River Street, Ashmont, if there was any practical way of limiting their validity. The company was unwilling, however, to give a transfer at an outlying point on one of its radial lines to an inward line. Such a course followed in Ashmont might lead to the possibility of a 40-mile ride for 5 cents—something which would certainly be embraced by the public on summer evenings. Care has to be taken in planning a system of limited transfers to see that the fares in opposite directions over the same route do not differ between the same points. At Talbot and Blue Hill Avenues the company was willing to try limited transfer arrangements if practicable, but at Upham's Corner, Dorchester, where extremely liberal transfer facilities already exist, the company could not in any sense afford to issue free checks between inward and outward cars. Similarly, additional transfer facilities might be issued in the East Boston tunnel provided no arrangement were made which would permit a round trip for a single fare. A fundamental objection to the extension of free transfer facilities is the fact that every transfer increases the opportunity for accident at two points, and it is a question whether the company should be obliged to carry accident insurance to cover such contingencies when only a single fare is received. About one-third of all accidents at Boston arise in connection with the use of transfers. At the close of the hearing it was arranged to hold a conference upon a possible arrangement of limited transfers, the parties in attendance to be the board, the petitioners and the respondent.

TRUNK LINE ELECTRIFICATION

On April 7 W. S. Murray, electrical engineer New York, New Haven & Hartford Railroad, presented a paper on the application of electricity to trunk line operation at a meeting of the American Institute of Electrical Engineers held in Toronto, Ont. Mr. Murray prefaced his discussion of the subject by recommending the adoption of the single-phase system using 11,000-volt, 25-cycle current as a standard for trunk line electrification projects, including suburban and terminal sections. The single-phase system could be used in any situation and he ventured the opinion that there was no trunk line electrification problem to which there could not be applied some construction drawing now in the engineering files of the New York, New Haven & Hartford Railroad. Continuing he said:

"We have made electrification in its various forms work. We can now make it pay. The only possible way that electrification can be made to pay is by electing a system the yearly operating cost of which, inclusive of its maintenance charges, subtracted from the yearly cost of the steam system it replaces leaves a figure which represents a little more than the interest on the capital investment required for the installation of the electrical system. When the board of directors of a railroad company passes favorably upon an appropriation of several millions of dollars to purchase power houses at, say, \$1,000,000 apiece, locomotives at \$30,000 apiece and line construction at \$25,000 or \$30,000 a mile for a four-track system it is not an unfair question for those directors (while they may be interested in eliminating the smoke and dirt incident to the original system replaced, and be glad to have the assurance of the electrical engineer that the time of switching movement of the railroad's equipment in yards, terminal property and main line will be reduced) to ask for a closer analysis than this, and also ask for some specific explanation as to the return each year of a fair percentage of some of the dollars spent."

LOCOMOTIVE CAPACITY

Referring to passenger locomotives, Mr. Murray quoted from his discussion of a paper by Messrs. Stillwell and Putnam, presented before the Institute in 1907, in which he gave the following results of tests of coal consumption per ton mile of steam locomotives in different classes of service: Freight, 0.169 lb.; express passenger, 0.194 lb.; local passenger, 0.335 lb. The horse-power required per ton of train weight was ascertained from the same tests and the capacity of the electric passenger locomotives built to replace the steam locomotives on the New Haven was fixed at 1000 hp. This size of unit had proved entirely satisfactory for the service.

A similar series of freight train tests was conducted to determine the proper size of freight locomotives. These tests on runs of 55½ miles with train weights varying from 720 tons to 1500 tons showed an average evaporation in the locomotive boilers of 6.9 lb. of water per pound of coal. The horse-power developed varied from 655 to 892, with average speeds of from 23.5 m.p.h. to 31.5 m.p.h. The electric freight locomotives which were being built were designed with a capacity of 1400 hp, which provided a large margin above the requirements. This would permit of hauling heavier trains at higher speeds than was possible with steam locomotives. In a recent test electric freight locomotive No. 071 hauled a dead steam locomotive and 37 cars—a total train weight of 1438 tons—at an average speed of 36.5 m.p.h. and developed 1650 hp. The energy consumption was 25.9 watt-hours per ton mile. In local passenger service the same locomotive hauled a 500-ton train with an energy consumption of 58.8 watt-hours per ton mile.

Tests of steam switching locomotives were made in the Harlem River and Oak Point yards for 12 days in 1910. The day's work consisted of an eight-hour shift and the following average results were obtained:

1. Total time of throttle open..... 36.7 per cent
2. Total time engine in motion..... 62.65 per cent
3. Total time engine standing..... 37.5 per cent
4. Rate of water used per hour..... 12,633 lb.
5. Total water used—7.5 hours..... 37,603 lb.

Assuming 40 lb. of water evaporated per hp-hour, which was probably much lower than the actual rate, these averages showed that the average horse-power during the time the throttle was open was 313 hp, but, as the throttle was open only 36.7 per cent of the total time, the average power developed per hour was only 115 hp. These figures suggested:

1. That, in switching, yard speeds could be greatly increased by the use of an electric locomotive of very much less engine capacity than that used in the steam locomotive.

2. On account of the low average rate of energy required for their operation, a central power station will deliver at far higher efficiency the power necessary to the electric switching engine than that obtained from the individual power plant on the steam switching engine itself.

The type of electric switching locomotive which will be used in the Harlem River and Oak Point yards is shown in the engraving on page 668. It is of the quill spring-supported type, and on account of the buffing stresses incident to yard switching the framing and attachments for all of the electrical apparatus are very strong and substantial. The four motors have an hourly rating of 150 hp each, giving the locomotive a total capacity of 600 hp. This locomotive will be tried out in the electrified Stamford yard.

About a year ago a multiple-unit train consisting of four motor cars and six trailers was put in service. There are now under construction four additional motor cars and 12 trailers. These multiple-unit cars will gradually replace electric locomotives for suburban service, and the locomotives so released will be used in express service between New York and New Haven.

The complication of control apparatus to permit of operation on both a.c. and d.c. sections is very marked. All freight and switching locomotives will have single-phase control only, as will the multiple-unit cars to be purchased for the Harlem River branch and the New York, Westchester & Boston. The saving in weight of straight a.c. control over a.c.-d.c. control is more than 8000 lb. per car or locomotive.

LOG OF THE NEW HAVEN ELECTRIC OPERATION

As showing the great improvement in the reliability of electric operation as time had developed troubles and remedies for them, Mr. Murray supplemented his "Log of the New Haven Electrification," presented before the Institute in December, 1908, with figures of train delays for the corresponding six months of 1909. These figures are summarized in the following table:

Month.	Power-House Delays—Min.		Line Trouble Delays—Min.		Locomotive Delays—Min.		Total Delays—Min.	
	1908.	1909.	1908.	1909.	1908.	1909.	1908.	1909.
July.....	0	0	2,100	170	1,183	153	3,283	323
August.....	132	0	1,642	548	407	97	2,181	645
September.....	0	0	942	0	224	219	1,166	219
October.....	0	54	2,140	204	343	121	2,483	382
November.....	139	0	103	42	405	95	647	137
December.....	179	0	194	55	240	315	613	370

The average delay per train in 1909 was 5.25 seconds, as against 27 seconds in 1908. In this connection Mr. Murray said:

"A comparison of the 1909 and 1908 train minute delays is immediately indicative of the fact that even in this short time the disturbing factors of the system had disclosed themselves and had been eliminated. Eighteen months after commercial service was inaugurated our electrical failure report showed a record of over 15,700 miles per engine failure. Between Nov. 2 and 23, 1909, 66,000 electric locomotive miles were run, and this mileage, which is approximately 11 round trips from New York to San Francisco, was accomplished with a total of three minutes' delay. This kind of record is the ground upon which the board of directors of the New Haven road stood in ratifying the system and voting an extension to apply to all service—freight and passenger, inclusive of yards, terminals and main line west of Stamford.

"In the diagram on page 669 is shown an interesting relation between failures for trunk line service of electric and of steam operation. It should be noted in the lower diagram of the figure that the power house failures had practically no effect on engine mileage. On account of the severe handicap that has been placed on the line by steam locomotive stack discharges directly beneath it, a number of failures per 100,000

engine miles are recorded. An elimination of the steam service under the electrified wires will greatly reduce, if not entirely eliminate, failures due to this part of the electrical system. In the upper diagram of the figure is shown the relation of electric engine mileage per failure versus steam locomotive mileage. It is to be noted that the electric locomotive failures are 9 per 100,000 electric engine miles, while the steam locomotive failures, which are an average for all of the divisions of the New Haven, are 21."

DISTRIBUTION SYSTEM

The power house of the New York, New Haven & Hartford Railroad at Cos Cob, Conn., which now supplies current to the main line between Woodlawn and Stamford, will also supply current for the electrified six-track Harlem River branch and freight yards and the New York, Westchester & Boston, as well as for the operation of direct-current trolley lines connecting White Plains, Mamaroneck, Stamford and Bridgeport. The alternating-current distribution system is a unit without substations and no voltage higher than 11,000 will be used. The wires carrying current are sectionalized and breakers controlled from the power house are installed to localize any line trouble without affecting the remainder of the network. Briefly described, the control consists of a single wire, upon which is impressed the normal voltage of the system when a short-circuit occurs anywhere, but not until the automatic resistance at the power station has been cut in series with the line, at which moment the control wire, through transformers, passes current through the tripping coils of the sectionalizing breakers, and the two breakers that are directly feeding the short-circuit are immediately opened. The resistance thus inserted, however, has reduced the short-circuiting current to a minimum and relieved greatly the duty of the opening breakers. The resistance scheme above mentioned has proved itself to be a most valuable acquisition to the system, serving at once to lessen the duty on both generating and distributing apparatus.

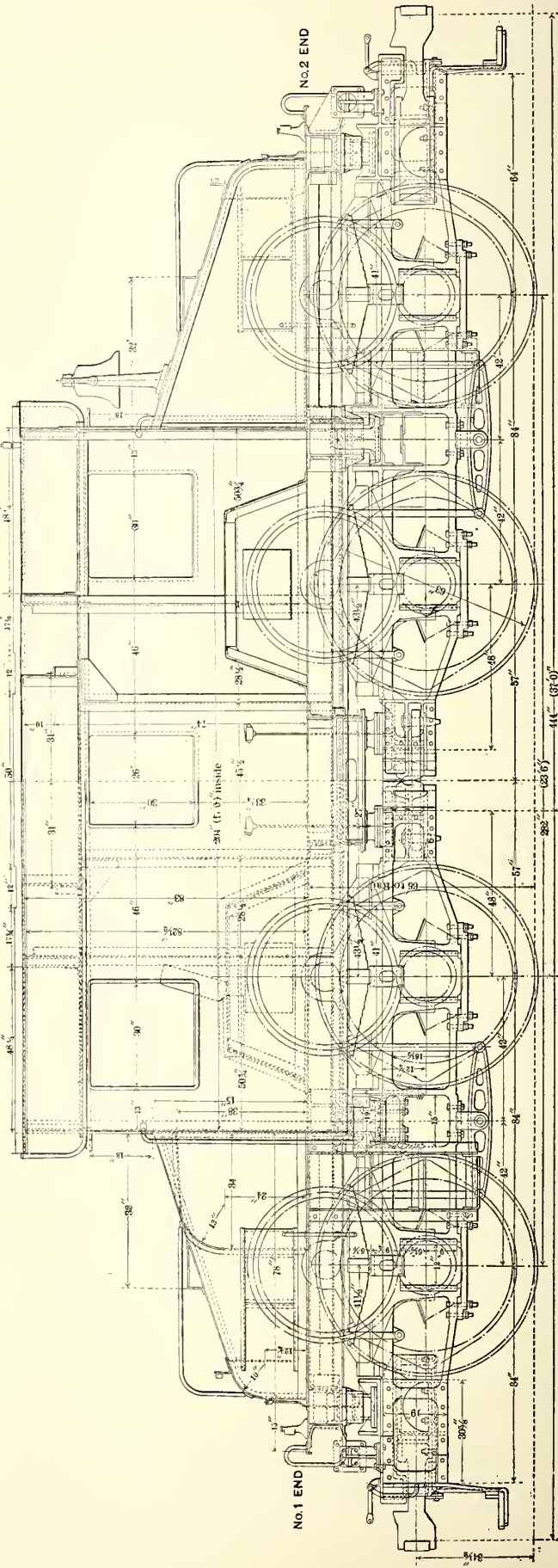
A study has been made of the voltage drop at the ends of the system. During the maximum load period the voltage at Harlem River, 25.6 miles from the Cos Cob power station, will be 9151 volts, which is ample to maintain all passenger and freight trains on schedule. The maximum peak load of the year occurs on "Football Day," when many extra trains are run between New York and New Haven. The peak load on Nov. 19, 1910, was 16,000 kw, and the average drop in voltage at Woodlawn was only 4 per cent.

Referring to storage batteries Mr. Murray said:

"Storage batteries for trunk line electrifications are not economical. This is true whether the propulsion current be direct or alternating. It is true that the storage battery does smooth out the power station load and lowers the rate of cost of producing a kw-hour, but the thing that concerns us quite as much as the rate of cost is the total amount of kw-hours manufactured in payment for the luxury of the battery. A train service requires a certain number of kw-hours. A plant producing these kw-hours will be required to manufacture more energy with than without a battery on its distributing system. In general it may be stated that more kw-hours mean more coal if the efficiency of generation is the same. As a matter of fact, the efficiency of production of electric energy is higher with than without a storage battery on account of the more constant load, but the difference is so small that at least for trunk line conditions it is offset by the increase in output required and the cost of maintenance of the battery. On account of the established reliability of generating equipment the argument for the use of a storage battery for the supply of power in the event of a power station breakdown is now no longer one for serious consideration. In this connection should be noted the importance of freight and switching loads in improving the station load-factor, due both to the physical exclusion of freight trains from main tracks during the hours of passenger peaks and to the latitude of operation afforded in fixing freight schedules."

INSULATION

Mr. Murray laid special stress on the importance of adequate



insulation of lines carrying high-tension current. In this connection he said:

"Practice has shown the wisdom of sectionalizing the lines at cross-overs. At these points it is necessary to bring the electrical catenary cables to a dead end and anchor bridges are supplied for that purpose. Oil switches must be provided for cutting in or out as necessity may require voltage on the lines thus dead-ended. In the order of their higher degree of insulation requirements should be mentioned:

- "1. Sectionalizing switches.
- "2. Sectionalizing busbars.
- "3. Dead-end catenary insulators.
- "4. Intermediate catenary insulators.

"As the whole track system leads into the anchor bridge buses a ground on them means an immediate effect on any wire connected to them. This reasoning is applicable to the switch should the ground be on the busbar side, and as the switch is

mate mechanical tensile strength of 50,000 lb. These insulators cost only \$7 apiece, as against \$61, and are capable of withstanding seven times the mechanical strain and three times the electrical strain of the original insulators.

WEAR OF CONTACT WIRE

"Micrometer measurements of the steel trolley wire taken at a point of maximum wear directly in front of one of our low highway bridges where the steel wire is on a gradient of 2 per cent, thus assuring a maximum upward vertical force of contact with the pantograph shoe of the locomotive, show that the actual vertical wear of the wire since its first installation 30 months ago is 0.028 in., which is practically 4.5 per cent per year of the half diameter of the wire (one-half taken to permit the wire to be held in clips). Even on this vertical diameter basis this indicates a life of over 20 years. As a matter of fact, it will be much more than this, for the reason that as the vertical diameter lessens the breadth of contact increases throughout, thus diminishing the rate of vertical wear. Of further interest, too, is the fact that there is practically no corrosion on the wire, for, like the traffic rails in service (only much more so), the wire is constantly covered by a film of grease—due to a generous amount of this material being placed on the pantograph shoe."

HOOSAC TUNNEL CATENARY CONSTRUCTION

A part of Mr. Murray's paper was devoted to a brief description of the catenary construction in the Hoosac Tunnel. The electrification of the tunnel is now rapidly nearing completion and electric locomotive operation has been begun in the approach yards for the instruction of engineers. The introduction of 11,000 volts into this tunnel, with the close overhead clearance that the double-track arrangement requires, afforded an interesting problem in the location and placing of insulators which would insure against any breakdowns between the electrified wires and ground. From the crown of the tunnel is suspended a bracket, as shown in the drawing on page 670. Four insulators, each capable of resisting 150,000 volts to ground, are installed on this bracket. Two of these insulators apply to each track. Their arrangement of support is such as to place them in series, thus giving them a combined dielectric strength of 300,000 volts. The outside insulator holds the track messenger, from which are hung the contact wires below. Some criticism might be offered against using a 150,000-volt insulator where a 40,000-volt insulator might have sufficed. By the expenditure of \$1 more per insulator there was secured practically eight times the insurance from breakdown. The tunnel is 5 miles long. There are 1000 insulators, hence \$1,000 has been spent to secure eight times the protection.

On the approaches to the tunnel the opportunity seemed an excellent one to secure immunity from trouble; 50 cents extra per insulator secured practically three times the protection offered by an ordinary 40,000-volt insulator. The outside insulators before erection were all required to withstand a dry voltage test of 110,000 volts.

Mr. Murray said that he was strongly of the opinion that it was good engineering to spend money on insulation. All of the insulators purchased for the Hoosac Tunnel electrification, inclusive of the tunnel itself and its outside approaches, did not total one-half of 1 per cent of the total expenditure. Insulation was of all things the one most important thing to be right in order to secure continuity of service. It paid a handsome dividend every year.

HARLEM RIVER YARDS

The two large yards at the terminus of the Harlem River branch contain 62.3 miles of track, all of which will be electrified. On account of the extremely small amount of current required per horse-power developed, and on account of the excellent conductor section offered in the gridiron arrangement of the track yards, not a pound of copper will be required throughout this extensive trackage, with the exception of rail bonds. These are to be reduced to the smallest size and only one rail will be bonded, with the attendant result of an extremely low cost compared to main line construction. Cross-catenary spans for the support of the track contact wires will

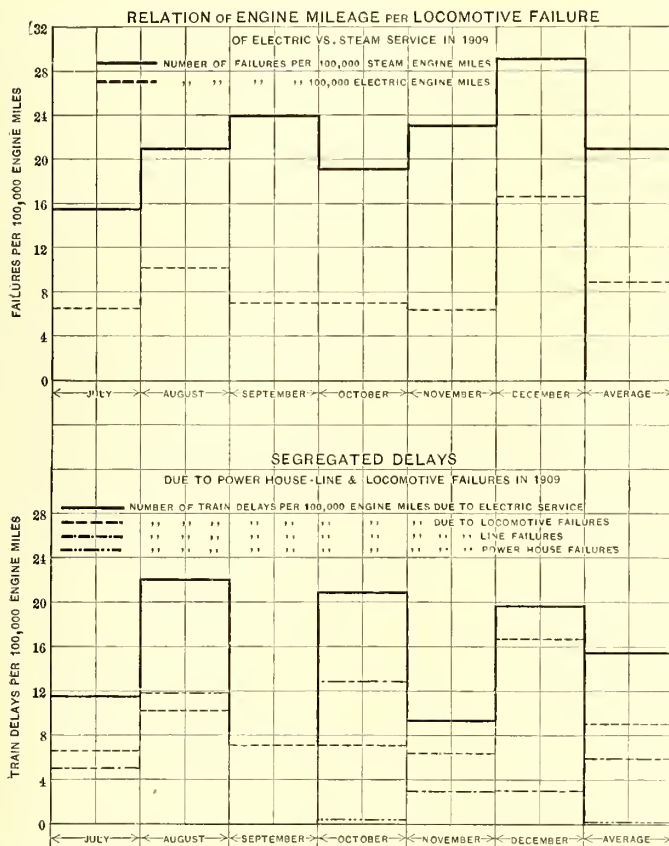


Diagram of Delays to Steam and Electric Trains

a piece of moving apparatus it is the more difficult to insulate and to keep insulated, and is, therefore, cited as the one deserving of the highest consideration of insulation. The dead-end insulator has been mentioned third, but it is in a class essentially its own and is worthy of respectful attention. No insulator throughout the past four years has had our more constant study. The difference between insulators not under and under mechanical strain while performing at the same time their electrical duty is marked. When the New Haven electrification was completed in 1908 the best dead-end insulator then on the market was one rated at 7000 lb. mechanically and 40,000 volts electrically, and cost \$27. We found in a very short time that two of these had to be used in series, which, with the yoke harness, made the cost \$61. It is interesting to note here that in order to secure an insulator strong enough mechanically to withstand a cross-catenary span in the electrification of our Port Chester yard we had to design a yoke to hold two of the above insulators in multiple. To-day we have placed orders for dead-end (or strain) insulators, every one of which is tested before shipment for 110,000 volts under a mechanical strain of 35,000 lb., and they have an ulti-

be used. By a simple system of bridles, which require only one rigid post to hold many tracks, the overhead contact wires are held in proper alignment over the tracks they serve. The cost of yard electrification, as before stated, varies from \$1,500 to \$3,000 per mile of track, depending upon the average number of tracks spanned.

ELECTRIFICATION COSTS

In conclusion Mr. Murray said:

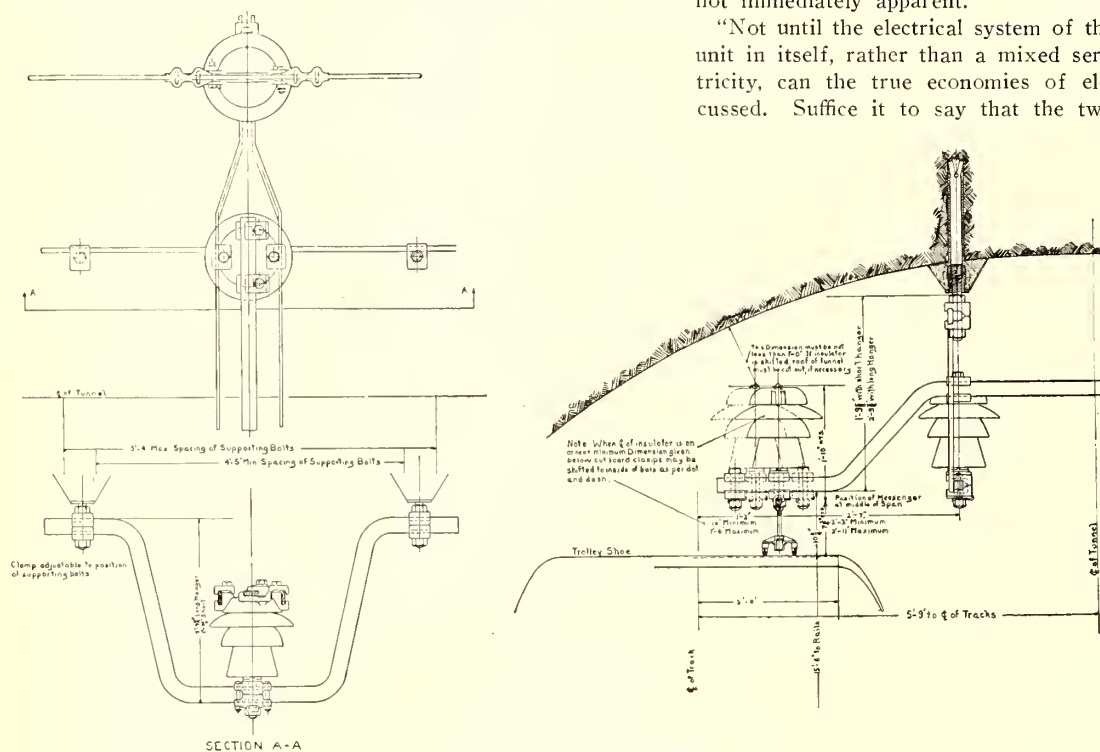
"The question of cost, both with reference to capital investment and operating in connection with electrified lines, is naturally the greatest factor of consideration on the part of railroad companies contemplating the application of electricity to their lines. While, in my opinion, no trunk line electrification can be better served than by the use of single-phase current, it must be conceded that electrification costs must vary with the greatly fluctuating conditions of volume and density of traffic involved. Again, while it would be perfectly possible to state the actual cost involved in handling a train mile by electricity versus a train mile by steam, this information as applying to the New Haven road might be extremely mislead-

structures,' while in the departments of 'maintenance of equipment and transportation expenses' a large credit, if the proper system is selected, may accrue. The balance between the debit and credit columns furnishes the ground upon which it may be said it is either a good or bad investment for the railroad company to electrify; and yet even though the direct returns prove unsatisfactory, it does not follow that the investment is a bad one if considered from a broader standpoint of general policy.

"A careful analysis of the relation between steam and electricity was made in connection with the lines of the New Haven road west of New Haven. Whether or not the policy of the railroad company in electrifying over 300 miles of its trunk line rails, terminals and yards was for financial gain to itself or better service to its patrons, it is reasonable to assume that the application of electricity to cover complete passenger and freight train propulsion and yard switching over the mileage above named, involving the expenditure of millions of dollars, would not have been decided upon by the directors unless the successful and uncompetitive characteristics of the system were not immediately apparent.

"Not until the electrical system of the New Haven road is a unit in itself, rather than a mixed service of steam and electricity, can the true economies of electrical traction be discussed. Suffice it to say that the two great departments of

economy lie in the saving of fuel and repairs to the rolling equipment. When the railroads consider trunk line electrification, all important will be the matter of freight movement and the cost and convenience of operation of yards. The ratio of the mileage of yard tracks to the main line tracks in the division run between Harlem River and New Haven is over 55 per cent; and while the New Haven road may be considered to have a high ratio of yard mileage to main line mileage, this condi-



SECTION A-A
Catenary Insulator Supports in Hoosac Tunnel

ing when considered for other applications. Power houses can be constructed, depending upon the capacity, for from \$90 to \$110 a kilowatt; line construction for one, two, four and six tracks can be erected at costs varying respectively from \$4,000 to \$7,000; from \$8,000 to \$15,000; from \$25,000 to \$40,000; \$40,000 to \$60,000 a mile. The fluctuation in cost for these respective constructions depends entirely upon the standards selected. The cost of overhead yard construction can vary from \$1,500 to \$3,000 a mile, depending upon the number of tracks spanned and the type of construction selected. Locomotives of the passenger, freight and switching type, depending upon the nature of their service, can vary in cost from \$25,000 to \$45,000 a unit. Thus it is seen that it would be impossible to give a usable estimate of electrification cost. Again, the necessity of property acquisitions, which in one case may be nothing and in another a very large sum, all varying in accordance with the environment of the electrification in question, makes such studies individual to specific cases.

"In general, from an electrical operating standpoint, it may be stated that for trunk line properties where a very considerable density of traffic is involved there will be shown a considerable debit in the department of 'maintenance of way and

tion holds true for all the railroads of the Atlantic Coast territory and in any territory including cities and towns in close proximity to each other.

"To discuss electricity versus steam without a recommendation of system in the specific cases of trunk line work, in my judgment, is to launch a ship upon a rough and windy sea without a rudder. An extremely important matter would be omitted if I did not say that my experience with the single-phase system versus other competitive systems affords me the sincere conviction that under practically all conditions of trunk line operation where the traffic is of the same amount and character or indeed much less than that which is comprehended in the mileage that this paper covers its first cost is at the greatest not more than 85 per cent of its next best competitor, and its operating costs are less than the above percentage.

"The above statements should not be taken to mean that all trunk line railroads considering electrification can electrify and save money; indeed, the general application of electricity is impossible. There are, however, roads that must and will electrify. To such railroads it is my hope that the information compiled will be of value."

DISCUSSION ON PUBLIC SERVICE COMMISSIONS

The weekly luncheon of the Electric Club of Chicago on April 5 was followed by an entertaining discussion on public service commissions and the regulation of public utilities. The speaker of the day was to have been W. J. Hagenah, chief statistician of the Wisconsin Railroad Commission. In his absence the subject was introduced by Alderman W. J. Pringle, chairman of the gas, oil and electric light committee of the Chicago City Council, and a member of the committee appointed by the Council to represent it at hearings on public service bills introduced in the State Legislature. Alderman Pringle spoke of the need for just regulation and indicated the purport of the utility bills now before the State Legislature, voicing the opinion that few, if any, of them would pass at the present session. However, he said that conditions were ripe for improved public utility measures and these were to be expected shortly, if not at the present session.

The successful work of the Board of Supervising Engineers of Chicago Traction was described by George Weston, city representative on that board. Mr. Weston outlined the conditions leading to the creation of the board by the Chicago City Council and stated that until now the work of the board had been confined almost entirely to surface transportation. Questions to be answered regarding public utility commissions, Mr. Weston said, were whether one commission should have jurisdiction over the entire State and whether the different classes of utilities should be handled by separate commissions. It was his opinion that the best results could be obtained by the appointment of separate commissions to supervise the workings of specific kinds of utilities. These generally would realize far better results than a single commission having supervision over different classes of utilities, such as railway, gas, light, heat and water.

Mr. Weston pointed out that the success of the Board of Supervising Engineers of Chicago Traction might be attributed largely to the fact that its work was confined to local transportation and that each member of the board had made that subject his lifework and, therefore, should be qualified for membership on the board. The work of this board had been of benefit both to the corporations and to the public. The board had been directed by the ordinances principally to supervise the accounts of the surface railways and the rehabilitation work. The board prescribed the exact form in which the railway should keep its books and had jurisdiction over its accounts. This was necessary in order that the city might know that it received its share of the profits as defined in the ordinances. The work of the board had been carried out with fairness to the public and to the corporations.

Mr. Weston believed that public utility companies should have representation on any other boards that might be organized, as they had had on the Board of Supervising Engineers of Chicago Traction. He had been led to believe, by his experience, that were similar boards to be appointed for each of the other utilities, such as telephone, gas and electric light, the results would be far better both to the public and to the corporations than if one board or commission handled all public utilities and was made up perhaps of board members not trained in the lines of work which they were to supervise.

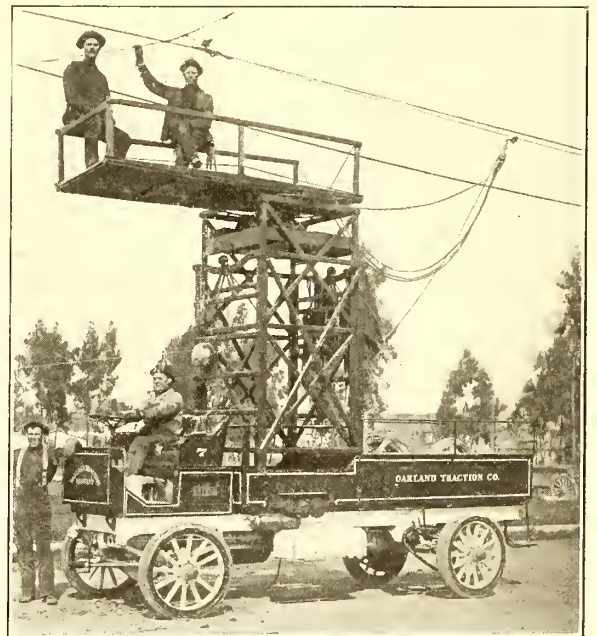
Frank F. Fowle, consulting engineer, who had fostered one of the bills now before the Legislature, said that reasonable regulation must be mutual; public demands at times were unreasonable and if the rates were limited, then the public service commission should give compensation therefor in some other phase of its work. The utility should have the same right of petitioning the commission that a consumer had. Mr. Fowle held the Wisconsin laws and commission in the greatest respect because the law provided for mutual protection and provided for fixing the rates for given communities. He compared the Wisconsin law regarding rates with that of the New York commission, which fixed only the maximum rate, and he said that it was safer to work toward the Wisconsin plan fixing definite rates.

Mr. Fowle said that the bill which he had drawn for the consideration of the Illinois Legislature called for a single commission to handle the entire State rather than one commission for Chicago and one for the remainder of the State. His reasons for favoring a single commission were that it would be more economical; would have no geographical division of authority; would least be subject to local political interests; would administer the laws according to their bearing on the entire State; would have a broader experience, and would have jurisdiction over composite plants, including those combination railway and lighting organizations which might otherwise have to report to two State commissions and those plants doing business inside and outside of Chicago which also might have to report to two commissions. He said the experience in New York had been that the commission in charge of public utility affairs outside of the City of New York had spent considerably less money than that having jurisdiction only over New York City and because of an opinion that the expenditures of the commission for New York City were too large an investigation had been demanded.

AUTOMOBILE LINE TRUCKS OF THE OAKLAND TRACTION COMPANY

Much interest has been manifested in the two 2-ton tower automobile line trucks which have recently been placed in service by the Oakland (Cal.) Traction Company. It has been found that in case of tie-ups caused by broken wires, fires or other causes this type of auto truck can be depended upon to reach the scene of trouble in one-half the time required by the old cumbersome and jolting horse-drawn line wagon. The direct maintenance cost is small. The gasoline consumption is about 1/3 gal. per mile and about 1 gal. of lubricating oil will serve this machine for about 30 miles.

The dimensions of the auto truck are as follows: 14 ft. long over all; width, 42 in.; frame in back of driver's seat, 9 ft. 4 3/4 in.; height from ground to top of frame (no load), 40



Gasoline Tower Wagon Used in Oakland, Cal.

in.; wheelbase, 120 in. The four-cylinder 32-hp vertical engine is located under the driver's seat; the cylinders are cooled by a blower. The motor control is from spark and throttle levers on the steering wheel. A single-lever speed change is at the right of the driver's seat. The transmission is a sliding gear of selective type which gives four forward speeds and one reverse. The rear or driving wheels are of hickory. They are of the "artillery" type, with 13 spokes, and a 3 1/2-in. dual

endless solid rubber tire. There are two independent sets of brakes besides the clutch brake. The service brake is on the jack shaft and is operated by a foot pedal. The emergency brakes, which are operated by a hand lever, are of the expanding type in drums on the rear wheels. All the brakes are well equalized and are lined with indestructible asbestos fiber woven on wire-mesh base.

The driver's seat is of steel, upholstered with black leather, with soft cushions and tuft back. The gasoline tank is located on the dash and is of 13-gal. capacity. The normal speed of the truck is 18 m.p.h. The trolley wagon tower mounted upon the steel truck is of the "Trenton" type. The trucks were built by the Kelly Motor Truck Company, Springfield, Ohio.

OPERATING RECORD OF HUDSON & MANHATTAN RAILROAD

Statistics of train delays on the Hudson & Manhattan Railroad for eight months of 1910 were printed in the *ELECTRIC RAILWAY JOURNAL* of Nov. 12, 1910. The excellent record of those months, during which the average total train delays were 100 minutes per month, was surpassed in February and March of this year, when the train delays were reduced to 59 minutes and 28 minutes respectively. The number of detentions and minutes' delay classified by departments to which they were chargeable are shown for the two months as follows:

Department.	February.		March.	
	No.	Min.	No.	Min.
Transportation	5	17	1	1
Car equipment	2	3½	2	7
Maintenance of way.....	2	8	0	0
Signals	5	11½	3	18
Power house.....	0	0	0	0
Substations	1	7	0	0
Construction	0	0	0	0
Signal construction.....	0	0	0	0
Miscellaneous	2	12	1	2
	17	59	7	28

The total car mileage in February was 566,000 miles and in March, 614,828. While all departments made a fine showing, the record of car equipment failures is remarkable. Only four failures with a total delay of 10½ minutes occurred during the two months. The cars ran 112,000 miles per minute of delay. The longest single delay in March was 15 minutes due to the freezing of a switch-operating mechanism at Thirty-third Street. With this unusual failure eliminated from the record the total delays from all other causes amounted to only 13 minutes.

In transmitting the report of detentions for March to the heads of departments the following letter also was sent by the general superintendent:

"April 3, 1911.

"To MR. C. S. KLUMPP, Assistant to General Superintendent.

" MR. J. F. O'ROURKE, Supt. of Transportation.

" MR. P. V. SEE, Superintendent of Car Equipment.

" MR. D. SAGE, Chief Engineer, J. C. P. H.

" MR. M. H. COLLINS, Supervisor of Signals.

" MR. L. G. SMITH, Chief Electrician.

"DEAR SIR:—

"I wish to congratulate all of you on the splendid showing your departments made during the month of March.

"Total detentions for March amounted to 28 minutes. This breaks all previous records and is one of which we may feel very proud.

"You all know how hard you have worked to make the above record possible. I do not see any indication of luck in the results. Coming in touch as I do with each department, and knowing the efficiency of your departments, I expected a 'record breaker' for March. However, I was agreeably surprised in it being such a good month, for I must confess it was really better than I anticipated.

"While we may not equal this record again for several months, I am firmly of the opinion that they will be excellent months, and can assure you that I shall not feel bad if in the near future you do even better than 28 minutes.

"Thanking you for the excellent work you are doing and assuring you that it is appreciated by my superiors, myself, and also by the traveling public, I remain

"Sincerely,

(Signed) "E. T. MUNGER,
"General Superintendent."

BOSTON ELECTRIFICATION DISCUSSED BY MEMBERS OF METROPOLITAN BOARD

On April 5 a hearing was given in Boston by the committees on railroad and metropolitan affairs of the Massachusetts Legislature to the report on the electrification of the railroads within the metropolitan district of Boston submitted by the Massachusetts Joint Board on Metropolitan Improvements. The two principal speakers at the hearing were George G. Crocker, who spoke in favor of the minority report, and Prof. George F. Swain, who defended the majority report. Both were members of the Joint Board and both are also members of the Boston Transit Commission. The report of the Joint Board was published in abstract in the *ELECTRIC RAILWAY JOURNAL* for Feb. 4, 1911. The minority report signed by Mr. Crocker and four other members of the board, it will be remembered, did not recommend legislation compelling the electrification of all the standard gage roads within the metropolitan district and suggested that the companies be allowed the greatest latitude with respect to the lines first to be electrified, but it did recommend the establishment by the Legislature of a reasonable date for the commencement of the actual work of construction for electrical operation. The majority opinion, signed by nine members of the board, including Professor Swain, stated that, in the opinion of the board, it was not wise nor in the public interest to enact legislation compelling electrification.

MR. CROCKER'S DISCUSSION

Mr. Crocker first referred to the statement of the Boston & Maine and New Haven railroads, submitted by Vice-president McHenry, that "the records of the New Haven company demonstrate that under present conditions the electric train service [on the New York division] not only fails to earn any interest upon the very large amount of capital invested, but that it has also increased the cost of operation and with the less favorable conditions in the City of Boston it is impossible to escape the conclusion that the deficit in fixed charges and operating expenses will be still greater."

Mr. Crocker said that the New Haven reply said later "present conditions" on the New York division were far from ideal because of the mixed steam and electric service, and that its reply in no place states that a properly planned electrification system would not prove profitable. The railroads claim that the Boston division is spread out much more than the New York division and state that the mileage is 70 per cent greater, but they also admit that the traffic to be handled at Boston is nearly three times that handled at the Grand Central Station in New York. The speaker said that these figures show that the passenger business per mile of track in Boston is greater than the passenger business per mile of track at the Grand Central Station in New York. This was not an unfavorable but a decidedly favorable condition for electricity. He also thought that the fact that many of the lines around Boston were branch lines which naturally require a large number of separate train units was another condition favorable to electricity. Statistics show that the total number of New York Central trains running in and out of the Grand Central Station in New York on week days in summer is 392, whereas the similar figure in Boston from the North and South stations is 1401.

Mr. Crocker did not agree with the conclusion of the majority of the committee that the real estate salvage resulting from electrification, due to the construction of buildings over the tracks of the company, should be considered problematical and hypothetical. He said that at present the railroad companies have at both the North and South stations large areas of valuable land occupied by train sheds and that the area above

these tracks was not simply valueless for any additional use, but was worse than valueless, because the locomotive smoke and gases caused a large annual expense for depreciation and repairs of the train sheds. With electricity these areas would become available for offices and other business purposes. The speaker called especial attention also to the valuable tracts of land in Back Bay, bounded by Boylston Street on one side and Huntington Avenue on the other, occupied by the Boston & Albany Railroad. After electrification this area, with the exception of one story needed for the railroad, could be covered by streets and buildings. He also thought that there would be a large real estate salvage from the electrification of the freight yards.

He also criticised the conclusion of the majority that "the best method of electrification is still undetermined. The science is in a state of rapid change, and standardization is much to be desired before extensive electrification is undertaken." To wait, he said, meant to wait for others to lead the way, and this had not been the method which had given Massachusetts its present standing and reputation. In the development of its railroads, its telephones, its electric railways and its subways it had not waited for standardization. It had created standards and they had generally been good. Another conclusion in the majority report was that a demand for electrification would compel the railroads to postpone other more important improvements, but he said that he could not find in the record any list of such proposed improvements. Could it be the purchase of more steam locomotives and more wooden cars?

He also criticised the conclusion of the majority that electrification, while desirable, was not necessary nor required on grounds of public safety, like air brakes, signals, standard couplings, etc. He thought that freedom from locomotive smoke and gas would have an important bearing on the public health by reducing the diseases of throat and respiratory organs. It is true, he said, that these elements do not kill outright, but he thought that their influence in shortening life was measurable. Statistics had shown that if a man should spend his whole time day and night riding in railroad trains at an average rate of 30 m.p.h., and if he had average good luck, he would not be killed by accident, without his fault, oftener than once in 1500 years, and that he would not receive any injury of sufficient importance to be reported oftener than once in 500 years. But he inquired how long a man would live if he was obliged continuously day and night to breathe the air in the railroad stations in Boston without an opportunity of relieving his lungs by a breath of purer and better air. Many people are now affected by these gases and it may well be that the sum total of all the injury which they do is greater each year than the sum total of the shortening of lives by accident.

Another point in the majority report attacked by the speaker was the claim that the change would be unprofitable to the railroads. He believed that the increased traffic would more than repay the companies and that any question of higher fares could safely be left by both railroads and public in the hands of the Railroad Commission. The railroads had estimated the entire cost of electrification at \$40,000,000, the interest on which at 5 per cent would be \$2,000,000 per annum. The present passenger traffic to and from the North and South stations was in round numbers 60,000,000 per annum. An increase of 20 per cent in this traffic would be an increase of 12,000,000 passengers, and if the average fare paid by them per mile was 1.6 cents, which was the average for the State, and the average ride was 10 miles, \$2,000,000 would be added to the gross earnings. He had noticed from diagrams submitted by the railroads and published in the report that the increase in traffic at the Grand Central Station in New York from 1900 to 1906 was 40 per cent; from 1906 to 1908, during part of which time there was combined steam and electrical operation, it decreased nearly 5 per cent, but from 1908 to 1910, under electrical operation, it increased over 12 per cent, in spite of the confusion attendant upon the rebuilding of the station.

Finally, Mr. Crocker said that the New Haven company, when seeking to control the Boston & Maine system, had declared its intention to carry out important improvements if

unified control was authorized. Prominent among these improvements were the following: "To equip both systems with electricity for a considerable distance near Boston, and by that means increase the convenience of travel and remedy the nuisance of smoke. . . . To connect the South Terminal Station in Boston with the North Union Station by a tunnel in which shall run suburban trains from stations on one system to stations on another." (Report of Commission on Commerce and Industry, page 13.)

Relying on these representations the Legislature had granted the necessary authority. He believed that the New Haven road intended to do what it then agreed to do and had thus far proceeded in good faith and with commendable diligence, and said that under these circumstances an explanation was due as to why he thought compulsory legislation was necessary. It was because the majority report of the Joint Board was of such a character that unless the State expressed its dissent therefrom and announced its intention to hold the company to its professions, the company would have good ground for claiming that it should not be expected to undertake the work. It is true that the New York Central was not under the same obligation to make similar improvements, but it could not afford to lag behind, nor should it be permitted by delay or otherwise to place obstacles in the way. The two systems of the New Haven company carry in and out of Boston six times as many passengers as are carried by the New York Central in and out of Boston on the Boston & Albany Railroad. The New Haven company was courageous and progressive. It proposed to undertake a work which would be epoch-making. It should be encouraged, not discouraged; helped, not hindered; commended, not declaimed against.

Speaking for himself he believed that the time had come when the work should be definitely planned and promptly carried into execution; that the act authorizing the construction of the North and South tunnel connecting the tracks of the New Haven and Boston & Maine systems should be passed; that the city should be given such authority as might be requisite to enable it to build a highway on the same route with the tunnel; that out passenger and freight terminals should be replanned so as to utilize to the best advantage the opportunities which electrification offered, and that if the work as outlined by Vice-president McHenry was carried out wisely and without waste it would prove increasingly profitable to the company and a blessing to the whole community.

PROFESSOR SWAIN'S REPLY

Prof. George F. Swain then defended the conclusions of the majority of the board. He said that in its report a year ago the board had recommended the passage of a resolve provided for study by the railroad companies, but had recommended and suggested no compulsory legislation. The resolve, however, passed by the Legislature was in a different form and required the board to present a bill which should provide for the electrification of all railroads of standard gage in the metropolitan district within a stated time. This was the subject before the board. The majority had reached the conclusion that it was wisest to enact no compulsory legislation. The second minority report agreed in this, but thought further study of the subject desirable. The first minority report thought that some legislation should be passed; with respect to electrification it was rather non-committal but suggested that the time for beginning the actual work should be fixed by the General Court or by some public agency designated by it. There was not, therefore, so much difference between the reports as might be supposed, and he reiterated the statement that the question which the majority had in mind was the suggestion of compulsory electrification of all lines within a stated time. The report had received the approval of some of the ablest electrical engineers in the country.

The majority agreed that electrification was desirable and physically practicable, but showed in its report why economical results from electrification would not be secured under the plan proposed. Hence, the resolution, as originally proposed, would have forced an uneconomical development. On the other

hand, if the roads should be left unhampered they could plan their electrification to such distances as might prove profitable.

He defended other conclusions made in the report and then referred to the request of the New Haven Railroad now before the Legislature to build a tunnel under the harbor and electrify each end of it. He believed that if this permission should be granted the beginning of electrification of the metropolitan district will have been seen, without necessity for further action, and he believed that nothing more was needed at the present time, so far as the New Haven railroad was concerned. As for the Boston & Albany, that company had been expending large sums for a number of years on permanent improvements, and the Interstate Commerce Commission had admitted that the New York Central Railroad Company had thus far suffered a deficit of about \$3,000,000 from the Boston & Albany lease. He thought that before the New Haven tunnel was built the relations between the two companies, now apparently growing closer, might be closer still and the terminal relations of the two might be different from what they were now. Possibly the Boston & Albany trains might use the tunnel. At all events the electrification of one road having begun and been allowed to develop naturally would lead in due time to the electrification of both.

CAR PULL-INS IN GREATER NEW YORK

The Public Service Commission of the First District, New York, is now issuing comparative monthly reports of the car pull-ins recorded by the electric street railways under its jurisdiction. The accompanying table, which gives the detail figures for February and résumés for January, shows that excellent standards of service are being successfully maintained even during the winter. The table gives the seven large street railway systems in Greater New York, but for some reason no

Railroad with a ratio of 0.44 per 1000 car miles in operating 852,617 car miles; then the Metropolitan Street Railway with a ratio of 0.73 in operating 2,700,839 car miles, and last the Second Avenue Railroad with a ratio of 0.85 in operating 255,044 car miles.

The comparative ratios per 1000 car miles for January, 1911, were as follows: Coney Island & Brooklyn Railroad, 0.14; Union Railway, 0.15; Brooklyn Rapid Transit Company, 0.24; New York & Queens County Railway, 0.25; Third Avenue Railroad, 0.60; Metropolitan Street Railway, 0.78; Second Avenue Railroad, 1.83.

The classification of defect causes for February shows that the plows are much more troublesome than trolley collectors. Thus plow troubles averaged from 21.61 per cent to 53.27 per cent of all defects, whereas the figures for overhead collectors were only 1.67 per cent to 3.03 per cent.

THE CONFERENCE ON GOVERNMENT CONTROL OF WATER-POWERS

A public conference on water-powers and their control by the government was held under the auspices of the power transmission section of the National Electric Light Association at the United Engineering Building, 29 West Thirty-ninth Street, New York, on April 8. Afternoon and evening sessions were held. A feature of the conference was the attendance of Secretary of the Interior W. L. Fisher, who explained the attitude of the present administration toward the development of water-power.

The sessions were opened by Henry L. Doherty, chairman of the transmission section of the National Electric Light Association, who called attention to the fact that there are at present 37,000,000 hp available in the United States in water-

REPORT OF DEFECTIVE STREET CAR SERVICE IN NEW YORK CITY FOR FEBRUARY, 1911.
WEATHER, 50 PER CENT FAIR.

	Metropolitan Street Railway.		Third Avenue Railroad.		Brooklyn Rapid Transit Company.		Union Railway Company.		Second Avenue Railroad Company.		Coney Island & Brooklyn Railroad.		N. Y. & Queens County Railroad.	
Defective Equipment.	No. of Defects.	% of Total Defects.	No. of Defects.	% of Total Defects.	No. of Defects.	% of Total Defects.	No. of Defects.	% of Total Defects.	No. of Defects.	% of Total Defects.	No. of Defects.	% of Total Defects.	No. of Defects.	% of Total Defects.
Found O. K. ....	...	...	18	4.80	1	0.12	36	20.11	...	...	1	1.51	8	7.62
Car body.....	492	24.79	69	18.39	148	17.67	51	28.49	6	2.78	11	16.67	20	19.05
Motor.....	267	13.42	13	3.47	309	36.90	28	15.64	55	25.44	34	51.52	33	31.42
Controller.....	101	5.08	5	1.33	55	6.56	8	4.47	8	3.70	2	3.03	6	5.72
Plow.....	429	21.61	186	49.60	...	...	...	...	115	53.27	...	...	...	...
Fender.....	...	...	...	...	7	0.84	...	...	...	...	...	...	3	2.86
Wheelguard.....	87	4.38	10	2.66	57	6.80	13	7.27	1	0.46	3	4.55	...	...
Brake.....	237	11.94	22	5.87	79	9.43	21	11.73	24	11.11	7	10.62	15	14.28
Truck.....	179*	9.01	26	6.94	105	12.51	16	8.94	6	2.78	4	6.05	6	5.72
Air motor, etc.....	38	1.91	21	5.60	45	5.36	...	...	...	...	...	...	10	9.53
Heater.....	22	1.11	1	0.27	11	1.31	1	0.56	1	0.46	1	1.51	...	...
Register.....	134	6.75	4	1.07	1	0.12	2	1.12	...	...	1	1.51	2	1.90
Trolley.....	...	...	...	...	20	2.38	3	1.67	...	...	2	3.03	2	1.90
Totals.....	1,986	100.00	375	100.00	838	100.00	179	100.00	216	100.00	66	100.00	105	100.00
Mileage.....	2,700,839		852,617		3,637,066**		690,956		255,044		386,558		401,608	
Mileage previous month.....	3,087,725		962,885		4,037,255		768,159		285,822		425,946		440,819	
Ratio pull-ins per 1,000 miles.....	.73		.44		.23		.26		.85		.17		.26	
Ratio pull-ins per 1,000 miles previous month....	.78		.60		.24		.15		1.83		.14		.25	

*149 cars pulled in for wheel troubles.

**Surface car mileage only.

figures are given on the service of the New York City Interborough Railway, which operates 17 miles in Bronx Borough, and the three lines in Richmond Borough, which operate a total of 64 miles. The table shows that the Coney Island & Brooklyn Railroad gave the steadiest service during February, as its run-ins in operating 386,558 car miles amounted to a ratio of only 0.17 per 1000 car miles. The next best record was made by the Brooklyn Rapid Transit Company, which had a ratio of 0.23 per 1000 car miles in operating 3,637,066 car miles. These companies are followed by the New York & Queens County Railway and the Union Railway, each with a ratio of 0.26 pull-ins for operating 401,608 car miles and 690,956 car miles respectively. It should be noted that all of the four leaders use the overhead trolley and so do not suffer from the plow defects which are so troublesome to the railways in Manhattan Borough.

The best Manhattan record was made by the Third Avenue

power which can be developed at a cost which compares favorably with steam. Of this amount 3,500,000 only have been developed. The country is now annually using in excess of \$200,000,000 of fuel that might be saved by the development of water-power. This cannot be undertaken to-day because of obstacles which are placed by the government and are of no benefit to the government or to the people.

The chief paper of the session was by S. Z. Mitchell, who also attributed the lack of development of water-powers to the present government regulations, which grant only a limited franchise. For every dollar invested in generating stations a power developer may have three or four times that investment in his distributing system and the whole plant would necessarily be inoperative and useless in case of failure to secure a renewal of the grant.

Secretary Fisher explained that the government was maintaining the existing status simply until a policy should be

decided upon. It is anxious to obtain all of the information available on the subject and would welcome any data which the National Electric Light Association could supply.

Calvert Townley, vice-president of the Connecticut Company, New Haven, sent a written communication in which he stated there was considerable water-power in New England yet undeveloped and that all of the water-power development already made had not proved satisfactory commercially. The imposition of high taxes upon water-powers retards development and increases the cost of energy to the consumer.

Other speakers were J. R. McKee, Richmond Lamb, J. G. White, John Bogart, C. F. Scott, R. D. Mershon, F. J. Sprague and D. B. Rushmore.

As a conclusion of the meeting a committee consisting of S. Z. Mitchell, R. D. Mershon, C. F. Scott, P. G. Gossler, M. A. Biedle and C. F. Wallace was appointed to formulate the resolutions expressing the general opinion of the conference. This committee reported the following resolution, which was adopted:

Resolved, That it is the sense of this meeting, convened at the instance of the power transmission section of the national body, that the National Electric Light Association should offer its co-operation with the legislative and executive branches of the national and State governments for the formulation of a definite, constructive policy which will encourage the prompt and fullest development of our water-powers in the public interests; and be it further resolved that to this end it is recommended that the officers of the National Electric Light Association appoint a committee or committees with power to act in the premises, and to invite the co-operation of such engineering, commercial or other bodies as they may deem expedient."

MEETING OF THE INTERURBAN RULES COMMITTEE

The interurban rules committee of the American Electric Railway Transportation & Traffic Association held a meeting at the Blackstone Hotel, Chicago, Ill., on April 11 and 12. Those present were J. W. Brown, Aurora, Elgin & Chicago Railroad; C. F. Handshy, Illinois Traction System; F. A. Boutelle, Puget Sound Electric Railway; W. H. Collins, Fonda, Johnstown & Gloversville Railroad; Alexander Shane, Indianapolis, Columbus & Southern Traction Company, and H. C. Donecker, secretary of the association.

Mr. Brown, chairman of the committee, in his opening remarks said that the meeting which was held in January was for the purpose of determining upon a plan of action. The committee had a very difficult task before it in drafting a code of rules that would be acceptable as a whole to all of the interurban roads. He believed that the committee was unanimous in its approval of the plan of numbering the interurban rules to conform to the American Railway Association standard code.

Mr. Handshy did not believe that it would be possible to get up a code of rules that would be suitable in their entirety for all roads. The majority of the roads needed as simple a code as the committee could compile and he was opposed to including in the code any rules that the electric railroads would not enforce. He thought the majority of roads could use the steam-road rules, but could get along with fewer forms of train orders.

Mr. Shane said that the three roads comprising the Indianapolis-Louisville route had just completed the compilation of a new code of rules. An endeavor was made to omit unnecessary rules wherever possible, although the management realized that a code of rules was in the nature of a book of instructions for men who sometimes had very little experience or knowledge of railway operation. In the State of Indiana the Railroad Commissioners had made it compulsory to include some rules in the books used by the interurban roads operating in that State. These rules have been found very satisfactory. The new code of rules for the Indianapolis-Louisville lines con-

formed very closely to the Denver code. A number of rule books had been examined and what were thought to be the best rules from each were copied. Mr. Shane thought that any standard code of interurban rules would have to be added to or subtracted from to meet local conditions. Such a standard code, however, should contain all the fundamental principles.

Mr. Handshy did not believe that the code of city rules should interfere in any way with the work of drafting a suitable code of interurban rules.

The committee then proceeded to pass on the individual rules included in the Denver code. In the following notes of changes which were approved the references are to the rule numbers and wording of the Denver code. The committee intends, however, to re-number all of the rules so as to make them conform to the numbering of the American Railway Association standard code.

GENERAL NOTICE

The general notice contained in the Denver code was approved, with the addition of Rule 8 to be inserted between the third and fourth paragraphs. Rule 8 refers to the promotion of the company's welfare by employees.

GENERAL RULES

The first sentence of Rule 1 was changed to read as follows: "The head of each department must be conversant with such rules as apply to his department, supply copies," etc. After the sentence ending "the action taken thereon" it was agreed to insert the last sentence of Rule 3. The first sentence of Rule 3 will be eliminated. In Rule 2, after the sentence ending "obey the rules and special instructions," it was agreed to insert the second sentence of Rule 5, and eliminate the first sentence of Rule 5. These changes entirely eliminate Rules 3, 5 and 8. In the heading of Rule 6 the word "correct" was stricken out.

General Rule C of the 1910 code was substituted for Rule 7 in the 1909 code. Rules 9 and 10 were approved and also Rule 11, with the following addition: "Employees must examine and know for themselves that grab irons, brake shafts and attachments, running boards, steps and all other parts of cars and locomotives which they are to use and all mechanical appliances, tools, supplies and facilities of every kind of which they must make use in performing their duties are in proper condition. If not, they must put them so, or report them to the proper person and have them put in order before using."

The last sentence of Rule 12 was changed to read as follows: "Politeness and courtesy must be continually practised by employees. This will prevent controversy and complaint and greatly benefit the service."

In Rule 18 the following sentence was added: "Conductors must enforce this rule."

The last sentence of Rule 28 was stricken out. Rule 29 was revised to read as follows: "When an employee is discharged from the company's service he shall not be re-employed by any department without the approval," etc.

The remainder of the rules under this heading were approved.

DEFINITIONS

Rules 50 to 76 were approved with a number of slight changes, among which were the following:

The heading of Rule 51 was changed to "regular train." In Rules 57 and 58 the words "regular train" were substituted for "scheduled train." Rule 63 was changed to read: "Station: A place designated by name or number at which a train may stop for traffic." In Rule 69 the word "engine" was substituted for "motors." The last sentence of Rule 70 was omitted and the following clause, "and responsible for the safe operation of the train," was added after the word "moved."

The following definitions were added after the definition of a pot signal:

Markers: Signals carried on the rear end of a train indicating that it is a train and that it is the rear end of a train.

Classification Signals: Signals carried on the front end of a train to indicate that the train is a section of a train or an extra.

Rule 81, under the heading of standard time, was omitted.

TIMETABLES

Rules 84 and 85 were combined. In the last line of Rule 88 the words "or below" were inserted after the word "above."

AUDIBLE SIGNALS

Section K of Rule 99 was omitted. Rule 102 was revised to read as follows: "In case of a breakdown or accident which disables a car on a railroad crossing not protected by an interlocking, the conductor," etc.

Rule 16 of the 1910 interurban code was substituted for Rules 103 and 104 of the Denver code with the following modifications: "Section c. Signals of motorman to conductor. Three bells by motorman is signal to conductor that he wishes to back the train. Section d. Four bells is signal to set rear brake."

TRAIN SIGNALS

In Rule 107 the following clause was inserted after the first sentence: "but must be concealed when train is clear of the main track." Rule 119 was amended to read as follows: "A yellow flag by day and a yellow light by night on the right-hand side of the track indicates that the track is in bad condition — ft. in advance and trains must operate at — m.p.h. until they pass the same kind of a signal on the left-hand side of the track."

SIGNALS

Rules 121, 122, 123 and 124 were eliminated. In Rule 130 the words "but give no proceed signal" were omitted, and in Rule 131 the word "crossing" was omitted after the word "regular."

MOVEMENT OF TRAINS

Rule 203 was amended to read as follows:

"203. A train must not leave its initial station on any division, or a junction, or pass from double to single track without order or clearance, and until it is ascertained from the dispatcher whether all trains due have arrived or departed.

"Where a train register is maintained it shall be the duty of the conductor to register and note carefully whether all trains due have arrived and departed."

Rule 203a was eliminated and Rule 92 of the 1910 interurban code was substituted for Rule 204. Rules 205 and 208 were consolidated into one rule and Rule 206 was amended by striking out the words "between reporting stations." In Rule 210 the distance between following trains was left blank to be filled in by each road. Rule 212 was omitted and the last line of Rule 211 corrected accordingly. A new Rule 214 was approved as follows:

"214. Trains carrying signals to an intermediate point will report to the dispatcher when arriving at that point and will not take down signals or leave that point until the following section arrives, unless otherwise instructed. The dispatcher will not instruct train carrying signals to proceed before the following section for which signals are carried arrives and until he has properly protected the following sections against all opposing trains."

Rule 220 was amended by the addition of the following: "The front end will go back to recover the detached portion, running with caution following a flagman. The detached portion must not be moved or passed until the front portion comes back."

Rule 222 was changed to read: "Yard limits marked by proper boards may be established and within such limits the main track may be used, clearing first-class trains as prescribed by the rules. All except first-class trains must move within the yard limits prepared to stop unless the main track is known to be clear."

In connection with Rules 256 and 258 the committee will insert the rules required by the Indiana commission under the captions which are obligatory in Indiana.

At the conclusion of the morning session on Wednesday Secretary Doncker read a letter from the Canadian Street Railway Association asking what results had been secured in the attempt to standardize operating rules.

An electric railway, 28 miles long, is to be constructed from Hiki to Sujiwara, in Kiushiu, Japan, at a cost of about \$750,000.

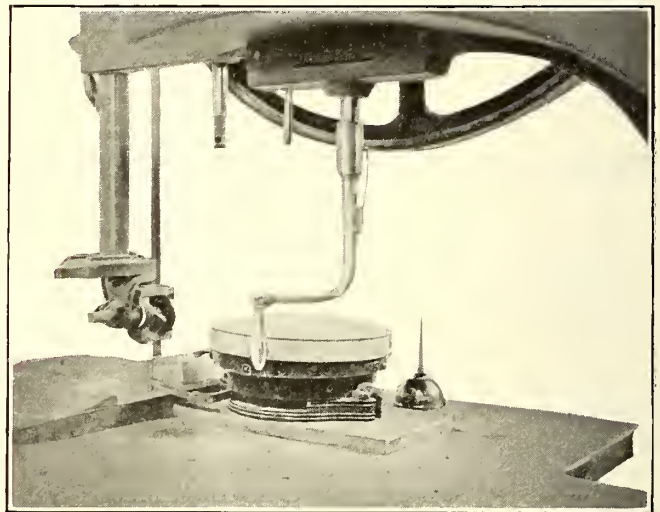
A. I. E. E. MEETING AT TORONTO

A meeting of the American Institute of Electrical Engineers was held on Friday evening, April 7, 1911, in the chemistry and mining building of the University of Toronto. The meeting was called to order by Chairman E. Richards, of the Toronto Section, who introduced Secretary Ralph W. Pope. Mr. Pope made a few remarks on the work of the Institute. President Jackson was then introduced and presided during the meeting.

The paper of the evening was presented by the author, William S. Murray, of New Haven, Conn., and was copiously illustrated with lantern slides. This paper is published in abstract elsewhere in this issue and was discussed by N. W. Storer and B. G. Lamme, of Pittsburgh. About 100 members were present, among those from a distance being President D. C. Jackson, Secretary Ralph W. Pope, W. S. Murray, of New Haven; John Murphy, of Ottawa; H. W. Weller, of Montreal; H. P. Davis, N. W. Storer and B. G. Lamme, of Pittsburgh.

COUNTING ATTACHMENT FOR BAND SAW

The construction departments of the Chicago Railways require a great many wooden shims and wedges and these are cut from scrap timber in the repair shop wood mill. A large motor-driven band saw is used for cutting the wedges. To steady the work and get the wedges of uniform size a beveled block is used to hold the wood while it is being pushed against



Fare Register in Use as a Counter on a Saw Table

the saw. As these wedges are ordered several thousand at a time some special means of counting them as they are cut has been found advisable. Accordingly an old fare register has been rigged up for this use. The register is mounted on a board which quickly can be clamped to the saw table. The ringing arm of the register has been extended to a length of about 8 in. When the register is in place on the board this arm is in such a position that each time a wedge is cut it engages the jig which holds the work. By this means an accurate count is obtained without requiring any attention on the part of the saw operator.

EMERGENCY SUPPLY OF SAND ON CARS

As a precaution against sand hoppers becoming empty on remote sections of the line, the Bristol & Plainville Tramway Company, Bristol, Conn., keeps stored under the seats of each car 24 canvas bags filled with fine gravel. Two bags are sufficient to fill a hopper. Special facilities have been provided for refilling the bags at the carhouse. The substitution of fine gravel for sand not only eliminates all tendency to form lumps in damp weather, but thorough tests have shown that gravel gives better results in stopping a car on a slippery rail.

WRITTEN EXAMINATION FOR TRAINMEN ON CLEVELAND, PAINESVILLE & EASTERN RAILROAD

Written examinations of trainmen have been substituted for oral examinations by the Cleveland, Painesville & Eastern Railroad Company, Willoughby, Ohio.

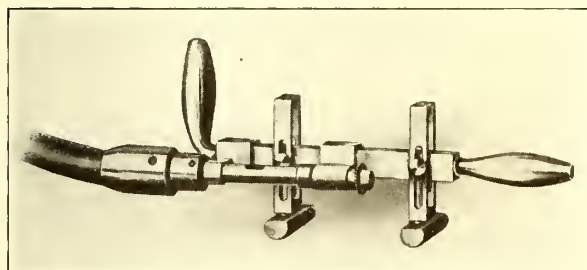
J. C. Espy, superintendent of transportation, states that his practice in the past has been to examine trainmen orally once a year. The questions asked the men have been varied each year, with the object of leading them further and further into questions of operation. Beginning with 1911, however, written examinations on the timetable and book of rules have been substituted.

When oral examinations were given one or two men were examined at a time, but with the change which went into effect this year each man examined was placed in a room by himself until he completed his answers to the questions. In the last oral examination 121 questions were asked; in the written examination there are 116 questions to be answered. The written examinations are checked and any questions not answered in full or properly are taken up with the man individually.

Mr. Espy states that the men are better pleased with the written examination, and that he has been surprised at the evidence of this fact. The new policy has had the good effect of leading the men to discuss the rules.

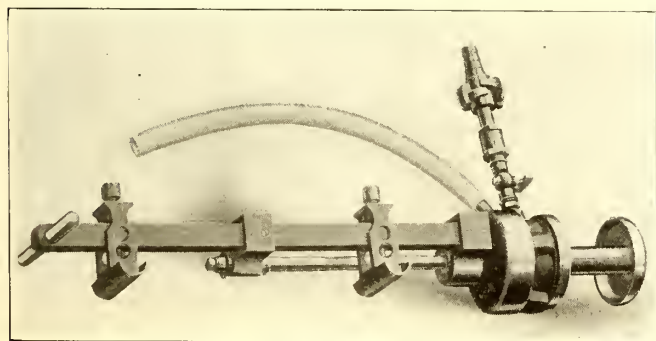
COMMUTATOR SLOTTING TOOLS

The Westinghouse Electric & Manufacturing Company is making two types of commutator slotting tools, one type air-operated and the other motor-operated. Both types are shown



Electric Commutator Slotting Tool

in the accompanying illustrations. Each of the slotting tools comprises a circular saw with adjustable rests for centering the tool. Guides which bear on the commutator face are adjustable on the guide bar of the tool, making it applicable to a large



Pneumatic Commutator Slotting Tool

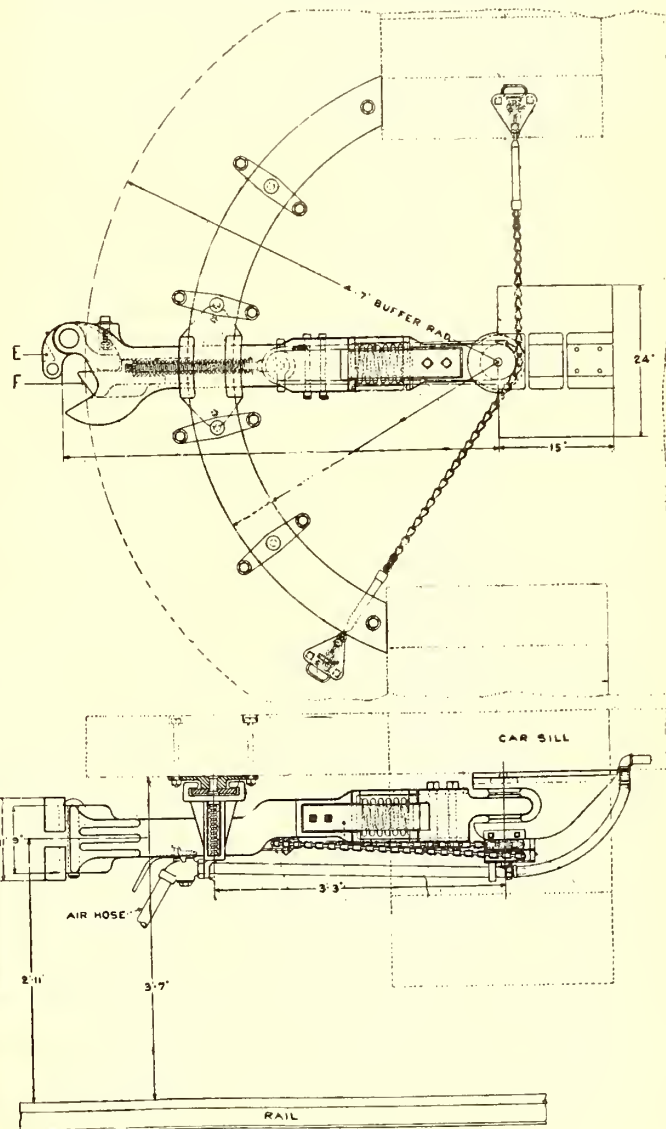
range of commutator sizes. The guides also permit the depth of slotting to be accurately adjusted and maintained. The pneumatic slotter is operated by an air turbine at a pressure of 40 lb. to 80 lb. per square inch. The air turbine forms part of the tool. The motor slotter is satisfactorily operated by a ¼-hp motor running at approximately 1700 r.p.m. A 5-ft. flexible shaft is provided for connecting the tool to the motor.

TOMLINSON M. C. B. COUPLER

The accompanying diagram shows the latest type of Tomlinson M. C. B. coupler for electric cars. This coupler has been used on several electric roads for more than a year. The special feature of the coupler is the device for preventing the coupler from uncoupling from vertical displacement.

The contour of the coupler head follows the M. C. B. lines, but on electric cars some device is necessary to prevent vertical uncoupling at sharp changes in grade. In the coupler illustrated this is accomplished by the sliding lock marked *F* in the drawing and the recess *E* in the face of the knuckle. When two couplers are connected the sliding lock *F* seats itself in the recess *E*, where its vertical movement is limited. When this limit of movement is reached the spring drawbar carrier provides all the additional flexibility necessary. At the same time the coupler can intercouple with any other standard M. C. B. coupler. As will also be seen from the drawing, the draft gear has an offset which throws the anchorage casting well up against the sills of the car. This reduces the strain upon the fittings.

The patents for this coupler have been taken over by the



M. C. B. Radial Coupler

Ohio Brass Company, which up to this time has been making the coupler for Mr. Tomlinson, and the Ohio Brass Company is now placing the coupler on the market.

The Winona Interurban Railway, Warsaw, Ind., is improving a public park a few miles north of Peru on the banks of Eel River, with a view to increasing its patronage to the park.

STEAM TURBINE FOR DRIVING MODERATE-SPEED MACHINERY

The De Laval Steam Turbine Company, Trenton, N. J., has developed a high-power, single-gear reduction system for driving d.c. generators and for direct connection to other moderate-speed machinery, such as centrifugal pumps and blowers. A typical example is afforded by the unit shown in the accompanying illustration, Fig. 2.

This set consists of a multi-stage turbine driving a 500-kw.

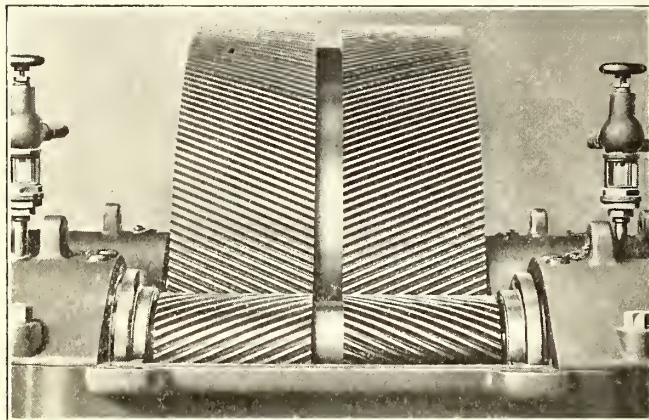


Fig. 1—Gear and Pinion of Multi-Stage Turbine

500 r.p.m., 250-volt, d.c. Crocker-Wheeler inter-pole generator through a pinion and single gear. The speed of the turbine shaft is 3600 r.p.m. Steam is admitted to the turbine first through a strainer case and then through a combined trip and throttle valve, to be seen at the extreme right; next through the adjacent governor valve, and then, after passing through steam nozzles of the standard De Laval type, it impinges upon the blades of the first-stage wheel. Partial admission is used in the first stage, but full admission in later stages. The buckets are non-corrodable and are dovetailed into the rim.

The wheels are mounted upon the shaft by split taper sleeves drawn tightly into place by internal nuts in the wheels. After the wheels are assembled a lock nut on the shaft serves

the periphery of the diaphragm between the first stage and the second stage. These blades are made of "extruded" metal and are fitted onto the cast-iron diaphragm. The diaphragm itself is slightly dished in order to increase its strength to withstand pressure, and to complete it a solid steel band is shrunk over the tips of the guide blades. The steel band is slightly wider than the blades and diaphragm, and as adjacent bands touch each other a complete steel casing is formed which would effectually prevent the possible penetration of parts in case of rupture of the wheels.

The packings surrounding the shaft at the high-pressure and low-pressure ends are more elaborate. The high-pressure packing consists of a long labyrinth, followed by four carbon packing rings. Any steam leaking by the labyrinth packing is piped to one of the intermediate stages of the turbine and utilized, while any steam leaking by the first carbon ring is taken to the exhaust outlet. The packing at the exhaust end of the turbine consists of three carbon rings, steam at reduced pressure being led in between the first and second ring from the outside, which is also done at the high-pressure end. Thus any leakage into the exhaust when vacuum is carried will be of steam, not of air.

The governing mechanism is in duplicate, that is, there is a speed-regulating governor and a speed-limiting or emergency governor. The former is mounted at the top of a vertical shaft driven by a worm gear from the turbine shaft. Through a system of two bell-crank levers and a connecting rod it controls the movement of a vertical double-seated poppet valve similar to that used on standard De Laval turbines. To prevent damage to the valve by overtravel of the governor a spring is inserted in the connecting rod. The same worm which meshes with the worm wheel on the governor shaft meshes with another worm wheel driving the tachometer. The lower end of the governor shaft is connected to an oil pump to supply the bearings and the pinion and gear.

The emergency governor is located in the end of the turbine shaft itself and is ordinarily not in contact with the trip. This trip may also be sprung by hand. The valve spindle may be used as a throttle valve independently of the trip.

The pinion and gear, perhaps the most important and interesting part of the construction, are shown in Fig. 1. The gear is of the double helical or herring-bone type. The pinion is cut from a solid bar of steel and is carried in plain babbitted

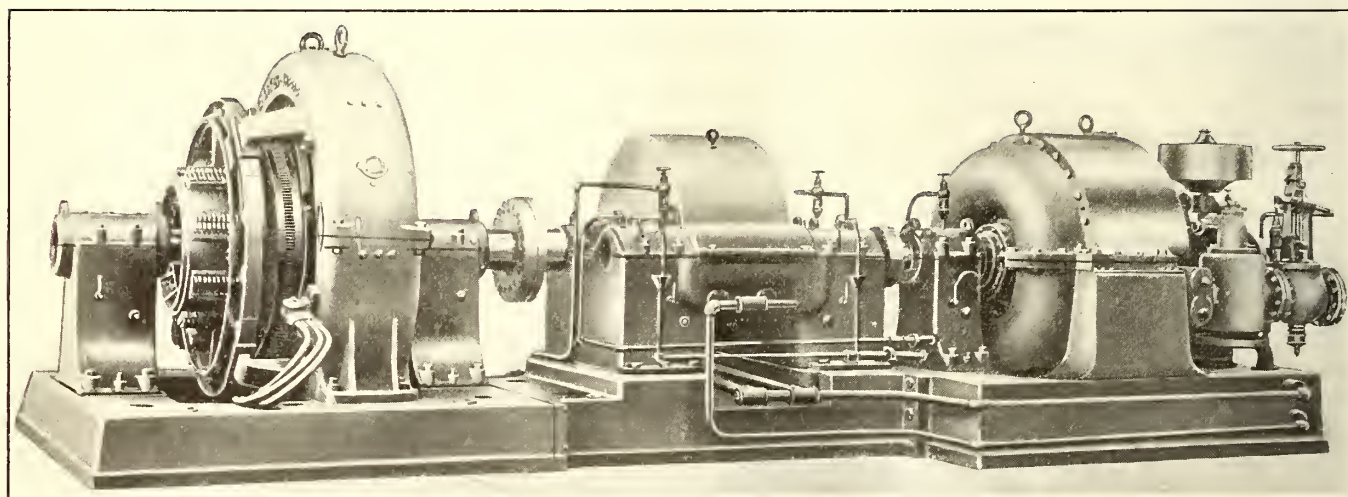


Fig. 2—Multi-Stage, Single-Geared Steam Turbine Driving a 500-kw, 500 R.P.M., D.C. Generator

further to secure them, while rotation of the wheels about the shaft is prevented by a key. The greater blade length required by the increased volume of the steam as it proceeds toward the exhaust is secured both by reducing somewhat the diameters of the wheels and by increasing slightly the bore of the casing.

Upon rebounding from the moving blades the steam again expands by passing between the guide vanes placed all around

bearings supported in a rigid cast-iron frame, which also supports the gear bearings. The pinion bearings are lubricated by sight-feed oilers, the excess oil overflowing to the wells of the gear bearings, which are ring-oiled. The gear consists of a solid cast-iron center upon which two thick steel rings are shrunk. The lubrication of the gear and pinion teeth is accomplished by jets of oil directed at the line of contact on the entering side.

PAY-AS-YOU-ENTER CAR SERVICE IN SAN FRANCISCO

On March 19 the United Railroads of San Francisco began to operate its Sutter-Jackson Street line with 10 new pay-as-you-enter cars. The Cliff House line is now being equipped with the new rolling stock and other lines in the city are to follow. Eighty cars have been ordered for delivery within the next six months. If this type proves a success the company will rebuild its standard closed cars to adapt them for prepayment service. A public inspection of the new cars was given at three prominent parts of the city for two days prior to their entering the service. For several weeks before large notices and handbills to illustrate and explain the pay-as-you-enter system were posted in conspicuous places in the street cars and throughout the city.

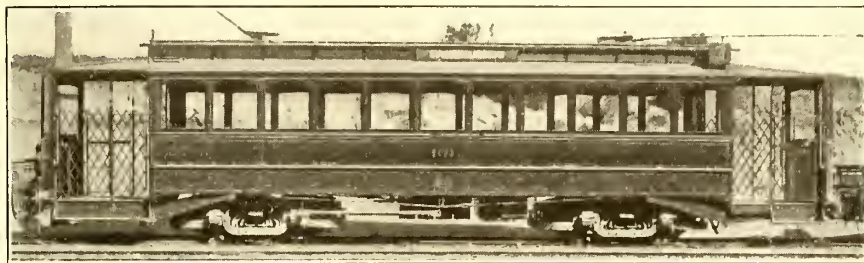
The officials of the railroad state that the pay-as-you-enter idea has thus far proved to be successful and a marked improvement over the old style of car. The only protest of note originating on account of the new cars came from the Carpenters' Union (with which Mayor McCarthy is affiliated) because the United Railroads does not allow large packages on prepayment cars. The carpenters complained that they would have to hire an expressman to move their tool boxes from job to job. Hitherto they have been allowed to transport their tool boxes on the cars to and from work. The matter has been referred to the District Council of Carpenters for action.

A city ordinance compels the company to have on top of each car two square illuminated route number signs to display the number designating the route. The figures can be plainly read in the night at a distance of two or three city blocks. Inside each car is a placard giving the names of the lines which correspond to the various route numbers.

The new car bodies are of wood with a $\frac{3}{8}$ -in. steel plate under the panels and were built by the Jewett Car Company, Newark, Ohio. They are 47 ft. 6 in. over the bumpers and 9 ft. wide. The body doors are of the double sliding type, as illustrated. The longitudinal rattan seating has a capacity for 48 passengers. The power cables are carried in a conduit under these seats. An air suction screen, a GE-M.C. automatic gov-

the conductor's platform only the screen gates are closed. The conductor's dividing rail can be raised from the floor to the roof on two 2-in. steel rods. Cash fares are recorded on Sterling-Meaker registers either by means of a foot-pin in the platform or by a hand-strap overhead, but tickets and transfers can be registered only by means of the handstrap. A push-button signal system is installed.

The electrical equipment was designed especially for the



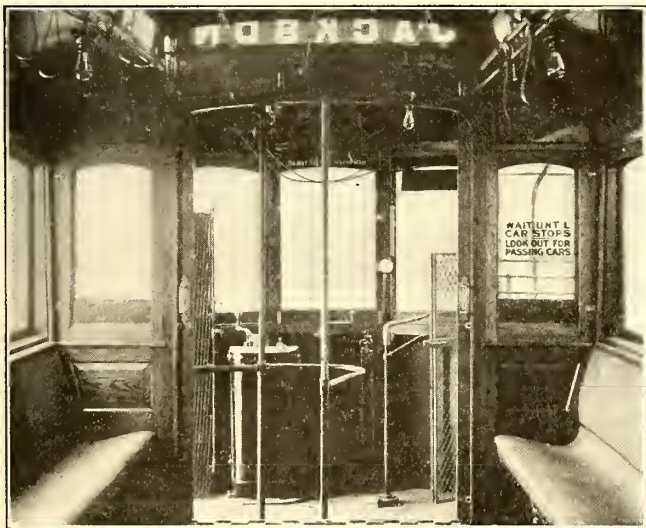
Exterior of San Francisco Pay-as-You-Enter Car

steep hill service of San Francisco as well as for quick acceleration. Four GE-216 50-hp interpole motors are mounted on Standard trucks. The K28-J controller is used on all the new cars. The air-brake equipment consists of a GE-C.P. No. 27 compressor, M.C. governor, G.E. reservoir with safety blow-off valve and National Brake & Electric Company's motor-man's valve and gages. A pressure of 75 lb. is used. The emergency handbrake is of the Peacock type.

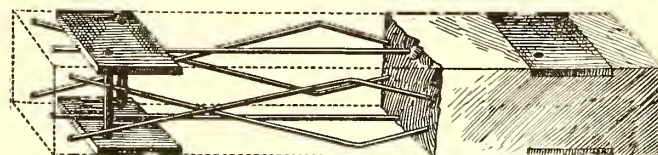
Among the specialties on these cars are ball-bearing trolley bases; Trolley Supply Company's "Ideal" catcher; Crouse-Hinds Company's incandescent headlights; Hedley anti-climbers and Eclipse fenders.

LOS ANGELES REINFORCED CONCRETE TIE

The Los Angeles (Cal.) Railway has recently purchased from the McDonald Spiked Concrete Tie Company, of the same city, the right to use the McDonald reinforced concrete tie. Several hundred feet of track have already been laid with this tie in Los Angeles, and the railway is preparing to reconstruct 5 miles more in the immediate future. This contract was made after a successful three years' test on a heavy-traffic spur of the Santa Fé Railroad. As shown in the accompanying drawing, this tie as built for street railway service comprises six $\frac{1}{4}$ -in. twisted square steel rods (not riveted) having an elastic limit of 55,000 lb. per square inch; four $\frac{3}{4}$ -in. galvanized sleeves or tubes for the track spikes; two $\frac{1}{4}$ -in. iron bed plates, and a concrete mixture, preferably consisting of four parts clean sharp sand and gravel, one part crushed stone and one part Portland cement. The manufacturer suggests that the plates shall have a coating of asphaltum or coal tar after the tie is made and before it is placed in the ground. The spikes should also be treated with similar anti-rust coatings. It is further recommended that the ties should not be used until about eight weeks after manufacture; also that



Platform of San Francisco Pay-as-You-Enter Car



Reinforced Concrete Tie

ernor and air-operated sanders are also carried under the seats. The motorman's vestibule curtain rolls up; when it is down two end cords with small catches are clasped to fasteners set in the platform floor. The gates on both sides of the motorman's platform are kept closed. The left-hand gate is of the folding type, but the right-hand or front exit gate is a two-section screen, the forward section of which opens on hinges when it is manipulated through a lever by the motorman. On

they should be wetted twice a day for the first week, once a day for the second week, three times a week for the next three weeks, but not at all for the last three weeks.

Some experimental ties, 7 ft. x 8 in. x 6 in., were made in Los Angeles for \$1.18 each, but probably this cost could be lowered under favorable conditions. In any event, the fact that these ties are laid 4-ft. centers makes the actual cost per mile approach that of the cheaper untreated wooden ties.

News of Electric Railways

Program of Annual Convention of Arkansas Association of Public Utility Operators

The following program has been arranged for the annual meeting of the Arkansas Association of Public Utility Operators, which is to be held at Little Rock on May 3, 4 and 5, 1911:

MAY 3—10.00 A. M.

Registration of delegates and visitors. 2.00 p. m., Paper, "Effect of Natural Gas Upon Municipalities," by W. L. Wood, vice-president and general manager of the Texarkana Gas, Railway & Electric Lighting Company, Texarkana, Ark.

Paper, "Rate Question Applied to Electric Light & Power Companies," by J. M. Hewitt, president and general manager of the Marianna Electric Light & Power Company, Marianna, Ark.

Paper, "Water," by W. C. McGuire, general manager of the Wilson Water & Electric Light Company, Arkadelphia, Ark.

Discussion.

Automobile ride for the ladies to places of interest.

Theater party at Majestic Theater.

MAY 4—10.00 A. M.

Paper, "New Business of Light and Power Companies," by Minor Woodward.

Paper, "The Railroad Bed Construction for Electric Railways," by D. A. Hegarty, vice-president and general manager of the Little Rock Railway & Electric Company, Little Rock, Ark.

Paper, "Relation Between Contractors and Central Station Operators," by F. C. Bragg, president of the Electric Construction Company, Little Rock, Ark.

Paper, "Municipal Plants of Arkansas," by W. H. Wal-kup, manager of the Municipal Electric Light Plant, Searcy, Ark.

Discussion.

2.00 P. M.

Paper, "General Accounting Public Utility Corporations," by W. J. Tharp, auditor of the Little Rock Railway & Electric Company, Little Rock, Ark.

Paper, "Opinions of Various Cases in Various States Affecting Public Utility Corporations," by L. E. Sawyer, general attorney of the Hot Springs Water, Light & Railroad Company, Hot Springs, Ark.

Discussion.

Visit to power house and shops of the Little Rock Railway & Electric Company.

Trolley ride to Forest Park by courtesy of the Little Rock Railway & Electric Company.

Informal banquet given by Class "B" members of the association.

MAY 5—A. M.

Executive session.

Election of officers and selection of place for next annual convention.

Program of Annual Meeting of Pacific Claim Agents' Association

The annual meeting of the Pacific Claim Agents' Association will be held in Seattle, Wash., on May 21 and 22, 1911. The following program of papers has been prepared for presentation at the annual meeting of the association:

"How Can the Public Be Best Educated in the Prevention of Accidents?" by George Carson, claim agent for the Seattle (Wash.) Electric Company.

"Should a Statement Be Taken from the Injured Party, and When?" by T. G. Newman, attorney for the Whatcom County Railway & Light Company, Bellingham, Wash.

"What Position Should the Pacific Claim Agents' Association Take Regarding the Hooper-Holmes Information Bureau, and What Sort of an Information Bureau Can Be

Established on the Pacific Coast?" by E. H. Odell, claim agent for the Tacoma Railway & Power Company, Tacoma, Wash.

"The Best Method to Employ in Dealing with Grafters in Connection with Claims for Damages," by S. A. Bishop, claim agent of the Pacific Electric Company, Los Angeles, Cal.

"The Organization of the Medical Department of a Large Street Railway," by T. A. Cole, claim agent of the Los Angeles (Cal.) Railway.

"Is It Advisable to Hold Out the Amount of the Physician's Bill in a Settlement with the Claimant and Pay the Physician Direct?" by J. H. Handlon, claim agent of the United Railways of San Francisco.

"What Is the Best Method to Be Adopted by the Association to Enlist as Members More of the Steam Roads?" by A. M. Lee, district claim agent of the Northern Pacific Railroad, Seattle, Wash.

"How Can We Best Diminish the Boarding and Alighting Accidents?" by J. N. Hone, claim agent of the Spokane & Inland Empire Railroad, Spokane, Wash.

Next Meeting of Central Electric Railway Association

At the suggestion of A. L. Neereamer, secretary of the Central Electric Railway Association, announcement is made that the next regular meeting of the association will be held on June 22, 1911, a month later than is customary. At the June meeting, which will be held at St. Joseph, Mich., it is planned to have an especially entertaining and profitable program. As many railway men as possible are requested to attend the meeting in special cars.

Program of Meeting of Missouri Electric, Gas, Street Railway & Water Works Association

The following program has been announced for the fifth annual convention of the Missouri Electric, Gas, Street Railway & Water Works Association, which is to be held at the Jefferson Hotel, St. Louis, Mo., on April 13, 14 and 15, 1911:

APRIL 13—MORNING SESSION.

Convention called to order.

Address of welcome.

Response—R. J. Irvine, president.

Reading of minutes of last meeting.

Election of new members.

AFTERNOON SESSION.

Paper, "Centrifugal Pumps," by W. H. Reeves.

Paper, "Lubrication," by Prof. H. B. Shaw.

EVENING.

Banquet at Jefferson Hotel.

Theater for ladies.

APRIL 14—MORNING SESSION.

Paper, "The Illuminating Engineer."

Paper, "The Electric Vehicle," by Herman Spoehrer.

Paper, "Ornamental Street Lighting," by N. J. Cunningham.

AFTERNOON SESSION.

Paper, "Coal and Water Gas," by P. A. Bertrand.

Paper, "District Steam Heating," by Hal. C. Kimbrough.

Automobile ride for ladies—from Jefferson Hotel.

EVENING.

Sons of Jove Rejuvenation at Union Electric Light Power Company's office.

APRIL 15—MORNING SESSION.

Executive session.

Inspection of Ashley Street plant and other property.

Lunch at Ashley Street plant.

EVENING.

Theater party, to meet at the Jefferson Hotel.

Spring Meeting of the A. S. M. E.

The spring meeting of the American Society of Mechanical Engineers will be held at Pittsburgh, Pa., May 30 to June 2, 1911. The headquarters of the society during the meeting will be at the Hotel Schenley, but the professional sessions will be held at the Carnegie Institute, which is close to the hotel. The first session for the presentation of papers will be on the morning of May 31. The subject will be "The Mechanical Engineering of Cement Manufacture." After the presentation of the paper those in attendance will have an opportunity to visit the plant of the Universal Portland Cement Company. The special train to this plant will stop at East Pittsburgh to permit members to visit the Westinghouse works. On the evening of May 31 there will be a session on machine shop practice at which the subject of assembling small machine parts and the development of milling cutters will be discussed.

On the morning of June 1 there will be a short session with miscellaneous papers, after which an excursion on the river is planned. On the evening of June 1 there will be a reception and dance. On the morning of June 2 papers will be presented which relate to steel works machinery with special reference to blowing engines and forging presses. The convention will close on the afternoon of June 2 with excursions. A session is also planned for the gas power section. The manufacturers of Pittsburgh have extended invitations to their works, and E. M. Herr, chairman, and E. K. Hiles, secretary of the local committee, have under way an extensive program for entertainment. Previous to this meeting the American Foundrymen's Association is to convene in Pittsburgh and an exhibit of foundry appliances, under the auspices of the association, will be held. The International Art Exhibit at the Carnegie Institute at Pittsburgh will be open at the time of the meeting of the American Society.

Franchise Negotiations Begun in Toledo

Actual negotiations between the City of Toledo, Ohio, and the Toledo Railways & Light Company for a new grant in that city were begun on the evening of April 6, 1911. Mayor Brand Whitlock represents the city and President Albion E. Lang represents the company. A meeting was held on the evening of April 4, 1911, but owing to a misunderstanding in regard to the proposed basis of negotiations the company substituted a communication for personal representation. The only thing done at that meeting was to draft a reply to this letter.

Mayor Whitlock consented to consider the question of fare last, as the company insisted that it would regard any negotiations as useless with the rate of fare fixed in the beginning. Both sides agreed to accept the Schreiber ordinance as a basis for the negotiations. The terms of the agreement as fixed by the representatives of the city and the company are to be submitted to the voters of the city for acceptance.

At the meeting on April 6 Mayor Whitlock said among other things: "We meet to negotiate the transportation problems of the city. We approach the subject with the desire to do justice to the city and no injustice to the company. The task will be tedious and laborious, and yet in a way simple. We hope to continue the work until the problem is settled."

Replying to the Mayor, President Long said in part: "We ought to be able to come to a speedy conclusion. We are here as business men to talk to business men. I see no objection to the use of all the information we have. We are not here to drive a sharp bargain. This community should get better advantages from the contract than was possible 25 years ago, because the capital invested then ran the risk of changes which could not be foreseen. To-day the future of American cities is assured. The change from the horse car to the electric car was greater than will be made in land transportation in the future. There always will be chances for economy. The situation is one to be worked out for the greater advantages of Toledo and of the company. We have passed the day of competition in street railways and are ready to conform to the program of the Council. We will meet every day and all day or every

night and all night, as desired. We are anxious to have this pushed forward as rapidly as possible."

The first question considered on the morning of April 7 was the term of the franchise. The Schreiber draft placed it at 12 years. President Lang believed that the necessities of financing demanded a grant for 25 years. Mayor Whitlock stated that 12 years was too short and suggested 20 years. Mr. Lang said that about three years would be required to rehabilitate the system and that the longer the term of the grant the cheaper money could be secured for the needs of the company. He believed that the people preferred good service, even though the fare might not be so low as could be given with indifferent service. The Mayor agreed with him in this. The question of length of term will be taken up again.

The company agreed to surrender all existing franchises on the receipt of a new grant properly phrased by the attorneys. Mr. Lang objected to the provision that in case of doubt the ordinance should be construed liberally in favor of the city. This was left for future consideration. The parties to the negotiations concurred in the suggestion that in the case of certain parallel tracks one of them should be abandoned. The attorneys are to arrange a section of the grant to forestall suits by citizens to prevent such abandonment. Mr. Lang said that the part of the Huron Street line on Chase Street ought to be abandoned and that grade crossings should be eliminated as soon as possible.

Attorney Fuller stated that the section in the tentative grant giving the city power to regulate the laying of tracks and specifying the kind of rails to be used was too broad and that future councils might be disposed to take advantage of it to the detriment of the company. The company also objected to the city specifying fenders and other safety devices. The company felt that it should have a certain amount of freedom in the adoption of the best and most economical devices.

Mr. Lang objected to the section of the tentative draft which gives the city the right to grant joint use of tracks to other companies. He said that such a provision was fatal and that an agreement could not be reached so long as this remained. Mr. Schreiber thought that the city should have the right to grant the use of half the tracks to another company, although the State law permits a new company to use only one-eighth of the trackage of an operating company. Mr. Lang replied that the tendency is to develop a single system with uniform fares. The question was passed for future consideration. The section of the draft relating to consolidations was amended so as to give the city supervisory powers only over operation, although it will prevent an increase of fares through such a step.

It was understood from the resolution adopted by the City Council on the evening of March 31, 1911, that the administration intended to begin the negotiations with the fare at 3 cents and representatives of the company were not present at the meeting of the Council committee of the whole on the evening of April 4. On this account Mr. Lang dispatched a communication in which it was stated that negotiations were out of the question if the rate of fare was retained at 3 cents as fixed in the Schreiber draft, but that the company was willing to proceed along the lines laid down in the letter written by Mayor Whitlock on Dec. 15, 1910, in which it was stated that the discussion of fare would be left to the last. This letter from the company under date of Dec. 15, 1910, was published practically in full in the *ELECTRIC RAILWAY JOURNAL* of Dec. 31, 1910, page 1287, and was subsequently approved by the City Council. After reciting the correspondence between the company and the city which passed under date of Dec. 15, 1910, Dec. 24, 1910, and Dec. 29, 1910, Mr. Lang concluded his letter of April 4, 1911, as follows:

"It would be absolutely futile for this company to enter upon a discussion of any ordinance fixing a 3-cent fare. To do this would simply be to mislead the people of Toledo as to our position. Under a proper system of universal transfers we cannot carry passengers for 3 cents, and if we correctly interpret the reports of your accountants these reports themselves demonstrate that fact. Three-cent fares have not been successful in any American city and cannot be made so in Toledo. We do not think it wise or proper to reduce the wages of our men or impair our service in a vain attempt to carry passengers with universal transfers

for 3 cents, as is proposed in the tentative ordinance submitted to Council. We are ready, however, to take up the subject along the lines laid down in the above-mentioned correspondence."

After some discussion the committee formulated and sent to the company the following reply, which resulted in the beginning of negotiations on April 6, 1911:

"The committee of the whole of Council has received your letter of April 4, 1911, in which the Toledo Railways & Light Company renews its acceptance of the proposals contained in the administration's letter of Dec. 15, 1910, and states its readiness to take up the subject along the lines laid down in that letter. The letter of Dec. 15, 1910, referred to reiterated the administration's views as to the practicability of 3-cent fares and proposed a line of negotiations in which the whole question would be publicly discussed between negotiators for the company and the city, leaving until the end the question of valuations and of fare. The resolution adopted in the committee of the whole Council on March 31, 1911, informed your company that the city was prepared with memoranda for its negotiations and again repeated the administration's willingness to take up negotiations along the lines laid down in letter of Dec. 15, 1910.

"Your company's letter of to-day raises certain questions as to the contents of those memoranda. We know of no reason why these objections could not be considered in the negotiations as proposed by the city and twice acquiesced in your company.

"The committee repeats that it is ready to proceed with negotiations along the lines laid down in letter of Dec. 15, 1910, and will meet at the Council chamber on the evening of April 6, 1911, at 7:30 o'clock, and the negotiator for the city will be ready at that time to meet the negotiator for your company. If your company is not then represented the committee will take such other action in the premises as it may deem advisable."

Details of Philadelphia Rehabilitation Program to Be Made Public

A hearing was held before the finance committee of the City Councils of Philadelphia on April 5, 1911, at which the question of the use of the proceeds of the \$10,000,000 loan proposed by the Philadelphia Rapid Transit Company was considered. E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa.; T. E. Mitten, president of the Chicago City Railway; Charles O. Kruger, president of the Philadelphia Rapid Transit Company, and other officers of the company attended. Mr. Mitten presented the following statement, which shows that it is proposed to spend \$11,000,000 before June 30, 1916:

"After providing for the refunding of present outstanding capital obligations of about \$1,600,000 maturing during the next five years, there will remain from the proceeds of the proposed \$10,000,000 bond issue approximately \$8,000,000 of new money available for the company's requirements.

"It is estimated that work to be completed during the 5-year period ending June 30, 1916, will be as follows:

"Thirteen hundred cars of the most modern type. \$6,500,000
 "One hundred and fifty miles of heavy standard track to be required to replace worn-out tracks 4,500,000

"Total cost.....\$11,000,000

"Approximately one-half of this amount, say \$5,500,000, represents the additional cost of new cars and track over that which is to be replaced, and, therefore, is a proper charge to capital account.

"The remaining \$5,500,000 should be charged against current earnings through the renewal account, the company thereby maintaining the physical integrity of the property out of earnings, as it should.

"After deduction of \$5,500,000 for capital expenditures, as above, there should remain about \$2,500,000 available for other improvements, including additional power requirements and extensions."

The members of the committee were of the opinion that a statement should be submitted showing more in detail the work which it is intended to do, and Mr. Stotesbury agreed to submit such a statement. This he did on Monday, April 11.

At the meeting on April 5 Mr. Stotesbury said:

"The whole thing is this: I was asked to go into the board, and I consider it a public duty I owe the company, now that I have accepted the tender, to help the situation. The company has to get the money. The Philadelphia Rapid Transit Company is incurring the obligation; the city will not have to put up a cent. With Councils' consent to the loan the property will be taken care of. I feel sure that it can be rehabilitated.

"Heretofore the property has not been taken care of as it should have been. There has been set aside only 12 per cent for making adequate provisions to take care of the increasing business; this should be increased to 15 per cent. The company needs power, but it has not the money to get it.

"If this money is not put up the company will drift and things will become worse. I do not wish to cast any discredit on the securities. I desire to see them increase in value. The company has no credit to enable it to borrow; the Union Traction Company guarantees the proposed loan. If the money is not forthcoming I do not know what the management will do.

"Both the Philadelphia Rapid Transit Company and the Union Traction Company have voted to float the loan. A voting trust has been established for five years. If Councils are willing to give their consent I will get the best people I can to run the property. As I see it now there should result a change for the better."

The directors of the Philadelphia Rapid Transit Company have decided that the request of the committee of five employees of the company for an increase in wages to 28 cents an hour cannot be granted at this time.

The Proposed Changes in the Cleveland Ordinance

Samuel E. Kramer, the new chairman of the street railway committee of the City Council of Cleveland, introduced an ordinance in the City Council on the evening of April 3, 1911, which embodies a number of the changes in the Tayler grant which were discussed by the special committee of the Chamber of Commerce. It was prepared by Street Railway Commissioner Dahl and is said to be merely a tentative draft upon which to base the amendments that are necessary to the success of the grant. Under the ordinance the company may at once sell bonds to secure funds for betterments and extensions. The stockholders will be protected by a change in the basis upon which the city may acquire the property at the end of the franchise period, the stock value being substituted for an appraised value. The city is given the right of initiative in extensions and betterments and may take a more important part in arbitration of disputes between the company and employees by appointing the company's members of the board of arbitration. No change has been made in the rate of fare.

Members of the committee of the Chamber of Commerce which has been considering proposed changes in the franchise were surprised when Street Railway Commissioner Dahl introduced in the City Council on the evening of April 3, 1911, an ordinance amending the grant. Mr. Dahl informed Chairman Frederick H. Goff that he wished to present a tentative draft to form a basis upon which the Council could work when the recommendations of the special committee were received. For a time it appeared as if the special committee and the Chamber of Commerce would drop the matter entirely, but it is probable now that they will make their report within a short time. The Dahl amendment would authorize the city to purchase the property at the expiration of the franchise at the value indicated by the capital stock, instead of at an appraised value plus 10 per cent. This, it is believed, would take care of the franchise value, which was not provided for in the original grant, and keep the value of the stock at par, so that stockholders would not suffer any loss if the city should decide to purchase the property or name a purchaser. It would also enable the company, it was argued, to secure funds for improvements through the sale of stocks or bonds. The maximum rate of fare was retained under the proposed changes and the right of the city to purchase at any time at the capital value plus 10 per cent was left undisturbed.

Prof. Edward W. Bemis appeared before the special committee of the Chamber of Commerce in a private conference on April 7. He stated that a surplus of \$10,000,000 would accumulate in the 15 years of operation under the Tayler plan. He based his conclusions upon a 4 per cent increase in the population compounded yearly and an 8 per cent compounded traffic increase. Secretary Davies of the company made the amount one-fourth as much. Warren Bicknell and A. B. DuPont will be consulted before the report of the committee is made.

Judge Estep of the Common Pleas Court has declared legal the franchises granted the Cleveland Underground Rapid Transit Company. The court held that the underground rights are not subject to the statutes governing street railways, but come under the head of those governing steam railroads. In regard to the allegation that a passenger terminal under the Public Square would invalidate the city deed to the property the Court ruled that an underground improvement of this kind would not violate any of the limitations imposed by the donor of this property. Attorneys for George B. Harris, who brought the suit, state that the case will be appealed.

The Kansas Utility Law

The Governor of Kansas has signed the bill to create a public utilities commission to succeed the Railroad Commission of Kansas, the passage of which by the Legislature was mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911. The official title of the new body is the "Public Utilities Commission for the State of Kansas." It is given authority to supervise and control all the public utilities and common carriers in Kansas, including street railways, suburban railways and interurban railways, and all the powers of the Railroad Commission of Kansas are vested with the new commission.

The officers of the Railroad Commission are to retain their respective offices for the terms for which they were elected. Thereafter the public utilities commission is to be composed of three commissioners to be appointed by the Governor with the consent of the Senate. One of the members of the commission is to be a business man and another is to be experienced in the management and operation of a common carrier or public utility. The first appointees to the public utilities commission are to serve one year, two years and three years, respectively. Upon the expiration of their terms commissioners are to be appointed for three years. After the expiration of the term of the present members each member of the commission is to draw a salary of \$4,000 a year. Not more than two members of the commission are to be of the same political party. There is to be a secretary to the commission, to receive the same salary as the secretary of the present Railroad Commission. The attorney of the Railroad Commission is hereafter to be the attorney for the Public Utilities Commission, and is to receive a salary of \$2,500 a year. Neither the commissioners nor the appointed officers of the commission are to be interested financially in any railroad or other common carrier or public utility. An expert rate clerk is to be employed at the salary of not more than \$5,000 a year.

The commission is empowered to require any corporation under its jurisdiction to establish and maintain joint rates. All corporations under the jurisdiction of the commission are to file with the commission copies of all schedules of rates, joint rates, tolls, fares, charges affecting traffic, and to furnish the commission with copies of all rules, regulations, etc. The commission is empowered to prescribe reasonable rules and regulations in regard to the printing and filing of all schedules, tariffs and classifications of all rates. The commission is empowered to investigate all rates and charges, and to order substituted therefore such rate or rates, fares, tolls, charges, etc., as shall be just and reasonable. All orders and decisions of the commission are to become effective 30 days after service. Public utilities are not to put any changes into effect without the consent of the commission, and not until 30 days after the proposed changes have been authorized by the commissioners. Any corporation which takes exception to any ruling by the commission is to commence action in court against the commission within 30 days from the time the order by

the commission is made. Appeal may be taken to the Supreme Court of the State. Detailed reports of the financial condition of the companies under the jurisdiction of the commission are to be furnished to the commission in such form and at such times as the commission shall require. On Sept. 15, 1912, and on Sept. 15 of each year thereafter the companies are to transmit to the commission a statement giving in detail affairs of the company for the period ended on June 30 preceding. All issues of stocks and bonds are subject to the approval of the commission. Reports of all accidents are to be telegraphed to the commission and the commission is empowered to inquire into all accidents. The law takes effect on its publication in the statute book.

Extensions in Detroit

At its regular meeting on the evening of April 4, 1911, the Common Council of Detroit, Mich., adopted a resolution granting the Detroit United Railway the right to make the extension agreed upon by Mayor Thompson, Corporation Counsel Hally and President Hutchins of the company some days previously, as mentioned in the issue of the *ELECTRIC RAILWAY JOURNAL* of April 8, 1911, page 645. The resolution gives the company the right to build extensions on Hamilton Boulevard, Mack Avenue and Chene Street and to construct the proposed Brush Street loop. One member of Council objected to the company being given the right to charge a fare of five cents on certain cars that will traverse a portion of the Beaubien Street route. The company has been requested to build a north and south line on Junction Avenue.

The 20 large open cars reconverted into cars of the pay-as-you-enter type were put in operation on the Jefferson Avenue line on April 9, 1911. The longitudinal seats have been retained in the reconverted cars, but the new cars which have been ordered will be fitted with cross seats. They will also have folding steps. The car crews will be instructed not to open the doors until the cars are stopped. Conductors will be furnished with hand fare boxes to take the fares of passengers who ride beyond the city limits. The regular city fares will be deposited in the fare box as the passengers enter.

The Detroit Federation of Labor has sent a letter of protest to the Common Council against allowing the cars of the Michigan United Railway into the city over the tracks of the Detroit United Railway. Labor interests insist that the company should enter into proper agreements with the City Council before its cars are allowed to come into the city.

Fiftieth Anniversary of the Massachusetts Institute of Technology

The fiftieth anniversary of the establishment in 1861 of the Massachusetts Institute of Technology at Boston, Mass., was celebrated April 10-11, 1911, in that city. The principal functions consisted of the reading of papers by prominent alumni and professors of the institute and meetings of the alumni and guests on the evenings of April 10 and April 11. The papers read were divided into six sections, as follows: (1) "Recent Industrial Developments," Professor Dugald C. Jackson presiding; (2) "Technological Education in Relation to Industrial Development," Professor Arthur A. Noyes presiding; (3) "Scientific Administration and Management," Dr. Davis R. Dewey presiding; (4) "Scientific Investigation and Control of Industrial Processes and Materials," Professor William H. Walker presiding; (5) "Municipal and Industrial Sanitation," Professor William T. Sedgwick presiding, and (6) "Architecture," Professor F. W. Chandler presiding. The presentation of these papers was preceded on April 10 by a general meeting at which President MacLaurin gave an address on "Some Factors of the Institute's Success." The banquet on April 11 was held at Symphony Hall and the dinner arrangements were in charge of Charles C. Peirce, of the class of '86.

At the banquet Tuesday evening President MacLaurin said that three sites within easy distance of the present location had been offered for the new buildings of the Institute and several further away. Lieutenant-Governor Frothingham spoke of the benefit which the Institute had been to the

State and said that he and the Mayor of Boston had agreed, if the Governor was in doubt in regard to signing the proposed grant, to advise him correctly on the subject. Mayor Fitzgerald expressed the hope, on behalf of the city of Boston, that there would be no penurious policy on the part of the State or failure of private wealth to rally to its support. President Coffin of the General Electric Company acknowledged the debt which the electrical industry owed to the graduates of Technology and of similar institutions. President Lowell, of Harvard, referred to the high standards of education which had always been maintained by the Institute. George S. Smith, president of the Boston Chamber of Commerce, spoke of the intimate relations between the Institute and the business world. Charles W. Eliot, ex-president of Harvard, referred to the force of imagination and inspiration in scientific work. Professor Wm. T. Sedgewick, the final speaker, sketched the changes which had been made in technical education since the establishment of the Institute.

Plans for Underground Railway in Toronto Authorized.—The City Council of Toronto has adopted the proposal of Controller Hocken to have the city engineer prepare plans and specifications at a cost not to exceed \$5,000 for an underground railway under Yonge Street, from the Union Station to St. Clair Avenue.

Another Columbus Dynamiter Sentenced.—Alfred N. Strader, convicted of unlawfully having dynamite in his possession and of having dynamited the South End car house of the Columbus Railway & Light Company, Columbus, Ohio, during the strike last summer, was sentenced to serve 10 years in the penitentiary on April 4, 1911.

Overhead Feed Wires Ordered Removed in Downtown Indianapolis.—The Board of Public Works of Indianapolis, Ind., has ordered the Indianapolis Traction & Terminal Company to remove all its overhead feed wires within a radius of one-half mile of a fixed point in the central part of the city and place them underground.

New Haven to Electrify Another Branch.—In connection with the plan which Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, has proposed for solving the railroad and river front problem at Springfield, Mass., he has announced that the company intends to equip the Tariffville branch of the Hartford & Connecticut Western Railroad between Springfield and Tariffville, Conn., with electricity.

Report Authorized on Boylston Street-Riverbank Subway.—Governor Eugene N. Foss, of Massachusetts, has signed a resolve directing the Railroad Commission and the Boston Transit Commission to report to the present Legislature as to the relative merits of the proposed Boylston Street subway and the proposed Riverbank subway and to report estimate of cost of construction of the Boylston Street route if that is decided on as preferable to the Riverbank route.

Meeting of Association of Railway Electrical Engineers.—The semi-annual convention of the Association of Railway Electrical Engineers will be held on June 16 and 17, 1911, in the Washington Terminal Station, Washington, D. C., and the annual convention of the association will be held in Washington, D. C., on Nov. 6, 7, 8, 9 and 10, 1911. The nineteenth floor of the La Salle Hotel, Chicago, Ill., has been reserved for the meeting on June 16 and 17 and for the exhibits by members of the Railway Electrical Supply Manufacturers' Association.

Electric Power Association Elects Officers.—At the recent regular monthly meeting of the Electric Power Association, composed of officers and employees of the New York Central & Hudson River Railroad, held at the Railroad Men's Y. M. C. A. in New York, R. Morris gave an instructive talk on the application of the three fundamental electrical units to every-day work. The association organized as follows: H. C. Tucker, president; S. H. Grauden and C. G. Cunningham, vice-presidents; G. M. Knickerbocker, secretary, and J. P. Roberts, treasurer.

Electric Railway in Canal Zone.—On Oct. 29, 1906, Henry T. Cook obtained from the municipality of Panama a 50-year franchise to operate an electric railway at Panama and applied to the Isthmian Canal Commission for a franchise to construct an electric railway on the Balboa and

Sabanas roads. The franchise from the city was contested in the courts of Panama, and a decision was rendered favorable to the grantee. A corporation, known as the Panama Public Utilities Corporation, was organized under the laws of Connecticut on July 18, 1910, with a capital of \$500,000, and bonds will be issued to the amount of \$300,000 to obtain money to construct the railway. The rights of Mr. Cook will be assigned to this corporation. The license under which the railway will operate in the Canal Zone was granted to Mr. Cook by President Taft of the United States, under date of Dec. 16, 1910. It provides for the construction, maintenance and operation of a tramway system for the transportation of passengers for profit between the City of Panama, in Panama, and Balboa, the Sabanas, the Hotel Tivoli and Ancon Hospital grounds in the Canal Zone, along routes to be approved by the chairman and chief engineer of the Isthmian Canal Commission.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

IOWA

The Iowa House has passed the Crist bill for a public utilities commission. The bill provides for a commission of five men, of whom the three railroad commissioners shall serve until their present terms expire. They are to have supervision over common carriers within the State, street railways, electric light properties, gas works and water-power sites.

MAINE

The Maine Legislature adjourned sine die on March 31, 1911. The public utilities bill failed to pass. Charters were denied to the Kennebec Dam & Reservoir Company and the Dead River Power & Railway Company. A bill for a State income tax was defeated, but the proposed national constitutional amendment to legalize an income tax was approved. Other measures which were defeated include bills to authorize municipalities to seize by eminent domain any power site or water power needed for municipal purposes, the act to forbid foreign corporations to generate electricity by water power, the act to tax railroads on a valuation basis. New laws which are likely to affect electric railways follow: To allow notice to be given to casualty companies within a "reasonable time" and make void contracts specifying a definite time limit; to allow railroads to furnish free transportation to firemen and policemen; to allow electric railways to be located outside the public ways when the convenience of the public makes it desirable, repealing the present law which allows such location only when location in the public way is not feasible; repeal of general law of eminent domain for railroad locations; to authorize municipal officers, upon petition and after hearing, to order change of location of street railway to another part of the same street, with right of appeal to the railroad commission by either petitioners or railway; to require accidents in shops to be reported to the State Labor Department and authorize the department to investigate accidents; to allow Supreme Court to appoint directors of a corporation in cases of failure of election at the stockholders' annual meeting; to require the retirement first of unissued stock in cases of reduction of stock by corporations; to require notice by mail, unless address is unknown, in cases of sales of corporation stock on execution; to make it a misdemeanor to neglect to pay passenger fare to a common carrier "whether said fare is demanded or not"; a more drastic fire escape law so drawn that electric railway pleasure parks will come within its provisions; to allow physical examination of a railroad to be made by one member of the railroad commission; to require weekly payment of wages; to require street railways to file profiles accompanying location maps; to permit the seizure of property of corporations which are delinquent in paying franchise taxes.

All the electric railway charter bills were enacted except one previously mentioned. The Aroostook Valley Railroad was authorized to acquire and electrify the Presque Isle branch of the Canadian Pacific Railway and to extend its lines from Washburn through Woodland to New Sweden, from Woodland to Caribou and from Washburn westerly to the border of L'Islet County, P. Q., thus affording a short route across northern Maine from Quebec to St. John, N. B. Another act confirms the bond issue by the town of

Presque Isle in aid of the Aroostook Valley. Two-year charters or charter extensions were granted to Bridgton Street Railway, Jonesport Central Railroad, Fairfield & Skowhegan Railroad, Mount Desert Transit Company, Winter Harbor & Easter Railway, Knox County Central Railroad to run from Friendship via Union to Belfast, Scarborough & Cape Elizabeth Railway, Waldo Street Railway, Rumford Falls & Bethel Street Railway, Eastport Street Railway, Hancock County Railway, Lincoln County Street Railway. An alternative act was passed to revive the charter of the Waterville & Winslow Bridge Company to build a bridge by which the Wiscasset, Waterville & Farmington Railroad may enter the city of Waterville. The charter rights of the Atlantic Shore Line Railway were confirmed to the Atlantic Shore Railway, which bought the former at receivers' sale. Propositions to make electric railway securities a legal investment for Maine savings banks in certain instances were refused, but the Governor was directed to appoint a commission to investigate the question of investments for savings banks. The County Commissioners of York County were authorized to co-operate with similar officers from New Hampshire in seizing by eminent domain the toll bridges between Kittery, Me., and Portsmouth, N. H., and between South Berwick, Me., and Dover, N. H., and freeing the same. The South Berwick & Dover bridge is used by the Atlantic Shore Railway. The Kittery and Portsmouth bridge is owned indirectly by the Boston & Maine Railroad, which uses a portion for the railroad, and the electric cars of the Atlantic Shore Railway are not permitted to use it as desired. An alternative bill grants rights for Kittery and Portsmouth to erect a public bridge which, if done, might enable the Atlantic Shore Railway to enter Portsmouth with its cars and abandon the ferry now in use. New charters were granted to Belfast & Augusta Electric Railway and Farmington & Augusta Electric Railroad.

MASSACHUSETTS

A contest developed in the House recently over the acceptance of the adverse report of the committee on street railways upon the Henebery bill to permit cities or towns to grant 20-year franchises to street railways in connection with the transportation of freight, baggage and express matter. Under the present law the electric railway express franchises are granted for an unlimited period. For about two years interests identified with the Worcester city government have sought legislation in favor of limited franchises, but without success. In the House the question came up on a vote upon the committee report. Representative Washburn, of Worcester, chairman of the committee on railroads, contended that the bill would reverse the policy of the State. He said that the unlimited franchise was satisfactory. The House voted to substitute the bill, which includes a provision whereby a company may appeal to the Railroad Commission in case a municipality lying between two others which have granted franchises refuses to take favorable action upon the company's petition for the right to carry freight. If the bill should pass it would deprive the Railroad Commission of its power to grant such franchises in case of ordinary appeals from the adverse action of municipal authorities.

The committee on street railways has reported favorably on House Bill No. 521, accompanying the petition of the Massachusetts Street Railway Association for legislation relative to pole and wire locations of street railways. The bill provides that a street railway may generate and transmit electricity in any city or town in which it may be entitled to operate, and for that purpose may erect and maintain poles and other devices with the permission of the aldermen or selectmen. The committee on metropolitan affairs has reported a resolve in favor of an estimate by the Boston Transit Commission of the cost of removing the elevated railway between the North Station, Boston, and Sullivan Square, and substituting a subway. Wide-spread interest was aroused last week at a hearing before the joint committee on railroads and metropolitan affairs upon the report of the joint commission on metropolitan improvements upon the advisability of legislation to require the steam railroads at Boston to electrify their lines within the metropolitan district. George G. Crocker, chairman of the Boston Transit Commission, spoke for the minority of the joint commission, which favors electrification.

Mr. Crocker contended that if all the factors were considered electricity would doubtless prove advantageous. The stimulation of traffic by electricity would do much to pay the fixed charges of its installation.

MISSOURI

The session of the Legislature of Missouri which has just ended was remarkable for the amount of time devoted to partisan schemes and investigations. None of the recommendations of the Governor was carried out, and none of the measures introduced at his suggestion and bearing his approval got out of committee with a favorable report. In this way the bill to create a public utilities commission was lost. The Phelps anti-discrimination bill, a measure compelling railroads to schedule reconsignment charges; a measure regulating the construction of cabooses, one to give the Railroad and Warehouse Commission power to fix passenger rates within the maximum fixed by the law, and others affecting the running of trains on branch lines constitute about all of the railroad legislation.

OHIO

The public utilities bill introduced in Ohio by Judge Winters was passed by the House on April 5, 1911. As amended the measure provides for a commission to have control over rates of public service companies, except those which receive their franchises directly from municipalities, and to act as a board of arbitration in case of a dispute between municipalities and public service companies. Stocks and bonds may be issued to reimburse the treasury for money expended in betterments, extensions and additions for the five years preceding Jan. 1, 1913, except where such funds were secured by the issue of stocks and bonds. No company would be permitted to hold, except as collateral, more than 25 per cent of the stock of another. Rates would have to be based upon the appraised value of the property. The bill will probably be opposed in the Senate. The Senate has acted favorably upon the Calvey House bill, which would require all companies to vestibule their cars to protect conductors. An amendment to this bill excepts all cars now in use. Governor Harmon has approved the Deaton bill which requires steam and electric railways to keep the weeds cut along their tracks. The Russell bill, permitting both interurban and city railways to sell current for light, heat and power has been reported upon favorably by the House committee to which it was referred. A favorable report has also been made upon the Day bill to require all rights-of-way of a road using the third-rail system to be fenced.

PENNSYLVANIA

The first hearing on the administration public service bill will be given by the judiciary general committee of the House on April 18, 1911. Representative Alter has introduced a bill making false billing a misdemeanor punishable by \$500 fine and six months' imprisonment. In addition to common carriers the Alter bill includes in its provisions persons or corporations engaged "in any other quasi-public business." Another employers' liability bill has been introduced in the House. It provides that the right of injured employees to compensation at the hands of employers shall not be defeated unless it can be shown that employees injured were intoxicated or wilfully negligent. The question of contributory negligence the bill provides is one of fact to be passed upon by a jury, and the power to fix the amount of payments and the length of time they shall be paid is placed with Courts of Common Pleas of the several counties. The Senate passed the Fox bill to allow street railways to lay tracks for temporary use in boroughs without first obtaining the consent of the authorities. The House has passed the bill creating a bureau of public utilities in public safety departments in cities of the second class, namely Pittsburgh and Scranton. The Senate has passed the bill giving the Department of Public Safety of Philadelphia command of traffic routes and movements.

WISCONSIN

Governor McGovern of Wisconsin has signed two public utility bills, the first validating valuations placed on public utilities by the State Railroad Commission not made within the six months required by law, and the second extending the time in which the commission may take valuations of public utilities from six months to one year.

Financial and Corporate

New York Stock and Money Market

April 11, 1911.

To-day's market showed a firm tone with only fractional price variations, most of the declines of the morning being recovered at the close. The market sold off rapidly at noon, but recovered as quickly. Despite this the total transactions for the day were less than 200,000 shares. Optimism is felt in crop reports, which are uniformly favorable.

There is no particular concern felt about the state of the money market. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{1}{2}$ per cent; 90 days, 3 @ $3\frac{1}{4}$ per cent.

Other Markets

A slight flurry in Philadelphia tractions was the result of publication of the plans for rehabilitating the local traction system. A few shares of Philadelphia Rapid Transit and Union Traction changed hands at prices which were from $\frac{1}{2}$ to 1 point down.

Trading in traction shares at Chicago has been light and prices are practically unchanged.

Boston transactions in general have been of small volume, the market remaining dull and prices showing only slight changes. Sales of tractions have been light.

United Railways bonds continue to be the principal traction features of the Baltimore market and some sales were made in to-day's market. General trading was small and price changes are not important.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 4.	April 11.
American Light & Traction Company (common).....	a295	a298
American Light & Traction Company (preferred).....	a107	a108
American Railways Company.....	a43 $\frac{3}{4}$	a44
Aurora, Elgin & Chicago Railroad (common).....	a44	a44
Aurora, Elgin & Chicago Railroad (preferred).....	a88	a88
Boston Elevated Railway.....	a129 $\frac{1}{2}$	a128
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a10	a11
Boston & Worcester Electric Companies (preferred).....	a43	a44
Brooklyn Rapid Transit Company.....	78 $\frac{3}{4}$	77 $\frac{3}{4}$
Brooklyn Rapid Transit Company, 1st pref. conv. 4s.....	84 $\frac{1}{4}$	84 $\frac{3}{8}$
Capital Traction Company, Washington.....	a126 $\frac{1}{2}$	a126 $\frac{1}{2}$
Chicago City Railway.....	190	190
Chicago & Oak Park Elevated Railroad (common).....	3	3
Chicago & Oak Park Elevated Railroad (preferred).....	7	6 $\frac{1}{2}$
Chicago Railways, ptcpgt., ctf. 1.....	a90	93
Chicago Railways, ptcpgt., ctf. 2.....	a24 $\frac{1}{2}$	23
Chicago Railways, ptcpgt., ctf. 3.....	a10	a10
Chicago Railways, ptcpgt., ctf. 4.....	a5	a5
Cincinnati Street Railway.....	132	130
Cleveland Railway.....	94 $\frac{3}{4}$	a97
Columbus Railway (common).....	96	a96
Columbus Railway (preferred).....	*101 $\frac{1}{2}$	100
Consolidated Traction of New Jersey.....	a76 $\frac{1}{2}$	a76 $\frac{1}{2}$
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a105	100
Detroit United Railway.....	a71	a71 $\frac{1}{2}$
General Electric Company.....	148 $\frac{1}{2}$	150 $\frac{1}{2}$
Georgia Railway & Electric Company (common).....	a133	a133 $\frac{3}{4}$
Georgia Railway & Electric Company (preferred).....	a91	a90
Interborough Metropolitan Company (common).....	19	18 $\frac{1}{2}$
Interborough Metropolitan Company (preferred).....	53 $\frac{1}{2}$	53 $\frac{1}{2}$
Interborough Metropolitan Company (4 $\frac{1}{8}$ s).....	78 $\frac{1}{2}$	78 $\frac{3}{4}$
Kansas City Railway & Light Company (common).....	22 $\frac{1}{4}$	21 $\frac{1}{2}$
Kansas City Railway & Light Company (preferred).....	70	70
Manhattan Railway.....	138	139
Massachusetts Electric Companies (common).....	a17 $\frac{1}{4}$	a17
Massachusetts Electric Companies (preferred).....	88	87 $\frac{1}{2}$
Metropolitan West Side, Chicago (common).....	23 $\frac{1}{2}$	23
Metropolitan West Side, Chicago (preferred).....	69 $\frac{1}{4}$	70
Metropolitan Street Railway, New York.....	*15	15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	71 $\frac{3}{4}$	71
Northern Ohio Light & Traction Company.....	*43 $\frac{1}{4}$	a45
Northwestern Elevated Railroad (common).....	23	23
Northwestern Elevated Railroad (preferred).....	63 $\frac{3}{4}$	63 $\frac{3}{4}$
Philadelphia Company, Pittsburgh (common).....	a53 $\frac{3}{8}$	a53
Philadelphia Company, Pittsburgh (preferred).....	43	a43
Philadelphia Rapid Transit Company.....	19 $\frac{1}{2}$	a18 $\frac{1}{4}$
Philadelphia Traction Company.....	84	a83 $\frac{3}{4}$
Public Service Corporation, 5% col. notes (1913).....	a100 $\frac{1}{2}$	100 $\frac{1}{2}$
Public Service Corporation, ctf. s.....	a106	105 $\frac{1}{2}$
Seattle Electric Company (common).....	a107	a106 $\frac{1}{2}$
Seattle Electric Company (preferred).....	a98 $\frac{1}{2}$	a98
South Side Elevated Railroad (Chicago).....	71	70
Third Avenue Railroad, New York.....	a10 $\frac{1}{4}$	9 $\frac{1}{2}$
Toledo Railways & Light Company.....	a8	a7 $\frac{1}{2}$
Twin City Rapid Transit, Minneapolis (common).....	a108 $\frac{1}{2}$	a108 $\frac{1}{2}$
Union Traction Company, Philadelphia.....	a46 $\frac{1}{2}$	a46 $\frac{1}{2}$
United Rys. & Electric Company, Baltimore.....	183 $\frac{1}{4}$	183 $\frac{1}{4}$
United Rys. Inv. Co. (common).....	a46	40
United Rys. Inv. Co. (preferred).....	a74 $\frac{1}{2}$	70
Washington Ry. & Electric Company (common).....	a38	a37
Washington Ry. & Electric Company (preferred).....	a89 $\frac{1}{2}$	a89
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	a103	103
Westinghouse Elec. & Mfg. Co.....	a67	a66
Westinghouse Elec. & Mfg. Co. (1st pref.).....	121	a117 $\frac{1}{2}$

aAsked. *Last sale.

Annual Report of the Public Service Corporation

A statement of earnings and expenses of the Public Service Corporation of New Jersey and subsidiary companies for the year ended Dec. 31, 1910, follows:

Gross earnings of leased and controlled companies.....	\$27,672,847
Public Service Corporation of New Jersey income from securities pledged and from miscellaneous sources.....	1,532,347
	\$29,205,194
Operating expenses and taxes.....	14,611,300
	\$14,593,894
Bond interest and rentals of leased and controlled companies..	10,558,243
	\$4,035,651
Fixed charges of Public Service Corporation of New Jersey...	1,835,356
Net income.....	\$2,200,295
Less amounts set aside as reserves:	
By Public Service Corporation of New Jersey...	\$125,000
By Riverside & Fort Lee Ferry Company.....	5,000
	130,000
Surplus	\$2,070,295

From this surplus dividends of 5 per cent, or \$1,250,000, were paid during the year on the capital stock.

Thomas N. McCarter, the president, says in part in his statement to shareholders:

"During the year the corporation general mortgage 5 per cent sinking fund 50-year gold bonds were listed upon the New York Stock Exchange, and since the close of the year the capital stock of the corporation has also been listed.

"On Oct. 1, 1910, the corporation sold to Drexel & Company, of Philadelphia, \$4,000,000 of 5 per cent three-year collateral gold notes, secured by deposit of \$5,000,000 of general mortgage bonds. The proceeds of the notes were required to pay the cost, in part, of betterments of and extensions to the properties of the corporation and its subsidiary companies during the year.

"During the summer the Public Service Railway sold \$450,000 equipment trust series 'B' certificates, the proceeds of which were used to pay for, in part, 100 new cars built by the Cincinnati Car Company, which have been delivered and are in service and giving complete satisfaction.

"Prior to July 1, 1910, the electric business of the corporation was operated directly by the corporation itself, whereas the gas business of the corporation was operated by the Public Service Gas Company, all the capital stock of which, except directors' shares, is owned by the corporation, and the railway business of the corporation was operated by the Public Service Railway Company, 99.24 per cent of the capital stock of which is owned by the corporation.

"On June 13, 1910, the Public Service Electric Company was formed and all the capital stock of this company, except directors' shares, is owned by the corporation. All the leases of the electric properties held by the corporation were assigned by it to the new company, and the electric stations and substations of the railway company were also leased to it, so that the entire electric business of the corporation, including the generation, distribution and sale of current, is now carried on by the Public Service Electric Company, making the organization of the corporation uniform in its three departments.

"During the year the corporation purchased 97.79 per cent of the common stock of the New Jersey & Hudson River Railway & Ferry Company, operating approximately 48.44 miles of railway in Bergen County, connecting with the existing lines of Public Service at Paterson on the west, Kearny near Newark on the south, and intersecting other lines of Public Service at Hackensack, Grantwood and Fort Lee.

"This property thus complements the existing lines of Public Service, and, it is believed, will form a most valuable acquisition to its railway system. Furthermore, it was the only substantial railway property in the northern section of the State not already controlled by Public Service.

"The more important of the improvements completed during the year 1910 are the Hoboken terminal, which has been put into service and which is probably the most thoroughly equipped street railway terminal in the country, consisting of a large double-decked station, both levels of which are used for the arrival and departure of cars; a large addition to the West Hoboken carhouse, providing facilities for 80 additional cars, and a substantial addition to the Marion electric generating station. In addition to the

100 cars purchased from the Cincinnati Car Company the Public Service Railway constructed during the year 10 new cars in its Plank Road shops. These cars are also in service. The extension of the Jackson Avenue line in Jersey City to the Greenville car house would have been completed had it not been for injunction proceedings instituted by a property owner. These proceedings are still pending, but it is hoped they will not prevent the early completion of the line.

"Taxes paid during the year amounted to \$1,422,698, an increase over the year 1909 of \$197,116. In addition to this the corporation contributed large sums to the municipalities in the form of new pavements, street paving repairs and street improvement assessments.

"During the year the corporation moved into its capacious new office building located at Broad and Bank Streets, Newark. The building is most admirably located, and well adapted to the purposes of the corporation. On the eleventh story a luncheon room has been provided, where luncheons are furnished daily to some 600 employees of the corporation, without expense to them.

"The wage scale put into effect for motormen and conductors, Jan. 1, 1910, as fully outlined in last year's report, has been adhered to, including the promised increase effective Jan. 1, 1911.

"Perhaps the most significant event connected with the business of the corporation during the year 1910 was the promulgation on Dec. 27 of an insurance, sick benefit and pension fund, effective Jan. 1, 1911. The plan has been received enthusiastically by the entire working force of the corporation.

"It is estimated that the application of this system will cost the corporation approximately \$50,000 per year for the first few years, and more thereafter, as the pension list grows. The system has been put into practical operation and it is believed that it not only contains all the features of a fair, liberal and humane policy on the part of the corporation towards its employees, but that it will also serve to foster and increase the cordial relations already existing between the corporation and those working for it.

"The fire insurance carried at the present time is \$23,263,442, and the annual premium thereof \$124,145, an average rate of 53 cents per \$100.

"On July 4, 1910, the act of the Legislature changing the name of the State Railroad Commission to the Board of Public Utility Commissioners, and prescribing the powers and duties thereof, became effective, and the commission forthwith assumed jurisdiction over the affairs of the public utility corporations of the State.

"It is a pleasure to say that the commissioners have entered upon their duties seriously, and with a due regard to the importance of the interests to be supervised by them, and that the relations of the companies owned by this corporation with said commission have been and are both cordial and agreeable."

The capital expenditures for the corporation and subsidiary companies amounted during the year to \$6,657,507, of which \$2,470,373 was for the railway.

Earnings of the railway properties have increased as follows:

1903*	\$1,471,244	1907	\$10,795,392
1904	8,415,278	1908	11,086,353
1905	9,488,358	1909	12,114,412
1906	10,086,933	1910	13,308,726

*Seven months only.

Traffic statistics compare as follows:

	1908.	1909.	1910.
Revenue passengers.....	219,421,974	238,171,257	258,746,130
Transfers and passes.....	74,688,628	81,548,978	82,632,558
Total passengers.....	294,110,602	319,720,235	341,398,688
Percentage of passengers using transfers	23.0	23.0	22.1
Average fare per passenger.....	3.70	3.72	3.78
Car mileage.....	39,519,972	40,890,360	42,632,760
Car hours.....	4,598,714	4,747,729	4,961,608
Passengers per day.....	803,581	875,946	951,721
Passenger receipts per car mile—cents	27.56	29.08	30.29
Passenger receipts per car hour... ..	\$2.37	\$2.50	\$2.60

The total track mileage was 759.6, and the number of cars available for operation \$2060, of which 1530 were closed and 530 open. During the year 27.86 miles of track were reconstructed with new rail and 7.196 miles were reconstructed with the same rails. Extensions of 4.567 miles were built.

Annual Report of the Duluth-Superior Traction Company

Earnings and expenses of the Duluth-Superior Traction Company for the year 1910 compare with the previous year as follows:

REVENUES.

	1910.	1909.
Revenue from transportation.....	\$1,082,815	\$972,508
Other revenue.....	8,767*	25,097
Total revenue.....	\$1,091,582	\$997,606

EXPENSES.

Ways and structures.....	\$49,994	\$42,571
Equipment	52,872	47,457
Traffic	786	910
Conducting transportation.....	366,185	345,873
General and miscellaneous.....	134,238	122,999

Total operating..... \$604,075 \$559,810

Net revenue from operation..... \$487,507 \$437,795

Interest on debt and taxes..... 190,779 172,365

Surplus available for dividends and depreciation.... \$296,728 \$265,429

Dividends, preferred stock..... \$60,000 \$60,000

Dividends, common stock..... 157,500 70,000

Total dividends..... \$217,500 \$130,000

Surplus from operation..... \$79,228 \$135,429

Per cent total operating (including taxes and renewal appropriations) to total earnings..... 65.77 65.73

*Other revenue for 1910 shows a reduction of \$16,330, as compared with 1909, which is due to profits resulting from invested surplus funds during the year 1909.

C. G. Goodrich, the president, says in his report:

"There was expended in new construction during the year \$145,200.

"There was expended during the year in renewals and charged against renewal funds \$55,988. The direct appropriation to this fund was \$54,579. The renewal fund now amounts to \$309,103.

"On Sept. 1 your directors increased the regular quarterly dividend on the common stock from 1 per cent to 1¼ per cent, thus placing the common stock on a 5 per cent annual dividend basis. Your directors believe the company will be able to maintain this rate of dividend.

"During February both the common and the preferred stock of the company were listed on the New York Stock Exchange.

"Under date of May 1, 1910, the Duluth Street Railway (the operating company) issued its mortgage or deed of trust securing an issue of \$2,500,000 general mortgage 20-year 5 per cent gold bonds, due May 1, 1930; \$390,000 of these bonds have been sold and the proceeds from the sale of \$300,000 used to establish a reserve fund as provided for in the trust deed. This fund is invested in high-grade 5 per cent bonds and short-time notes. The proceeds from the sale of \$90,000 of these bonds were applied against the cost of new construction during the current year."

Passenger traffic compared as follows in the two years:

	1910.	1909.
Revenue passengers carried.....	21,624,039	19,431,381
Transfers redeemed.....	4,036,815	3,778,780

Atchison Railway, Light & Power Company, Atchison, Kan.—The Atchison Railway, Light & Power Company has been made a part of the Western Railways & Light Company, and is being operated under the supervision of H. E. Chubbuck, general manager of the holding company. The Atchison property serves a population of 18,000 with electric and gas lighting mains and about 15 miles of street railway track on which cars are operated with a normal headway of 15 minutes. The power house is a brick structure with an engine room 60 ft. x 90 ft., and a boiler room 46 ft. x 76 ft. The six boilers are gas fired and are rated at 1000 hp. Three simple Corliss engines drive three d.c. and three a.c. generators, all belted. The power station has a mercury arc rectifier plant. The rolling stock includes the following: Five American Car Company single-end semi-convertible cars, six American Car Company double-end closed cars, two St. Louis Car Company closed double-end cars, four St. Louis Car Company single-end open cars, and eight utility cars. The rolling stock repair department has a shop 40 ft. x 130 ft., near which is a storage barn 36 ft. x 130 ft. The lighting department of the Atchison Railway, Light & Power Company has 121 electric street arcs and 2210 gas service meters.

Belton & Temple Traction Company, Belton, Tex.—The Southwestern Traction Company has been incorporated with

a capital stock of \$165,000, to succeed the Belton & Temple Traction company, the sale of the property of which under foreclosure was noted in the *ELECTRIC RAILWAY JOURNAL* of May 14, 1910.

Brooklyn (N. Y.) Rapid Transit Company.—William A. Day and George E. Ide have been elected directors of the Brooklyn City Railroad to succeed the late Edward Merritt and James McKeen.

Central California Traction Company, Stockton, Cal.—The Central California Traction Company has filed amended articles of incorporation which provide for an increase in the capital stock of the company to \$2,500,000, 24,301 shares to be common stock and the remaining 699 shares to be preferred stock, par value of \$100 per share. A meeting of the stockholders of the company has been called for May 8, 1911, to vote on the question of increasing the stock to \$4,000,000, of which \$3,000,000 is to be common stock and \$1,000,000 preferred stock.

Chicago (Ill.) Railways.—Gross earnings for the year ended Jan. 31, 1911, were \$14,064,709 as compared with \$12,442,882 in the preceding year. Expenses were \$9,845,296 as compared with \$8,710,017. From the balance of \$4,219,413 in 1911 there was deducted interest at 5 per cent on the valuation, or \$2,865,531, leaving a net income of \$1,353,882. In the division of this amount the City of Chicago received \$744,635 and the Chicago Railways \$609,247. From the balance of \$3,732,865 which remained in the preceding year after the payment of expenses, there was deducted \$2,275,719 for interest on the valuation of the property, leaving a net income of \$1,457,146. In the division of this amount the City of Chicago received \$801,430 and the Chicago Railways Company \$655,716. The gross income of the company from all sources last year was \$3,816,108 as compared with \$3,114,637 for the preceding year. The total deductions last year were \$3,542,858 as compared with \$2,818,750. The net income was \$273,250 as compared with \$296,157. The number of passengers carried last year was 488,490,104, of which 276,750,953 were revenue passengers, 4,147,736 free passengers and 207,591,415 were transfer passengers. For the preceding year 427,138,380 passengers were carried, divided as follows: Revenue, 245,510,655; free, 4,303,145; transfer, 177,324,580.

Delaware & Hudson Company, New York, N. Y.—The annual report of the Delaware & Hudson Company for the calendar year 1910 refers as follows to the electric railways in which this company is interested: "Increases in net operating revenues were as follows: Hudson Valley Railway, \$31,874; Schenectady Railway (including electric express), \$94,564; Plattsburgh Traction Company, \$268,70. The United Traction Company, of Albany, shows a decrease in net operating revenues of \$47,661, the Troy & New England Railway a decrease of \$566, and the Mechanicsville power plant a decrease of \$20,424. The decrease in the net return of the United Traction Company is mainly due to increase in pay of all employees and to the unusually heavy fall of snow in 1910, which increased the charges for removal of snow and the cost of maintenance of equipment. Dividends of 4 per cent for the year 1910 were declared on the capital stock of the United Traction Company, 6½ per cent on that of the Schenectady Railway, 4 per cent on the capital stock of the Troy & New England Railway and 5 per cent on that of the Plattsburgh Traction Company."

Fort Dodge, Des Moines & Southern Railroad, Boone, Ia.—Judge Smith McPherson, of the District Court of the United States for the Southern District of Iowa, has granted the Fort Dodge, Des Moines & Southern Railroad permission to issue \$500,000 of receiver's certificates to defray expenses amounting to \$230,000 and to provide for further improvements.

Fort Smith Light & Traction Company, Fort Smith, Ark.—H. M. Byllesby & Company, Chicago, Ill., have arranged to refinance the Fort Smith Light & Traction Company, and the entire issue of \$2,200,000 of 5 per cent refunding bonds, dated March 1, 1911, and due March 1, 1936, but callable in whole or in part on any interest date at 105 and interest, has been taken by Lee, Higginson & Company, Boston, Mass., by whom they are being offered for subscription at 93¼. The \$1,500,000 of consolidated 5 per cent bonds due in 1944, and the \$650,000 of 6 per cent notes due in 1913

will be called and paid at once at 102 and 101, respectively, out of the proceeds.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company has announced that it will take up on May 1, 1911, the \$4,584,000 of 5½ per cent notes of the company which mature at that time.

Interstate Railways, Philadelphia, Pa.—J. A. Rigg, president of the Interstate Railways, has announced that all the subscriptions to the new issue of \$1,000,000 of 6 per cent cumulative preferred stock of the company have been made in full. Of this amount \$500,000 has been paid for in cash by the common stockholders, and \$500,000 has been taken in exchange for the overdue coupons of the 4 per cent bonds of the company. The last instalments of the subscriptions were due April 1, 1911, and were met.

Lancaster County Railway & Light Company, Lancaster, Pa.—The Lancaster County Railway & Light Company has purchased the property of the Lititz Electric Light, Heat & Power Company.

Milwaukee Northern Railway, Cedarburg, Wis.—The Wisconsin Railroad Commission has authorized the Milwaukee Northern Railway to issue \$1,500,000 par value of 5 per cent bonds to be secured under the terms of a mortgage executed by the company to the First Savings & Trust Company, Milwaukee. The bonds are to be issued for not less than 75 per cent of the par value. The company has been empowered also to issue 4000 shares of first preferred cumulative stock of the par value of \$100 per share and 6000 shares of second preferred non-cumulative stock of the par value of \$100. The stock is to be sold at not less than par. The stock and bonds are to be sold to supply the company with funds with which to purchase and retire an outstanding bonded indebtedness of \$2,500,000.

Oakland & Antioch Railway, Oakland, Cal.—The Oakland, Antioch & Eastern Railway has been incorporated with an authorized capital stock of \$10,000,000 to take over the Oakland & Antioch Railway, which was placed in operation recently, and extend the road from Antioch to Stockton.

Oklahoma Railway, Oklahoma City, Okla.—The Oklahoma Railway has filed with the Secretary of State of Oklahoma a certificate of the increase in the capital stock of the company from \$3,000,000 to \$15,000,000 authorized by the stockholders at a meeting on Feb. 24, 1911. Of the \$15,000,000 of stock \$5,000,000 is to be preferred and \$10,000,000 common. The amount of authorized bonds has been increased from \$3,000,000 to \$12,000,000.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia Company has authorized an issue of \$1,400,000 of 5 per cent convertible notes. The capital stock of the company is \$47,000,000. According to the report of the company for 1910 there were outstanding bonds and notes to the amount of \$28,047,000, consisting of \$5,559,000 of first and collateral trust 5 per cent bonds due in 1949; \$15,138,000 of consolidated and collateral trust 5 per cent bonds due in 1951; \$2,350,000 of collateral trust 6 per cent notes due in various amounts up to 1918, and \$5,000,000 of 6 per cent convertible debentures due in 1919.

Salisbury & Spencer Railway, Salisbury, N. C.—Control of the Salisbury & Spencer Railway is reported to have been secured by W. J. Oliver, Knoxville, Tenn., and others through the purchase of the holdings of W. F. Snider, president of the company, and others.

Springfield (Mass.) Street Railway.—A bill has been introduced in the Massachusetts Legislature to provide for the purchase of the Springfield Street Railway by the Berkshire Street Railway, a subsidiary of the New York, New Haven & Hartford Railroad. The name of the new company is to be the Springfield & Berkshire Railway.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The Public Utility Commission of Maryland has signed an order granting authority to the Washington, Baltimore & Annapolis Electric Railway, in accordance with the company's reorganization plan, to transfer its franchises and physical properties to a new corporation and to issue stock to discharge obligations incurred by both. In addition to permission to take over the properties of the Anne Arundel Electric Railroad the Washington, Baltimore & Annapolis Electric Railway asked to be allowed to issue \$3,000,000 of 5 per cent bonds at par, \$1,369,512.75

par value of non-cumulative preferred stock at 6 per cent and \$1,500,000 common stock of the Anne Arundel Electric Railroad in payment of obligations. A trust mortgage of \$7,500,000 from the Washington, Baltimore & Annapolis Electric Railway to the Cleveland Trust Company has been filed for record. It covers all of the property, rights and franchises of the company, and is to secure the issue of an equal amount of first mortgage gold bonds dated March 1, 1911, payable March 1, 1941, and bearing 5 per cent interest. The mortgage states that \$5,000,000 of the bonds will be issued immediately to acquire the Anne Arundel Electric Railroad. The remaining \$2,500,000 will be used for improvements and extensions.

Washington & Rockville Railroad, Washington, D. C.—George H. Harries, vice-president of the Washington Railway & Electric Company, has issued a statement in part as follows in regard to the appointment of a receiver for the Washington & Rockville Railroad at the instance of the Washington Railway & Electric Company, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 8, 1911, page 649: "From its beginning the Washington & Rockville Railroad has been an insolvent concern. Its continued existence was possible only through the financial and executive support given it by the Washington Railway & Electric Company. A fare-reducing act passed by the Maryland Legislature at its 1910 session threatened arbitrary and serious diminution of the Washington & Rockville Railroad's earnings, rendering necessary defensive action in the courts. This litigation had already been so expensive, and promised to be so much more expensive, that it was deemed proper and advisable to dismiss the suit for injunction and to ask for such relief as could only be had through the operation of the road by the court, a proceeding that has been long delayed but which would ultimately, no matter how the suit should terminate, have to be entered upon. Rational business administration clearly demanded immediate action looking to the collection of the money due from the Washington & Rockville Railroad, probably to be obtained only through the sale of the property."

Dividends Declared

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.
Public Service Investment Company, Boston, Mass., quarterly, $1\frac{1}{2}$ per cent preferred.
Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, quarterly, $1\frac{1}{4}$ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Feb. '11	\$41,900	*\$20,872	\$21,028	\$12,379	\$8,649
1 " " '10	39,922	*20,196	19,726	11,712	8,014
8 " " '11	397,407	*178,731	218,676	96,585	122,091
8 " " '10	383,422	*173,043	210,379	93,093	116,476

CHATTANOOGA RAILWAY & LIGHT COMPANY.

1 m., Feb. '11	\$69,264	*\$39,447	\$29,817	\$19,311	\$10,506
1 " " '10	61,122	*36,802	24,320	17,868	6,362
2 " " '11	142,798	*82,257	60,541	38,424	22,117
2 " " '10	127,068	*77,568	49,500	35,795	13,705

GRAND RAPIDS RAILWAY.

1 m., Feb. '11	\$81,836	*\$48,687	\$33,149	\$15,121	\$18,028
1 " " '10	78,468	*44,850	33,618	15,076	18,542
2 " " '11	173,903	*99,723	74,180	30,222	43,958
2 " " '10	164,820	*93,916	70,904	31,123	39,781

LAKE SHORE ELECTRIC RAILWAY SYSTEM.

1 m., Feb. '11	\$76,258	*\$48,132	\$28,127	\$34,782	*\$6,656
1 " " '10	70,877	*47,276	23,601	34,847	*11,246
2 " " '11	160,828	*97,489	63,338	69,410	*6,072
2 " " '10	149,871	*95,815	54,056	69,118	*15,062

LEWISTON, AUGUSTA & WATERTOWN STREET RAILWAY.

1 m., Feb. '11	\$31,096	*\$27,661	\$3,435	\$13,187	\$9,752
1 " " '10	29,894	*23,724	6,170	14,616	8,446
8 " " '11	359,232	*224,787	134,445	105,033	29,412
8 " " '10	358,066	*209,290	148,776	116,054	32,716

PADUCAH TRACTION & LIGHT COMPANY.

1 m., Jan. '11	\$21,787	\$11,592	\$10,196	\$7,752	\$2,444
1 " " '10	22,741	14,476	8,266	7,070	1,196
12 " " '11	248,792	141,248	107,544	86,956	20,589
12 " " '10	231,037	137,975	93,062	81,671	11,391

SAVANNAH ELECTRIC COMPANY.

1 m., Jan. '11	\$53,803	\$35,040	\$18,763	\$18,754	\$0
1 " " '10	48,898	31,068	17,831	17,818	13
12 " " '11	637,261	420,206	217,055	215,949	1,106
12 " " '10	602,725	391,162	211,563	210,002	1,562

WHATCOM COUNTY RAILWAY & LIGHT COMPANY.

1 m., Jan. '11	\$33,437	\$19,057	\$14,381	\$10,556	\$3,825
1 " " '10	36,202	22,741	13,460	8,957	4,503
12 " " '11	408,396	230,000	178,387	111,045	67,342
12 " " '10	409,721	231,085	178,636	99,936	78,700

Traffic and Transportation

Increase in Wages in Grand Rapids

Benjamin Hanchett, president of the Grand Rapids (Mich.) Railway, has issued a statement to the employees of the company announcing an increase in wages effective on May 15, 1911, in which he says in part:

"One year ago I had the pleasure of advising you that the directors of the Grand Rapids Railway authorized an increase in your wage scale of 10 per cent and I am now pleased to be able to inform you of a further increase, as stated below, which makes a total advance in the schedule of wages since 1907 of 25 per cent. The new rate goes into effect May 15, 1911, as follows:

"For service as conductors or motormen, one year or less, 23 cents per hour.

"For service as conductors or motormen for one year and up to two years, 24 cents per hour.

"For those men who have served the company as motormen and conductors for more than two years, 25 cents per hour.

"Conductors and motormen serving on the extra list who report at all change times and at time of starting out trippers, as ordered by the carhouse foreman, will be credited with enough additional time to make their wages for that day at least \$1.50, even though they are not called on to perform service to this amount. This additional compensation, under the conditions named, for men on the extra list goes into effect April 1.

"Motormen and conductors during their student time of 13 days and 10 days respectively will, of course, work without compensation as in the past, but such men who remain in the service for one year continuously will receive pay at the rate of \$1.50 per day, payable at the end of the year, for such service, and this rule applies to all new men who started on or after Jan. 1, 1911.

"As you have been advised on previous occasions, it is the desire of the management to consider your welfare in every way and you can help along this line by earnest co-operation and attention to duty. You should keep in mind when in charge of a car that you are the company's representative and that the public forms its opinion of the company by the treatment it receives from the motormen and conductors. I therefore rely upon the exercise of your best judgment and assistance in raising the standard of service and in other ways working for the best interests of the company."

Excellent Accident Record of the Lehigh Valley Transit Company

R. P. Stevens, president of the Lehigh Valley Transit Company, Allentown, Pa., was interviewed recently by one of the local papers at Allentown in regard to the excellent showing made by the company as disclosed by the accident report for January and February filed by the company with the Pennsylvania Railroad Commission. Mr. Stevens said in part:

"We not only have a clear record for January and February, but it is worthy of note that for the past year, although our cars traveled 3,593,389 miles, equal to about 1200 times across this country from New York to San Francisco, or 143 times around the world, and over 23,000,000 passengers were handled, not a passenger or an employee was killed. We doubt if there is a road in the country running the mileage and carrying the number of passengers we have that can equal this record.

"I attribute this record very largely to the class of men we have in our employ and their length of service and experience. More than 50 per cent of our motormen have been in our employ five years or more, and more than 25 per cent have been with us more than 10 years. This fact is remarkable.

"Of course, in addition to this, however, we must give proper credit to the efforts and co-operation of the heads of all departments to keep down the accident list. We have men in our employ devoting all their time to devising ways and means to avoid these unfortunate occurrences. We have also received much favorable criticism on our present

campaign of teaching the school children how to avoid accidents. These accidents are generally the most distressing kind, and if grown-ups would use the same care that we now feel the children will it would go a long way toward reducing the number of accidents. During the past month our men have spoken to more than 38,000 school children in the cities and towns along our lines on 'how to avoid accidents' and endeavored to impress it on their minds so the impression will be lasting."

"Come to Sarnia."—The Sarnia (Ont.) Street Railway is distributing a folder entitled "Come to Sarnia," which is compiled and printed by the Canadian Printing Company, Sarnia. Sarnia is located at the point where Lake Huron meets the St. Clair River. The pamphlet contains views in and about Sarnia reached by the lines of the Sarnia Street Railway.

Car License Fees in Reading.—The Reading (Pa.) Transit Company has paid its car license tax for the fiscal years of 1911-12, as required under the ordinance passed last August by Councils. The corporation paid \$720. This is at the rate of \$10 a car truck. An affidavit was taken that 72 trucks is the total number in use on all the lines under the control of the company. For the last fiscal year the company paid for 69 trucks, or \$690.

Fare Changes at St. Lawrence.—On March 2, 1911, the St. Lawrence International Electric Railroad & Land Company, Alexandria Bay, N. Y., will cancel local one-way fares in both directions between State Road and Kavanaugh's, Gulf Hill, Sauerwein's, Alexandria Center, Hass, Brown's Crossing, Bickelhaupt's and Redwood, and thereafter fares from and to Alexandria Bay will apply from and to State Road. The advance in each instance is 5 cents. On the same date the round-trip fares between all local stations will be canceled and no round-trip fares will be in effect thereafter.

Decision Which Requires Exchange of Transfers in Seattle.—With two judges dissenting, the Supreme Court of Washington has affirmed the decision of the King County Superior Court in the case of A. G. Linhoff against the Seattle, Renton & Southern Railway, holding that the appellant company must issue transfers to the lines of the Seattle Electric Company and accept the transfers from the same company. The settlement for transfers is to be made on the basis of 2½ cents on the 5-cent cash fares and 1¼ cents on the tickets offered by school children, which tickets are sold for 2½ cents each by both the companies concerned.

Plan to Divert Long Island Suburban Traffic.—It is stated that an agreement has been reached between the Pennsylvania Railroad and the Interborough Rapid Transit Company, New York, N. Y., in reference to transit extensions in Queens and that the suburban traffic of the Long Island Railroad is to be diverted from the station of the Pennsylvania Railroad at Thirty-third Street and Seventh Avenue, New York, by way of the Queensboro Bridge and the Steinway Tunnel. At Woodside, just outside the limits of Long Island City, a new station to cost about \$150,000 will be erected. A route not heretofore considered has been adopted for the line which is to run to New York through the Steinway Tunnel. The capacity of the tunnel is estimated at 20,000 passengers an hour, and that of the bridge at 28,000 passengers an hour.

Traffic Circulars in Baltimore.—The United Railways & Electric Company, Baltimore, Md., has printed the third edition of its circular entitled "Chartered Cars for Private Parties." This circular is devoted entirely to the subject of chartered cars and outlines the service which the company offers. There are interior and exterior views of private cars of the company. "Seeing Ourselves as Others See Us" is a booklet in which opinions are set down which have been expressed by prominent people about Gwynn Oak Park. "Excursions by Trolley to Gwynn Oak Park" is somewhat different from "Seeing Ourselves as Others See Us" in that it tells how the park may be reached and shows scenes in the Park. Another circular issued by the company bears the title "Excursions by Trolley to Bay Shore Park."

Traffic Department of the Consolidated Companies in Los Angeles.—Reference has been made from time to time recently in the *ELECTRIC RAILWAY JOURNAL* to the changes in the personnel of the electric railways in Los Angeles which have been merged. The traffic department of the Pacific Electric Railway, Los Angeles-Pacific Company and Los Angeles & Redondo Railway is organized as follows: D. W. Pontius, traffic manager; D. A. Munger, general agent passenger department; F. L. Meneley, chief clerk passenger department; B. L. Dowell, traveling passenger agent; E. L. Taylor, traveling passenger agent; T. J. Day, chief clerk freight department; F. C. Weeks, traveling freight agent; C. V. Means, contracting freight agent; E. C. Thomas, advertising agent; C. M. Pierce, manager personally conducted trolley trips; W. H. Dempster, assistant manager personally conducted trolley trips.

"The Road of To-day."—The Chautauqua Traction Company, Jamestown, N. Y., has published a folder entitled "The Road of To-day." The cover shows a scene in colors along the company's lines and a scene in black of Lake Chautauqua by moonlight. Views are also presented of Celeron Park, Lakewood and Chautauqua. There is a map of the company's lines between Jamestown, Mayville and Westfield, and also a map on which are shown the railroads which connect with the lines of the Chautauqua Traction Company. During the summer cars are operated every 40 minutes, with extra cars at frequent intervals. During the winter cars are operated every hour. Through tickets to Chautauqua Institution, Jamestown, Lakewood, Celeron, Mayville and all points on the Chautauqua Traction Company's line are sold by agents of all principal railroads, enabling passengers to purchase through transportation and check their baggage to destination.

Safety Measures in Chicago.—In the monthly report of the city attorney of Chicago to the corporation counsel it has been suggested that if all the cars were painted a light orange color rather than the present olive green the safety of pedestrians who cross the streets would be increased. Cars with inclosed rear platforms similar to those now being given a trial by the Chicago Railways also are approved in the report, which says: "When cars of this type supersede the present models getting on or off cars while they are in motion will be impossible." It is pointed out that 63 accidents occurred during March in this manner. The general report for March states that all accidents in connection with street car operation resulted in the death of five persons and injury to 226. In 73 of the accidents persons were injured while trying to cross the tracks ahead of approaching cars. The report states that one-half of the total number of accidents came from causes wherein fully 75 per cent of the victims might have escaped injury had they used a little precaution. The Illinois House of Representatives has passed the O'Toole bill to require all entrances and exits to Chicago street cars to be closed while the cars are in motion.

Extension of Time Under Fender Ordinance in Portland, Ore.—A resolution has been passed by the City Council of Portland, Ore., to extend for one year, or until July 1, 1912, the time in which the Portland Railway, Light & Power Company is required to equip all of its cars with automatic fenders in accordance with the provisions of the ordinance passed by the Council in the fall of 1910. The requirements of the device necessary to meet the terms of the ordinance were given in the *ELECTRIC RAILWAY JOURNAL* of Nov. 26, 1910, page 1076. Subsequently Mayor Simon vetoed the resolution. In a long statement which he issued the Mayor said in part: "It abounds in whereases and recitals and sets forth that the present type of fender in use on lines of the Portland Railway, Light & Power Company is better than the device provided by State law. It provides for a pilot type of fender for interurban cars. It attempts to legalize operation of freight cars over the company's lines within the city limits, which authority is not contained in any of the franchises held by the corporation and does not belong in a fender ordinance. It extends the time for equipping the street cars with the Nelson automatic fender from July 1, 1911, until July 1, 1912. While the street car company and the fender concern have reached an agreement perfectly satisfactory to them, the general public must have consideration."

Personal Mention

Mr. George W. Delany has resigned as auditor of the Lexington & Interurban Railways, Lexington, Ky.

Mr. R. H. Fish has been appointed traffic manager of the Oakland & Antioch Electric Railway, with headquarters in Concord, Cal.

A. W. Price has been appointed auditor of the Lexington & Interurban Railways, Lexington, Ky., to succeed Mr. George W. Delany, resigned.

Mr. L. E. Moe, who has been connected with the Portland, Eugene & Eastern Railway, Portland, Ore., since the road was placed in operation, has been appointed general manager of the company, a newly created position.

Mr. G. E. Barber has been appointed superintendent of the Ohio Electric Railway at Springfield, Ohio, to succeed Mr. W. G. Williams, resigned. Mr. Barber was formerly a dispatcher in the office of the company at Springfield.

Mr. W. N. Keiser has resigned as electrical engineer of the Union Electric Company, Dubuque, Ia., effective on May 1, 1911, to become connected with the G. W. Parsons Company, Newton, Ia., manufacturer of contractors' machinery.

Mr. George Kidd, London, Eng., one of the secretaries of the British Columbia Electric Railway Company, Vancouver, B. C., will make his home in that city for a year, taking up the duties formerly performed by Mr. Francis Hope, assistant general manager, who is going to London, Eng., temporarily.

Mr. William D. Norton has resigned as first assistant secretary of the Public Service Commission of the First District of New York to become connected with the Commonwealth Edison Company, Chicago, Ill. Mr. Norton has been first assistant secretary of the commission since that body was created in 1907.

Mr. N. A. Kemmish has resigned as electrical engineer of the Lincoln (Neb.) Traction Company to become general manager of the municipal electric lighting and pumping station at Alliance, Neb. Mr. Kemmish, who has been with the Lincoln Traction Company for the last seven years, is a graduate of the University of Nebraska.

Mr. L. M. Levinson, who has been general manager of the Mineral Wells (Tex.) Electric System since August, 1910, has resigned to become general superintendent of the syrup and sugar plantation of Pennick & Ford, Ltd., New Orleans, La. Before becoming connected with the Mineral Wells Electric System Mr. Levinson was for 11 years general manager of the Shreveport (La.) Traction Company.

Mr. William E. Rolston, superintendent of power and shops of the Cleveland, Southwestern & Columbus Railway, has resigned to become connected with the Des Moines City Railway, Des Moines, Ia. Mr. Rolston has been superintendent of power and shops of the Cleveland, Southwestern & Columbus Railway for the past two years and a half. Previous to that he was master mechanic of the company.

Mr. R. W. Levering has been appointed superintendent of the Lafayette division of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., the successor of the Ft. Wayne & Wabash Valley Traction Company, to succeed Mr. S. J. Ryder, who has been appointed acting superintendent of the Ft. Wayne division. Mr. Levering was formerly connected with the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.

Mr. S. J. Ryder, who has been superintendent of the Lafayette division of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., the successor of the Ft. Wayne & Wabash Valley Traction Company, has been appointed acting superintendent of the Ft. Wayne division to succeed Mr. E. M. Raver, resigned. Mr. Ryder has been for several years superintendent of the Lafayette city lines for the Ft. Wayne & Northern Indiana Traction Company. He was sent to that city from Ft. Wayne, having been advanced from the position of carhouse foreman.

Mr. S. H. Waddell, formerly auditor of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., has been elected secretary and treasurer of the company, to succeed Mr. Mark G. Hibbs, resigned, and will in the future

act as secretary, treasurer and auditor of the company. Mr. Waddell became connected with the Pittsburgh, Harmony, Butler & New Castle Railway as auditor on Feb. 15, 1910. Previous to that time he was engaged principally in the iron and steel business with the Mellon and Frick interests and held the position of secretary, assistant treasurer and auditor of the Union Steel Company previous to its absorption by the United States Steel Corporation in 1902. Mr. Waddell was also engaged in public accounting.

Mr. Clinton L. Bardo, who resigned recently as superintendent of the electric division of the New York Central & Hudson River Railroad at New York, has been appointed assistant to the general manager of the Lehigh Valley Railroad, with offices at South Bethlehem, Pa. Mr. Bardo was born at Montgomery, Pa., on Oct. 24, 1867, and began his railway career as an extra operator with the Pennsylvania Railroad. In November, 1904, he became freight trainmaster of the New York division of the New York, New Haven & Hartford Railroad, and from December, 1905, to June, 1907, he was assistant superintendent of the same division. Since June, 1907, he has been superintendent of the Grand Central Station and the electric division of the New York Central Railroad. Over this division between the terminal and the Mott Haven yards, 4½ miles, there are 700 train movements a day.

Mr. C. J. Pearson, until recently in charge of freight and passenger accounts for the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has been appointed division freight and passenger agent of the Michigan United Railways with headquarters at Jackson, Mich. Mr. Pearson started his railroad career as a messenger with the Cleveland, Cincinnati, Chicago & St. Louis Railway at Anderson, Ind., and continued with that company in various capacities until he became bill clerk. In 1903 he resigned from the Cleveland, Cincinnati, Chicago & St. Louis Railway to take charge of the freight accounts for the Indiana Union Traction Company at Anderson. In 1905 Mr. Pearson became State cashier of the Central Union Telephone Company at Springfield, Ill., but in 1906 he returned to Indiana and took charge of the freight and passenger accounts of the Terre Haute, Indianapolis & Eastern Traction Company.

Mr. Miles Bronson, superintendent of the Mohawk division of the New York Central & Hudson River Railroad at Albany, N. Y., has been appointed superintendent of the electric division of the New York Central & Hudson River Railroad at New York to succeed Mr. C. L. Bardo, whose appointment to the Lehigh Valley Railroad is announced elsewhere in this column. Mr. Bronson was born at Sandusky, Ohio, on May 8, 1875. He entered railway service in 1890 as a clerk in the law department of the Grand Trunk Railway at Detroit, Mich. For five years he was stenographer to the general solicitor of the Grand Trunk Railway, and from May 30, 1895, to April 27, 1898, he was secretary to the president of the New York, Chicago & St. Louis Railroad. From April 27, 1898, to Nov. 1, 1900, he was successively secretary and assistant to the president of the New York Central & Hudson River Railroad. On Nov. 1, 1900, he was appointed superintendent of the Harlem division of the New York Central & Hudson River Railroad, with offices at White Plains.

Mr. J. W. Brown, superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has been appointed assistant superintendent of transportation of the Public Service Railway, Newark, N. J., effective on May 15, 1911. Mr. Brown has been connected with the Aurora, Elgin & Chicago Railroad since August, 1910. Prior to that time he was superintendent of transportation of the West Penn Railways, Connellsville, Pa. He entered the service of the McKeesport, Wilmerding & Duquesne Railway, McKeesport, Pa., about 12 years ago as night car dispatcher. He also served as electrician and later as power station engineer of this company. When the Pittsburgh, McKeesport & Connellsville Railway, Pittsburgh, Pa., was formed Mr. Brown was made master mechanic of the McKeesport division of that road, and later was promoted to the position of division superintendent. When the transportation department of this company was organized in 1903 Mr. Brown was appointed superintendent of transportation of the company. Mr. Brown is chairman of

the committee on interurban rules of the American Electric Railway Transportation & Traffic Association.

Mr. I. C. Fetter has resigned as general claim agent of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, Wilmington, Del., to become claim agent of the Reading (Pa.) Transit Company, which operates the railways and light plants in Reading, Norristown and Lebanon. Mr. Fetter was admitted to the bar in 1881, and was city clerk from 1890 to 1895. He was appointed claim agent of the Reading Traction Company in 1895. When the United Power & Transportation Company was formed in 1899 and acquired the Wilmington, Trenton, Chester, Norristown, Wilkes-Barre, Reading, Lebanon and other systems, he was made general claim agent and continued in that capacity until the Interstate Railways was formed. This company acquired still other properties, and Mr. Fetter remained in its service until 1910, when the properties were leased. In July, 1910, he became connected with J. G. White & Company, Inc., New York, N. Y., they having leased the lines in Wilmington, Chester and Delaware County previously operated by the Interstate Railways, and was appointed general claim agent of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company. Mr. Fetter resigned from the Wilmington & Philadelphia Traction Company because of the opportunity that was afforded him to return to Reading, where he had lived for more than 30 years.

OBITUARY

Owen Leibert died at his home at Bethlehem, Pa., on March 26, 1911. Mr. Leibert was connected with the Bethlehem Steel Company, South Bethlehem, Pa., for 38 years, resigning in 1891 as chief engineer.

Tom L. Johnson died at Cleveland, Ohio, on April 10, 1911, after a long illness. He was 57 years old. Mr. Johnson was born in Georgetown, Ky., and was thrown upon his own resources when he was 15 years of age. He began his street railway career in the office of the Louisville (Ky.) Passenger Railway about 1872. This property was controlled by Biderman du Pont, the father of Mr. A. B. du Pont, who later was a very close associate of Mr. Johnson. While connected with the Louisville Railway Mr. Johnson invented a fare box which came into general use before the present system of fare collection was established. With the du Ponts and others he purchased the railway system in Indianapolis. Later he became interested in the Southern Railway of St. Louis and in a 4-mile line at Cleveland, running to Brooklyn Village. Later the former line was sold to the Hamilton interests and that at Cleveland became part of the Cleveland Railway System. In the early 80's Mr. Johnson invented the girder rail. The Johnson Company, of Johnstown, Pa., was formed and built its own rolling mill. In 1894 the Johnson Company was taken over by the Lorain Steel Company and the rolling mill was moved to Lorain, Ohio, but the manufacture of special work was continued at Johnstown. Mr. Johnson, however, was not an officer in either the Johnson Company or the Lorain Steel Company. After the flood at Johnstown, Pa., Mr. Johnson and his associates rebuilt and operated the street railway there. In 1887 Mr. Johnson built on Park Avenue, Brooklyn, a cable line which was afterward acquired by the Atlantic Avenue Railroad Company. About 1893 Mr. Johnson and his brother, the late Albert L. Johnson, with the assistance of R. T. Wilson & Company, constructed the Nassau Electric Railroad, which is now part of the Brooklyn Rapid Transit System. Mr. Johnson was treasurer of this company. About 1895 R. T. Wilson & Company and Mr. Johnson became interested in the property which is now a part of the Detroit (Mich.) United Railway. On the advice of the late Henry George, Mr. Johnson entered politics, running first for Congress, but was defeated. Later he was elected and served two terms from 1890 to 1894. In 1901 he was elected Mayor of Cleveland. In 1903 he ran for Governor and was defeated, but was re-elected Mayor in 1905 and continued in that office until 1910. The use that Mr. Johnson made of the power that was vested in him as Mayor of Cleveland in the negotiations with the Cleveland Electric Railway and the history of the failure of the Municipal Traction Company, Cleveland, Ohio, Mr. Johnson's device to establish 3-cent fares in Cleveland, are familiar to the readers of this paper.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Inter-Counties Railway, Modesto, Cal.**—Application for a charter will be made by this company in California to build an electric railway from Modesto to Crow's Landing and Newman, and from Modesto to Turlock, Merced, Madera and Fresno. Capital stock, \$5,000,000. Directors: A. W. Maltby, Concord; J. F. Peters, Charles Harris, William H. Langdon, Modesto; A. T. Nelson, Stockton, and L. G. Worden, Merced.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Incorporated in California to take over the Oakland & Antioch Railway and extend it to Stockton. Capital stock, \$10,000,000. S. L. Naphtaly, treasurer. Directors: A. W. Maltby, Concord; Lawrence Arnstein, John R. Selby and A. J. Krutmeyer, San Francisco. [E. R. J., March 18, '11.]

***Elberton & Eastern Railway, Augusta, Ga.**—Application for a charter has been made by this company in Georgia to build a 50-mile electric or steam railway between Elberton, Tignall, Washington and Lincolnton. Capital stock, \$500,000. Incorporators: M. A. Pharr, of Washington; James A. Moss, W. J. Adams and J. J. Wilkinson, of Tignall; W. O. Jones, W. F. Anderson, J. H. Blackwell, L. M. Heard, R. L. Cauthen and Z. B. Rogers, of Elberton.

***Osceola & Southwestern Railway, Osceola, Ia.**—Incorporated in Iowa to build an electric railway to connect Lacelle and Hopeville.

Little Falls & Johnstown Railroad, Little Falls, N. Y.—Incorporated in New York to build a 27-mile electric railway between Little Falls and St. Johnsville, via Ephratah and Johnstown, where it will connect with the Fonda, Johnstown & Gloversville Railroad, Gloversville. Capital stock, \$300,000. Among the directors are: Lorenzo O. Bucklin, Little Falls; Frederick Englehardt, St. Johnsville; James P. Argersing, Johnstown; J. L. Hees, Fonda, and Henry D. Harmickell, New York.

***Hellertown & Richlandtown Street Railway, Hellertown, Pa.**—Application for a charter has been made by this company in Pennsylvania to build a 6-mile electric railway to connect Hellertown and Richlandtown. All rights-of-way have been secured from Hellertown borough limits to the Richlandtown borough limits. Capital stock, \$360,000. Officers: A. R. Trumbauer, president; Jacob Apple, secretary, and W. B. Frankensfield, treasurer.

***Northumberland County Traction Company, Sunbury, Pa.**—Application for a charter has been made by this company in Pennsylvania to build an electric railway through Northumberland, Sunbury, Union, Snyder, Montour, Columbia, Lycoming, Schuylkill and Luzerne Counties. John C. Johnson, Philadelphia, and J. F. Schaffer, Sunbury, are the solicitors.

***Elizabethton, Milligan & Johnson City Electric Railway, Johnson City, Tenn.**—Chartered in Tennessee to build an 8-mile electric railway between Johnson City, Milligan College, Oak Grove and Elizabethton. Capital stock, \$25,000. Incorporators: W. G. Payne, James H. Smith, A. B. Brannon, W. C. Burchfield, J. N. Inders and J. G. Burchfield.

FRANCHISES

Los Angeles, Cal.—The Los Angeles Railway has reported to the City Council that it is ready to build a cross-town railway in Los Angeles whenever a favorable route is offered. The route proposed by the company is from Fourth Street and Vermont Avenue south to Jefferson, thence east to city limits. A resolution was adopted by Council referring matter to Board of Public Utilities.

Oakland, Cal.—The Oakland Traction Company has received a franchise to build its tracks on Hopkins Street from Fruitvale Avenue to Redwood Road, in Oakland. The company has withdrawn an application for a franchise in East Sixteenth Street and the Scenic Boulevard, and has filed a new one, which substitutes Ignacio Avenue for the Boulevard.

San Francisco, Cal.—The Southern Pacific Company has asked the City Council for a 50-year franchise for two extensions of its tracks between Townsend Street and Channel Street, in San Francisco. This application is preliminary to extension of the line to Market Street and Stuart Street.

Turlock, Cal.—S. N. Griffith, representing the Turlock Traction Company, Modesto, has asked the Board of Trustees for a 50-year franchise to build its tracks through Turlock. This proposed 4-mile electric railway will connect Turlock and Denair. [E. R. J., April 1, '11.]

Wilmington, Del.—The Wilmington, New Castle & Southern Railway, New Castle, has received a franchise from the Street Directors to build from Front Street and Market Street, in Wilmington, to the city line along the causeway, where the line will continue on to New Castle.

Wilmington, Del.—The People's Railway, Wilmington, has received a franchise to extend its tracks in Wilmington to King Street wharf, from its present termination on Front Street and King Street.

Atlanta, Ga.—The Atlanta Northwestern Railroad has asked the City Council for a franchise to build its tracks over certain streets in Atlanta. This projected 47-mile railway will connect Roswell, Alpharetta, Cummins and Atlanta. John M. Ponder, Forsyth, president. [E. R. J., April 10, '10.]

St. Boniface, Man.—The Manitoba Rural Railways, St. Vital, has received a franchise from the City Council to build its railway through St. Boniface. Work will begin soon. It will connect Winnipeg, St. Boniface, St. Vital and Emerson, 5 miles. Charles E. Lewis, Minneapolis, Minn., president. [E. R. J., March 25, '11.]

Baltimore, Md.—The Hagerstown & Clear Spring Railway, Hagerstown, has asked the Public Utilities Commission in Baltimore for permission to build its proposed 25-mile electric railway to connect Hagerstown and Clear Spring, Md., and Mercersburg, Pa. L. N. Downs, Hagerstown, is interested. [E. R. J., Jan. 21, '11.]

Bessemer, Mich.—The Gogebic & Iron Counties Railway & Light Company, Ashland, has received a franchise from the City Council to build an electric railway through Bessemer. This railway will connect Ironwood and Bessemer. M. M. Reid, general manager. [E. R. J., March 4, '11.]

Buhl, Minn.—A. C. Gillette, representing the Mesaba Electric Railway, will ask the Council for a franchise to build its tracks in Buhl. Work on this proposed 36-mile railway will be begun as soon as the weather permits. It will connect Hibbing, Chisholm, Buhl, Kinney, Virginia, Eveleth and Gilbert. Oscar Mitchell, president. [E. R. J., Jan. 7, '11.]

Hibbing, Minn.—The Northern Traction Company has asked the Village Council for a 25-year franchise to build its tracks over certain streets in Hibbing.

St. Paul Park, Minn.—The St. Paul Southern Electric Railway has received a franchise from the Village Council to build its tracks along Pleasant Avenue to Pullman and Laurel, and thence to the village limits. The County Commissioners have granted this company franchises to build its tracks through Central Point and Frontenac. This company will build a 60-mile electric railway to connect St. Paul, Hastings, Red Wing and Lake City. W. L. Sonntag, St. Paul, general manager. [E. R. J., March 18, '11.]

St. Louis, Mo.—The St. Louis, Arcadia & Jefferson County Railroad, St. Louis, has received a 50-year franchise from the Municipal Assembly to build its tracks in southwest St. Louis. This is part of a plan to build an interurban railway into the district south and west of St. Louis. E. A. Hildenbrandt is interested. [E. R. J., Feb. 4, '11.]

Virginia City, Mont.—The Virginia City Southern Electric Railway has received a franchise from the City Council to build its tracks through Virginia City. This is part of a plan to build a 12-mile line between Virginia City and Alden. Karl Elling, president. [E. R. J. April 23, '10.]

Zanesville, Ohio.—The Zanesville & Meigs Valley Traction Company has asked the County Commissioners for a franchise to build an electric railway from Zanesville to Parkersburg. It will extend from Zanesville to Beverly, via McConnellsville. H. D. Blodgett, Zanesville, general manager. [E. R. J., June 18, '10.]

Toronto, Ont.—The Toronto Railway has received a franchise from the Ontario Railway and Municipal Board to build a loop on Louisa Street and to extend its line on Lansdowne Avenue and on several other streets in Toronto. Work will begin at once. This company will ask the Ontario Railway and Municipal Board for permission to extend its tracks on Spadina Avenue south of King Street, in Toronto.

Corvallis, Ore.—The Albany Interurban Railway, Albany, has asked the City Council for a franchise to build its tracks through Corvallis. It will connect Albany, Sweet Home, Lebanon, Brownsville, Holley and Corvallis. P. A. Young, general manager. [E. R. J., Dec. 3, '10.]

New York, N. Y.—The Public Service Commission, Second Division, has approved the franchise granted by the Board of Estimate for the Third Avenue Railway to build an extension in St. Ann's Avenue, Bronx, from 161st Street to Southern Boulevard, and thence south through Southern Boulevard.

Port Chester, N. Y.—The Public Service Commission, Second District, has authorized the New York & Stamford Railway to exercise a franchise granted by the Port Chester Council permitting it to construct a single-track line in and through North Regent Street, South Regent Street and Putnam Avenue.

***Lansdowne, Pa.**—The Terminal Street Railway has received from the Borough Council a franchise to build its railway through Lansdowne. This line will be operated by the Philadelphia Rapid Transit Company as soon as it is completed. It will begin at the terminal at Sixty-ninth Street and will extend through upper Darby, East Lansdowne and Lansdowne, and will connect with the tracks of the Darby and Lansdowne division of the Philadelphia Rapid Transit Company, which will make a direct line from Sixty-ninth Street and the Market Street elevated lines and Darby. Frank B. Rhoades, Media, and John Taylor, Wolfenden, are interested.

Providence, R. I.—The Rhode Island Company, Providence, has asked the Town Council for a franchise to double-track its line on Broadway.

***Longview, Tex.**—J. C. Turner, Longview, has received a franchise from the City Council to build an electric railway over certain streets in Longview. This is part of a plan to build a belt line around Longview.

Salt Lake City, Utah.—The Utah Light & Railway Company has received a franchise from the County Commissioners to extend its tracks on the Upper County Road to Halliday, and to extend its West Temple line in Salt Lake City.

***Olympia, Wash.**—P. H. Carlyon, Olympia, has asked the City Council for a franchise to build an electric railway in Olympia.

TRACK AND ROADWAY

Montgomery (Ala.) Traction Company.—Contracts will be placed during the next three weeks by this company for building a 2-mile extension from Washington Street to Carter Hill Road. W. J. Ginnavan, Montgomery, general manager.

Owens River Valley Electric Railway, Bishop, Cal.—This company advises that it is in the market for material for a 4½-mile electric railway to connect Bishop and Laws, and extending to Round Valley, a distance of 12 miles. The company will purchase power. Capital stock, authorized, \$200,000. Stock, issued, \$107,250. Officers: Harry Shaw, Bishop, president; Curtis Hillyer, San Francisco, secretary and treasurer, and Raymond Spaulding, Bishop, chief engineer. [E. R. J., March 25, '11.]

San Joaquin Valley Electric Railway, Stockton, Cal.—This company has ordered 300 tons of 75-lb. steel rails to be delivered in Stockton for building its railway between Modesto and Stockton.

Sierra Construction Company, Willows, Cal.—This company plans to build an electric railway from Woodland to Redding, on the west side of the Sacramento Valley. A. S. Lindstrom, Willows, is interested. [E. R. J., April 8, '11.]

Atlanta, Griffin & Macon Electric Railway, Atlanta, Ga.—This company is said to have secured financial backing for building its 80-mile railway between Macon and Atlanta.

Construction will begin at once. Rights of way have been secured. [E. R. J., Jan. 22, '10.]

Atlanta & Carolina Railway, Atlanta, Ga.—This company has awarded the contract for grading the first section of this railway between Atlanta and Conyers to Adams & Sturm, Columbus, Ohio, and work will begin within a month. The right-of-way has been secured from Atlanta to Augusta, and both cities have granted franchises. M. Mason, Atlanta, president.

***Jackson, Ga.**—It is reported that the Georgia Power Company, Jackson, is considering a plan to build an electric railway from Montezuma via Oglethorpe to Miona and Reynolds, Ga.

Pana, Girard & Jacksonville Interurban Railroad, Springfield, Ill.—This company advises that it has secured about three-quarters of the right-of-way. W. O. Myers is in charge of the construction. Work will be pushed vigorously to completion this summer on its line, which will connect Pana, Girard and Jacksonville. At a meeting of the directors J. J. Stowe, Girard, was chosen president and Charles Russell, 125 La Salle Street, Chicago, secretary. Headquarters, Springfield. [E. R. J., March 28, '11.]

Indianapolis, Columbus & Southern Traction Company, Columbus, Ind.—This company has begun double-tracking its line from a point three-quarters of a mile south of Indianapolis to Columbus. It is the purpose ultimately to double-track from Columbus to Seymour. General Manager Shane will supervise the work.

Indianapolis & Delphi Traction Company, Indianapolis, Ind.—This company is preparing to let a contract for the construction of its 75-mile railway to connect Sheridan, Carmel, Westfield, Burlington, Flora and Delphi. Henry L. Smith, Board of Trade Building, Indianapolis, general manager. [E. R. J., Apr. 8, '11.]

Indianapolis, Nashville & Southern Traction Company, Indianapolis, Ind.—Officials of this company have conferred with the officials of the Indianapolis, Columbus & Southern Traction Company with a view to making a traffic agreement between the roads. They plan to build from Nashville to Greenwood, and connect there with the Indianapolis, Columbus & Southern Traction Company. It is said that the survey from Nashville to Greenwood has been completed and the company will let a contract for the construction of the line at once. The same company is also promoting an 8-mile spur that will be built from Nashville to Fruitdale. This spur will be built immediately. John A. Johnson, Indianapolis, is interested. [E. R. J., Aug. 13, '10.]

Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.—This company has let a contract to build its line between Vincennes and Loogootee. Work is to begin on April 20. Joseph L. Ebner, Vincennes, is interested. [E. R. J., May 14, '09.]

Tri-City Railway & Light Company, Davenport, Ia.—This company states that it will soon build its extension from Davenport to Muscatine. J. G. White & Company, Inc., operating managers.

Osage, Ozark & Springfield Electric Railway, Fristoe, Mo.—This company advises that it will begin construction as soon as it has secured financial backing for its proposed 80-mile electric railway to connect Warsaw and Springfield via Fristoe, Cross Timbers and Buffalo. Money has been subscribed for preliminary surveys. The power stations of the company will be located at Warsaw and Bennetts Springs. E. E. Trippe, Fristoe, is interested. [E. R. J., April 1, '11.]

Metropolitan Street Railway, Kansas City, Mo.—This company is said to be in the market for 2,500 tons of 70-lb. and 80-lb. rails. The company has completed and placed in operation an extension from the Metropolitan power house on Second Street and Grand Avenue, Kansas City, to Sheffield.

Wildwood & Delaware Bay Shore Line Railroad, Trenton, N. J.—This company advises that it has begun the construction of its line to extend through Wildwood and across the state to Delaware Bay and there connect with the Wilmington, Delaware & Philadelphia Railway. This railway will also connect with the Philadelphia & Reading Railroad. The company will award contracts for bridge

work and for sand pumping. Its power station will be located at Rio Grande and it will operate 12 cars. Bonds issued, \$562,500. Officers: Curtis T. Baker, Wildwood, N. J., president; George N. Smith, Holly Beach, vice-president; J. Dubois, Wildwood, secretary; R. W. Ryan, treasurer; Slaughter & Hann, 1208 Real Estate Building, Philadelphia, Pa., general manager and purchasing agent, and H. E. Weir, chief engineer. [E. R. J., Dec. 17, '11.]

Kingston (N. Y.) Consolidated Railroad.—This company will reconstruct a mile of track and overhead work within the next few weeks.

New York Central & Hudson River Railroad, New York, N. Y.—The New York Public Service Commission, Second District, has decided on the plans for the elimination of the grade crossing on the Harlem division of this company in Bronxville, made necessary by the electrification of this railroad. The plan adopted provides for the construction of an undergrade crossing, 50 ft. wide, at about the present location of the present station. The cost will be about \$150,000. The commission has also ordered the elimination of the Main Street grade crossing in Irvington. An overhead crossing for pedestrians is to be constructed on the line of the present Main Street crossing. The total amount of this improvement will be about \$80,000.

***Delaware, Ohio.**—A delegation from the Commercial Club of Delaware appeared before the finance committee of the Ohio Senate last week and urged that the State build an electric line between Delaware and the Girls' Industrial Home, a distance of 8½ miles. It is estimated that the cost would be \$133,000, exclusive of rolling stock and power plants.

People's Electric Railway, Muskogee, Okla.—This company advises that it has begun the construction of its 300-mile railway to connect Muskogee, Tulsa, Fort Gibson, Claremore, Bartlesville, Wagoner and Oklahoma City. The company's power station and repair shops will be located at Muskogee. Capital stock, \$200,000. Officers: G. W. Risser, Oklahoma City, president; W. N. Patterson, Muskogee, vice-president; Samuel Spaulding, Muskogee, secretary, and T. H. Martin, Muskogee, treasurer. [E. R. J., April 1, '11.]

Interurban Railway, Clearfield, Pa.—This company advises that it has completed surveys and will begin work on its projected line within three months. Six straight gasoline and gasoline-electric cars will be operated. The line will be 19.8 miles long and will connect Philipsburg, Blue Ball, Wallacetown, Bigler, Woodland, Clearfield and Hyde City. The repair shops will be at Philipsburg. Capital stock authorized, \$500,000. Capital stock issued, \$200,000. Bonds authorized, \$500,000. Officers: W. Ellis Schomo, Clearfield, president and purchasing agent; A. C. Lansbery, vice-president; P. H. Ferguson, Philipsburg, secretary and treasurer. [E. R. J., Nov. 12, '11.]

Johnstown (Pa.) Traction Company.—This company expects to begin work soon on repairs to the line which will cost approximately \$40,000. New curves and switches will be installed at Main Street and Clinton Street. New rails will be laid. Similar work will be done on the stretch of Franklin line.

Philadelphia (Pa.) Rapid Transit Company.—This company contemplates building an extension between Germantown and Roxborough via the new Walnut Lane Bridge.

Eastern Pennsylvania Railway, Pottsville, Pa.—This company has begun surveys for building an 18-mile extension from Pottsville to Frackville and Shenandoah.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—Contracts have been placed by this company for building 5 miles of track in Sherbrooke.

Bristol (Tenn.) Traction Company.—This company will place contracts during the next month for building two extensions in Bristol and a loop in the western section of Bristol. It will also build an extension to Virginia Park and will standardize 10 miles of its line to the Park at Holston River. Fred Dulaney, Bristol, general manager.

Bonita Valley Rapid Transit Railway, Pleasanton, Tex.—This company is in the market for steel and ties. It has already built about 7,000 ft. of heavy work. It will build from 5 to 25 miles of track between Jourdanton and Pleas-

anton. The motive power will probably be gasoline. C. S. Young, San Antonio, superintendent. [E. R. J., Mar. 11, '11.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company is considering plans for building a passenger station on the northeast corner of Greenleaf Avenue and Penn Street, in Whittier.

Southern Pacific Railroad, Los Angeles, Cal.—This company has decided to locate its main passenger terminal at the foot of Market Street on the block bounded by Market, Mission, Steuart and Spear Streets, in Los Angeles.

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—Plans are being considered by this company for enlarging its car houses in Sacramento.

Tri-City Railway & Light Company, Davenport, Ia.—This company will build soon a new carhouse and repair shop in Rock Island.

Boston & Northern Street Railway, Boston, Mass.—The car house of this company situated off Ocean Avenue at Crescent Beach, Revere, was destroyed by fire on April 11. The entire structure 60 ft. x 150 ft., eight open cars and several snow plows were burned. The loss is estimated to be about \$30,000.

Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio.—This company's station and carhouses on Canal Street and Dumont Street, in Cincinnati, were destroyed by fire on April 5. The loss is estimated to be about \$35,000.

Western Ohio Railway, Lima, Ohio.—This company has completed and has opened for business its new freight station on Wayne Street, in Lima.

Eastern Pennsylvania Railway, Pottsville, Pa.—This company is making extensive alterations to its carhouse at Palo Alto. A new storeroom is being built under the carhouse and the former store rooms in the western wing are being altered into clubrooms for the employees. C. F. Crane, general superintendent.

Chicago, Burlington & Quincy Railroad, Deadwood, S. D.—This company is considering plans for building a depot at Downer's Grove, Ill., and one at Princeton, Ill. The structures are each to be one-story, of brick construction, and the cost of each is to be about \$20,000.

POWER HOUSES AND SUBSTATIONS

Montgomery (Ala.) Traction Company.—This company will place contracts during the next three weeks for building a power house in Montgomery. W. J. Cinnavan, Montgomery, general manager.

Phoenix (Ariz.) Railway.—This company is now building a new substation in Phoenix. The machinery to be installed will consist of a 100-kw motor generator set with transformers, oil switches, switchboards and necessary auxiliary apparatus.

Kokomo, Marion & Western Traction Company, Kokomo, Ind.—This company will place contracts during the next few weeks for building a new power plant. It expects to purchase 1000-hp boilers, stokers, a 200-ft. smokestack, coal-handling apparatus and other equipment necessary to the enlargement of its plant in Kokomo.

Tri-City Railway & Light Company, Davenport, Ia.—This company expects to purchase soon coal-handling apparatus for its power house at Moline.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company will purchase during the next six weeks new engines and generators with a capacity from 1000 to 1500 kw for its power plant in Harrisburg. Frank B. Musser, Harrisburg, general manager.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—This company has placed contracts for building a substation in Lennoxville. It has purchased three 100-kva transformers, switchboard, etc.

El Paso (Tex.) Electric Railway.—The Stone & Webster Engineering Company of El Paso has been awarded the contract for erecting a steel and concrete addition to the power plant of this company. A new generating and power plant will be installed in the new part, doubling its capacity at a cost of \$250,000.

Manufactures & Supplies

ROLLING STOCK

Montgomery (Ala.) Traction Company expects to purchase 10 new trucks.

Ogdensburg (N. Y.) Street Railway, it is reported, will purchase a number of open cars.

Bristol (Tenn.) Traction Company is in the market for four new city cars and two suburban cars.

Vancouver (B. C.) Power Company has ordered six Brill 27-MCB trucks from the G. C. Kuhlman Car Company.

British Columbia Electric Railway, Vancouver, B. C., has ordered two 45-ton locomotives from the Westinghouse Electric & Manufacturing Company.

Utica & Mohawk Valley Railway, Utica, N. Y., has placed an order with the G. C. Kuhlman Car Company for four 34-ft. 4-in. Brill semi-convertible combination passenger and smoking cars and eight 30-ft. 11-in. Brill semi-convertible pay-as-you-enter cars.

Indiana Union Traction Company, Anderson, Ind., has recently purchased from the Dorner Railway Equipment Company three new 13-bench open trailer cars, mounted on Taylor trucks; two 14-bench rebuilt open trailer cars, mounted on Brill 27-G trucks, and one 8-bench rebuilt open motor car.

TRADE NOTES

John Langan, of the Okonite Company, New York, N. Y., has resigned. His retirement from active business to take a much-needed rest is due to a recent illness.

C. H. Pearson has accepted a position in the hoist department of the Yale & Towne Manufacturing Company. Mr. Pearson was formerly connected with the Noera Manufacturing Company, Waterbury, Conn.

McKeen Motor Car Company, Omaha, Neb., has recently shipped a 70-ft. motor car to the Southern Pacific Railroad. This is the thirtieth car to be received by the Southern Pacific Railroad. All of them are in daily service on its lines in California and Nevada. The company has also received an order from the Sand Springs Interurban Railway for one 70-ft. car.

Wendell & MacDuffie Company, New York, N. Y., which has recently been appointed sole Eastern agent for the St. Louis Car Company, has appointed Charles A. Remelius, chief engineer of the company, in full charge of the car department. Mr. Remelius was formerly connected with the Public Service Railway and the Pay-As-You-Enter Car Corporation.

Wonham, Sanger & Bates, New York, N. Y., have taken the American agency for the helio-chronometer, about which they have issued a circular. The helio-chronometer is a device by which time is told from the sun, but, unlike the ordinary sun dial, it gives accurate time without calculation or allowances of any kind. Wonham, Sanger & Bates believe that this device will prove of interest in electric railway parks.

Gregory Electric Company, Chicago, Ill., is building an addition to its works to be completed July 1, 1911, that will double the capacity and also the storage space of its present plant. The addition will be brick and steel construction of the same type as the present buildings. A brass foundry will be added and also another Whiting 20-ton electric crane installed, to take care of the large volume of business that this company is doing.

Canadian Westinghouse Company, Hamilton, Ont., has transferred Chas. F. Gray, who for the past five years has been superintendent of construction, with headquarters at Hamilton, Ont., to the Winnipeg office of the company, to take charge as chief engineer of the construction staff, erecting switching and transforming apparatus, at Winnipeg's new 60,000-hp hydroelectric plant at Point du Bois, Manitoba, and the terminal station and substations in Winnipeg.

Southern Car Company, High Point, N. C., is being reorganized. J. Elwood Cox, of High Point, has interested in the property J. B. Duke, who is connected with the Southern Power Company and several electric railways; W. G. Brokaw, R. W. Morrison and Abraham Cook, the two latter

having been associated with the St. Louis Car Company. The company has increased the capital stock to \$200,000 and has purchased 12 acres of ground adjoining the property of the present plant, on which it will construct several large buildings and which will greatly increase the capacity of the plant.

United States Metal Products Company, New York, N. Y., which is a consolidation of the J. F. Blanchard Company and the John W. Rapp Company, and was incorporated in Massachusetts with \$6,000,000 common and \$2,000,000 seven per cent cumulative preferred stock authorized, for the manufacture of metal doors, window frames, interior trim, etc., has plans under way for an addition to its Rapp plant at College Point, N. Y. This will involve the erection of a shop 250 x 600 ft., a dock 75 x 600 ft. and an employees' bath house 50 x 60 ft. The officers of the company are John W. Rapp, president; H. C. Randall, C. J. Hale and A. J. Connell, vice-presidents; C. A. Leonardi, secretary, and E. B. Wires, treasurer.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received orders from the Johnstown Passenger Railway for five two-motor equipments, with type K-11 control; Toledo, Bowling Green & Southern Railway, for four four-motor equipments consisting of No. 304 interpole motors and type HL unit switch control; Georgia Railway & Electric Company, for six additional two-motor equipments, with type K-35 control; City Railways, Dayton, Ohio, for 10 two-motor equipments consisting of No. 306 interpole motors and type K-36 control; Nashville Railway & Electric Company, for four two-motor equipments consisting of No. 307 interpole motors and type K-35 control; Cincinnati Traction Company, for nine four-motor equipments consisting of No. 303-A interpole motors and type HL unit switch control, and from the Fairmount & Clarksburg Railway, for four additional four-motor equipments consisting of No. 306 interpole motors and type HL unit switch control.

Transportation Utilities Company, New York, N. Y., has been organized, with its main office at 30 Church street, to represent directly the Acme Supply Company and the General Railway Supply Company. The territory of this company in the steam railroad field will include all roads running east of Chicago and St. Louis, and in the electric railway and building trade fields the United States, Canada and Mexico. Among the devices and materials which this company will handle are steel doors, Flexolith composition flooring, metallic sheathing, diaphragms, vestibule diaphragm attachments, vestibule curtain rollers, weather strips, vestibule curtain shields, vestibule curtain hooks, Tuco car curtains and fixtures, National steel trap doors and lifting devices, standard roofing, vestibule curtain catches, roller deck sash ratchets, Imperial car window screens and Acme vestibule curtain handles. The company will be represented in Baltimore, Md., by H. B. Chamberlain, 704 North Fulton Avenue., and in Chicago, Ill., by John T. Morton, No. 703 Steger Building. W. L. Conwell is president and treasurer of the company, but this does not imply a severance of his connection with the Westinghouse Electric & Manufacturing Company. R. M. Campbell is also connected with the company.

Hale & Kilburn Company, Philadelphia, Pa., has been incorporated to take over the property and business of the Hale & Kilburn Manufacturing Company, for which Edward B. Smith & Company, Philadelphia, Pa., together with two New York banking houses, have underwritten the securities. The capital stock consists of \$2,206,000 first preferred 7 per cent cumulative stock, \$2,293,400 second preferred 7 per cent cumulative stock and \$4,000,000 common stock. The officers and directors of the company are: Francis H. Greene, president, of whom mention was made in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911; Robert B. Caverly, vice-president. The directors are: Albert H. Wiggins, Henry S. Hale, Otis H. Cutler, F. H. Eaton, A. M. Kittredge, W. H. Marshall, J. S. Coffin, E. H. Fallows, Winthrop Sargent, W. H. Davis, A. H. Lockett, W. F. Cutler, Herbert H. Dean, Francis H. Greene and Robert B. Caverly. Mr. Wiggins is president of the Chase National Bank of New York; Mr. O. H. Cutler, president of the American Brake Shoe & Foundry Company; Mr. Eaton, president of the American Car & Foundry Company; Mr.

Kittredge, president of the Barney & Smith Car Company, and Mr. Marshall, president of the American Locomotive Company. Dividends on the first preferred stock are payable quarterly from April 1, 1911. It is preferred as to both assets and dividends. After March 10, 1914, the second preferred stock is convertible into first preferred, provided the net earnings for the two years preceding shall have been at least 50 per cent in excess of dividends on both classes of stock. The preferred and common stocks have equal voting power, but in the event of default of dividends for four successive quarters on either class of preferred, the voting power of the common is suspended. The first preferred and the common stock have been placed in a voting trust for three years, and are represented by voting trust certificates.

ADVERTISING LITERATURE

Templeton, Kenly & Company, Chicago, Ill., have issued Catalog No. 13 on "Simplex" jacks, for use particularly by railways, industrial plants, contractors and engineers.

Railway Improvement Company, New York, N. Y., has issued a folder entitled "Power Pointers," which gives several reasons why the use of the coasting time recorder results in a saving to railways.

Canton Culvert Company, Canton Ohio, has issued a folder calling attention to its new catalog on "Acme" corrugated metal culverts and also containing several illustrations of culverts now in use.

Barber Car Company, York, Pa., has issued a post card, part of which is printed with sympathetic ink, so that when the card is exposed to the light a clear picture of the "Barber" center entrance car is brought to view.

H. W. Johns-Manville Company, New York, N. Y., has published the "J-M Roofing Salesman" for April, 1911. The publication contains several interesting articles and also a number of illustrations of buildings roofed with J-M asbestos roofing.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Circular No. 1517, which contains a reprint of a series of advertisements on railroad electrification which appeared in the technical magazines from Jan. 1, 1911, to Mar. 1, 1911.

General Vehicle Company, Long Island City, N. Y., has published "Elec-Tricks" for March, 1911, containing an article on "G. V. Electrics in United States Postal Service," and also illustrating and describing the operation of G. V. electric trucks under the most severe conditions.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued sheets 1-A, 2-A, 18-B and 34-A, Series 336, on "Mounting for Radial Load without Thrust," "Mounting for Combined Radial and Thrust Loads," "Mounting Directions" and "Electric Motor and Other Two Journal Mountings."

W. N. Matthews & Brother, St. Louis, Mo., have printed the third edition of "Matthews' Telephone Line Construction Book." Besides the data which have been retained from the previous edition, about 30 pages of new specifications and diagrams have been added. In addition the book contains four interesting articles on "Flexibility in the Cable Plant and How to Obtain it at the Minimum Cost," "The Murray, Fisher and Varley Loop Tests," "Wire Transpositions" and "Underground Conduit Construction."

The J. G. Brill Company, Philadelphia, Pa., has published the *Brill Magazine* for March, 1911. It contains a biographical sketch of Charles S. Sergeant, vice-president of the Boston Elevated Railway. The sketch is accompanied with an excellent portrait of Mr. Sergeant as a supplement. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Mexico City, Mex.," "Shipment of Double-Deck Cars to Concepcion, Chile," "Prepayment Semi-Convertible Cars for Macon, Ga.," "Express Cars for Fairmont & Clarksburg Traction Company," "Single-Truck Semi-Convertible Cars for Madison, Wis.," "Open Cars for Danbury, Conn.," "Semi-Convertible P-A-Y-E Cars for Benton Harbor, Mich.," "Supplements to the Brill Magazine," "Test of the Brill Half-Ball Hanger by the Philadelphia Rapid Transit Company," "Manufacturer's Inspection and Test of Trucks" and Part III of "A History of The J. G. Brill Company."

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CONTENTS.

Specifications for Car Wiring.....	697
Comparative Statistics.....	697
Progress in Rule Making.....	698
Handling Materials and Supplies Economically.....	698
The Proportionate Investment in Supplies on Hand.....	699
Electrification of the Salt Lake & Ogden Railroad.....	700
Flange Wear on St. Clair Tunnel Locomotives.....	707
Metropolitan Street Railway Organization.....	708
Details of Suggestions of T. E. Mitten for Rehabilitation in Philadelphia	711
Convention of the Missouri Electric Association.....	712
Meeting of the Committee on City Rules.....	713
Lugano and Tesserete 1000-Volt Direct-Current Railway.....	715
Meeting of Interurban Rules Committee.....	716
Reinforced Concrete Carhouse of the San Diego Electric Railway... ..	717
Platform Bars in Chattanooga.....	717
Rapid Transit Publicity Campaign in Brooklyn.....	718
Announcement of Block Signals on Illinois Traction System.....	718
New Combination Baggage Cars and Snow Sweepers for Michigan United Railways.....	719
Pitch Filler in Akron, Ohio.....	719
"Turn-In" Car at Dayton.....	719
Electric Railway Legal Decisions.....	720
News of Electric Railways.....	722
Financial and Corporate.....	725
Traffic and Transportation.....	728
Personal Mention.....	729
Construction News.....	730
Manufactures and Supplies.....	733

Specifications for Car Wiring

While the biennial revision of the code of installation rules of the National Board of Fire Underwriters which was completed recently did not result in any changes in the special rules affecting the wiring of cars or carhouses, the new specifications for rubber-covered wire which were adopted have an important bearing on the safety of car wiring, inasmuch as all wire used must be of an approved brand. The new specifications are much more severe in their test requirements than those which they supersede, since they embody not only mechanical and electrical tests, but chemical tests as well. It is well known that rubber compounds containing only a small percentage of pure rubber can be made up so that they will pass either a mechanical or a chemical test, but it is far more difficult to make an inferior compound which will stand both tests. The effect of putting the new specifications in force will be to insure a much better grade of rubber-covered wire at an increase in cost of not more than 15 per cent for the smaller sizes and less for the large sizes. While the use of any grade of wire which conforms with the new specification will be permissible for car wiring, too much dependence should not be placed on the label showing that the wire is of an approved brand. It pays to use the very best insulation on car wiring, exposed as it is to moisture and the flow of heavy currents. The cost of the wire is only a small part of the total cost of wiring a car, and long life of the insulation is essential for safety, reliability and low maintenance cost.

Comparative Statistics

It is needless to say that in a comparison of the service of two or more railway properties, or indeed in the comparison, on any unit basis, of two dissimilar things, all of the circumstances affecting the service or things compared should be taken into consideration if complete knowledge is desired. The car mile in a small city with light grades is a unit of an entirely different value from that in a large city with steep grades and considerable street obstruction, and each of these car miles is apt to differ widely from the car mile on a high-speed interurban road. Similarly, comparisons of pull-ins per 1000 car miles will be but a slight measure of the operating and mechanical efficiency of a company unless many of the elements which affect the number of pull-ins form part of the comparison, such as the extent of the defect which the company regards as sufficient to warrant it in withdrawing a car from service, type of equipment used, the extent to which repairs are allowed on the road and many other attendant circumstances. These remarks are made because in some quarters there seems to be a tendency to place undue emphasis upon the comparative pull-in defect records of the electric railway companies in New

York City compiled by the Public Service Commission and reproduced in our issue of last week. The value of statistics of this kind when they relate entirely to one company is considerable because presumably they have been compiled upon the same basis. Thus they assist the management quickly to detect the parts of the equipment which are relatively weak, either mechanically or electrically. From this standpoint they are interesting and instructive. But, as with all statistics, their use should not be stretched in an attempt by anyone to draw conclusions which are not justified by the widely different bases used in their compilation.

Progress in Rule Making

The prospects that the association will reach an amicable and satisfactory agreement this year on the perplexing question of standard codes of rules for city and interurban roads are most encouraging. Last week the interurban rules committee finished its revision of the rules in a two-days meeting which was marked by a spirit of compromise and harmony. The code of interurban rules which it will present to the convention for adoption this year is essentially the Denver code, modified in some respects, but rearranged and renumbered to conform as nearly as possible with the American Railway Association code. A few steam road practices of doubtful safety when applied to interurban railway operation, such as those conferring superiority by direction and those permitting the use of time orders, have been omitted, and rightly so, because a standard code should be a safe code to use under any and all conditions. The city rules committee also held a meeting last week, and in addition to revising the standard code decided tentatively upon a set of station or carhouse rules and also upon a special code of rules for the operation of prepayment cars. The two committees have not yet been able to unite upon a code of bell signals for both city and interurban roads. Standardization in this particular is highly desirable in view of the many cases where interurban crews have to run over city tracks. Response to a bell signal on the part of trainmen comes to be instinctive rather than studied—indeed, it is well that it should be so, because action is then quicker—but a man's instinct or intuition cannot be changed several times a day at will whenever he passes the city limits. We realize that a great deal can be said in favor of each code of bell signals, but the differences on the whole are so slight that it would seem as if the two codes could be harmonized. Both committees have wisely decided to give wide publicity to their proposed revisions of the rules and to solicit early comment and criticism of them from the member companies. This request should be respected, because in no other way can real progress be secured. If the committees have made serious omissions or mistakes these errors can be rectified if called to the attention of the committees in time, or if the rules as a whole are satisfactory, expressions of approval of them on the part of member companies would be equally helpful. But if all or a greater part of the criticism of the rules is reserved for the floor of the convention it will be practically impossible to make the needed changes in time to receive the thoughtful sanction of the association. It will probably be necessary for several years, and possibly always, to make slight changes in the codes from time to time. But it would be a pity if an extended revision of either the city or the interurban code should have to go over for another year.

HANDLING MATERIALS AND SUPPLIES ECONOMICALLY

The problem of handling materials and supplies economically is one of pressing importance in electric railway service on account of the yearly tonnage and the variety of articles consigned to operating companies. On a small system the provision of adequate facilities for receiving and transferring both light and heavy supplies and equipment is a matter of no little pecuniary consequence, and on a large system, using frequently from 20,000 tons to 30,000 tons of track and rolling stock, building and machinery material per year, the arrangement of the receiving yard and its equipment with suitable tracks and tools, the design of new yard facilities and the improvement of established plant exert a powerful influence upon the cost of operation. It is difficult to overestimate the advantages of locating a receiving yard for material close to one or more main lines of track providing easy access to the entire system, with convenient steam and water connections where a property is adjacent to navigable streams or bays, and with facilities which obviate rehandling of material so far as possible before it is delivered at the point of utilization.

On large systems the tendency for the volume of freight handled to increase from year to year makes it desirable for the shifting of all cars to be under the jurisdiction of a single department, allowing all branches of the service equal facilities. The reduction of hand labor to the minimum in unloading material is of recognized importance, and while it will always be necessary to unload certain kinds of material by manual methods, the bulk of the tonnage received and shipped can be handled more economically by an electric crane. Thus, in a recent instance, it was found that the cost of unloading girder rail by the existing hand methods was about 45 cents per ton. With light derricks on tool cars, electrically operated, it was possible to unload and stack rails 33 ft. long, weighing 935 lb. each, for 12 cents to 15 cents per ton. A locomotive crane was found to be necessary to handle 60-ft. rails, weighing 2700 lb. each, and at a cost of 10 cents to 12 cents per ton. Similarly it was found possible to load scrap rail by electric hoists at 15 cents per ton when stored at a main material yard, compared with an expense of 75 cents per ton for hauling the scrap rail to a distant railroad yard and loading it on the cars. With an electric crane a shipment of structural steel can be handled at a maximum of 50 cents per ton, contrasted with at least \$2 per ton where a derrick has to be erected and an engine furnished for unloading.

In applying electric cranes to receiving yards the best results require in many instances a rearrangement of the trackage, the elimination so far as possible of sharp curves and grades, the installation of parallel tracks for transfer of freight between steam railroad and electric service cars, and the avoidance of material storage between existing tracks where the spacing is narrow. The provision of ample storage facilities for heavy steel equipment on the premises of the receiving yard is desirable in the interests of avoiding rehauling and extra handling. The installation of parallel tracks for crane service is of special importance, for the unloading of rails at the side of a train instead of at its end is preferable on the ground of lower cost. The provision of trackage which permits the company's service cars or trains to stand beside the strings of loaded cars is also worth looking into.

Coal constitutes the largest single item of supplies purchased and delivered in cars or boats, and rapid and economical coal handling apparatus is an essential part of the equipment of a modern power station. On a large system other bulk material, such as sand, broken stone and paving blocks, is handled in quantities which frequently would justify the installation of special unloading trestles, conveyors and other labor-saving machinery. In St. Louis, for example, a new sand-drying plant has been built in which the sand is not touched by hand from the time it is loaded on the railroad cars in which it is shipped until it is delivered at the carhouses. The wet sand is dumped from hopper-bottom cars into a pit between the rails of the unloading track and is lifted to the storage bin above the drier by a conveyor. Where from 3000 to 4000 tons of sand are dried each year a saving of even 10 cents a ton in the cost of handling will pay large returns on the investment in suitable conveyors. The Detroit United Railway and the Public Service Railway both have facilities for handling track material in the most economical manner in the storage yards.

The question of demurrage is an important feature of material handling. Where the company depends upon a postal-card notification from the steam railroad that a car has arrived, 12 hours may easily be lost through the rule that a demurrage charge is figured back to the time the car is set, deducting the free unloading time and including the time lost in the mails. Notification by the shipper of the details and time of the shipment may properly be required in contracts, and an arrangement between departments in the electric railway organization whereby cars may be unloaded by the most available force is desirable in forestalling demurrage. Another source of economy which may easily be utilized is the provision in receiving yards of quarters for the housing of materials not to be immediately used. Cement, for example, cannot be exposed in wet weather without serious damage, and a saving of 25 cents per ton may readily be made by proper housing, taking account of the expense of demurrage and the cost of haulage to other locations prior to retransportation for use in the field. The consignment of as much freight as possible to a central receiving yard may be a means of saving substantial sums per year, since freight may be handled in a trolley train for perhaps 20 cents per ton in comparison with a cost of 60 cents per ton by teams. The pavement of teaming ways cannot safely be overlooked, since poor thoroughfares render it impossible to handle the full capacity of vehicles utilized.

The possible saving in handling supplies in bulk, of course, is greater than in the case of miscellaneous supplies purchased in smaller quantities. Nevertheless, suitable facilities in the general storehouse where this class of material is delivered will reduce the cost of unloading and placing in the stock bins to a marked degree. The storeroom of the Indiana Union Traction Company at Anderson, Ind., is an excellent example of a building constructed not only for the safe and orderly storage of material but with a view also of reducing to a minimum the labor required to handle it on and off cars. A depressed track runs through one end of the room and the level of the car floor is the same as the floor of the storeroom. Thus the contents of a car can be trucked to any part of the room without undue exertion in ascending or descending ramps. A somewhat different but equally satisfactory arrangement of an unloading track within the storeroom is used in the Syra-

cuse shops of the Oneida Railway. Smooth floors and wide, level aisles contribute to rapid loading and unloading of material on trucks.

THE PROPORTIONATE INVESTMENT IN SUPPLIES ON HAND

A report regarding the Philadelphia Rapid Transit Company to which we referred in our issue of March 11, 1911, shows a total value of supplies and materials on Dec. 31, 1910, of \$829,417. This is not far from the values shown for the corresponding item in the balance sheets made public by the company previously. The totals at other recent dates have been as follows: June 30, 1910, \$826,901; 1909, \$973,870; 1908, \$930,712; 1907, \$1,255,248; 1906, \$746,859. The average for the six dates is \$927,168. Of course these figures do not necessarily approximate the average of the account, materials and supplies, which may have been lower or higher at the time the reports were issued than at most other periods during the year.

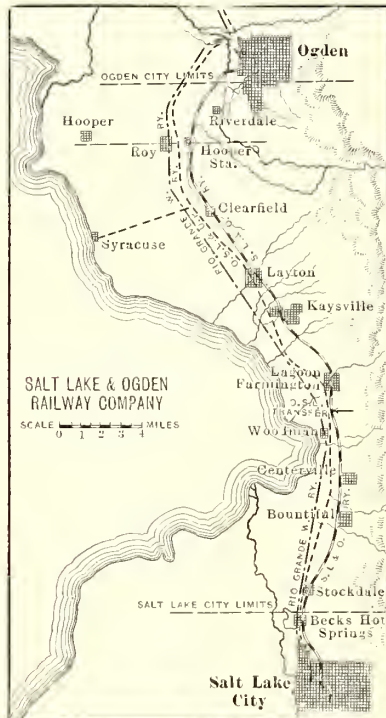
It is true that the fair investment for a year can be shown only by the average of the amount of the daily investments for the period. However, with the exception of 1907 there is no great variation in the figures given. At the close of the fiscal year 1906 the value of materials and supplies was 4.2 per cent of the total earnings and income for the year. In 1907 it rose to 6.8 per cent. For subsequent periods the percentage was as follows: 1908, 5 per cent; 1909, 5.2 per cent; year ended June 30, 1910, 4.5 per cent. The most recent published report of this company to which we directed attention in the foregoing gives the earnings for the six months ended Dec. 31, 1910, and of this total the value of supplies and materials on hand on the last day of the year was 8 per cent, which would indicate about 4 per cent on the approximate gross earnings for the full year. Analysis of the total of \$829,417 shows the following: General supplies, \$244,057, or 29.4 per cent; maintenance of way supplies, \$457,888, or 55.2 per cent; general engineering construction supplies, \$53,551, or 6.5 per cent; coal supplies, \$62,092, or 7.5 per cent; maintenance of power, \$11,829, or 1.4 per cent.

It appears from these figures of the values of supplies, provided they can be accepted as typical of the policy of the company, that a smaller proportionate amount is carried in this account by this corporation than by many other street railways. Of course, the amount of the account does not of necessity represent the gross investment in materials and supplies, which may properly be carried in part in operating expense accounts. The census record of 1907 shows that 939 operating companies carried supplies accounts on the day of reporting their balance sheets of 7.3 per cent of their gross operating earnings for the yearly period. While inspection of the accounts of several representative companies of the country shows a supplies account of 2 or 3 per cent more of gross earnings than is indicated by the Philadelphia report, other prominent electric railways appear to carry as small an investment, in proportion to their revenue, as is shown by our calculations regarding Philadelphia. If the regular investment in materials and supplies is excessive it implies a waste of interest on capital. Managers may find that it is well worth their while to study means of lessening their working capital requirements.

ELECTRIFICATION OF THE SALT LAKE & OGDEN RAILROAD

Nearly 20 years ago Simon Bamberger, of Salt Lake City, and several business associates began to construct a railway line that was to extend northward to a point near Ogden and thence in a southeasterly direction through the Weber River canyon to Coalville, there to tap the coal mines of that district. The total length of the road was to be 68 miles, with a 10-mile branch to Ogden. Some rights-of-way were obtained and a 5-mile extension was constructed as far as the Becks Hot Springs. Later the road was built 10 miles farther north to Lagoon, where Mr. Bamberger established a beautiful artificial resort that since has been successfully operated in connection with the road. An extension was next made to Layton, 22 miles from Salt Lake. This was the northern terminus of the road for several years.

A few years ago it was decided that it would not be wise to build the line through to Coalville as originally planned, inasmuch as the Union Pacific Railroad had built its main line through the Weber canyon, with a branch to Coalville. The increase in wealth of the Salt Lake valley lying west of the Wasatch Mountains and the growth in importance of the two largest cities of the State—Ogden and Salt Lake—on the other hand influenced the completion of the line to join those two cities. The cities already were connected by



Salt Lake & Ogden Railway—
Map of Route



Salt Lake & Ogden Railway—Exterior of Car House at Ogden

two steam railroads, but it was believed that a profitable business could be derived from an interurban railway catering by means of frequent trains to a passenger as well as an express and freight traffic. That this belief was justified has been evidenced by the success with which the Salt Lake & Ogden Railroad Company has met since it began operating electric car service between Salt Lake and Ogden in May, 1910. During this period the gross receipts have more than doubled.

The old road, extending from Salt Lake City to Layton, was operated by steam. The changes preparatory to electrical operation have included the bonding of the rails and the stringing of feeder high tensions and trolley wires over the old track; the building of 13 miles of new roadbed and track from Layton north into Ogden; the construction of the necessary generating stations and substations and the purchase of electric motor cars.

ROUTE

The main line is 35.5 miles long. The principal towns en route are shown on the accompanying map. At St. Joseph, Bountiful and Kaysville branch lines connect with brickyards, thereby bringing the total trackage up to 40 miles.

The road has excellent terminal facilities at both Salt Lake and Ogden. The railway enters the suburbs of the former city opposite the Oregon Short Line depot. The company has franchises, however, which will permit its tracks to reach the center of the business district, and the Federal Building, over the city streets.

The track runs in a general northerly and southerly direction, skirting the western slope of the Wasatch range and lying between the mountains and Great Salt Lake. Midway between the terminals the line runs within a mile of the lake, of which it affords an excellent view. The route parallels the main lines of the Oregon Short Line and the Rio Grande Western railways, but its location makes it more accessible to the farmers of this valley, one of the most fertile belts in the State.

At Ogden the track leaves the private right-of-way and runs to Twenty-fifth Street, the principal cross street of the city. The Ogden depot is midway between the union station and the center of the business district on the line of the Ogden Rapid Transit Company. An extension is now being built north to reach the northern and eastern portions of the city. The company owns a right-of-way up the Ogden River canyon to "Idlewild," a mountain hotel owned by Mr. Bamberger; but it is doubtful if a railway will be built there by his company, inasmuch as the Ogden Rapid Transit Company now operates a line in the canyon as far as the Hermitage Hotel and is planning to build on to "Idlewild" and points in the valley beyond in 1911.

The Salt Lake & Ogden company owns several pieces of property fronting on the streets traversed by its tracks, which can be used as needed for storage tracks, shops and terminal stations and facilities. The main car and repair shops, however, are to be located at St. Joseph, 5.4 miles north of Salt Lake City. Here the company owns a large tract of land and



Salt Lake & Ogden Railway—Bridge Over Union Pacific Railway

at present has its main storage tracks and a small repair shop. As necessity arises modern and complete shop buildings and car houses will be erected at that point.

Track connections for the interchange of freight are maintained at Salt Lake with the Rio Grande and the Ogden Short Line railways, and at Ogden with the Union Pacific.

ROADBED

Outside of the cities the company operates on its own right-of-way, which has a standard width of 66 ft. Although only

single track with sidings is at present in use, provision is made for a double track throughout. The heaviest roadbed construction occurs at the Ogden end of the line, where bridges with the required cuts and fills are necessary for crossing the Weber River, the Union Pacific tracks and a local street railway track. At present the river crossing is made on a temporary trestle, but a concrete bridge with concrete approaches will soon be built at that point.

The Union Pacific crossing is made over two tracks and over Pacific Avenue. Above the tracks is a pony truss with 180-ft. span covering the entire right-of-way at the steam road. Over Pacific Avenue is a 9-ft. plate girder, the span being 89 ft. The bridge carries two tracks and is built on a slight skew with a grade of 1.1 per cent descending toward Ogden. A clearance of 22 ft. is provided over the Union Pacific tracks. At Wall Avenue the 80-ft. street is crossed with an 83-ft. bridge, made up of a 48-ft. central plate-girder span and two approaches, all resting on concrete abutments.

TRACK

The maximum grade is 1.1 per cent and the maximum curvature outside of the cities is 6 deg. The track is laid with 85-lb. T-rail, A. S. C. E. section, on a gravel-ballasted roadbed with standard size Oregon pine ties. All rail joints are bonded with No. 0000 "twin-terminal" copper bonds and the rails are cross-bonded every 600 ft. with cross bonds of like section. Long sidings are used to avoid delays at meeting points.

POWER AND SUPPLY

The Salt Lake & Ogden Road within the coming year will have two independent sources of power. One of these is from the high-tension supply lines of the Telluride Power Company and the other is a generating station which the railway company is building near the midpoint of its line. For the first year of operation a contract for power was made with the Telluride company.

POWER-STATION BUILDING

The site of the steam power station is at Lagoon directly

charge from the condenser is utilized to warm the water in a bathing pool.

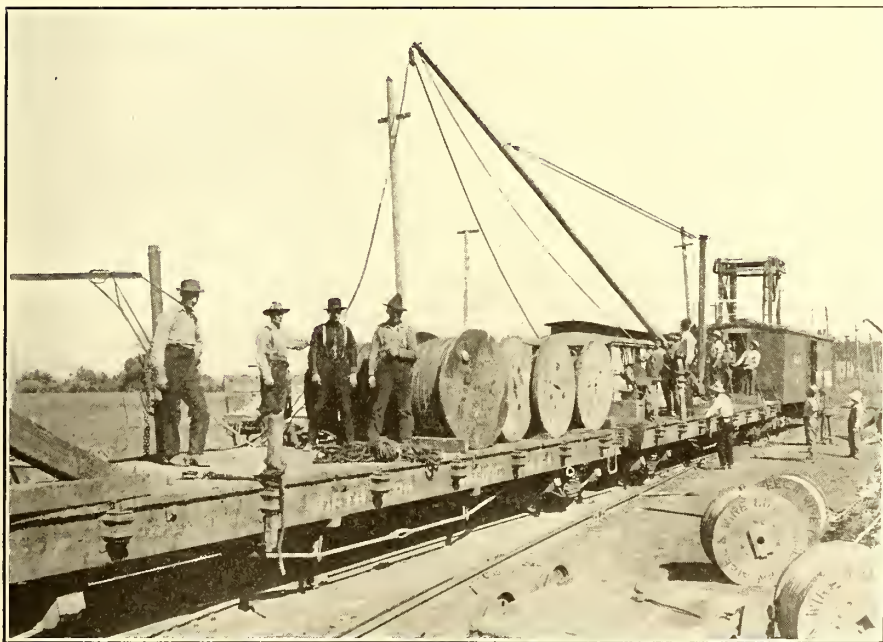
The new power station building is a steel-frame structure with concrete foundations and brick curtain walls. It is 106 ft. 6 in. wide by 143 ft. long. The floor space is subdivided by a fire-resisting wall into a boiler house and an engine room. A bay in the engine room 49 ft. long x 25 ft. wide incloses the high-tension buses and switching apparatus. The boiler and engine room roofs are carried on structural steel girders spanning from wall to wall. These girders carry 8-in. I-beam pur-



Salt Lake & Ogden Railway—Train at Salt Lake Terminal

lines which support a roof of reinforced concrete that is protected by a tar and gravel coating.

Coal is received over an elevated track supported on a steel floor structure and a wing wall so arranged that a storage space directly beneath the receiving track is opposite the boiler firing aisle. The boiler equipment includes one 306-hp, two 250-hp and four 150-hp Heine boilers equipped with American underfeed stokers and force draft. The boiler-plant auxiliaries are located on the boiler house floor. This boiler house has no basement. Ashes will be removed by a belt conveyor which will carry them to overhead bins from which they may be loaded into cars.



Salt Lake & Ogden Railway—40-ft. Derrick for Stringing Feeder Lines and Setting Poles



Salt Lake & Ogden Railway—Track Construction Inside of Town Limits

across the tracks from an extensive summer garden and amusement park, which has for several years been operated successfully by this company. The park was described and illustrated in the Oct. 2, 1909, issue of the *ELECTRIC RAILWAY JOURNAL*, page 522. A steadily flowing stream from the nearby mountains passes through the park and its waters are stored to form a lake. This water supply determined the location of the generating station at Lagoon and, as will be described later, condensing water is obtained with a lift of less than 3 ft. The dis-

The initial generating equipment includes two Allis-Chalmers cross-compound Corliss engines belted to two 400-kw General Electric, 2200-volt, three-phase, 60-cycle generators, and a 400-horsepower horizontal type Curtis turbo-generator connected for operation either on high-pressure steam or the exhaust from the reciprocating engines. Exciting current for the generators is furnished by a turbine-driven unit. A condenser equipment of the Le Blanc type will serve the two engines as well as the turbine.

culating water is taken and which is fed by the stream earlier mentioned.

ELECTRICAL WIRING

The generators deliver 2300-volt current through oil switches and buses located in the engine room basement to a bank of 150-kw transformers which raise the potential to 45,000 volts. The transformers are delta-connected on both sides. A sectional elevation through the high-tension bay shows in general the arrangement of the low-tension switch gear beneath the engine room floor, the main control board in the engine room and the transformers and lightning arresters in the high-tension bay. All the high-tension connections within the power house are made of $\frac{5}{8}$ -in. copper tubing mounted on post-type insulators. The buses into which are connected the high-tension leads from the transformers are supported under the ceiling of the high-tension bay. Parallel with the transformer bus is a similar bus for the outgoing lines. Both buses may be sectionalized with hand-throw switches. The line bus is connected with the transformer bus through K-10, 45,000-volt solenoid-operated switches. Similar switches are installed for each outgoing line.

The high-tension bay with its exposed 45,000-volt connections is so arranged that all of the wiring is in plain sight and any disturbance may quickly be located and segregated. Facility of access for inspection and repairs is provided by a mezzanine floor and provision is made for handling the transformers on industrial railway tracks built in the floor. The wiring is so laid out that practically all leads are suspended and thus the floor space is clear for the movement of employees and apparatus. The transformer leads are fitted with special potheads which permit of quick disconnection in case it is necessary to run on open delta or to replace a transformer. All 45,000-volt leads pass in or out of the building through the roof. They are insulated from the reinforced concrete roof slabs by large nested porcelain roof entrance insulators installed as shown in the accompanying engravings of the power house and substations.

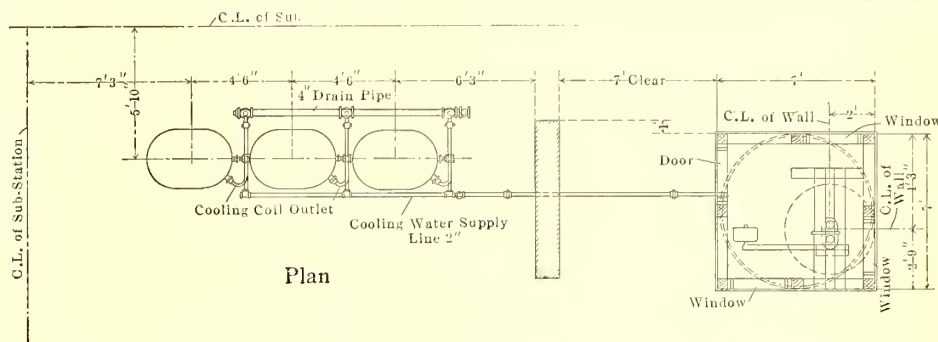
LIGHTNING ARRESTERS

Three high-tension lines extend out of the power station, one in each direction along the railway company's right-of-way, and the third to connect with the transmission system of the Telluride Power Company. All three outgoing lines have similar protection against disturbance from lightning. This protection is afforded by banks of electrolytic lightning arresters having horn-gap discharge points above the roof of the building, which are shown in the vertical section through the high-tension bay. Lightning arrester connections are made with copper tubing. The bank of electrolytic lightning arresters is installed within a protecting framework on the floor of the high-tension bay directly behind the transformers. From the tops of the arresters the leads pass directly up and through the roof to one side of the horn gaps. The other side of the horn gaps connects with the outgoing line. Electrolytic lightning arresters require charging and so an operating mechanism has been provided with which the horn gaps may be closed to supply current to the aluminum cells which form the arresters. This operating mechanism has a latch to prevent accidental closure of the horn gaps.

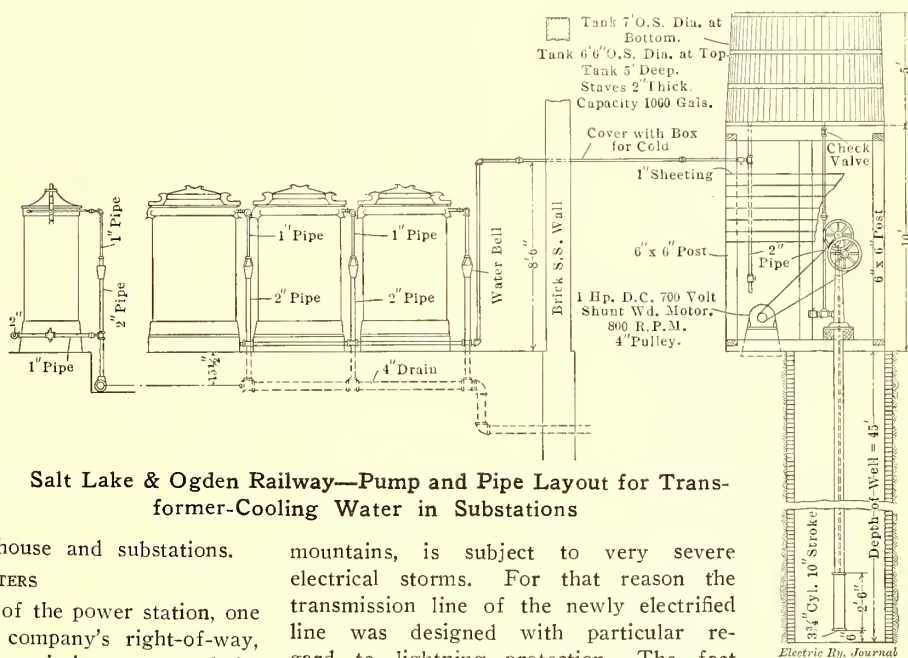
TRANSMISSION LINE

The transmission wires are carried on an independent pole line built of 45-ft. cedar poles with 8-in. tops and 12-in. butts set 6 ft. in the ground. The transmission poles are set 150 ft. apart on tangents and 80 ft. on curves, while the trolley poles are spaced 80 ft. apart throughout. The butts of the transmission poles, as well as those of the trolley suspension, were treated with Carbolineum. Where wet ground made it necessary the poles are set in concrete, barrels being used for forms. An accompanying engraving shows the general dimensions and arrangement of the transmission poles. The transmission circuits consist of three No. 14 copper or aluminum wires carried on $8\frac{1}{2}$ -in. triple petticoat porcelain insulators supplied by the Ohio Brass Company. Two 4-in. x 5-in. x 8-ft. cross-arms are used, the wires being spaced 7 ft. apart.

The valley of the Great Salt Lake, closely shut in by high



Plan



Salt Lake & Ogden Railway—Pump and Pipe Layout for Transformer-Cooling Water in Substations

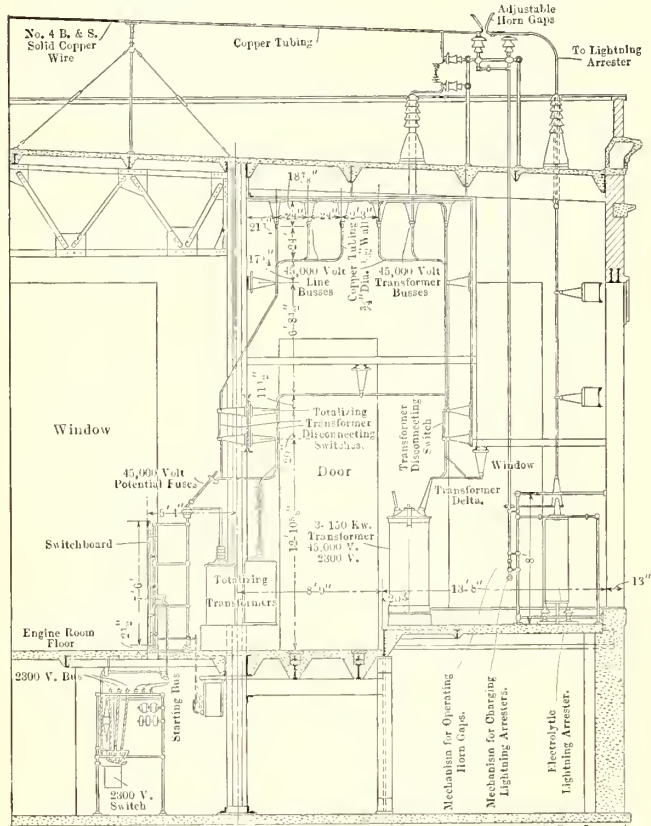
mountains, is subject to very severe electrical storms. For that reason the transmission line of the newly electrified line was designed with particular regard to lightning protection. The fact that during the first eight months of operation up to the time this article was written the transmission system had not experienced a shutdown indicates the thoroughness of construction and the excellence of the design. A No. 8 galvanized-iron guard wire is strung on top of the poles for lightning protection, its support being a galvanized channel iron fastened with lag screws to the pole top. To the fact that the protecting ground wire is grounded at every pole may be credited the freedom from lightning troubles enjoyed by this transmission line.

SUBSTATIONS

The trolley wire and feeders are supplied with 700-volt direct-current from four motor-generator substations located about 10 miles apart. One substation is installed within the power house at Lagoon. The substation installations are similar and each includes one 400-kw motor-generator set receiving 2300-volt a. c. and delivering 700-volt d. c. Banks of three 150-kw water-cooled oil-insulated transformers receive current from the trans-

mission line at 45,000 volts potential and deliver it to the motors at 2300 volts. The generating and substation apparatus is chiefly of General Electric manufacture.

The building design of the substations conforms to that of the power house, having concrete foundations, floors and roofs with brick side walls. A floor plan of one of these substations



Salt Lake & Ogden Railway—Section Through High-Tension Bay of Power House

is shown. This design is standard for all stations. The building provides a generous amount of floor space for the accommodation of duplicate motor-generator sets and attendant apparatus. An aisle and tracks between the high and low-tension sections of the substation furnish an economical means for handling heavy apparatus directly into the substation on cars.

In general the wiring plan of the substations is similar to that in the power house. All high-tension leads are brought into the building through roof insulators. The circuits of the 45,000-volt, three-phase power line pass through choke coils just below the roof insulators, thence through disconnecting switches to underhung buses supported on post-type insulators. From these buses connections are made to K-10 oil switches which throw the transformers onto the line. All the high-tension connections are made with $\frac{3}{4}$ -in. copper tubing. The extreme simplicity of the high-tension connections in one of these substations is shown in the plan. The arrangement of the roof entrances and the location of the larger apparatus are shown in a sectional view.

The substations, as well as the power house, are protected from lightning discharges by electrolytic arresters, the horn gaps of which are installed above the substation roofs. The aluminum cells are placed directly under the high-tension entrances and are inclosed in a grillwork to protect against accidental contact. A special mechanism has been installed to facilitate the operation of the horn gaps and the transferring of the fourth electrolytic arrester cell from the ground side to the line side for charging. This mechanism essentially consists of rope drive for the moving parts with special stops attached to the ropes, indicating the extent of travel for completing the movements necessary to close the horn gaps and to transfer the end cell. Arrester discharges are indicated by an alarm bell.

TRANSFORMER WATER SUPPLY

An independent plant has been installed at each substation to supply cold water for the transformers. One of these plants is shown in elevation by the engraving on page 703. Water is taken from a well by a 1-hp, 700-volt shunt-wound motor, driving a Rumsey pump which discharges into a storage tank having a capacity slightly more than 1000 gal. The pump and its driving motor are installed within the inclosure surrounding the supports for the storage tank.

OVERHEAD LINE CONSTRUCTION

The overhead construction of the road is of particular interest because of the care taken to gain permanence and because an especially large amount of copper has been installed. An accompanying engraving shows a cross sectional view of the right of way and indicates the arrangement and dimensions of the poles and fittings supporting the trolley and feed wires. Span construction with 80-ft. pole spacing along the track and 35-ft. spacing across the track has been used throughout the length of the line. Two No. 0000 grooved trolley wires have been installed over the present track and one of these wires is so arranged that it can, at comparatively small expense, be shifted on the span wire to a position over the second track which the company expects to build. The span wires are supported by 35-ft. poles on one side and 30-ft. poles on the other. Every trolley span pole has been back-guyed with a 6-in. anchor. A variety of anchors has been utilized. The anchors have $\frac{5}{8}$ -in. rods and are connected with the pole tops by $\frac{3}{8}$ -in. steel strand cables.

In the cities where the poles could not be guyed they were set in concrete for the full distance below ground. On the right of way all poles were anchored with a concrete collar 24 in. in diameter extending 18 in. below the ground and 5 in. above. The butts of the poles were treated with Carbolineum for a length of 8 ft.

The poles on one side of the track carry two-pin cross arms, on one pin of which a 750,000-circ. mil feeder cable has been installed for the full length of the road. The south section of the road, 5 miles in length, where the heavy switching will be done, is fed by the two such cables. Westinghouse type M. P.



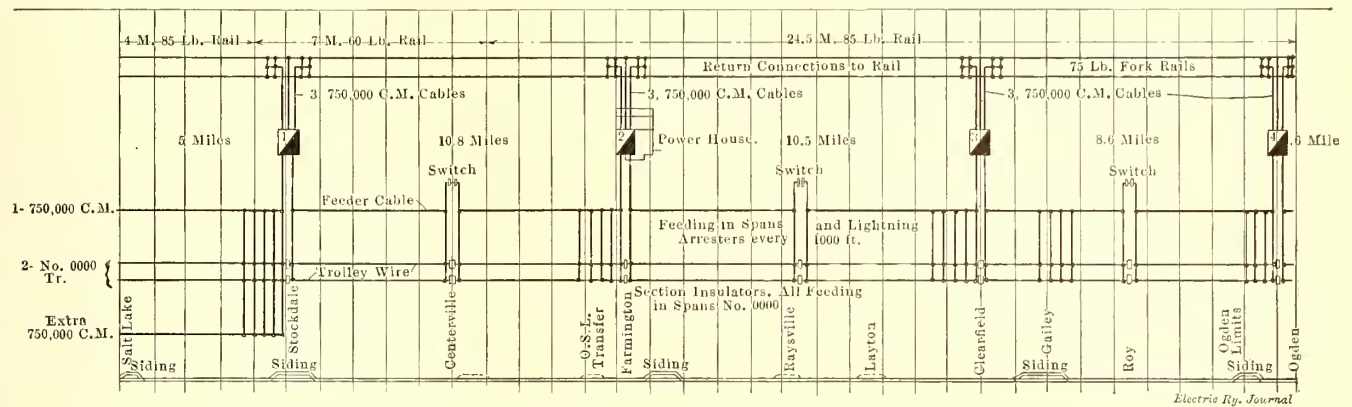
Salt Lake & Ogden Railway—Switching Tower at Power House

lightning arresters are installed on every eleventh pole, at which points trolley feeding taps also are made. The lightning arrester ground wires are No. 4 B. & S. solid copper, which for a distance of 7 ft. above the ground are inclosed in sections of $\frac{3}{4}$ -in. standard wrought-iron pipe terminating in malleable

points 6 ft. below the ground surface. It is planned to supplement the trolley line arresters with electrolytic arresters placed in the substations.

Two pairs of telephone wires, one of No. 12 galvanized iron and the other of No. 10 copper, have been erected. The iron wire line is used by the traffic department and the copper line is

position, but any one may quickly be dropped at the will of the dispatcher. The dropping of the semaphores is effected by an installation of Gill selectors supplied by the United States Electric Company. These selectors do not require an independent signal line, but are operated over the dispatcher's telephone circuit. The dispatcher is provided with a separate key



Salt Lake & Ogden Railway—Feeder Diagram

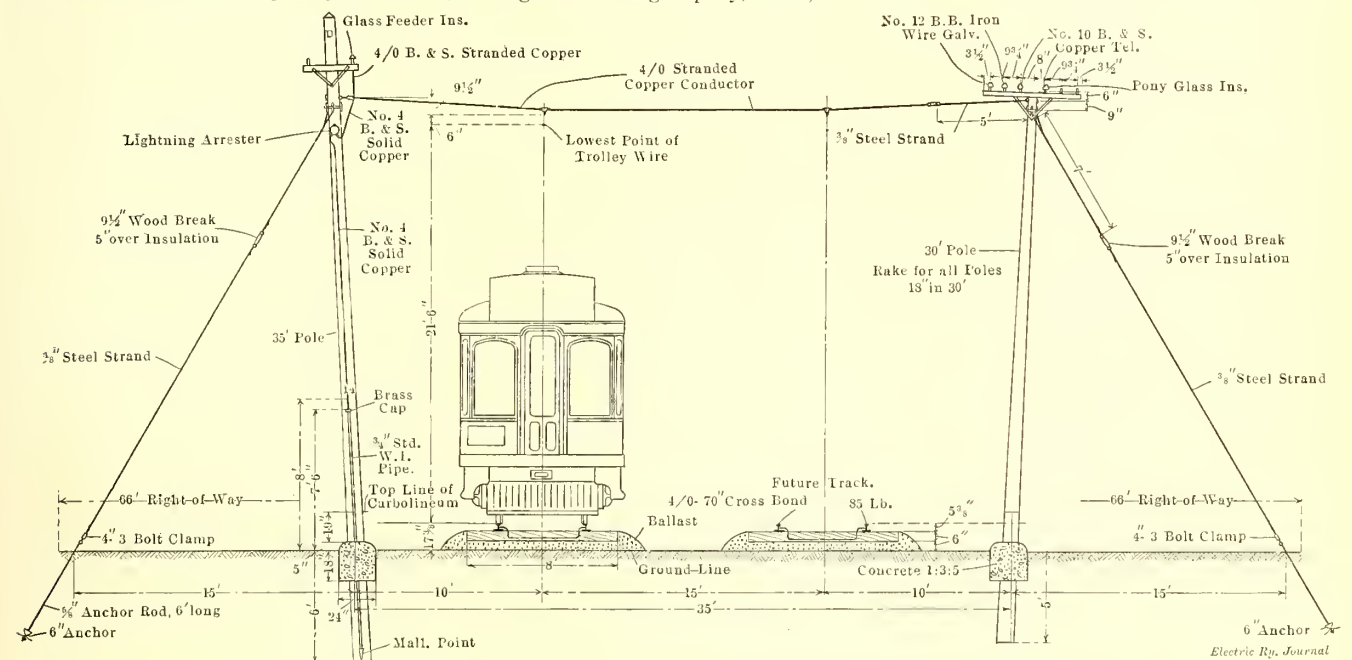
for the dispatcher and for a system of dispatcher's signal boards operated by telephone selectors.

So far as possible special tools were used to facilitate the construction of the pole line and overhead wiring. A hand derrick with a 40-ft. boom, as illustrated, was mounted on a flat car and used for setting poles. This derrick also was used to place the feeder and trolley wires at the pole tops. So far as possible all of the work of fitting up the span and guy wires and serving them into the strain insulators was done at a field shop at one point on the road. In this way considerable labor was saved and the speed of the work could be accelerated because the wire men were protected from the weather and could use heavier tools than would be convenient to carry along the road. In the towns and cities all poles are painted a dark green and each trolley pole is plainly numbered, the figures reading

for each semaphore and by turning this key certain impulses are sent over the telephone line. These impulses will cause to operate only that selector switch controlling the semaphore corresponding with the sending button turned by the dispatcher. The semaphores are returned to the clear position by the train crews which are stopped by them.

ROLLING STOCK

The initial motor-car equipment of the road consists of 10 three-compartment cars built by the Jewett Car Company. The 40 coaches used by the company when the road was operated by steam are brought into service as trailers. Some of these coaches are being remodeled for electrical operation and 10 trail-car bodies of the same dimensions as the new motor cars are now under construction at the shops of the Niles Car Company, Niles, Ohio.



Salt Lake & Ogden Railway—Standard Overhead and Track Construction

alternately from the north and the south. The overhead fittings for the trolley and feeder installation are of the Westinghouse type, but the pole hardware was supplied by the Western Electric Company.

DISPATCHERS' SIGNALS

The safety of train operation is assisted by the use of an equipment of dispatchers' signals with stop boards located at all sidings. Normally all these boards are held in the clear

The motor cars, which have a seating capacity of 60 passengers, are designed to conform as nearly as possible to standard M. C. B. specifications. The following are the dimensions of the cars:

Length over buffers.....	55 ft. 0 in.
Length over corner posts.....	41 ft. 0 in.
Length over center to center of trucks.....	35 ft. 0 in.
Width over all.....	9 ft. 0 in.
Height from bottom of sill to top of car.....	9 ft. 7 in.
Wheel base.....	6 ft. 6 in.
Weight complete.....	80,000 lb.

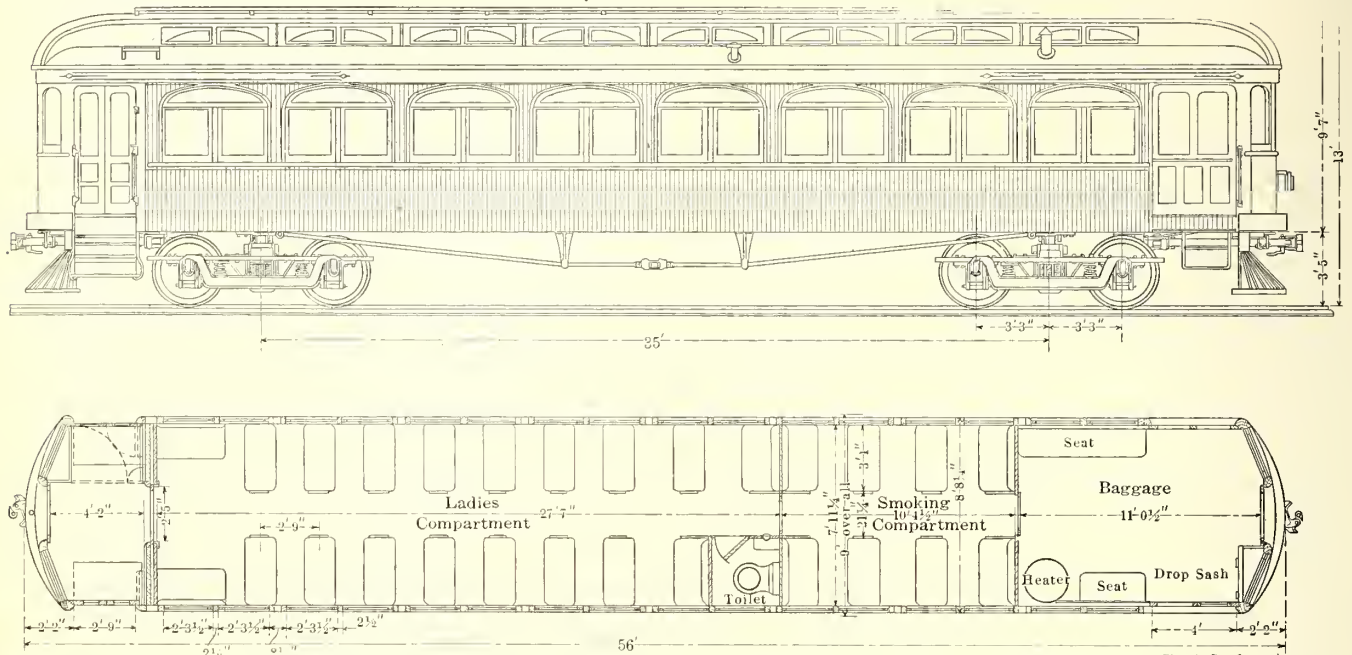
The interiors of the cars are finished in solid mahogany with full-vaulted Empire ceilings. The main compartment has 15 reversible and four stationary seats of the Hale & Kilburn No. 199 type. The smoking compartment has four reversible and four stationary seats.

The baggage compartment occupies a space 11 ft. long at the front end of the car and has two sliding doors. Two fold-

m.p.h. They are geared to 53 m.p.h. so that the run between Salt Lake and Ogden may be made in less than an hour.

TRAIN SERVICE

The operation of the road is handled by a train dispatcher located at Salt Lake. Twelve trains are operated each way daily, the headway being 1 hour and 20 minutes. For the regular run, making 16 stops between Salt Lake and Ogden, 1 hour

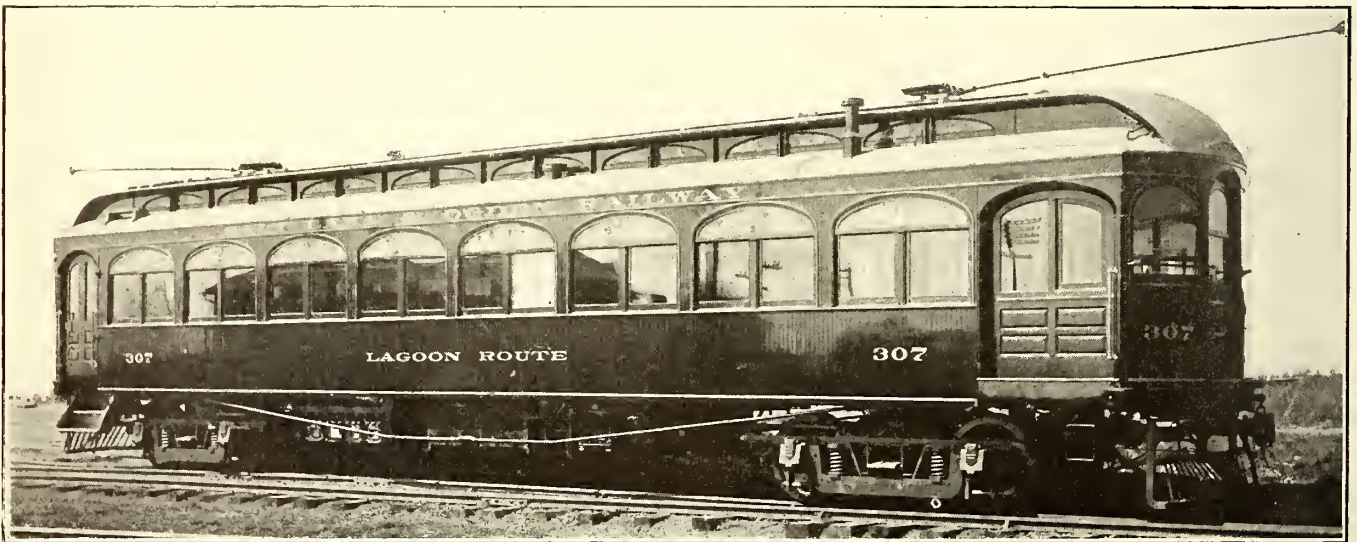


Salt Lake & Ogden Railway—Elevation and Plan of Standard Motor Car

ing seats are placed along the side walls. The vestibules, which are 4 ft. 6 in. long, have end doors for use during train operation. The front end of each car is set off as a motorman's cab. The cars are built for single-end operation, but are equipped with double-end control.

The cars are equipped with Janney radial M. C. B. couplers and McConway & Torley draft gear adapted for train operation in heavy interurban service. Other equipment installed

and 10 minutes is required. Three of the trains are operated on a "flyer" schedule, making but four stops en route and requiring only one hour for the trip. Agents are located at Bountiful, Centerville, Lagoon, Kaysville and Layton, and at the terminals. Since the road was electrified and extended to Ogden the passenger traffic has more than doubled and is increasing rapidly. Between 150 and 200 through passengers are carried each way daily and many more local passengers. This



Salt Lake & Ogden Railway—Standard Motor Car

on these cars includes: Baldwin class 78-30 trucks, Symington ball-bearing centerplates, Woods roller side bearings, Keystone air sanders, Edwards window fixtures, Curtain Supply Company's ring curtain fixtures, Duner toilet fixtures, Westinghouse AMM brake equipment, General Electric 205-B motors, General Electric type M automatic control and Peter Smith hot-water heating system.

The cars are designed for a schedule speed of about 30

increase in traffic has been made in spite of the fact that the rates have been increased over those charged during the steam period, and also in spite of the steam railroad competition. The company sells its local tickets at a rate of practically 2½ cents a mile. In addition it issues 500-mile mileage books for \$8.75, or at the rate of 1¾ cents a mile. These books can be used unrestrictedly. Under steam operation the Salt Lake & Ogden Railway charged 80 cents one way and \$1.60 round trip

between Salt Lake and Ogden. Under electrical operation the corresponding rates are \$1 and \$1.80. The steam roads, especially the Oregon Short Line, have bettered their service considerably, even placing a "flyer" in service which makes the trip in 45 minutes. The bulk of the traffic, however, goes to the electric railway, as the passengers seem to prefer the cleaner ride, the regular schedule and also the facility of boarding cars on the street.

FREIGHT AND EXPRESS

In addition to the passenger traffic the company handles baggage and an express, milk and general freight business. At present the total traffic averages 9000 car miles a day. Although a good, substantial local freight business has been built up this summer, this is being discouraged now in an effort to build up the express business.

Local freight is not solicited except in carload lots. A through freight train is operated every other day. Express is carried on every train. The rates for both express and freight are identical with those charged for corresponding service by the steam railroads. The company does not operate under the regulations of the Interstate Commerce Commission, but conforms in every respect to standard steam railroad practice. Interchange of freight is now made between the Oregon Short Line and Rio Grande roads at Salt Lake and with the Union Pacific at Ogden and the electric railway receives a fixed switching charge for cars turned over to a steam road.

At present the carload freight is handled by steam locomotives, but orders have been placed for two electric locomotives of a heavy type capable of handling 10-car trains. The bulk of the foreign traffic consists of coal for the company's own plant and for the consumers along the line. About 75 per cent of the foreign freight passes through Salt Lake. An average of five or six cars of freight is shipped out daily, the shipments consisting principally of brick and the products of the canning factories on the road.

In the way of local business the company hauls into Salt Lake about 30 to 40 cars a week of brick, vegetables, fruit, etc. Under a contract with the City of Salt Lake all garbage of the city is hauled to a dump 6 miles north. The railway company furnishes the cars and power, unloads the cars and sets fire to the dumping. The spur to the dump crosses the Oregon Short Line, the crossing being protected by an automatic electric block signal. Another remunerative class of freight is the manure which the company hauls from the city and distributes to the farms along the line.

PERSONNEL

The work of placing the road on a firm operating basis is in the hands of the superintendent, Robert H. Grinnell, formerly of the Chicago City Railway.

The officers of the Salt Lake & Ogden Railway Company are: President, Simon Bamberger; vice-president, Sidney M. Bamberger; secretary and treasurer, J. B. Bean; auditor, W. E. Jones; general station agent, Roy Needham.

The selection of system and the design of conversion from steam to electricity were placed in the hands of H. A. Strauss, consulting engineer of Chicago, and the construction of the entire system was carried out by the Falkenau Electrical Construction Company, of Chicago, as general contractors.

FLANGE WEAR ON ST. CLAIR TUNNEL LOCOMOTIVES

Since electric operation of the St. Clair Tunnel of the Grand Trunk Railroad was begun the driving wheels of the locomotives have been subject to excessive flange wear. After 10 months' operation, when the locomotives had made only 80,000 miles, it was necessary to turn the driving wheels and form new flanges. To do this 5/16 in. of metal had to be cut off of the treads and the operation was expensive owing to the cost of removing and replacing the wheels and the loss of good metal. Under normal conditions the tires should last six years. The following information regarding the nature and probable cause of the excessive wear has been furnished this paper by W. D. Hall, superintendent of power plant and electrical equipment of the St. Clair Tunnel:

The three locomotives in use each consist of two duplicate half-units. Each half-unit is mounted on three pairs of driving wheels 62 in. in diameter. No guiding wheels are used and the rigid wheel base is 16 ft. The total weight of each half-unit is 67½ tons, which is evenly divided on the three pairs of driving wheels. The motors are each of 250 hp and are geared to the driving axles. The height of the center of gravity of the locomotives is 51 in.

Almost all the flange wear takes place on the leading wheels at each end of the half-units, which are turned end for end at regular intervals to distribute the wear as evenly as possible. The flange wear on the interior wheels is very slight and wear on the tread of any wheel is barely perceptible. The depth of the flanges is 1¼ in. and the minimum thickness allowed is 1 in. The steam locomotives which formerly were used for hauling trains through the tunnel did not show excessive flange wear on any wheels.

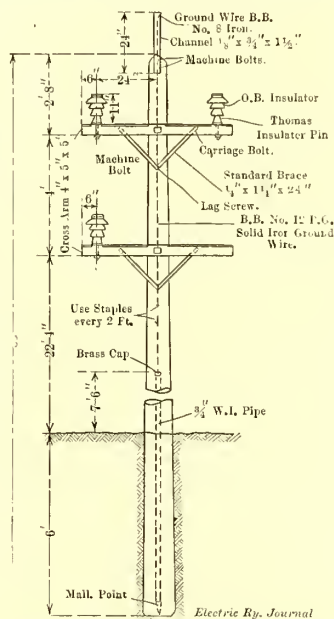
While some of the flange wear on the electric locomotives is due perhaps to the frequent application of the brakeshoes in descending the 2 per cent grades in the tunnel, there is no doubt that it is mainly due to curve resistance encountered in the tunnel yards. Conditions have been improved very much since last June. Up to that time various wheel flange lubricators had been tried out, but satisfactory results were not obtained, mainly on account of the heating of the tires due to the almost continuous braking which is necessary in descending the long approaches.

Mr. Hall designed an apparatus which would spray oil on the wheel flanges and one which would do this only when the tires required lubricating to enable them to take the curves with as little resistance as possible. By pressing an electric contact button at any controller or, in the case of a steam locomotive, by opening a small air valve, oil is sprayed on the flanges of the leading wheels of each locomotive from one lubricator. The action of the combination of oil and air not only lubricates the flanges, but cleans them from grit as well, as the spray forces the dirt and grit to the outer edge of the flange. When two or more locomotives are coupled together the pressing of a button on any locomotive will cause the leading wheels of each locomotive to be lubricated. For steam locomotives, or where electric current is not available, the action of the lubricator is the same except that it is controlled by an air valve placed near the operator and controlled by hand. This device has been giving very satisfactory results since all the electric locomotives were equipped.

The first lubricator of this design was tried out and has been in continuous operation since July 10, 1910, but a sufficient time has not elapsed to determine just what saving has been effected.

MEETING OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The Central Electric Traffic Association met in Lima, Ohio, on April 12, 1911. After transacting routine business the rest of the day was spent in studying the various changes noted in the Interstate Commerce Commission's Tariff Circular 18-A.



Salt Lake & Ogden Railway—High-Tension Pole Details

METROPOLITAN STREET RAILWAY REORGANIZATION

After several postponements, the hearing before the New York Public Service Commission, First District, on the plan for reorganization of the Metropolitan Street Railway was resumed on April 6. Testimony in relation to the value of the property was offered on behalf of the joint committee of bondholders.

TESTIMONY OF CHARLES F. UEBELACKER

Charles F. Uebelacker, chief engineer of Ford, Bacon & Davis, submitted a table showing a division of the appraisal cost of

Under examination by Mr. Mathewson, Mr. Uebelacker said that he took the actual cost of reproduction of the system as a unit and apportioned it between the several companies. If the companies had been constructed separately, the cost would have been greater than the cost as a single company. Similarly the development charge was for the production of a single property. The development charge for organizing and putting in operation twenty companies would undoubtedly exceed that for the production of a single company. On some items of cost of construction and equipment nothing was allowed for sub-

TABLE I—COST OF REPRODUCTION NEW AS EXISTING OF THE PROPERTY OF THE METROPOLITAN STREET RAILWAY SYSTEM AS OF OCT. 1, 1910, AS ESTIMATED BY FORD, BACON & DAVIS

		Item.	Total.
I. Development.			
1. Development period (obtaining rights and capital).			
A. Rights.			
a. Time and expense of development organization and legal and technical departments.	Inventory priced	\$ 3,061,980	
b. Cost of property owners' consents.	Estimated	2,529,700	\$ 5,591,680
B. Capital.			
a. Time and expense of development organization and legal and technical departments.	Inventory priced		438,600
C. Interest on development expenditures during development period.	Computed		802,417
2. Construction period (expenditure of capital to completion of construction).			
A. Rights (completion).			
a. Time and expense of permanent organization.	Inventory priced	\$ 183,000	
b. Initial payments for franchises and trackage rights.	Estimated	4,814,800	4,997,800
B. Capital (completion).			
a. Time and expense of permanent organization.	Inventory priced	\$ 1,233,750	
b. Payments to underwriting syndicates.	Estimated	2,500,000	3,733,750
C. Interest on development expenditures during construction period.	Computed		2,533,407
Total cost of development.			\$ 18,097,654
II. Construction.			
1. Permanent organization—time and expense on construction.	Inventory priced		\$ 732,250
2. Cost of franchise security deposits.	Estimated		740,000
3. Cost of reproducing land (exclusive of special value for street railway purposes).	Appraisal by W. H. Wheelock		13,808,987
4. Cost of construction and equipment based partly on labor and material and partly on sub-contracts, and as of Jan. 1, 1909, or dates shown in inventories.			
a. Straight track and paving, electric.	Inventory priced	\$13,983,662	
b. Special track and paving, electric.	" "	2,319,189	
c. Horse track and paving, straight and special.	" "	1,317,657	
d. Ducts laid with track.	" "	1,485,169	
e. Ducts laid separate from track.	" "	858,854	
f. Feeder cables and telephone system.	" "	3,524,468	
g. Power plant and sub-station apparatus.	" "	4,256,939	
h. Buildings.	" "	8,157,900	
i. Equipment of buildings.	" "	608,609	
j. Rolling stock, electric.	" "	8,148,019	
k. Rolling stock, horse.	" "	710,399	
l. Fixed tools and appliances.	" "	221,013	
m. Fourth avenue tunnel.	" "	466,356	
n. Incidentals.	" "	3,901,024	49,959,258
5. General contractor.	10 per cent of Items 4 a-n		4,995,926
6. Cost of engineering.	5 per cent of Items 4-5		2,747,759
7. Interest and taxes during construction.	Computed		7,333,723
8. Furniture and fixtures, implements and apparatus.			
a. Stores and supplies.	Inventory priced	\$ 1,518,512	
b. Office furniture and fixtures.	" "	170,953	
c. Floating tools, wagons, etc.	" "	131,886	
d. Incidentals.	5 per cent of Items 8 b and c	15,142	1,836,493
9. Working capital.	Compiled from receivers' balance sheet		1,182,434
Total cost of construction, as of dates of inventories.			\$ 83,336,830
10. Cost of construction added from dates of inventories to Oct. 1, 1910.			771,756
Total cost of construction, as of Oct. 1, 1910.			\$ 84,108,586
Total cost of reproduction, as of Oct. 1, 1910 (subject to exceptions as noted below).			\$102,206,240

NOTE:—The above estimate does not include any: (a) "Going concern" value, of the character recognized by authoritative decisions. (b) Value of claims against various street surface railway companies, described in lot 13 of supplemental decree of foreclosure of "4 per cent mortgage." (c) Special value of land for street railway purposes, as distinguished from ordinary purposes. (d) Profits of promotion. (e) Discounts on securities. (f) Special value of existing franchises. (g) Reorganization assets not included in estimated cost of reproduction. (h) Net investment in superseded property.

reproduction new as of Oct. 1, 1910, between the thirteen corporations composing the Metropolitan system. The total cost of construction amounted to \$84,108,586, or, with development expenses, to \$102,206,240. With the reorganization assets and the net investment in superseded property the total was \$120,561,885. The values for the system as a whole are shown in Tables I and II, published herewith.

Charles F. Mathewson, counsel for the joint reorganization committee, stated that this total was exclusive of some other elements of value that had not been valued separately.

contracts or sub-contractors' profits. Straight track and special track work and other items to which reference was made involved sub-contractors' profits, but no allowance therefor was made in the estimate. Sixty-seven per cent of the track of the Metropolitan was actually constructed by sub-contractors. If profits for sub-contractors were to be computed it would be fair to figure them, if put on the basis of percentage on payroll and material furnished by the contractor, at 7½ or 10 per cent, or, if put on the basis of so much per unit completed, probably 15 or 20 per cent. On straight track alone, at

15 per cent, this would be \$1,500,000. The allowances for incidentals and general contracts did not include anything for sub-contractors' profits.

Mr. Mathewson stated that such profits should be allowed, but that it was thought better to show what these additional items would be than to add them in the first instance.

In explaining how he computed the value of incidentals illustrated in Table III Mr. Uebelacker said he used his judgment as to the detailed estimate summarized by each item. Wherever possible he took individual instances of actual construction and checked his judgment. If he found that the instance which he had taken showed a rather lower result than his judgment had indicated, he reduced the figure to correspond with the actual result. If he found that the example showed a higher result than his judgment, he almost always considered it an exceptional case and did not raise his estimate. The net result was an average of 8.8 per cent for incomplete inventories and incidentals, whereas his judgment had always indicated about 10 per cent for that item. An estimate for contingencies, made in advance, would vary somewhat with the information available, but Mr. Uebelacker's allowance for such items, in addition to the amount

as a long-continued strike. A small item was added under buildings for ordinary delay.

The allowance of 10 per cent for contractors' profit on certain items was a customary allowance for that purpose on work

TABLE II—SUMMARY OF CAPITALIZABLE ASSETS.

1. Cost of reproduction of Metropolitan Street Railway System.....	\$102,206,240
2. Reorganization assets not included in Item 1, consisting of (a) cash, and (b) bonds (\$1,200,000) and stock (\$300,000) of Central Park, North & East River Railroad Company, as estimated by reorganization committee, at least.....	5,000,000
	\$107,206,240
3. Add net investment in superseded property below....	13,355,645
Total.....	\$120,561,885

This summary does not include any:

- "Going concern" value, of the character recognized by authoritative decisions.
- Value of claims against various street surface railway companies, described in lot 13 of supplemental decree of foreclosure of "4 per cent mortgage."
- Special value of land for street railway purposes, as distinguished from ordinary purposes.
- Profits of promotion.
- Discounts on securities.
- Special value of existing franchises.

TABLE III—DETAILS OF INCIDENTALS.

Item	Track Paving and Special.	Cars and Equipment.	Power Plant and Cables.	Buildings and Equipment.	Total.
(a) Incomplete inventories.....	\$ 209,000	\$ 81,453	\$ 189,318	\$ 171,326	\$ 651,097
(b) Breakage and waste material, rehandling material.....	d	5,098	26,804	67,831	99,733
(c) Delays.....	d	c	d	68,530	68,530
(e) Weather damage.....	d	c	d	c	d
(f) Accidents above insurance policies, careless blasting, etc.....	50,160	d	2,610	17,130	69,900
(g) Temporary work.....	d	4,180	590,000	77,094	671,274
(h) Tracing, demurrage, express, etc.....	48,000	d	c	34,264	82,264
(i) Miscellaneous oil, waste, ice, etc.....	46,658	4,452	1,200	2,500	54,810
(j) Broken and lost tools, etc.....	167,195	4,242	31,178	85,663	288,278
(k) Lights for night work.....	d	3,239	400	1,000	4,639
(l) Mistakes and poor work removed.....	12,000	d	28,000	85,663	125,663
(m) City and government inspection and permits.....	414,848	d	400	4,000	419,248
(n) Storeyard rental and wages.....	127,645	43,490	d	102,795	273,930
(o) Cost record office.....	41,798	2,257	15,955	17,132	77,142
(p) Drying out and testing machinery.....	d	17,640	23,000	1,250	41,890
(q) Wear and tear during construction.....	d	c	d	c	d
(r) Pay roll insurance.....	208,994	3,699	5,000	85,663	303,356
(s) Fire insurance.....	d	1,045	4,037	8,566	13,648
(t) Sub-contractor's bonds.....	104,497	32,033	39,887	42,831	219,248
(u) Fidelity bonds.....	1,440	c	c	c	1,440
(v) Paymasters' wages and expenses.....	95,600	2,299	c	37,692	135,591
(w) Supervision, power, watching, cleaning, etc.....	d	39,872	c	171,326	211,198
(x) Telegraph, telephone, traveling, stationery, etc.....	40,000	11,280	2,600	34,265	88,145
Total incidentals.....	\$ 1,567,835	\$ 256,279	\$ 960,389	\$1,116,521	\$ 3,901,024
Total cost.....	20,005,945	7,845,884a	7,779,908	8,766,509	44,398,246b
Per cent of incidentals.....	7.8	3.3	12.3	12.7	8.8b

a Electric cars and equipment only. No allowance made for incidentals on horse cars.

b Does not include horse cars, fixed tools and appliances and Fourth Avenue Tunnel, for which no allowances for incidentals have been made.

c Amount so small as to be disregarded.

d Included elsewhere.

TABLE IV—INTEREST AND TAXES DURING CONSTRUCTION.

Item.	Principal, Including Incidentals.	Years from Beginning Work to Use.	Interest Period—Years.	Rate of Interest.	Tax Rate.	Carrying Cost. (A)
Permanent organization.....	\$ 732,250	5	2 1/2	6 Comp.	—	\$ 115,188.78
Franchise security deposits.....	740,000	5	2 1/2	"	—	116,407.92
Land.....	13,808,987	3	3	"	1.4	3,270,955.00
Fourth Avenue tunnel.....	466,356	2	1	"	1.4	34,706.21
Track paving, ducts and feeders.....	25,096,749	1	3	"	1.4	1,398,798.67
Power plant and substation apparatus.....	5,217,228	2	1	"	1.4	388,266.11
Buildings and equipment.....	9,883,030	1 1/2	3 1/4	"	1.4	550,843.03
Rolling stock and horses.....	8,812,562	1 1/4	1 1/8	"	1.4	81,574.03
Fixed tools and appliances.....	221,013	—	—	"	1.4	—
General contractors' profit.....	4,969,794	—	—	"	—	—
Engineering.....	2,733,386	2	1 1/2	"	—	250,924.83
Stores and supplies.....	1,518,512	5	5	"	1.4	636,616.63
Office furniture and fixtures.....	170,953	—	—	"	1.4	—
Floating tools, wagons, etc.....	131,886	—	—	"	1.4	—
Working capital.....	1,182,434	5	5	"	1.4	495,720.25
						\$7,340,001.46

(A) Includes 6 per cent interest compounded annually on amount of tax payments, over one-half of interest period.

which he could fix definitely when he had complete specifications and plans, was usually 15 per cent, and he expected then that the full estimate would just about cover the actual cost. Under the heading of power plant and cables, there was \$590,000 for temporary work. That was the net cost—that is to say, the difference between the construction cost and the sale price of the apparatus—to the Metropolitan of the temporary steam plants used during the construction of the Ninety-sixth Street power house.

No allowance was made under incidentals for any delay, such

where the constructing company agreed to pay for the materials and payrolls plus a certain percentage for the profit. If the contractor took the risk, a fair percentage, depending on the nature and size of the work, would be 15 to 20 per cent.

The general contractors' profit was not applied to furniture or cost of land, but was calculated on rolling stock. The values for rolling stock were based on the piece prices per car body, truck, pair of wheels, etc., and while it was possible that the expense would not be so great as for other items, he thought that 10 per cent was a fair average for all the items.

Engineering expense would be much greater in New York, with its vast number of sub-surface constructions, than where there were fewer obstructions of that nature. In order to show what obstructions existed test pits were dug. The figure of 5 per cent was the usual allowance for large engineering contracts, which did not cover all of the expenses of engineering.

In computing the allowance for interest and taxes during construction shown in Table IV Mr. Uebelacker judged from his experience what time would be required from the commencement of work until the work should be completed far enough to earn money for each of the headings in the estimate. He charged against the investment thus determined 6 per cent interest, compounded annually, and added to that as a tax rate 1.4 per cent per annum. He did not figure interest on fixed tools and appliances or interest or taxes on general contractors' profit. The period during which interest would be computed on some of the elements of construction was made very short; for instance, on rolling stock and horses only about 45 days' interest was allowed. When it was considered that 12

tem in substitution for the horse system was reasonable and prudent at the time. Similar changes in Chicago, and undoubtedly in other places, also were capitalized by the consent of the city.

TESTIMONY OF FRANK R. FORD

Frank R. Ford, of Ford, Bacon & Davis, testified that he thought it was possible to make a fair estimate of development expense by the use of a percentage of what was called construction cost, but that the actual cost was likely to be largely in excess of that. The cost should be not less than about 25 per cent of the construction cost. The figures submitted represented 24 per cent. In the cases of Detroit, Chicago and Cleveland, and in other cases, Mr. Ford did not find any instance where the development figures were less than 25 per cent and they extended from that up to over 100 per cent of the cost of construction. In the 1899 valuation of the Detroit system by a State commission headed by Prof. M. E. Cooley, the physical property was appraised at \$8,000,000, and the value of franchises or intangible properties was fixed by Prof. E. W. Bemis at \$8,478,563. In the Chicago valuation the com-

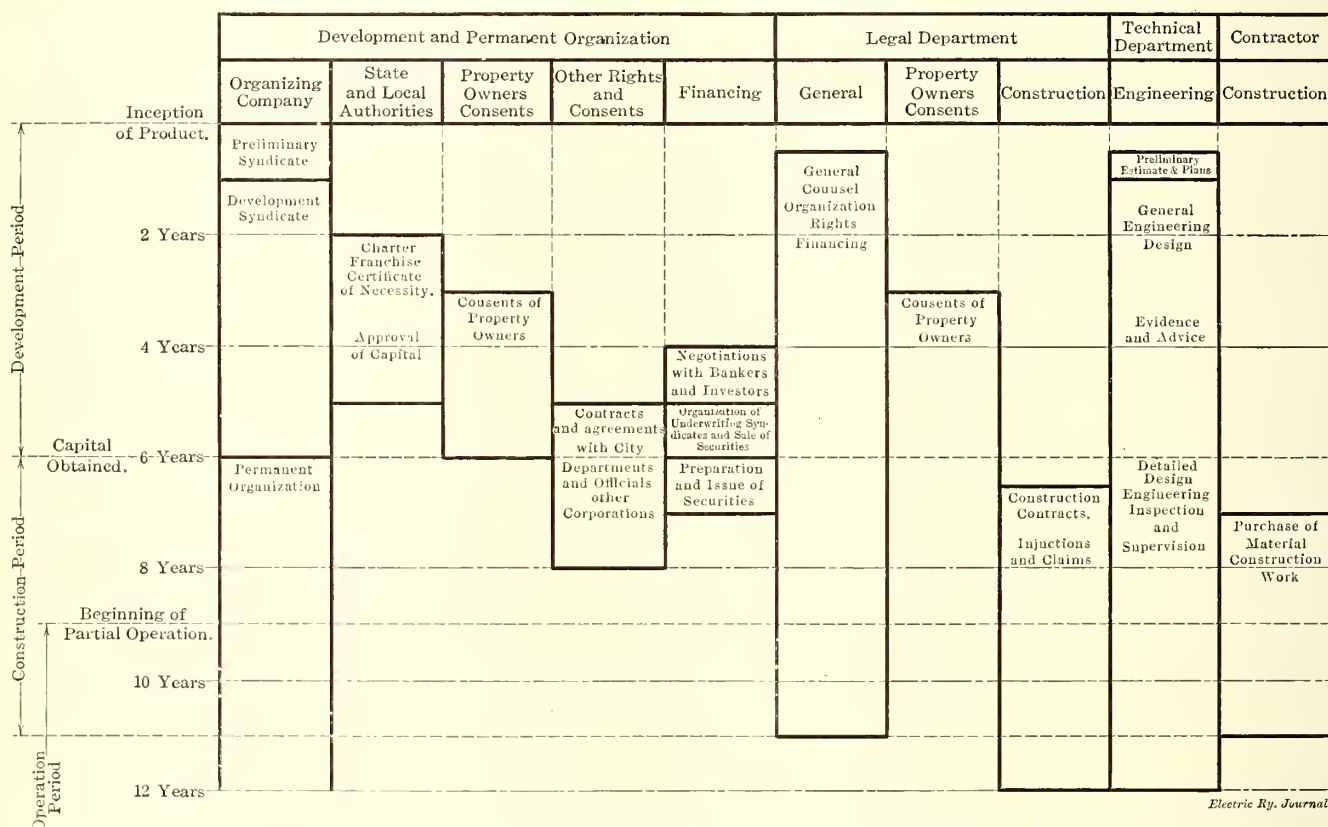


Chart Showing Estimated Time of Reproduction, Prepared by Ford, Bacon & Davis

months would elapse after commencement of the work before any given track earned money, he charged three-quarters of a year interest on the ground that the material, which was the bulk of the cost, would have to be provided ahead of the completion of the work. It would be logical either to add for the general contractors' profit more than the 10 per cent allowed or to add to the interest allowance a sum for interest on such profit.

The item of furniture and fixtures, implements and apparatus, was based on an inventory. The allowance for working capital was taken from the balance sheet of the receivers. It was composed of cash in banks, cash in treasurer's department, petty cash, prepaid accounts, prepaid insurance and accounts receivable, less accounts payable.

Mr. Matheson said the usual amount for working capital was 10 per cent of the revenue.

The net investment in superseded property, shown in Table V, was discussed by Mr. Uebelacker. These were not the total values of the systems named, but the net values of the superseded property, less salvage. The installation of the cable sys-

mission representing the city, headed by B. J. Arnold, agreed upon a total value of \$50,000,000, of which the values of franchises and other intangible property, covering the same items of development as are specified in this case, represented approximately 43 per cent of the physical construction. This percentage included the extra value of the cable systems as going concerns. In the 1908 Cleveland valuation the value of the physical property was determined as \$14,994,614 and of the franchises and other intangible or development costs as \$8,994,995, or 60 per cent. In the final Cleveland settlement in 1909, Judge Tayler's valuation of these development items, so far as it was possible to separate them, represented over 25 per cent of the value of the physical property, or between 30 and 35 per cent if the differentiation could be made definitely. In the 1910 Detroit valuation the physical property was estimated by Mr. Barcroft to be worth \$11,121,725. The value of the development items, or franchises or tangible property, made by Prof. H. C. Adams, of the Interstate Commerce Commission, equaled \$2,810,615 to \$4,246,208, or from 25 to 38 per cent of the physical value.

The development charge was made for the Metropolitan system as one corporation and would have been somewhat higher if separate estimates had been made of the cost of reproducing the rights and capital of each of the constituent corporations. The total was divided pro rata, in proportion to the construction cost, among the 13 corporations. A chart, published herewith, shows an estimate of the time that would be required to reproduce the system, considered as one company. Mr. Ford estimated that the development period would be six years and the construction period five years, based on the time required for development and construction of properties in this and other cities.

Mr. Ford also submitted a detailed inventory of development items, similar to that presented by him in the Coney Island & Brooklyn Railroad case and published in the *ELECTRIC RAILWAY JOURNAL* of Dec. 25, 1909, page 1266.

The sum of \$5,000,000 did not seem to Mr. Ford to be an unreasonable amount for cost of the time and expenses of the development syndicate and its organization and the permanent organization which would follow it up to the time of construction.

The cost of property owners' consents, estimated by Mr. Ford at \$2,529,700, was based upon \$2.50 per front foot, or \$13,200 per mile of street front. This was based in part on some records of the Metropolitan company showing past costs of \$1.92 and \$1.98 per street front. He believed the figure which

TABLE V—SUMMARY ESTIMATED NET INVESTMENT IN SUPERSEDED PROPERTY.
(ESTIMATED COST LESS SALVAGE.)

1. Horse car system.....	\$ 6,640,439
2. Cable car system.....	5,371,698
3. Compressed air equipment.....	386,794
4. Thirty-fourth Street storage battery equipment.....	956,714
Total.....	\$13,355,645

he submitted was a moderate estimate of what it would cost to get these consents in Manhattan streets. This did not cover any legal costs or court proceedings, but did cover title search. Construction of such a system as that of the Metropolitan company would be effected under competitive conditions, and in some cases it would be impossible to secure consents on certain streets and the work would have to be discontinued and begun on other streets.

The method of estimating \$4,000,000 as the initial payment for franchises was to consider the payments imposed by the Board of Estimate and Apportionment for other franchises granted recently in New York City. An average of 10 franchises in Queens Borough showed that the initial payment was 11 per cent of the gross earnings as estimated or as they proved to be. In Bronx Borough the ratio was 17 per cent, and in Manhattan Borough, in the case of a road that was not built, it was 30 per cent.

The estimated payment of 2½ per cent, or \$2,500,000, to an underwriting syndicate might be considered, Mr. Ford said, as insurance on obtaining the capital. This was the same commission that the Pennsylvania Railroad Company paid in 1903 for the underwriting of an issue of \$75,000,000 of stock. The cost of franchise security deposits consisted of the interest for deposits required under the law, figured at 6 per cent, less the rate of interest that could be secured upon them.

A report filed with the commission giving the cost of track work showed that during the period of reconstruction of the electric system on Manhattan Island the actual rate of construction was about 24 miles per year, single track, from 1897 to 1903. From those records Mr. Ford assumed that 30 miles per year would be a reasonable amount of construction from the standpoint of both the city and the company, which would mean an actual working time of four years, but, due to the interference of the winter weather, would have to be spread over a period of five years. The Chicago companies were allowed a period of three years for rehabilitation, but this period began about a year later for one company than for the other, making a total period of about four years for an expenditure of \$60,000,000. The Metropolitan company was assumed to spend over \$80,000,000. Mr. Ford thought it would require fully

three years to construct the power system used by the Metropolitan company.

The hearing was adjourned until April 18.

DETAILS OF SUGGESTIONS OF T. E. MITTEN FOR REHABILITATION IN PHILADELPHIA

On April 10, 1911, E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., addressed a letter to J. R. C. McAllister, chairman of the finance committee of the Councils of Philadelphia, in response to the request of the committee contained in the resolution which it adopted on April 5 urging that a statement should be submitted showing more in detail the work it is intended to do than the summary of this work contained in the announcement made by T. E. Mitten and published in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, page 682. In his letter transmitting the statement from Mr. Mitten Mr. Stotesbury said:

"As you are no doubt aware, the task of improving the street car service of Philadelphia has not been one of my own seeking, and has only been considered by me in the interests of the public welfare.

"After receiving the petition in October last requesting that I enter the board of directors of the Philadelphia Rapid Transit Company with such associates as I might select and thereafter 'control the policy and the business of the company,' I determined that additional capital would be required, to provide which a new bond issue of \$10,000,000 should be created.

"As you know, all the details concerning this bond issue have been satisfactorily arranged, and the published report of the company's condition as of Dec. 31, 1910, submitted by Vollum, Fernley, Vollum & Rorer, chartered accountants, shows that \$1,500,000 in current assets has been set aside for renewals, as per my requirements.

"The plans and the policies as outlined in Mr. Mitten's communication herewith are those which, in my opinion, should be followed."

Mr. Mitten's letter to Mr. Stotesbury follows in part:

"The agreement with the city, effective on July 1, 1907, provides for a monthly payment of certain sums by the company, constituting a sinking fund, which, at the expiration of the present ordinance on June 30, 1907, should, with its accumulations, be sufficient to enable the city to exercise its option and purchase the capital stock of the Philadelphia Rapid Transit Company at par.

"The \$30,000,000 derived from the Philadelphia Rapid Transit Company's stock issue, which was paid in at par, has now been fully expended, and while not so expressly stated in the agreement it was, nevertheless, clearly intended that the property represented by this expenditure should be maintained intact and renewed from time to time out of the company's earnings and not from the proceeds of new securities.

"To insure the proper maintenance and renewal of the property an annual expenditure of an amount equaling 15 per cent of gross earnings is considered necessary. The expenditure in this regard has not heretofore been in excess of an amount equaling 12 per cent of gross earnings, the result being evidenced in the gradual depreciation of the physical property.

"The earnings of the company are not as yet sufficient to bear the cost of operation, including this 15 per cent, in addition to the payment of its fixed charges; the shortage for the current year ending June 30, in this regard, will be in excess of \$600,000. To meet this and the estimated shortage of the two succeeding years a fund of \$1,500,000 in current assets has been set aside, as per your requirement. This, when used, will entirely exhaust the present available current assets of the company.

"The earnings of the year ending June 30, 1914, as estimated, should be sufficient to bear the 15 per cent cost for maintenance and renewals, the increased fixed charges due to the introduction of new capital at the rate of \$2,000,000 annually, and also

pay the contribution to the sinking fund as required by the city agreement.

"The earnings for the year ending June 30, 1915, and thereafter, as estimated, should be sufficient to pay all costs, including fixed charges and the allowance for maintenance and renewals as aforesaid, and in addition thereto produce an annually increasing surplus, excepting only as this estimate may be interfered with by unforeseen contingencies, the building of unremunerative extensions or the assumption of like burdens entailing additional costs.

"The results as estimated are based upon a 4 per cent annual increase in gross earnings; the actual increase, 1902 to 1909, was at the rate of 4.2 per cent per annum.

"The rate of fare under the city agreement, as now interpreted, requires the payment of 5 cents, with an additional 3 cents for an exchange ticket, and the maintenance of 210 transfer points at which a continuation of the 5-cent ride is given by the issuance of a transfer ticket without the payment of additional fare. These rates are considered as fixed, no change being permissible under the agreement without the consent of both parties.

"It has not been estimated that the present cost of operation can be materially decreased, the economies resulting from the introduction of larger cars being practically offset by the cost of improved service due to the greatly increased seating capacity which will be necessary in order to properly serve the public during the hours of heaviest traffic and the semi-annual increase in wages of trainmen, as already promised by the company in its published notice, recently arbitrated.

"It must be borne in mind, however, that as the more scientific management of the property and increased efficiency of the employees result in increased earnings the scale of wages paid should be correspondingly advanced.

"Of the 15 per cent of gross earnings heretofore mentioned as necessary to appropriate for maintenance and renewals, approximately 10 per cent will be expended in ordinary maintenance; an amount equaling 5 per cent of gross earnings, being a sum in excess of \$1,000,000 per annum, is thus available for replacements and renewals.

"Barring unforeseen contingencies, the realization of this estimate, which is reasonably conservative, will enable the company to pay interest on \$2,000,000 new capital annually, and with the aid of \$1,500,000 now set aside for that purpose, as aforementioned, carry out the spirit and intent of its agreement with the city by maintaining the physical integrity of the property out of earnings and without the issuance of additional securities therefor.

"The proposed \$10,000,000 bond issue would, if marketed at an average price of 96, produce \$9,600,000, of which approximately \$1,600,000 would be required to pay present outstanding capital obligations which mature during the next five years, leaving an amount approximating \$8,000,000 available for the capital requirements of the company.

"The funds available to complete the rehabilitation which will constitute both the renewal of present property and the acquisition of new and additional property during the five-year period ending June 30, 1916, will be as follows:

Net proceeds of bonds after deducting \$1,600,000 to pay maturing obligations, as aforementioned, approximately.....	\$8,000,000
From earnings, through renewal account, approximately.....	5,500,000
Total available.....	\$13,500,000

"It is estimated that the work to be completed during the above five-year period will be as follows:

1300 cars of the most modern type, with cross seats and center aisles, having nearly double the seating capacity, will be required to replace present equipment at an estimated cost of..	\$6,500,000
150 miles of heavy standard track will be required to replace worn-out tracks where a lighter type of rail had proved inadequate. This at an estimated cost of.....	4,500,000
Total cost.....	\$11,000,000

"Approximately one-half of this amount, say \$5,500,000, represents the additional cost of the new cars and track over that which is to be replaced and, therefore, is a proper charge to capital account.

"The remaining \$5,500,000 should be charged against current

earnings through the renewal account, the company thereby maintaining the physical integrity of the property out of earnings, as it should. After the deduction of \$5,500,000 for capital expenditures, as above, there should remain about \$2,500,000 available for other improvements, including additional power requirements and extensions.

"The proper development of an adequate power supply and the charges for new track connections incident to the scientific rerouting of car lines, both of which must be immediately undertaken, will consume such a large portion of this available \$2,500,000 as to make it unsafe to undertake extensions in excess of those here listed and which are now considered necessary to construct.

Twenty-ninth Street from Columbia Avenue to Ridge Avenue, with connections at York and at Dauphin Streets.....	\$33,650
Twenty-second Street, Montgomery Avenue to Ridge Avenue; Twenty-first Street, Ridge Avenue to Montgomery Avenue; Twenty-second Street, Susquehanna Avenue to York Street...	28,658
Nineteenth Street, McKean Street to Passunk Avenue.....	7,011
Nineteenth and Twentieth Streets, between Passunk Avenue and Porter Street; also along Porter Street between Nineteenth and Twentieth Streets.....	24,241
Snyder Avenue, from Front Street to Twenty-third Street.....	135,440
Total estimated cost.....	\$229,000

"Extensions and additions to property not embraced herein will necessarily require the issuance of additional securities, and only such should be undertaken within the next three-year period as will add a sufficient amount to the gross earnings of the company to pay the increased cost of operation, together with interest on the added investment."

CONVENTION OF THE MISSOURI ELECTRIC ASSOCIATION

The fifth annual convention of the Missouri Electric, Gas, Street Railway and Water Works Association was opened at the Hotel Jefferson, St. Louis, Thursday morning, April 13, by President R. J. Irvine, of Marshall, with an attendance of about 50 members. The convention was welcomed to St. Louis in a speech by Mayor F. H. Kreismann. Following the reports of the association's secretary, N. J. Cunningham, of Springfield, a number of new company members were voted into the association.

On Thursday afternoon W. H. Reeves read a paper on "Centrifugal Pumps." This was followed by a paper by Prof. E. A. Flowers, of the University of Missouri, on "Lubrication." Professor Flowers reported to the association progress and results already obtained in a series of experiments he is conducting to study cylinder and bearing lubrication and friction under actual service conditions with various temperatures, pressures and speeds. Ex-Judge Daniel G. Taylor, of St. Louis, then explained to the association a plan of employees' and public liability insurance conducted on a reciprocal arrangement between the public-service corporations subscribing to it. This plan is designed to avoid the heavy business-getting and administration expenses of the old-line companies, instituting better inspection and better selecting risks and reducing the cost of insurance to member companies. Following the banquet at the Hotel Jefferson Thursday evening, W. D'A. Ryan, illuminating engineer for the General Electric Company, delivered an address on "Illumination and Street Lighting," illustrated by several hundred lantern slides.

On Friday papers were presented on "Illumination," "Electric Vehicles," "Ornamental Street Lighting," "District Steam Heating," and "Gas Manufacture."

The officers elected were: President, F. E. Murray, Louisiana; vice-presidents, P. A. Bertrand, Jefferson City; J. E. Harsh, Joplin, and C. L. Clary, Sikeston; secretary and treasurer, N. J. Cunningham; executive committee, R. J. Irvine, of Marshall, H. Spoehrer, of St. Louis, P. W. Markham, R. Scott, of Kansas City, and C. C. Barnard; advisory committee, P. A. Bertrand, W. A. Bixby, of Springfield, and Alten S. Miller, of St. Louis; finance committee, S. M. Locke, of Mexico, H. D. Hibbler, of Washington, and R. D. Boyce. Upon the invitation of J. E. Harsh, of the Empire District Electric Company, of Joplin, Mo., the association voted to hold its next convention in that city.

MEETING OF THE COMMITTEE ON CITY RULES

A meeting of the committee on city rules of the American Electric Railway Transportation & Traffic Association was held at 29 West Thirty-ninth Street, New York, N. Y., April 14 and 15. Those present were: H. W. Fuller, chairman, general manager Washington Railway & Electric Company; D. A. Hegarty, general manager Little Rock Railway & Electric Company; M. C. Brush, assistant to vice-president Boston Elevated Railway, and C. B. Buchanan, superintendent of railways Virginia Railway & Power Company, Richmond, Va. F. I. Fuller, vice-president Portland Railway, Light & Power Company, Portland, Ore., and Marshall M. Phinney, president Northern Texas Traction Company, Boston, Mass., were unable to be present.

In opening the meeting of the committee Mr. Fuller announced that at the meeting in January the committee had been instructed by the executive committee to take up three subjects in connection with a revision of the standard rules for city operation. One of these was a revision of the present city rules. The second was to draft a set of station or carhouse rules. The third was to draft a set of rules for the government of train crews on prepayment cars. It was also decided to prepare a short appendix to each code giving the titles of such subjects as might properly be made the subject of local rules. The committee was induced to do this because it was found that several companies, particularly among the smaller roads, had taken the standard code of the association and, considering that it was a complete code for the operation of any road, had adopted it bodily and had issued copies of it to their trainmen. Mr. Fuller explained that the Standard Code of Rules was intended to be complete only in so far as a general code could be made complete and that in all cases it should be supplemented by other rules relating to local conditions whose wording necessarily had to be special. Such wording could not be drafted by any general committee, but if an appendix was added to the codes giving the subjects which should properly be taken up by such local rules it would be of help to many roads.

The committee believes that if the proposed changes in the code are submitted to member companies early in the year, the members will have time to consider the changes and offer criticisms and suggestions which can be embodied in the code to be considered by the association next fall. An urgent plea will, therefore, be sent to member companies at an early date to examine these rules carefully and to forward promptly any comments which they may have to make upon them. It was also decided not to number these new rules or to make any changes in the numbering of the rules in the standard code until a decision should be reached as to the changes to be made and the number of new rules to be adopted. Following is a list of the changes tentatively adopted at the meetings on April 14 and 15 in the code of operating rules:

OPERATING RULES

RULE NO. 2.—"RESPONSIBILITY"

The committee recommends the amendment of this rule so as to incorporate to a very large extent the recommendations of the city rules committee of 1910 and to cover the operation of prepayment types of cars. The amended rule reads as follows:

The motorman is held responsible—
 (a) For the safe running of the car.
 (b) For the proper operation of the machinery of the car.
 (c) For running the car according to schedule.
 (d) For the safety of passengers boarding or leaving car by way of the front platform.
 (e) For the proper setting of the front sign.
 (f) For the proper display of headlight.
 The conductor is in charge of the car and of the passengers, and is held responsible—
 (g) For the safety of passengers boarding or leaving the car by way of the rear platform, and for the convenience of all passengers.
 (h) For the collection and proper accounting of fares.
 (i) For the proper setting of the side and rear signs.
 (j) For the proper display of rear signal.

The committee believes that the changes as incorporated make the above rule applicable to all types of cars except center-entrance cars and those single-end cars which do not permit the passengers to leave by way of the front platform.

The question of a divided responsibility with regard to the setting of signs is eliminated.

The rule as it now appears in the code reads as follows:

The conductor is in charge of the car and is responsible—

- (a) For the stopping and starting signals.
 - (b) For the safety and convenience of the passengers.
 - (c) For the collection and proper accounting of fares.
- The motorman is held responsible—
 (d) For the safe running of the car.
 (e) For the proper operation of the car and its machinery.
 (f) For running the car according to schedule.

Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therefor.

RULE NO. 10.—"BELL SIGNALS"

The bell signals in the present city code differ somewhat from those in the code adopted by the interurban rules committee. At a conference between two members of the interurban rules committee and the city rules committee in January it was agreed to submit at the next regular meetings of the two committees a rule reading as follows:

From conductor to motorman—to be given on motorman's signal bell:

- 1 Bell—Stop at next crossing or station.
- 2 Bells—Go ahead.
- 3 Bells—Stop at once.
- 4 Bells—Back car slowly.
- 5 Bells—(Not needed for city use, except locally.)

Motorman to conductor—to be given on conductor's signal bell:

- 1 Bell—Come forward.
- 2 Bells—Pull trolley down to roof.
- 3 Bells—Set rear brake.
- 4 Bells—Signal to conductor that motorman desires to back car.
- 5 Bells—Watch trolley, and danger signal to conductor to look out for obstructions adjacent to track.

The signals in the city code at present are as follows:

From conductor to motorman—to be given on motorman's signal bell:

- 1 Bell—Stop at next crossing or station.
- 2 Bells—Go ahead.
- 3 Bells—Stop immediately.
- 4 Bells—(Given when car is standing). Back car slowly.

From motorman to conductor—to be given on conductor's signal bell:

- 1 Bell—Come forward.
- 2 Bells—Watch the trolley and danger signal to conductor.
- 3 Bells—Set rear brake.
- 4 Bells—Signal to conductor that motorman desires to back the car.

At the meeting of the interurban rules committee April 11 and 12, however, the majority of the interurban rules committee decided that it would be impracticable in interurban operation to adopt the proposed compromise code of bell signals, especially Bells 3 and 4 of motorman to conductor. In consequence the city rules committee believed that it would be better to retain the bell code as given in the present city code and as published above.

The committee also believed that the fourth paragraph of Rule 10, as adopted at the 1910 convention, should have added to it "on a double-end car," printed in italics below. This paragraph will then read:

When car is standing, and motorman desires to back for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify 'All is clear behind.' However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends on a double-end car.

RULE NO. 15.—"LEAVING CAR"

The committee decided to suggest in Rule 15 the insertion of the word "temporarily" as printed in italics in the rule below, which otherwise is taken from the 1909 code.

When necessary for conductor to leave his car *temporarily*, he must notify the motorman to protect passengers and car. Should passengers board car during absence of conductor, motorman will notify conductor of the number and location of such passengers upon his return.

Cars in commission must not be left unprotected; either conductor or motorman always remaining in charge.

This rule is intended to cover those cases where the conductor leaves the car to signal at railroad crossings, to operate derrails on grades and do similar work. Where the conductor should leave the car for a longer time, as at terminals or in case of sickness, the motorman on prepayment cars is called back to the rear platform to guard the fare box, as covered by a new rule given under Rules for Prepayment Cars.

RULE NO. 21.—"STANDING ON STEPS"

The changes recommended in Rule 21 consist in the omission of the word "steps" inclosed in brackets in the rule as printed below and the addition of the final sentence printed in italics.

Permit no person to ride or stand on the [steps], buffers, dash, fenders or roof. Passengers should be fully inside the car or safely landed on the platform before the signal is given to start. *Starting signal should not be given before passengers are fully off the steps or running board of the car.*

RULE NO. 20.—"EJECTMENTS"

This rule was also subject to a conference between the inter-

urban rules committee and the city rules committee, and the language finally agreed upon as satisfactory to both the inter-urban rules committee and the city rules committee was as follows:

Ejectments shall be made for two causes:

Failure to pay proper fare.

Disorderly or offensive conduct.

Ejectments shall be made by the conductor with the assistance of the motorman, after the car has been brought to a stop at a regular stopping place for passengers, using only such force as is sufficient to expel the offending passenger, with a reasonable regard for his personal safety, without the use of harsh language or the display of ill temper.

A passenger must not be ejected at a point where he is liable to be exposed to danger, and extraordinary precaution must be observed during bad or inclement weather, late at night, or when the passenger is intoxicated.

A child of tender years, a person of unsound mind, or a person in such feeble or helpless condition as to be unable to take care of himself must not be ejected.

Report all ejectments as required by Rule 25.

The rule recommended takes the place of both Rule 29 and Rule 30 in the present code, which reads as follows:

Ejectments shall be made by the conductor, with the assistance of the motorman, after the car has been brought to a stop, using "only such force as is sufficient to expel the offending passenger, with a reasonable regard for his personal safety." No passenger shall be forcibly ejected from the car for any cause whatsoever without order from an inspector, starter or official of the company, unless the conduct of the passenger is dangerous or grossly offensive.

Any person ejected from a car must be put off at a regular stopping place.

No passenger will be put off at a point where likely to be exposed to danger.

Particular attention must be paid to this rule during bad and inclement weather, late at night, or when a passenger is intoxicated.

RULE NO. 116.—"CHANGE"

The committee decided to recommend that the rule on "change" adopted at the Atlantic City convention be amended by the addition of a paragraph reading as follows:

A conductor must not accept from a passenger a bill or coin of larger denomination than two dollars, unless he can furnish change for the same at once. If change cannot be furnished, ask passenger presenting same to leave car, secure change and take following car. If the passenger refuses to leave, eject and report as required by Rule 25—

so that the rule as amended will read:

When necessary to give change, first register fare, and immediately thereafter give change, stating amount received and amount returned.

Should a conductor have any dispute with a passenger in regard to change, he must make a report in writing to the superintendent.

Previous to taking charge of the car, conductors will provide themselves with at least two dollars for the purpose of making change.

A conductor must not accept from a passenger a bill or coin of larger denomination than two dollars, unless he can furnish change for the same at once. If change cannot be furnished ask passenger presenting same to leave car, secure change and take following car. If the passenger refuses to leave, eject and report as required by Rule 25.

The committee makes this recommendation because it is firmly of the belief: First, that it is time for the railway companies to take firm stand as to the denomination of the bill or coin for which the conductor must supply change, and, second, a recent decision affecting a member company would seem to make important that the conductor should not accept a tender in excess of \$2 unless he is sure that he has the necessary change. It was stated that California was the only State in the Union in which a court had required a conductor to change a coin or bill of higher denomination than \$2.

RULE NO. 117.—"REGISTER"

The committee decided to recommend that the name of this rule be changed from "register bell" to "register," and that the wording of the rule as now shown in the code—

Be careful to see that register rings each fare—

be eliminated and that the following wording be substituted:

Registers must be set to read "in" or "out" in accordance with the direction the car is going, and must be set at zero before leaving on any half trip.

Turn the car into the carhouse with the register locked.

Conductors must be careful to see that register rings each fare, and that the dial shows it. In order to protect themselves from errors in forgetting to register, it is well for them to count their money at the beginning of each day and at the end of day to turn in any surplus above that which the register calls for, making a note of same on back of day card.

RULE NO. 122.—"REFUSAL TO PAY"

The committee recommended that this rule be changed by the addition of the words printed in italics and the omission of those inclosed in brackets.

When a passenger refuses to pay fare or presents defective coin, transfer or ticket, upon which, in the judgment of the conductor, the passenger is not entitled to ride, the conductor must retain or *make careful note of such defective coin, transfer or ticket and secure the names of as many witnesses to the fact as possible, whereupon the car must be stopped and the passenger requested to leave. Eject if necessary and report as required by Rule 25.*

If the conductor is not sure whether or not the passenger has paid fare or whether the fare (coin, ticket or transfer) tendered is good, then the passenger must be allowed to ride and [if the passenger fails to comply with such request] the facts of the case must be brought to the attention of the first inspector, starter or official who is met and the conductor must act according to instructions received from such inspector, starter or official. A note must be made of the incident on the back of the day card.

When a passenger who refuses to pay fare requests to be allowed to leave the car, the car must be stopped and the person permitted to alight.

RULE NO. 210.—"RUNAWAY CAR"

The committee suggests the changes in Rule 210 shown as follows, the new words being printed in italics and the portions omitted being inclosed in brackets:

While descending a grade, should it not be possible to stop a car equipped with two motors by means of brake, the motorman must immediately [turn off hood switch], reverse and advance controller cylinder to last position. In the event of car being equipped with four motors, simply reverse to stop.

Should a car equipped with two motors start to roll backward while ascending a grade and the brakes be unable to hold it [the hood switch must be immediately turned off and] the controller cylinder *must be* advanced to last position. Should the car be equipped with four motors, if the reverse is set in forward position the car will stop.

It was felt that if the hood switch was left in, the power on the wire might be of some assistance in stopping the car. Even if the circuit-breaker opened or the fuse blew, the car could be stopped as quickly if the hood switch had been left in as if it had been turned off.

RULE NO. 213.—"POWER OFF LINE"

The committee recommends that the rule submitted by the former committee to the convention of 1910, reading as follows:

When power leaves the line, cars must be stopped clear of all crossings or danger points. The overhead switch must then be thrown off and the light switch thrown on and the car started only when the lights burn brightly—

be adopted with the addition of the following words: "and then operated at half speed for a distance equal to one city block," so that the rule recommended reads as follows:

When power leaves the line, cars must be stopped clear of all crossings or danger points. The overhead switch must then be thrown off and the light switch thrown on and the car started only when the lights burn brightly and then operated at half speed for a distance equal to one city block.

This rule to take the place of the present rule in the code, which reads as follows:

When the power leaves the line the controller must be shut off, the light switch must be turned on and the car started only when the lights burn brightly, but motormen must never allow their cars to coast when power is off the line except to clear crossings or dangerous points.

RULES TO BE ADDED TO THE PRESENT CODE OF CITY RULES

The following rules were suggested for addition to the present code of city rules as new rules:

OBSTRUCTIONS IN RAIL

Should a car at any time run over a bolt, nut or other hard substance on the rail, the car should be stopped and the obstruction removed if possible. If it cannot be removed, the motorman must report to first inspector or starter.

DISABLED CONDUCTORS OR MOTORMEN

Should a conductor or motorman be disabled or compelled to leave his car, the conductor or motorman of the following cars for the same destination must move up so that but one car may be detained.

Conductors must turn in for the actual number of fares registered, making note on back of day card thus: "Left Car No. ... at ... going ... with ... cash and ... tickets registered." Conductor must also note on back of day card the reading of the totalizers on both cars. Registers must not be set at zero until car is switched back or terminal is reached.

In case any accident disables the motorman while the car is in motion, the conductor must at once throw off the overhead switch or circuit breaker and apply rear brake to stop car.

FOG, SNOW, SLEET, RAIN

During fog, heavy rain, sleet or snow storm, cars must be operated entirely with a view to safety. The car must be operated at such speed and with such precaution that it can be stopped in time to avoid collisions with cars and vehicles.

Motormen must slow down when approaching stops and sound gong or whistle.

In all cases of fog, or in case of wet snow which clings to windows, cars must be operated with front vestibule window open.

CARS WITHDRAWN FROM ROUTE

If for any reason a car is withdrawn from service, side-tracked or turned back, the conductor must transfer any passengers to the next car on the same route in the following manner:

Take passengers to the car to which they are to be transferred and see that the conductor understands that they are transferred and that he knows the number of passengers and the number of the car taking them.

The conductor receiving passengers under these circumstances will not attempt to collect or register any fare for such passengers but must enter the number of passengers received and number of the car from which they came on the back of his day card.

PASSENGERS RINGING BELL

Passengers have a right to ring bell to stop car, and conductors should bear this in mind. They must, however, try in a polite way to discourage passengers from doing so.

CONDUCT OF PASSENGERS

Conductors will not allow passengers to put their feet on the seats, or children to stand on the seats.

KNOWLEDGE OF ELECTRICAL EQUIPMENT

Motormen are required to acquaint themselves with the mechanical and electrical equipment of cars in order that they may be able to cut out a motor or replace a fuse, when necessary.

Motormen should familiarize themselves with the sounds made by the

car while running, and if any unusual sound is noticed, should endeavor to find the cause and report it. If they cannot find the cause they should report the fact of the unusual sound at the earliest possible moment. They should observe carefully whether the car takes its natural speed on all positions of the controller, and, if not, report same.

They should apply to proper authority for instruction in any matter they do not thoroughly understand.

ROUNDING CURVES

Power must be shut off and brake applied on approaching curves, allowing car to enter the curve on its own momentum with brake partly on. Before movement is lost brake should be released and power applied.

Cars must not be stopped on curves except when it is unavoidable.

CARS PASSING ON CURVES

Motormen must not attempt to pass on curves unless they are sure of safe clearance. (See special orders at depot from which cars are operated.)

TOPICS FOR LOCAL OPERATING RULES

The following are subjects suggested as an appendix to the operating rules, as they give the titles of topics which could very well be treated as local regulations of each company:

Riding on front platform.

Unnecessary making of signs and signals.

Arrests.

Transportation of employees.

Transportation of dogs.

Transportation of newspapers.

Regulation of heaters.

Smoking on cars.

Electrical storms.

Test for electrical car trouble.

Delay by teamsters.

Protection of car during fog, snow, rain and sleet.

Ventilation of cars.

Peddling on cars.

CARHOUSE OR STATION RULES

The following is a list of the carhouse or station rules which the committee thinks should be made standard, and the subjects which ought to be treated in local rules.

APPOINTMENT

Trainmen will be assigned to work in the order of the dates of assignment.

BADGES AND PUNCHES

The official badges and punches will be furnished by the company, and are always to remain its property. They are the official tokens that the wearer is in the employ of the company, and must never be allowed out of the possession of the employee to whom issued. If lost, such loss must be promptly reported at the office.

EXCHANGING DUTIES

Employees must not engage substitutes to perform their duties, nor exchange duties without permission.

LEAVE OF ABSENCE

Leave of absence will be granted only on account of illness, or for rest and recreation.

No employee will be excused from duty to engage in any other occupation or business, nor will his position be held open while so engaged, except by special arrangement with the superintendent.

SUSPENSIONS, DISMISSALS

Disobedience of orders, violation of rules, or neglect of duty will always be considered a sufficient cause for dismissal. Discharged employees shall immediately turn in their badges.

PAY WHEN OFF DUTY

Employees will not receive pay while absent or suspended from duty for cause.

RE-EMPLOYMENT

An employee discharged from the company's service will not be re-employed in any other department, without the consent of the head of the department from which he was discharged and the sanction of the management.

RELIEF

Motormen and conductors who are to be relieved must remain on duty until the relief has taken charge of the car.

CONDUCTORS' SUPPLIES

Conductors, before taking car, will obtain from the station office such transfers, change, day cards and other supplies as are required by the regulations.

ASSIGNMENT OF WAGES

Employees must not make any assignment of wages, except with the consent of the management.

SAFETY OF EMPLOYEES

All persons are cautioned to exercise care in crossing pits and walking through carhouse. Employees must never move a car until certain that no one is working over, under or about it.

FIRE

Employees will exercise great care to guard against fire.

TOPICS FOR LOCAL CARHOUSE RULES

Temporary Assignment to Foreign Divisions.

Distant Reliefs.

Penalty for Failure to Report.

Reporting for Emergency Service.

Rating, Daily Assignment to Work and Excuses.

Gratuities, Fees and Bribes.

Soliciting Subscriptions.

Sick Report.

Shortage, Overage.

RULES FOR PREPAYMENT CARS

The following is a list of the standard rules suggested for the operation of prepayment cars to be added as an appendix to the standard code of rules for city operation:

FOR CONDUCTORS

1. POSITION

The conductor's position under all ordinary circumstances is at the rear, in the place provided for him. While the car is at a standstill, taking on and discharging passengers, he must watch both the entrance and exit and see that passengers board and leave the car by the proper openings. The conductor should not leave his position at rear at places where several passengers are likely to board or leave the car.

2. FARE COLLECTION

The conductor must register every fare promptly when collected. He shall not allow unauthorized passengers to pass into the car without paying fare, except when forced to absent himself owing to accident or other cause. When passengers enter interior of car without paying fare the conductor must enter car and collect fare as soon thereafter as his duties on the rear platform permit, returning at once to his position at the rear. Conductors shall request incoming passengers to "have your fare ready, please."

3. MAKING CHANGE

When a passenger presents a bill or coin which would cause delay in making change, and others are waiting to enter car, the conductor shall politely request passenger to step aside on the platform until he has opportunity to make change.

4. NO ONE TO REMAIN ON REAR PLATFORM

The conductor shall request passengers to enter the car and to move forward, endeavoring to keep exit and entrance portions of the platform clear at all times.

5. TRANSFERS

Conductors will be governed by the existing regulations regarding the acceptance and issuance of transfers. If the validity of a transfer is in doubt, request the passenger to step aside until the matter can be decided in the usual way.

6. PREVENTING ACCIDENTS

Conductors shall see that all incoming passengers are safely on the platform before giving "go ahead" bells, and that those leaving the car at rear end do not step off while car is in motion.

7. LEAVING CAR

When conductor is obliged to leave car for any purpose, except the flagging of crossings or other regular duty, the motorman shall close front end of car, shall take conductor's position and shall proceed as required by Rule 15 of the General Code.

8. PASSENGERS RIDING TO END OF LINE

Conductors shall be careful to collect the fares from passengers riding to the end of the line and returning on same car.

9. PACKAGES ON PLATFORM

Conductors shall not allow bundles, packages or anything else to remain on rear platform.

10. COMFORT OF PASSENGERS

The conductor's position at the rear must not interfere with the proper care of passengers as required by the General Code.

FOR MOTORMEN

1. POSITION

The motorman's position is on the front platform, except when he is relieving the conductor, as provided in Conductor's Rule No. 7.

2. EXIT DOOR TO BE KEPT CLOSED

The exit door of front platform must not be opened while car is in motion, and must be closed before car is started.

3. PERSONS NOT ALLOWED TO BOARD AT FRONT

No person shall be permitted to board the car at front platform.

TOPICS FOR LOCAL PREPAYMENT OPERATING RULES

Doors to be kept closed.

LUGANO AND TESSERETE 1000-VOLT DIRECT CURRENT RAILWAY

There has been in operation since July 28, 1909, a single track, 1000-volt, direct-current railway between Lugano and Tesserete in the canton of Tessin, Switzerland. This line is 8 km (about 5 miles) long. A small portion of the line in Lugano is laid with grooved rail, weighing 34 kg per meter (68 lb. per yard), but the rest of the line consists of T-rail, weighing 22.5 kg per meter (45 lb. per yard). The trolley potential of 1000 volts direct current is secured from motor-generator sets in a converter station at Tesserete. The station is supplied by a 25,000-volt transmission line. This converter station also has a reserve equipment consisting of 485 cells of 160 ampere-hour capacity. The trolley wires are single-insulated despite the high potential. Porcelain section breakers and horn lightning arresters are also parts of the overhead equipment. The rolling stock comprises three 60-passenger motor cars, two 52-passenger trailer cars and four 6-ton capacity freight trailers. A standard train comprises one motor car and one trailer or freight car, weighing in all 38 to 39 metric tons. The passenger motor cars are 15 m over buffers and 14 m over the body and 2.7 m wide. The motive equipment per car consists of four 45-hp, 500-volt motors, which are always operated two in series except in starting, when the four motors are in series. The electrical equipment was furnished by the Alioth Company, of Münchenstein, near Basle, Switzerland. The cost of the line was \$262,000.

MEETING OF INTERURBAN RULES COMMITTEE

The report of the Chicago meeting of the interurban rules committee of the Transportation & Traffic Association which was published in the *ELECTRIC RAILWAY JOURNAL* of April 15, page 675, gave a summary of the action taken on the rules up to the time of going to press with last week's issue of the paper. It included the revisions made in all rules up to and including Rule 222. At the closing session of the committee meeting the following changes in the Denver code of rules were approved:

Rule 230 was amended to read as follows:

"Delayed Trains.—All regular trains or sections of a regular train when becoming minutes late must report to the dispatcher, and will also report for each successive minutes lost. If unable to get the dispatcher by company or long-distance telephone the train may proceed on its time-card rights.

"All regular trains, or sections of a regular train, after they have become two hours late will lose their time-card rights."

For Rule 232 of the Denver code the committee agreed to substitute Rule 115 of the 1910 code. A new rule similar to one used by the Illinois Traction System was inserted as No. 232½. This rule follows:

"When a train running in sections takes a siding for an opposing train, the conductor of each section of such train carrying signals for the following section will hold the main line with danger signals until the section for which the signals are being carried is also in the clear, or until the dispatcher may modify the order."

The following paragraph was inserted in Rule 252 after the first paragraph of that rule:

"Where trainmen other than the conductor and motorman are employed on any train, it shall be the duty of the conductor to read all orders received to such other trainmen."

The titles to Rules 255 and 256 were amended by the insertion of the word "train" before the word "orders." Rule 256 was changed so that the conductor would receive an order and the motorman would repeat it. The amended rule follows:

"How to Obtain Train Orders.—To obtain train orders at telephone stations the conductor will call the dispatcher and report train number and location. The dispatcher will give such orders as are necessary to the conductor, who will write the same plainly, and without (unauthorized) abbreviation, on the blank provided for that purpose, with sufficient carbon copies for each member of the crew, and when he has finished writing the order he will read it to the dispatcher, who will O. K. the same if correct. The conductor will thereupon sign his name to the order. The motorman will then read the order to the dispatcher and, if correct, the dispatcher will complete the order by giving the initials of the Superintendent or other designated authority, and the time of completion, which initials and time of completion, together with the signature of the motorman, shall be promptly written upon the order by the motorman, after which the order shall be in full force and effect.

"If for any reason the line should fail before the dispatcher completes an order it is of no effect and must then be treated as though it had not been given."

In place of the optional Rule 256 included in the Denver code the following rule, which the Railroad Commissioners of Indiana have made obligatory to use in that State, was substituted:

"How to Obtain Train Orders.—To obtain train orders the motorman or conductor, whichever is more convenient, will call the dispatcher, announce his train and location and give his serial order blank number, which will be repeated by the dispatcher, who will then give such orders as are necessary. The one taking the order will write the same plainly, without abbreviation, with carbon copy, on the blank provided for the purpose. When he has finished writing the order he will repeat it to the dispatcher. If correct, the dispatcher will O. K. the same. The one taking the order will then give his name to the dispatcher and at the same time sign the order.

The one who has not taken the order will then repeat it without abbreviation to the dispatcher and give his name and at the same time sign the order. If correct, the dispatcher will then give the initials of the superintendent or other designated authority and the train order number, which must be repeated back to the dispatcher by the one then at the telephone. If correct, the dispatcher will say "Complete at" (giving the time), which completes the order and puts it in full force and effect. If for any reason the dispatcher does not complete the order, it is of no effect and must be treated as if it had not been given. After the order is completed the motorman and conductor will each take a copy of same.

"Where it is not practicable for both members of the crew to leave the car at the same time, at important places designated by the bulletin, or, in emergency, at other places, after authority has been given by the train dispatcher on duty at the time, one member of the crew may receive and complete the order, the second member being required to read the order aloud to the one who has taken and repeated it before the train is started, the dispatcher making a full record of the facts and reasons on his record book for every order completed by his instructions in this manner."

Rule 258 was changed to conform with Rule 256—that is, the agent must complete the order in the same manner as a conductor. Following this rule the committee agreed to insert as optional a rule which is now being considered by the Railroad Commissioners of Indiana with a view of making it obligatory for use in that State. This optional rule follows:

"Issuing Orders at Stations.—To obtain orders at stations where there are operators the operator will call up the dispatcher (or answer the telephone call, as the case may be), announce his station, the train for which the order is intended (unless same is given by dispatcher) and give his serial order blank number, which will be repeated by the dispatcher, who will then give such orders as are necessary. The one taking the order will write the same plainly, without abbreviation, with carbon copies, on the blanks provided for the purpose. When he has finished writing the order, he will repeat it, without abbreviations, to the dispatcher and give his name, and at the same time sign the order. If correct, the dispatcher will say 'O. K. at ——' (giving the time, which shall be entered upon the order by the operator). The operator will deliver the order to the conductor or motorman of the train for which it is intended, who will read the order in full to the dispatcher, giving his name, and at the same time signing the order. If correct, the dispatcher will then give the initial or name of Superintendent or other designated authority, and the train's order number, which must be repeated back to the dispatcher. If correct, the dispatcher will say 'Complete at ——' (giving the time), which completes the order and puts it in full force and effect. If for any reason the dispatcher does not complete the order, it is of no effect and must be treated as if it had not been given.

"The one who has not repeated the order to the dispatcher will read it aloud to the one who did.

"The motorman and conductor will each take a copy of the order, the operator retaining a copy."

The last part of Rule 261, beginning with the words "If the train," was eliminated, and the word "motorman" was changed to "conductor." Rules 272 and 273 were also eliminated.

DUTIES OF EMPLOYEES

Rule 300 was revised to read: "Train dispatchers report to and receive their instructions from ——." In Rule 303 the words "signed for" were eliminated, making the rule read "every motorman and conductor has a copy of each new timetable." The following new rule was substituted for Rule 304:

"The dispatcher going off duty must make a written transfer advising the dispatcher coming on duty of all orders not executed, and fully advise him on all matters pertaining to the movement of trains or duties not performed."

Rule 305 was amended to read: "They must report promptly all defects or failures of telephone lines or signal apparatus to the proper authority."

In Rule 310 the word "superintendent" was omitted and a blank space left. Rule 311 was changed to read "Before going on duty they must."

Rules 313 and 315 were eliminated and Rule 316 was amended to read:

"They will report promptly by telephone to the proper officer any defective switch or target lights, switch locks, defective wires, track or cars noticed by them. If defect is serious or considered dangerous, train crews must not leave the point unless relieved by order of the ———."

Rule 318 was changed to read: "Train orders received by motormen and conductors must be sent daily to the ——— unless otherwise directed."

At the end of Rule 322 the words "or other designated authority" were added after the word "superintendent."

Rule 352 was amended to read:

"Motormen while operating cars are permitted to answer questions of superior officers, to hold necessary conversation with conductors concerning their duties and to give proper instructions to students only. All other conversation while car is in motion is forbidden."

Rule 353 was changed by the substitution of the words "the motorman" for the word "they" in the next to the last line. In Rule 355 the word "apprentices" was changed to "students." After the words "being driven ahead" in Rule 358 the words "or alongside of train" were added.

Rule 361 was amended to read, "When necessary to back a train, it must be done under the protection of a flag," and it was suggested that this rule should be inserted after Rule 221 under the heading "Movement of Trains."

Rule 364 was changed as follows:

"Testing Brakes.—Motormen on all trains must test air brakes by applying and releasing brakes after starting from a terminal and before running one thousand feet (1000 ft.) or at any point where the make-up of their train has been changed, and also before approaching railroad crossings apply the air brake sufficiently to know that it is in good working order.

"Hand brakes must be tested at least once during each trip."

Rule 365 was amended to read: "In case of failure of air brakes cars will be run in on siding until repaired."

REINFORCED CONCRETE CARHOUSE AT SAN DIEGO

In January of this year the San Diego Electric Railway, San Diego, Cal., completed a new car storage building of reinforced concrete construction. This building is 194 ft. x 269 ft. inside dimensions. It is divided by firewalls into three storage bays, having a total of 15 tracks, which are constructed of 91-lb., 7-in. T-rail. The rail also serves the purpose of a girder. The total storage capacity is about 100 cars measuring from 34 ft. to 46 ft. in length. This capacity will meet all requirements for three years, after which time another building of similar size will probably be constructed on a block of land now owned by the company opposite the present building.

Only minor car repairs by night men are made in this building. All overhauling, painting, etc., is done at the repair shops adjoining the power station. The pits are of the open type, the space between the tracks being furnished with plank walkways. However, concrete gangways are provided for transverse communication from bay to bay through the gravity fire doors. All tracks have steel spring bumpers and wheel stops.

The building fronts south and has no doors. Owing to the mild climate of this region it is not considered essential to close up a building of this nature at any time. It may be of interest to know that since 1904 the San Diego company has stored most of its rolling stock on vacant property which adjoins its power station. For a long time the officials believed that the housing of cars from four to six hours out of twenty-four was unnecessary. However, they finally came to the conclusion that the additional cost of maintenance from storing cars in the open was more than the interest on the construction cost of a building.

The building is equipped with an automatic sprinkler system which is supplied by the city pressure and an emergency tank of 30,000 gal. capacity erected over the roof. It cost approximately \$100,000.

PLATFORM BARS IN CHATTANOOGA

The Chattanooga (Tenn.) Railway & Light Company has recently applied a pivoted platform bar to the center vestibule post of its cars, as shown in the accompanying illustrations. These bars were installed in consequence of injuries which had resulted to passengers who left a moving car at railroad crossings while the conductor went ahead to flag the crossing. With



Platform Bar in Service Position

this device a passenger cannot leave the car without deliberately passing under or raising the bar, which has been lowered by the conductor before alighting. The lettering on the inside of the bar is "Don't get off car while bar is down." The lettering on the outside is "Don't board car while bar is down." During



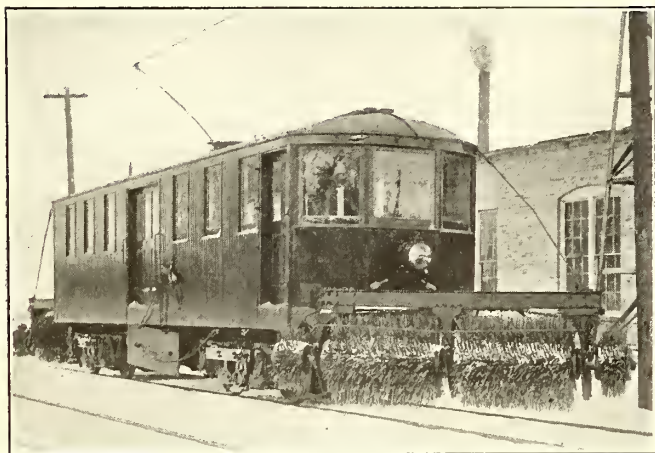
Platform Bar Folded Against Vestibule Post

the past year the company was called upon to settle damage claims of from \$3,000 to \$3,500 due to platform accidents at crossings, but this simple precaution relieves the company from all liability from this source. The bars were installed by J. W. Smith, superintendent of the company.

In connection with the power station and transmission line improvements which the Augusta Railway & Electric Company, Augusta, Ga., proposes to carry out the company will install ornamental poles for its trolley wires and feeders and clusters of tungsten lamps for street lighting. The transmission wires in Augusta will be placed underground in three of the principal streets.

NEW COMBINATION BAGGAGE CARS AND SNOW SWEEPERS FOR MICHIGAN UNITED RAILWAYS

The Michigan United Railways Company has recently equipped at its Albion shops two large snow sweepers that were built by the McGuire-Cummings Manufacturing Company. An illustration of one of the sweepers is presented. Each of the new machines is so constructed that it may be used during the winter months as a snow sweeper and converted for use as a baggage car during the summer. As the Michigan United Railways' electric system includes about 80 miles of third-



Combination Sweeper and Baggage Car for the Michigan United Railways

rail track, provision is made for operating either with third-rail or trolley current collectors and also small brooms are provided for cleaning the third-rail. These brooms are mounted on extensions of the main broom shaft.

The new combination sweeper and baggage cars have steel underframes and are mounted on McGuire-Cummings No. 28 trucks. The bodies are 38 ft. 8 in. long over end sheathing and 8 ft. wide. Each of the new cars is equipped with four GE-210 motors and K-34 D controllers. The brakes are supplied with air from an Allis-Chalmers B-4 compressor and the brooms are operated by GE-57 motors.

PITCH FILLER IN AKRON, OHIO

The record of the paving in Akron, Ohio, is interesting because the city has over 65 miles of paved streets, of which over



Brick Paved Street with Pitch Filler

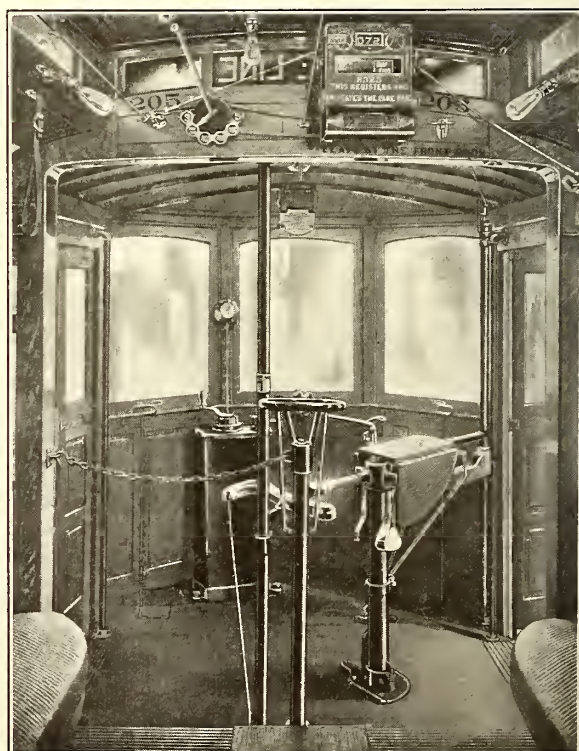
80 per cent are of brick. The first brick pavements laid in Akron were put down in 1890 on a sand base and paving pitch

was used for a filler. These streets after twenty years of continuous usage are in good condition to-day and nothing has been spent for repairs other than to replace portions torn up to make water, gas, sewer and electric connections. These pavements have been laid on crushed slag, crushed stone, gravel and cement concrete foundations. Subsequently the Akron authorities laid some brick pavement with cement filler under largely the same conditions, but the results were far less satisfactory, so that a return was made to paving pitch, and for the last ten years it has been used almost exclusively as a filler.

There are over 1,000,000 sq. yd. of brick pavement in Akron, 90 per cent of which is filled with pitch filler. In addition to this there are several thousand yards of stone pavement, all of which has been filled with pitch filler. The grade on these streets varies from less than 1 per cent to over 9 per cent, yet the filler has been found well adapted to all conditions, keeping the foundation dry and, therefore, firm. When necessary to take up the pavement for any reason the work can be done without breaking the brick, and when properly relaid it is impossible after a few weeks to tell where the pavement has been relaid. During the year 1910 about 2,000,000 lb. of paving pitch was used in the city, while plans for 1911 call for an additional large quantity. The largest private user of pitch filler in the city is the Northern Ohio Traction & Light Company in paving between tracks.

"TURN-IN CAR" AT DAYTON

The accompanying illustration shows the exit platform of car No. 205 of the People's Railway, Dayton, Ohio, as equipped with John F. Ohmer's combination of prepayment turnstile table and recording, indicating and printing register. In this case the turnstile arms and the two leaves of the table have been dropped to afford the maximum clearance for departing passengers. It is reported that this combination of turntable apparatus and registering mechanism is operating to the entire satisfaction of the railway management. The principal features of the "turn-in" car were first exhibited at the 1910 Atlantic City convention of the American Electric Railway Association, as mentioned on page 800 of the ELECTRIC RAILWAY



Turn-in Car Platform as Arranged for Exit Use

JOURNAL of Oct. 13, 1910. An illustrated description of this method as adapted for long and short platforms was published

on page 1209 of the ELECTRIC RAILWAY JOURNAL for Dec. 17, 1910, and reference to an early test of the Dayton equipment was made on page 388 of the issue for March 4, 1911.

RAPID TRANSIT PUBLICITY CAMPAIGN IN BROOKLYN

On March 2 the Brooklyn Rapid Transit Company made a proposal to the Public Service Commission for the First District, New York, to build certain subway and elevated railway extensions in the boroughs of Kings, Queens and Manhattan, New York City. Immediately after the submission of this offer the company started a comprehensive advertising cam-

TIME IS MONEY

THE ADOPTION OF THE B.R.T. PLAN MEANS TO BROOKLYNITES
WITH BUSINESS IN MANHATTAN AN AVERAGE SAVING OF

THIRTY MINUTES a day = Fifteen days a year

WE WILL TAKE YOU FROM			
RIDGEWOOD	TO CITY HALL (N.Y.), IN 19 MIN.; TIMES SQ., 21 MIN.		
EAST NEW YORK	" " " " 20 " " 22 "		
BATH BEACH	" " " " 21 " " 28 "		
GREENPOINT	" " " " 20 " " 15 "		
SHEEPSHEAD BAY	" " " " 22 " " 29 "		

WRITE BROOKLYN RAPID TRANSIT COMPANY FOR PARTICULARS

Second Car Advertisement of the Brooklyn Rapid Transit Company

paigned in order to acquaint the public with the advantages of the proposed routes. The first step was to insert in all of the important general and local newspapers of New York and Brooklyn a map showing the proposed lines and their connections to existing rapid transit routes. In many cases, when the proposal first appeared, the newspapers were glad to use the map and parts of the text in their reading columns. The maps and summaries of the proposals were later reprinted as advertisements in all of the papers so as to familiarize the public with the merits of the plan.

Another form of advertising in the newspapers has been the insertion of short talks from day to day accompanied in some cases by excellent cartoons. One of these cartoons, entitled "Is This the Way to Boost Brooklyn?" shows a mob of conflicting people tearing up the map of Brooklyn. This pointed the moral that if the borough is to grow to the best advantage its transit development must be assisted in a united way by all the residents of that borough. Another cartoon showed that if the Brooklyn Rapid Transit Company's plan was accepted the Queensboro Bridge, which is now practically useless, would become a most important link in interborough transportation.

**Boost Brooklyn by boosting the
B. R. T. transit relief plan.**

**Get a map == all details == from
Brooklyn Rapid Transit Company.**

Fifth Car Advertisement of the Brooklyn Rapid Transit Company

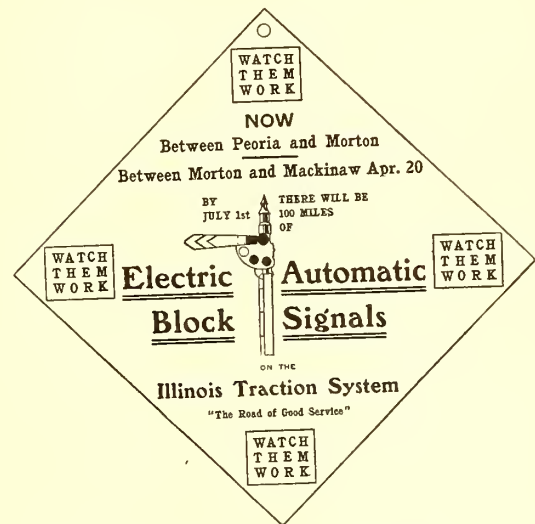
In addition to the first map, which was printed in black ink, a second map with colored areas has been issued to show the promised running times from points within these areas to the City Hall, New York. A third map gives the time which would be saved in traveling from specified points in Brooklyn and Queens Borough to prominent localities in Manhattan Borough. This timetable has also been printed as a circular. In addition, the company has issued local maps and descriptive matter devoted to showing the benefits which some of the proposed lines would bring to certain sections. Thus one sheet, entitled "The B. R. T. in South Brooklyn," gives the present and proposed running times along the most prominent routes and otherwise

discusses the relief measures that are intended for this district.

Besides advertising the merits of its proposal in the newspapers, the company has posted large maps with explanatory text on billboards. Framed copies of the map have also been hung up in real estate offices and in the headquarters of many social and civic organizations. All of this advertising has been supplemented by a series of 11 in. x 21 in. car announcements. The first announcement was simply "Watch this space to-morrow," and thereafter an argument has been presented every three or four days with each change of card. Two of these cards are reproduced. In all of these car announcements the public has been requested to write to the company for further particulars. This invitation has met with such hearty response that the company has already printed 20,000 pamphlet copies of its proposal as presented to the Public Service Commission. Many testimonials have been received from prominent citizens and civic organizations and will be used in future advertising matter.

ANNOUNCEMENT OF BLOCK SIGNALS ON ILLINOIS TRACTION

On April 1 the Illinois Traction System made effective for train operation its first installation of automatic block signals. These signals are between Peoria and Morton. The signals between Morton and Mackinaw Junction, it is announced, will be put into use on April 20; also it is announced that by July 1 100 miles of track of the Illinois Traction System will be



Car Card Hanger of Illinois Traction System Announcing Installation of Block Signals

protected by automatic block signals. The publicity department, which is in charge of Fred G. Buffe, plans to base a widespread advertising campaign on the extensive new signal equipment of this road. This campaign will include various kinds of descriptive matter. The attention of passengers now is being called to the new block signals by means of car card hangers of the accompanying form. In the choice of signals and in their location the management has recognized their value as a means of establishing the confidence of the public and so the new advertisements about the signals ask the public to "Watch them work."

"The Strength of Oxyacetylene Welds in Steel," by Herbert L. Whittemore, has just been issued as Bulletin No. 45 of the Engineering Experiment Station of the University of Illinois. This bulletin gives the results of an extensive series of tests to determine the strength which may be developed in welded joints made by fusing thin steel plates together by means of the flame of an oxyacetylene blowpipe. It was found that with careful manipulation such a welded joint may be expected to have about 85 per cent of the strength of the plate material.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Illinois.—Rights in Streets—Constitutional Provisions.

Const., Art. 11, Sec. 4, providing that no law shall be passed by the General Assembly granting the right to construct and operate a street railroad within any city, town or incorporated village without acquiring the consent of the local authorities having control of the streets or highways proposed to be occupied by such railroad, did not confer on cities and villages the exclusive control of their streets, and hence did not preclude the passage of act May 27, 1889 (Laws 1889, p. 223), giving to the Railroad and Warehouse Commission jurisdiction to determine the manner in which one railroad shall cross another in so far as it relates to crossings within the streets of cities and incorporated villages.

While a municipal corporation is vested with the control of the streets within its corporate limits, such control is not exclusive, but is subject to the control of the State.

Where a railway extending from Chicago to the City of Kankakee had been determined to be a commercial railroad, it could not be regarded as a street railroad and exempt from act May 27, 1889 (Laws 1889, p. 223), controlling the crossings of one railroad over the tracks of another, by reason of the fact that a part of its main line containing the contemplated crossing was located on one of the streets of a city. (*Chicago & S. Traction Co. v. Illinois Cent. R. Co.*, 92 N. E. Rep., 583.)

Oregon.—Charges—Unjust Discrimination.

The fare charged by an electric railroad company from the city limits of a city having more than 50,000 population to certain suburban towns was 15 cents, without transfer privileges, while that charged upon another division to certain other towns, which were a less distance from the city limits, was 10 cents, with transfer privileges. Held, that there was an unjust discrimination in charges in favor of the towns on the latter division, which the Railroad Commission properly corrected. (*Portland Ry., Light & Power Co. v. Railroad Commission of Oregon*, 105 Pac. Rep., 715.)

Pennsylvania.—Covenants—Construction.

A deed of land to a street railway company was in consideration of the company furnishing free electric current and issuing certain passes to members of the grantor's family "for such length of time, only, as they reside at their present residence." The family removed to another State for a short time, but subsequently returned, and for many years thereafter the street railway company furnished the passes and the electric current without objection. Held, that the company could not forfeit the privilege conferred by the deed because of the removal of the family, or because title to the property passed to another, where the family continued to occupy it. (*Humbert v. West Penn. Rys. Co.*, 77 Atl. Rep., 661.)

Texas.—Right to Occupy Highways—Objection by Third Persons—Right to Cross Steam Road—Character of Business—Delegation of Power to Street Railroads.

The commissioners' court having granted the right to a street railway company to use a road for the construction of its track upon petition of citizens owning the land in the vicinity and for whose use it was primarily constructed, the company could not be deprived of that right by objection of a steam railway company which had previously been permitted to cross the road.

No new servitude is imposed upon a public highway by constructing and operating a street railway therein whose cars are propelled by electricity for the transportation of passengers, and the right of such a city railway company to cross over the tracks of a steam railroad crossing such highway is subject to no conditions other than those to which the general public is subject in traveling over the highway.

That an electric railway carries mail, persons and property would not render it a commercial, and not a street, railway.

General Laws 1907, page 23, Chapter 15, conferring the power of eminent domain on interurban electric railway companies does not apply to street railways. (*Galveston, H. & S. A. Ry. Co. v. Houston Electric Co.*, 122 S. W. Rep., 287-8.)

LIABILITY FOR NEGLIGENCE

Georgia.—Passengers—Persons Having Safely Alighted from Car—Trespasser—Operation of Cars on Parallel Tracks—Duty to Use Gates or Bars.

Where a passenger has safely alighted from a car at his destination he ceases to be a passenger.

A passenger of a street railroad, who had just alighted from an open car on the side on which was a parallel track at a street intersection, and walked three or four steps between the tracks and then attempted to pass over the other track, was not a trespasser, and the railroad company owed the duty of exercising ordinary diligence to prevent injuring him.

Where a person knowingly and voluntarily puts himself in a place of immediate and obvious peril without necessity or propriety, and injury results to him in consequence, he cannot recover, notwithstanding the negligence of the person injuring him.

While, in the absence of statute or ordinance, no absolute duty rests on a street car company operating its cars on parallel tracks to equip them with gates or bars to prevent passengers from getting off on the side next to the parallel track, whether a failure to so equip its cars is negligence is a question for the jury in each particular case. (*Columbus Ry. Co. v. Asbell*, 66 S. E. Rep., 902.)

Massachusetts.—Rights of Travelers on Street—Collision with Wagon—Question for Jury.

Travelers on a street partly used by a street railway may use that part of the street as freely as any other, subject only to the limitation that they do not unreasonably interfere with the street railway cars and exercise ordinary prudence to avoid collision with them; and those in charge of street cars are bound to drive them in view of the travelers' rights, each owing the other a reciprocal duty.

In an action for injuries to the occupant of a wagon driving on the right-hand side of a street, by a street car striking the rear of the wagon, whether plaintiff was negligent and whether the motorman was negligent held, under the evidence, for the jury. (*Carroll v. Boston Elevated Ry.*, 91 N. E. Rep., 525.)

Michigan.—Action for Death of Passenger—Instructions—Duty to Warn Passengers of Danger.

In an action for death of a boy killed while riding as a passenger and seated on the steps and running board on the side of a street car, it was disputed whether he was hit by paving bricks piled by the city on each side of the track or whether another boy, after being knocked off, grabbed him in passing and pulled him from the car. The court charged that evidence was introduced showing the city piled the bricks near the track, and defendant had the right to use the street; that if the city piled the brick so close to the track as to endanger passengers riding on the steps or running boards of cars it was its duty to warn them of the danger and not permit them to remain where they might be brought in contact with the brick; and that if defendant failed under the circumstances to do this its negligence or failure of duty to its passengers rendered it liable, and it was no excuse to say the city piled its brick there. Held, to fully and properly instruct the jury as to whether a notice or warning was given. (*Moers v. Michigan United Rys. Co.*, et al., 123 N. W. Rep., 602.)

Missouri.—Derailment of Car—Authority of Employees—Negligence of Company—Damages.

A crew was sent out from car barns with a car to relieve a disabled car, and the crew failed to take the disabled car back to the barns but left it standing at the point of transfer, and, other cars coming up, a blockade was formed, to relieve which employees of the company, without authorization, took the disabled car and proceeded to the barn. On the way it was boarded by another employee, who took the place of the one acting as motorman, and thereafter the car, running at an excessive speed, jumped the track and injured a person on the sidewalk. Five minutes after the car started for the barn the company knew that the proper crew had not started back with the car, and though it had to travel over 5 miles through the heart of the city, nothing was done. Held, that as a matter of law the negligence of the company was shown, since either the employees were trespassers in taking the car, in which case it

was the duty of the company to stop it and see that competent persons were running it, or the men had authority to do as they did and the company would be liable for their negligence.

Where a seamstress, 51 years of age, was injured and both knees were badly wrenched and sprained and her left leg broken and the injuries were painful and permanent and the motion of her left leg was impaired and she had in the right knee an exudation down in the joint which had a tendency to stiffen it and sustained other severe injuries and was confined in bed five weeks, a verdict of \$5,000 was not excessive. (*Baker v. Metropolitan St. Ry. Co.*, 126 S. W. Rep., 764.)

New Mexico.—Effect of Contributory Negligence.

Although the general rule is that, even if the defendant be shown to have been guilty of negligence, the plaintiff cannot recover if he himself be shown to have been guilty of contributory negligence which may have had something to do in causing the accident, yet the contributory negligence on his part would not exonerate the defendant and disentitle the plaintiff from recovering if it be shown that the defendant might by the exercise of reasonable care and prudence have avoided the consequences of plaintiff's negligence. (*Thompson v. Albuquerque Traction Co.*, 110 Pac. Rep., 552.)

Montana.—Platforms—Injuries to Passenger.

Where a passenger arose from his seat as the car approached his destination, went out on the platform, and mentioned the name of the street to the motorman, which was the customary manner of signifying a desire that the car be stopped, and the speed of the car was reduced to about four or five miles an hour, and, under the impression that it was about to stop, he stepped from the platform to the first step of the car, and the car continued at a slow rate of speed for some distance beyond the crossing, when suddenly the speed was increased with a violent jerk and the passenger was thrown off and injured, it established a prima facie case of negligence. (*Knuckey v. Butte Electric Ry. Co. et al.*, 109 Pac. Rep., 979.)

New York.—Master and Servant—Injury to Servant—Action for Injury—Burden of Proof—Defective Appliances—Knowledge of Defects.

A motorman of one company who was injured while operating his car over the track of another company on a part of his route because the track was not properly sanded has the burden of showing which company owed him the duty of sanding that track.

A street railroad company is not liable for injuries to its motorman from defects in the track of another company over which he operated the car on the part of the route in the absence of knowledge of such defects. (*Powell v. Cohoes Ry. Co. et al.*, 120 N. Y. Sup., 336.)

Ohio.—Indemnity—Construction of Contract—Scope of Liability.

A contract for the rehabilitation of the tracks of a street railroad company, the work to be done without interfering with the operation of its cars, provided that the contractor should indemnify the company against all suits brought against it on account of claims for damages done or caused in the course of construction of the work, "or in consequence thereof," including injury to persons, land or buildings. At a place where the company switched its eastbound cars onto the westbound track to pass around a long excavation, 14 in. in depth, made by the contractor for replacing the eastbound track, a car was stopped in the night between street crossings, and a passenger alighting on the right-hand side fell into the excavation and received injuries for which she recovered a judgment against the company. Held, that the injury was not one received "in consequence" of the contractor's work but was proximately due to the negligence of the company's employees operating the car, who, with knowledge of the excavation, permitted the passenger to alight on that side of the car at an unusual place, and that the company could not recover on its indemnity contract. (*North American Ry. Const. Co. v. Cincinnati Traction Co.*, 172 Fed. Rep., 214-5.)

Oregon.—Crossing Accidents—Duty to Look and Listen—Operation—Care Required—Crossing Accident—Negligence.

It is presumptively negligent for a pedestrian to attempt

to cross a railway track without looking and listening when if he had looked and listened he would have discovered the approach of a car in time to have avoided injury, but he is not required to look or listen at any particular place or given distance from the crossing, but only to do so at the time and place necessary in the exercise of ordinary care.

Street railroad cars and the general public have an equal right to the reasonable use of the public highways, but there is a resulting mutual obligation resting upon each to exercise such right with reasonable care so as not to reflect injury upon another, and a street car company cannot, by running its cars at an unusual and unlawful speed at crossings, make its limited right a preferred right-of-way, nor can the driver of a vehicle escape responsibility for injuries resulting from his careless driving or lack of diligence.

When plaintiff's team reached the curb of a street on which there was a street railway, the rear of the wagon was about 35 ft. distant from the center of the nearer track, and the team was traveling about 6 m.p.h. An approaching car on that track was then about 240 ft. distant, and neither plaintiff nor the person with him observed that it was moving at an unusual speed. Held, that it could not be said as matter of law that the car was so close that reasonable men would say that plaintiff attempting to cross the track was not acting as a reasonably prudent man should act under the circumstances and hence plaintiff was not negligent as matter of law. (*Donohue v. Portland Ry. Co.*, 107 Pac. Rep., 964.)

South Carolina.—Release—Effect of Invalidity—Deduction from Recovery.

If a traction company by which plaintiff was injured furnished medical services as a consideration for plaintiff's release of damages, and the release was not binding because of plaintiff's ignorance thereof through mental deficiency, the value of the services could be deducted from any damages recovered by her. (*McKittrick v. Greenville Traction Co.*, 66 So. E. Rep., 289.)

Texas.—Passenger on Bumper of Crowded Street Car—Injury Resulting from Carrier's Negligence.

Where a passenger was allowed to ride with others on the bumper of a crowded street car as he had done before, and without knowing that it had been prohibited on the day in question, and he was injured by the negligence of the company in managing the car, and the passenger, aside from his occupying the dangerous position, was not negligent, the street railroad company was liable. (*Beaumont Traction Co. v. Happ.*, 122 S. W. Rep., 610, 830.)

Virginia.—Liability to Passengers—Effect of Contract Between Carriers.

A contract between carriers as to the stopping of trains at an intersection of their roads cannot control or affect the degree of care which a carrier owes to its passengers to avoid collisions. (*Washington, A. & Mt. V. Ry. Co. v. Trimyer*, 67 S. E. Rep., 531.)

Washington.—Master's Liability for Injury to Servant—Assumption of Risk—Questions for Jury.

An employee does not assume the risks arising from his employer's negligence, which are not incidental to the business, when he has no actual knowledge of the same.

Defendant operated an electric railroad and at one terminal made up a train at night at a switch on a trestle. There was a light at the switch stand only and a platform extending for some distance. Plaintiff, as conductor, was sent one night to make up the night train and having run the motor car on the switch to a point where it would clear cars on the main track, which was in fact beyond the platform and at a place not lighted by the switch light, he swung off with his lantern. He had not been at the place for some time but knew that in the meantime the platform had been extended, although not how far, and seeing a plank below him and supposing it to be the platform dropped to it, but it proved to be only a single plank lying on the timbers below the level of the track, and he fell from the trestle and was injured. Held, that under the facts of the case the question of defendant's negligence in failing to provide a platform at the place or better lights and also the question of plaintiff's contributory negligence and assumption of risk were properly submitted to the jury. (*Puget Sound Electric Ry. v. Harrigan*, 176 Fed. Rep., 488.)

News of Electric Railways

Progress of Negotiations in Toledo

The negotiations between the city of Toledo, Ohio, and the Toledo Railways & Light Company were continued during the week ended April 15, 1911. At the meeting on April 10 payments to the city of rentals for the use of bridges and for the pavement of the streets 18 inches outside the rails were discussed, but decision was deferred. The Schreiber ordinance provides that the company shall pay from \$100,000 to \$110,000 a year as rental for the use of bridges. Albion E. Lang, president of the company, stated that the company would pay the rental willingly, but that the expense would be borne by the patrons of the company eventually. Additional burdens for paving would also have to be charged against the patrons. Mayor Whitlock stated that the principle of requiring the company to pay money into the city treasury as rental or for other purposes was wrong.

Mr. Lang also objected to the section of the franchise to give the city power to order extensions and double tracks. It lacked safeguards to prevent over-development. A double track was not justified until the earnings of the single track were sufficient to pay the interest on the investment required for the additional track. Double tracks were needed on some of the routes and the company would make such improvements as soon as a settlement was reached. Plans would be made to reach all parts of the city more readily than can be done now. The negotiators felt that they should investigate plans in other cities before proceeding.

The problem of handling interurban cars was discussed briefly. It was stated that the company received no direct benefit from bringing interurban cars into the city, as the receipts were exhausted by the expenses incurred and the repairs made necessary by wear on the tracks.

On April 11 the subject of paving the streets for 18 inches outside of the outer rails of the tracks was again taken up and Mr. Lang agreed tentatively to the provision. Mayor Whitlock reserved the right to modify the phraseology of the Schreiber franchise relating to this point. The company is to pay its share of paving expenses in a lump sum, but it is not to be required to pay any part of expenses for paving within two and a half years of the expiration of its franchise. It is optional with the city as to which of the parties shall do the work, but an amendment was inserted that if a contractor for the city did it he must not interfere with the operation of cars. Pavement which is taken up must be restored in as good order as it was found.

The negotiators disagreed on the section of the ordinance which referred to the use of salt to remove snow from the tracks. The Schreiber ordinance would give the city full control over the matter. Mr. Lang insisted that the company should have freedom in this respect. In order to reach a tentative agreement the draft was amended to provide for the use of salt as permitted by the general ordinances, with the idea that the discussion would be resumed.

It was agreed that all tracks should be kept at the level of the streets and that the Council should direct the time and material for the company's portion of the street paving and maintenance of the tracks and roadways.

It was suggested that an official would have to be named to represent the city in the operation of the system after an agreement was reached and Mayor Whitlock suggested that the director of public service was the proper person for that duty.

The tentative ordinance was amended in relation to the use of salt at the meeting on the morning of April 12. The company must haul away the snow when it exceeds 6 in. in depth, if so directed by the city.

Mr. Lang intimated that the company would probably desire to install pay-as-you-enter cars when the road was rehabilitated, and the discussion of the section giving the city authority to order old cars to be replaced with new rolling stock was deferred. When the period of rehabilitation has been agreed upon this subject may be taken up again.

but the negotiators believed that it would be satisfactorily covered in that agreement. The clause to give the city the right to require attendants in the cars in addition to the motorman and the conductor was also held in abeyance.

Mr. Lang discussed the length of franchise in a number of cities as an introduction to the negotiations on the length of the period to be covered in this instance. A statement on this point was submitted for the consideration of the city.

An agreement was reached to the effect that the company should sprinkle and clean the portion of the streets which it occupies and keep clear paths at regular stops, except street crossings.

The company will carry no advertising on the outside of cars, except for baseball games and circuses, as provided in the tentative ordinance.

At the session on April 14 it was agreed that the city should not have the right to require the replacement of the overhead system during the first ten years of the grant, and then only after a notice of two years. The Schreiber draft provided that the city might order a change at any time.

An agreement was reached to the effect that the city may regulate the construction of pole and wire systems, but the company objected to the proposed right of the city to direct that the use of its poles be shared with any other company. Mayor Whitlock said that the idea was to prevent an excessive use of poles on the streets, but Mr. Lang said that it suggested a partnership which the company could not accept. A section of the proposed grant to give the city free use of the company's wires, tracks and other property was called incomprehensible by Mr. Lang. He said that the company would perform any service the city desired in return for proper remuneration. The matter was passed for the present.

The poles of the company's system may be used to carry the fire alarm and police telephone system, under an agreement which was easily reached. The company now has an arrangement with some of the telephone and telegraph companies for joint use of poles which has proved economical to all concerned, but there has never been an agreement of this kind with a competing railroad.

Subway Proposals in New York

The conferences in regard to subway proposals which have been held recently in New York by the Public Service Commission were enlivened on April 12, 1911, by a statement issued by T. S. Williams, president of the company, to the effect that the proposal of the Brooklyn Rapid Transit Company was not to be regarded as a club to assist the city in its negotiations with the Interborough Rapid Transit Company. Mr. Williams said, in part:

"Before the Brooklyn Rapid Transit Company filed its subway proposal it emphasized informally to the city's officials and the members of the Public Service Commission, with whom the plan was gone over, that the proposition was not to be regarded as furnishing a club to assist the city in its negotiations with the Interborough Rapid Transit Company.

"We insisted that the proposal should be treated on its merits as a plan primarily for solving Brooklyn's transportation needs; that it was not presented in antagonism to the Interborough Rapid Transit Company nor with any desire to compete with that company for Manhattan business, but solely with the view of giving Brooklyn, Queens and Richmond people through transportation from those boroughs into and through the business centres of Manhattan.

"It may be true, although we cannot believe it, that the Interborough Rapid Transit Company will attach as a condition of acceptance of the city's demands the exclusion of Broadway, Manhattan, as a distributing line for Brooklyn's, Queens' and Richmond's passengers, and, of course, if such a stipulation should be made, no city officer could

for a moment directly or indirectly accede to it. But, in order that the city's interests might not be jeopardized by such a situation, the Brooklyn Rapid Transit Company has assured the joint committee, in response to its inquiry, that it would in such an event include in its proposal of March 2 the entire triborough route for which bids were recently received, subject to such slight modifications as may be necessary to fit the route to our general plan and with such changes in specifications as would reduce the cost without diminishing the efficiency of operation. That assurance was given some weeks ago, and still stands."

Subsequently William R. Willcox, chairman of the commission, issued the following statement:

"No formal proposal has been received from the Brooklyn Rapid Transit Company other than that submitted on March 2, which contemplates an extension into Manhattan only as far north as Fifty-ninth Street. It is true that in our conferences we have asked Col. Williams, president of the company, whether he would be willing to extend his offer so as to operate the routes laid out north of Fifty-ninth Street and extending into the Bronx. Col. Williams informed the conferees that under certain conditions his company would include in its offer the operation of such lines.

"Both the question put to him by the conferees and his answer thereto were parts of the negotiations which have been going on for some weeks. As parts of such negotiations we have consistently refused to discuss them in public, just as we have refused to discuss such parts of the negotiations as affected the offer of the Interborough Rapid Transit Company. Whenever a formal proposal is made to the commission by any company it is promptly made public, and manifestly it would hinder our negotiations both with the Interborough and the B. R. T. Company if we should from day to day discuss the progress of those negotiations.

"That the conferees should use the Brooklyn Rapid Transit Company's offer as a club to compel better terms from the Interborough Company is just as absurd as if the statement were made that they would use the offer of the Interborough as a club to compel better terms from the B. R. T. Company. Both corporations are bidding for valuable concessions from the city government, and the conferees are earnestly and honestly striving to arrive at a decision which will be for the best interests of the city. If the fact that the two corporations are bidding against each other should result in obtaining from either a better proposal for the city than would have been possible without such competition, then it is for the interest of the city that such bidding be encouraged."

On April 17, 1911, Borough President McAneny of Manhattan expressed the opinion that the Brooklyn Rapid Transit Company offered an attractive proposition in case the Interborough Rapid Transit Company should not bid "quick and high." When President Shonts was asked to comment on the views of Mr. McAneny, as told in the newspapers, he said:

"I have not read the interview with Mr. McAneny. So far as I know there is only one definite subway offer before the authorities, and that is ours. We have had \$30,000,000 in cash lying in the banks for those elevated extensions since Nov. 1, 1910.

"These gentlemen said they wanted to talk matters over. At their suggestion, and not at ours, it was agreed that the negotiations should be kept confidential. We have not been asked to concede this or that, because at their suggestion it was said at the beginning that we would not discuss finalities until we were through with the preliminaries. We are still adhering to the word we gave not to discuss anything that went on in those conferences, and it is no use to ask me any questions on those matters.

"But, after all we have done, we are told that there is another performer in the ring, and if they crack their whip at us and tell us to jump high and quick, and particularly high, why, then we are going to wait until at least we see the spangles on the other performer before we say whether we will jump or not."

The Brooklyn Heights Railroad, the Nassau Electric Railway, and the Coney Island & Brooklyn Railroad have secured writs of certiorari to review the action of the Public Service Commission in giving the Manhattan Bridge Three-Cent Line a certificate of necessity in the Supreme

Court before Justice Greenbaum. The Manhattan Bridge Three-Cent Line proposes to operate not only on the Manhattan Bridge, but on Desbrosses, Washington, Canal and Vestry Streets, in Manhattan, and on Livingston and Fulton Streets, Flatbush, Atlantic and Third Avenues, in Brooklyn. This line, the Brooklyn Rapid Transit complains, is designed to draw its "most remunerative business by taking its short-haul traffic without furnishing better convenience" than the Brooklyn Rapid Transit Company can supply. One of the grounds of the Brooklyn Rapid Transit Company's complaint is that the new line proposes to operate over streets in both boroughs already occupied by street car tracks and cars at important junctions whose car lines at present occupy some of the streets in Manhattan on which the three-cent line wants to operate. The Brooklyn Rapid Transit Company alleges that the three-cent line cannot obtain the necessary consent of property owners.

Conference in New Jersey on Engineering and Operating Subjects

The Board of Public Utility Commissioners of New Jersey has called a conference with the street railways of New Jersey for Friday, April 21, 1911, at the offices of the board in the State House, Trenton, N. J., to consider the following subjects:

1. Track and roadway, with special reference to bridges, trestles, protection of same, curves and track construction.
2. Grade crossings of electric railways with those of steam railroads.
3. Station or waiting room facilities at transfer points.
4. Car equipment, with special reference to brakes, fenders and headlights.
5. Rails and gates for the protection of passengers when crossing bridges, trestles, passing around curves, etc.
6. Car signs, showing route and destination.
7. Standard regulations for government of conductors and motormen.

New Road Opened in Missouri.—The Jefferson City (Mo.) Bridge Company has completed and placed in operation between Jefferson City, North Jefferson and Cedar City an electric railway which connects with the Chicago & Alton Railroad and the Missouri, Kansas & Texas Railroad.

Work to Begin on Municipal Railway in San Francisco.—At a recent municipal conference called to consider the Geary Street, Park & Ocean Railroad, which is to be rehabilitated as a municipal railway, it was decided that construction work should be commenced at once on the roadbed and the overhead lines. The roadbed is to be built by contract and the overhead line by the Board of Public Works.

Bion J. Arnold to Report on Traffic in Los Angeles.—The City Council of Los Angeles, Cal., has retained Bion J. Arnold to report upon transportation problems in Los Angeles with a view to securing plans for the co-ordination of all transportation lines, including the proposed municipal railroad, and their development in accordance with the assumption that within fifteen years the city will have a population of 1,000,000.

Fire in New York Communicated to Rolling Stock.—A spectacular fire on April 13, 1911, which destroyed the grand stand at baseball park known as Polo Grounds, in New York, communicated to the adjoining elevated structure of the Interborough Rapid Transit Company, and four elevated motor cars and three trail cars on a siding on the structure were destroyed and ten other cars were damaged. The company has placed its loss at \$45,000.

Mr. Mortimer in Milwaukee.—On April 3, 1911, James D. Mortimer assumed his duties as acting president and general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., as the successor of John I. Beggs. Mr. Mortimer said to the newspapers when asked for a statement: "I have nothing to say. All my attention has been taken up familiarizing myself with the interests of the company and I will be engaged in this work for some time to come."

Address on Scientific Business Management.—Frederick Winslow Taylor, consulting engineer, Philadelphia, Pa., and ex-president of the American Society of Mechanical Engi-

neers, will make an address on "The New Conception of Business and Industrial Efficiency" in Carnegie Hall, New York, on April 28, 1911, at 8 p. m., under the auspices of the Civic Forum. Brief addresses will also be made by John Golden, president of the United Textile Workers of America, on the attitude of organized labor toward this movement, and by Frank B. Gilbreth, on its practical operation.

Meeting of New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on the evening of April 26, 1911. Dinner will be served at 6:30 o'clock sharp. At 8 o'clock the regular business meeting will be held, after which Louis K. Rourke, commissioner of public works of Boston, will address the members of the club on "The Organization and Construction of the Panama Canal." Special attention is called to the fact that the meeting this month is held on the fourth Wednesday instead of the fourth Thursday.

Franchise Negotiations in Montreal.—When they were at Quebec the members of the committee which represented the city of Montreal agreed with the railway committee of the Legislature to enter into negotiations at an early date with the Montreal (Que.) Street Railway to renew the company's franchise. E. A. Robert, the president of the company, is reported to have said that he understood that the city had a new proposal in preparation. While the Montreal Street Railway was ready to take up the subject at any time it would not, in view of the promise made to the Legislature on behalf of the city, address the city in connection with franchise negotiations at this time.

Bridge Proposed for San Francisco Bay.—A project is being promoted by Allan C. Rush to erect a suspension bridge across San Francisco Bay so as to connect the Alameda County shore with San Francisco. The cost of the structure is estimated at \$16,000,000. The plan is for a suspension bridge with five piers, four spans and approaches on each side. The length of each span is to be 4560 ft. The height of the bridge above the water is to be 150 ft. The length of the water span of the bridge would be 18,240 ft., and including the two approaches 24,000 ft., or a little more than 4½ miles. It is proposed to have the bridge carry six car tracks, two driveways and two observation paths for foot passengers.

Block Signal Committee of Illinois Electric Railways Association.—The block signal committee of Illinois Electric Railways Association, of which John Leisenring, signal engineer Illinois Traction System, is chairman, has decided, with the approval of the executive committee of the association, to work in connection with the joint block signal committee of the American Electric Railway Transportation & Traffic and Engineering Associations, rather than to conduct a special investigation of its own. Mr. Leisenring attended the meetings of the joint committee at Chicago the latter part of March and will probably attend future meetings of the committee. The report prepared by the committee will then be taken up by the Illinois Electric Railways Association.

Chief Engineer Selected for Electrification Study at Chicago.—Horace G. Burt, formerly president of the Union Pacific Railroad, has been selected by the electrification committee of the Chicago Association of Commerce as chief engineer to take charge of the work of the committee in the preparation of a report on electrification of steam railroads in Chicago. The members of the committee are: Prof. W. F. M. Goss, of the University of Illinois; E. R. Graham, of D. H. Burnham & Company, Chicago, and H. G. Hetzler, president of the Chicago & Western Indiana Railroad. The permanent headquarters of the electrification committee will be established in the People's Gas Building, and after May 1, 1911, the committee will meet every second Friday afternoon.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

A bill, agreed upon by railroads, shippers, consumers and labor, was accepted as a substitute for all pending railroad and commerce bills on April 12, 1911, and was reported favorably from the House committee on railroads.

To the amplified powers of the commission is specifically added the power to fix and regulate freight and passenger rates, to assume jurisdiction over express, steamboat lines and sleeping car companies, to sit in judgment in all conflicts between the transportation companies and the people, and to have access to the internal financial affairs of the transportation companies for the purpose of rate making or settling issues at stake. The Circuit Court of Sangamon County, sitting in Springfield, is constituted the court of appeal from the decisions of the commission, from which direct appeal is to the Supreme Court of the State. As the substitute bill is dissected by Orville F. Berry, chairman of the Railway and Warehouse Commission, it conserves to the commission all of the powers now granted, and confers upon the board these additional powers: Jurisdiction over the subject of demurrage, of refund of overcharge on freight rates and of return of overcharge on passenger rates; power to fix through routes and rates; power to fix joint rates; jurisdiction over express companies, steamboat lines and sleeping car companies; authority to require interchange of cars between common carriers; jurisdiction to determine rules or rates for storage and other charges incident to the transportation of freight; power to compel physical connection between common carriers; authority to establish switching rules and regulations and to fix the limits of switching districts; authority to investigate the general business management of common carriers in relation to the distribution of cars, granting of sidings, location of passenger and freight stations, and use and compensation for cars owned or controlled by common carriers.

MICHIGAN

The committee on railroads of the Michigan Senate has decided to postpone further consideration of the James bill to refer questions of renewal of franchises of electric railways to the Railroad Commission, when the companies and municipal authorities fail to agree upon rates and terms.

NEW JERSEY

The House has its work well in hand, and is ready to adjourn on twenty-four hours' notice. The Senate has adopted a resolution to adjourn on April 21, 1911. The House has passed nearly 400 bills, while the Senate up to April 13, 1911, acted on only a few more than 200. As stated previously in the *ELECTRIC RAILWAY JOURNAL* the employers' liability bill has become a law, and only two administration measures are still pending, public utilities and corrupt practices. The conference committee on public utilities bills was expected to report a bill on the evening of April 18. It was understood that it would be the Egan bill modified in accordance with the ideas of the Democrats so as to retain the present Public Utility Commission in office.

OHIO

Governor Harmon has signed the bill which requires street railways to sprinkle their rights-of-way within municipalities. A bill has passed the Senate to give the State Railroad Commission power to enforce the law relating to the use of power brakes on double-track electric railway lines. The Todd bill, introduced in the Senate, would empower municipalities to construct conduits and order the removal of overhead wires.

TENNESSEE

The bill introduced in the Tennessee Legislature to prohibit the use of prepayment cars on street railways has been rejected. A companion measure to prohibit the use of safety gates has also been rejected. Representative Cohn has introduced a bill to provide a public utilities board to consist of three members with power to regulate the rates, schedules, etc., of street railways, electric companies, etc., and authority to regulate issues of bonds and stocks.

WASHINGTON

An act creating a public service commission was approved by the Governor of the State of Washington on March 18. It makes the valuation of the property of every service company mandatory upon the commission. The members of the Railroad Commission constitute the first Public Service Commission. The sum of \$118,146 is provided to carry out the provisions of the act.

Financial and Corporate

New York Stock and Money Markets

April 18, 1911.

To-day's trading on the New York Stock Exchange was the most active since March 2, total sales aggregating 549,187 shares, against the 100,000 of yesterday's market. A decline was experienced in the prices of the majority of securities traded, and decreases of 1 to 3 points were registered at the close.

Money rates continue easy. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{3}{8}$ per cent; ninety days, $2\frac{1}{2}$ @ $2\frac{3}{4}$ per cent.

Other Markets

The week on the Philadelphia Exchange shows an appreciable falling off in traction shares. To-day's trading resulted in a further decline in prices of Philadelphia Rapid Transit and Union Traction.

Aside from a few transactions in bonds Chicago tractions were not active during the short Easter week. General trading to-day has reflected the New York market, and heaviness, with price decline, has prevailed.

In Boston the market has been rather quiet since last report and trading has been light in traction shares. A few transactions have been made in Boston Elevated and in Massachusetts Electric and price changes have been nominal.

There has been fair trading in Baltimore during the week in United Railways bonds, with prices generally firm.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 11.	April 18.
American Light & Traction Company (common).....	a298	a287
American Light & Traction Company (preferred).....	a108	a106
American Railways Company.....	a44	a44½
Aurora, Elgin & Chicago Railroad (common).....	a44	a44
Aurora, Elgin & Chicago Railroad (preferred).....	a88	a88
Boston Elevated Railway.....	a128	a128
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	a75	71
Boston & Worcester Electric Companies (common).....	a11	9½
Boston & Worcester Electric Companies (preferred).....	44	44
Brooklyn Rapid Transit Company.....	77¾	76¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84¾	83¾
Capital Traction Company, Washington.....	a126½	*126½
Chicago City Railway.....	190	a190
Chicago & Oak Park Elevated Railroad (common).....	3	3
Chicago & Oak Park Elevated Railroad (preferred).....	6½	6
Chicago Railways, pteptg., ctf. 1.....	93	a90
Chicago Railways, pteptg., ctf. 2.....	23	a23½
Chicago Railways, pteptg., ctf. 3.....	a10	a9½
Chicago Railways, pteptg., ctf. 4.....	a5	a5½
Cincinnati Street Railway.....	130	*130
Cleveland Railway.....	a97	a95½
Columbus Railway (common).....	a96	*96
Columbus Railway (preferred).....	100	*100
Consolidated Traction of New Jersey.....	a76½	a76½
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	100	100
Detroit United Railway.....	a71½	71½
General Electric Company.....	150½	150
Georgia Railway & Electric Company (common).....	a133¾	a133
Georgia Railway & Electric Company (preferred).....	a90	a91
Interborough Metropolitan Company (common).....	185½	177½
Interborough Metropolitan Company (preferred).....	53½	50¾
Interborough Metropolitan Company (4½s).....	78¾	78½
Kansas City Railway & Light Company (common).....	21½	21¼
Kansas City Railway & Light Company (preferred).....	70	70
Manhattan Railway.....	139	137
Massachusetts Electric Companies (common).....	a17	a16½
Massachusetts Electric Companies (preferred).....	87½	a87
Metropolitan West Side, Chicago (common).....	23	24
Metropolitan West Side Chicago (preferred).....	70	67
Metropolitan Street Railway, New York.....	*15	15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	71	70¾
Northern Ohio Light & Traction Company.....	a45	45
Northwestern Elevated Railroad (common).....	23	a21½
Northwestern Elevated Railroad (preferred).....	a103	a104
Philadelphia Company, Pittsburgh (common).....	a53	a53
Philadelphia Company, Pittsburgh (preferred).....	a43	a43
Philadelphia Rapid Transit Company.....	a18¾	a16¾
Philadelphia Traction Company.....	a83¾	83¾
Public Service Corporation, 5% col. notes (1913).....	100½	100½
Public Service Corporation, ctf. 5.....	105½	a106
Seattle Electric Company (common).....	a106½	a106
Seattle Electric Company (preferred).....	a98	a98
South Side Elevated Railroad (Chicago).....	70	a71
Third Avenue Railroad, New York.....	91½	a10
Toledo Railways & Light Company.....	a7½	a7½
Twin City Rapid Transit, Minneapolis (common).....	a108½	a108½
Union Traction Company, Philadelphia.....	a44¾	a44¾
United Rys. & Electric Company, Baltimore.....	18¾	18¾
United Rys. Inv. Co. (common).....	40	42½
United Rys. Inv. Co. (preferred).....	70	72
Washington Ry. & Electric Company (common).....	a37	37
Washington Ry. & Electric Company (preferred).....	a89	89
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	103	103
Westinghouse Elec. & Mfg. Co.....	a66	a66
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a17½	a17

aAsked. *Last sale.

Organization of Tri-State Railway & Electric Company

The stockholders and directors of the Tri-State Railway & Electric Company met on April 14, 1911, at East Liverpool and organized as follows: President, J. G. White, of J. G. White & Company, Inc., New York, N. Y.; vice-president, J. H. Pardee, of J. G. White & Company, Inc.; second vice-president, Edward McDonnell, East Liverpool; treasurer, R. B. Marchand, of J. G. White & Company, Inc.; secretary and assistant treasurer, George H. Faulk, East Liverpool; assistant treasurer, T. W. Moffat, of J. G. White & Company, Inc.; general manager, W. R. W. Griffin, East Liverpool; directors, J. G. White, New York; J. H. Pardee, New York; Edward McDonnell, East Liverpool; W. Carl Ely, Buffalo; Horatio G. Lloyd, Philadelphia; James Hilbert, W. R. W. Griffin, George H. Faulk and George H. Owen, East Liverpool.

The new company has taken over and will operate the urban and interurban railways, electric light, bridge and other properties formerly controlled by the Beaver County Light Company, the Midland Electric Light & Power Company, the Ohio River Passenger Railway, the East Liverpool Traction & Light Company, the Steubenville & East Liverpool Railway & Light Company, the Steubenville & Wellsburg Traction Company, the Tri-State Traction Company, the Steubenville, Wellsburg & Weirton Railway, the Wellsburg Electric Light, Heat & Power Company, and has also acquired an interest in the running rights over the bridge of the Steubenville Bridge Company between Steubenville and Middle Ferry, W. Va.

Arrangements have been made to construct an electric railway between Steubenville and Weirton, W. Va.

The active management of the properties will be assumed by J. G. White & Company, Inc. W. Caryl Ely, Buffalo, and Edward McDonnell, East Liverpool, and their associates, retain their interests in the properties.

Annual Report of the New Orleans Railway & Light Company

The income account of the New Orleans Railway & Light Company for the years ended Dec. 31, 1910 and 1909, is as follows:

	Year ended Dec. 31.	1910.	1909.
Operating revenue:			
Railroad department.....	\$4,206,303	\$4,101,546	
Electric department.....	1,072,546	1,027,898	
Gas department.....	966,373	904,881	
Total operating revenue.....	\$6,245,222	\$6,034,325	
Operating expenses:			
Railroad department, including depreciation.....	\$2,557,490	\$2,403,076	
Electric department, including depreciation.....	564,455	525,806	
Gas department, including depreciation.....	399,793	400,019	
Total operating expenses.....	\$3,521,738	\$3,328,901	
Net operating revenue.....	\$2,723,484	\$2,705,424	
Deduct operating taxes.....	502,954	481,750	
Operating income.....	\$2,220,530	\$2,223,674	
Miscellaneous income.....	24,313	8,569	
Gross income.....	\$2,244,843	\$2,232,243	
Income deductions:			
Interest on funded debt.....	\$1,544,092	\$1,498,889	
Other interest charges.....	10,591	13,967	
Dividends on New Orleans City Railroad stock, proportion payable to minority stockholders..	4,438	4,745	
Amortization of debt, discount and expense....	35,597	47,222	
Miscellaneous deductions.....	6,836	6,947	
Total deductions.....	\$1,601,554	\$1,571,770	
Net income.....	\$643,289	\$660,473	
Miles of track.....	201	198	

Hugh McCloskey, the president, says in part:

"The operating revenues of the properties for the year increased \$210,897, or 3.5 per cent.

"Our average railroad revenue per passenger this year was 4.06 cents against 4.1 cents in 1909. Of the passengers paying fare 23.9 per cent used transfers this year, whereas last year the percentage using transfers was 22.6.

"The operating expenses of all the companies for the year 1910 were \$3,521,737, an increase of \$192,836 over the preceding year. This is mainly due to charging into operation this year the sum of \$150,000 for depreciation, which was distributed among the various operating departments

as follows: Railroad department, \$112,000; electric light department, \$18,000; gas department, \$20,000; total, \$150,000.

"For the year ended Dec. 31, 1910, net income amounted to \$643,288, against \$660,473 the preceding year, a decrease of \$17,184. Charging the \$150,000 referred to above into operating expenses this year for past depreciation explains the reason for a decrease.

"Charges were made to the property accounts during the year to the amount of \$765,835 for betterments, improvements and the acquisition of new property.

"The Magazine substation and emergency house were completed. Two 500-kw motor-generator sets, panels and instruments were installed therein complete. One additional 500-kw motor-generator set was installed at the Valence Street substation, together with feeders, transformers and three regulators. A site was purchased at the corner of North Pierce and Iberville Streets, and a fire-proof substation of 5420-kw ultimate capacity was erected for city arc lighting, commercial and power and railway distribution. One 1000-kw railway motor-generator set was installed complete and is now in daily service. At the Claiborne station the old engines were connected to the new condenser system. These engines are now in first-class operating condition. One additional 500-kw transformer was installed at the Dryades substation. Two artesian wells, one at the magazine shops and the other at the Arabella barn, were installed, giving us all the water needed there except for drinking purposes.

"Fifty new cars were purchased and placed in operation. It is pleasing to be able to assure you that the physical property and equipment of the company in every branch has been maintained in a good state of repair and its efficiency considerably improved."

The surplus account for the year ended Dec. 31, 1910, is as follows:

Balance, Dec. 31, 1909.....	\$3,159,829
Additions:	
Adjustments of accounts of prior period.....	\$1,398
Net income of all companies operated, after eliminating inter-company transactions.....	643,289
Total additions.....	644,687
	\$3,804,516

Deductions:

Depreciation reserve.....	\$1,000,000
Electric car replacements.....	155,281
Electric cars scrapped.....	11,653
Reconstruction of Claiborne power house tunnel....	33,831
Reconstruction of portion of Dauphine track.....	1,723
Cost of moving tracks, Carrollton Avenue.....	3,442
Expenses relative to threatened strike.....	17,367
Amortization of commission on loans, proportion applicable to year 1909.....	14,407
Reserved for uncollectible accounts.....	12,300
Adjustments of accounts of prior period.....	9,891
Premiums on redeemed securities.....	3,992
Miscellaneous adjustments.....	1,707
Dividends to minority stockholders (except dividends on New Orleans City Railroad stock, charged to income).....	4,554
Dividends on preferred stock of New Orleans Railway & Light Company.....	249,875
Total deductions.....	1,520,023

Balance, Dec. 31, 1910.....	\$2,284,493
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Statistics of traffic are as follows:

Year.	Revenue Passengers.	Transfers Redeemed.	Revenue Mileage.	18-Hour Cars.
1909	78,643,680	17,816,746	18,718,605	117,072
1910	80,408,085	19,246,906	19,021,429	118,775

British Columbia Electric Railway Company, Ltd., Vancouver, B. C.—Gross earnings for the year ended June 30, 1910, were £628,763, as compared with £478,146 in the preceding year. The net revenue, including income from investments in subsidiary companies, was £226,803, as compared with £190,444. The number of passengers carried was 34,476,804, as compared with 25,183,739. The balance available for dividends was £139,391 last year, as compared with £123,417 in the preceding year. Dividends of 6 per cent were paid in each year on the preferred ordinary stock and of 8 per cent on the deferred ordinary stock. The company charged against the revenue account for the year the following sums: Provision for renewals and maintenance (from which £15,242 was taken for adjustment and expenditures on renewals during the year), £46,426; special provision against depreciation in value of certain obsolete steam plants, £3,000; bonus to employees, £11,333; amount added to capital amortization fund, £2,098.

Cleveland, Youngstown & Eastern Railway, Cleveland, Ohio.—Robert D. Beatty, secretary of the Cleveland, Youngstown & Eastern Railway, having about 38 miles of electric railway extending from Cleveland to Garrettsville, Ohio, consisting of power house, rolling stock, building, etc., is offering the property for sale. The road passes through Chagrin Falls, Troy and Hiram, and has a contract with the Cleveland Railway enabling the Cleveland, Youngstown & Eastern Railway's cars to reach the Public Square of Cleveland. Outstanding bonds about \$8,000 per mile. The construction of about 13 miles of additional track will connect the Cleveland, Youngstown & Eastern Railway with the Mahoning & Shenango Railway & Light Company lines, opening up a territory containing about 250,000 people only about 70 miles from Cleveland.

Columbus, Mount Vernon & Mansfield Traction Company, Columbus, Ohio.—The Interurban Securities Company, Columbus, Ohio, is offering an issue of \$750,000 of 5 per cent bonds of the Columbus, Mount Vernon & Mansfield Traction Company at \$850 for each \$1,000 bond with a bonus of \$400 in the fully paid non-assessable stock.

Detroit (Mich.) United Railway.—Additional first consolidated mortgage 4½ per cent bonds of the Detroit United Railway to the amount of \$1,066,000, due in 1932, have been listed on the New York Stock Exchange. The total amount of bonds of this company listed to date is \$12,433,000. The bonds just listed were issued for 75 per cent of the cost of betterments and improvements which exceed \$1,422,000.

Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.—The Eastern Wisconsin Railway & Light Company has been authorized by the Wisconsin Railroad Commission to issue \$76,000 par value of its 5 per cent 20-year first mortgage gold bonds, of the par value of \$1,000 each, to be secured by the refunding and extension mortgage executed by the company to the Milwaukee Trust Company, Milwaukee. The funds to be derived, in so far as possible, are to be used to pay the obligations incurred in making additions and extensions to the system, and also to reimburse the reserve, working capital and surplus accounts for the funds taken from these accounts and used in paying for the extensions and additions.

Fort Smith Light & Traction Company, Fort Smith, Ark.—All of the \$650,000 of 6 per cent gold notes of the Fort Smith Light & Traction Company, dated Jan. 1, 1910, have been called for redemption at 101 and interest on May 1, 1911, at the office of the Continental & Commercial Trust & Savings Bank, Chicago, Ill.

Havana (Cuba) Electric Railway.—Additional consolidated mortgage 5 per cent bonds of the Havana Electric Railway to the amount of \$1,847,000, due in 1952, have been listed in the New York Stock Exchange, making the total amount listed to date \$9,634,000, \$366,000 of the \$10,000,000 issue having been canceled by the sinking fund. Of the bonds just listed \$1,147,000 has been issued to retire \$331,000 of first mortgage bonds and against cash to retire the remaining \$762,000 of first 5 per cent bonds called for payment on or before Jan. 1, 1912; \$700,000 has been issued for future corporate purposes, and \$81,000 has been exchanged for \$81,000 of second mortgage 6 per cent bonds.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—A quarterly dividend of 1½ per cent has been declared on the \$800,000 of common stock of the Honolulu Rapid Transit & Land Company, payable on March 31, 1911, to holders of stock of record of March 27, 1911. By declaring this dividend the annual rate has been increased to 6 per cent, contrasting with 4 per cent in 1908, 1909 and 1910, 3 per cent in 1907, 3¼ per cent in 1906 and 4 per cent in 1904 and 1905.

Interstate Railways, Philadelphia, Pa.—The entire issue of \$1,000,000 of 6 per cent cumulative preferred stock of the Interstate Railways has been subscribed, \$500,000 in cash by the holders of the common stock and \$500,000 in exchange for the overdue coupons of the 4 per cent bonds of the company.

Las Vegas Light & Power Company, Las Vegas, N. Mex.—The property of the Las Vegas Light & Power Company was sold under foreclosure on April 3, 1911, to J. M. Cunningham, vice-president of the company and

president of the San Miguel National Bank, for \$126,500. The purchase is said to have been made by Mr. Cunningham in the interest of the Federal Light & Traction Company, New York, N. Y.

New Orleans Railway & Light Company, New Orleans, La.—Seven New Orleans banking houses are offering at 87½ and interest to yield 5.80 per cent \$800,000 of "refunding and general lien 5 per cent gold bonds" of the New Orleans Railway & Light Company, dated Nov. 1, 1909, and due Nov. 1, 1949, but redeemable at 105 and interest on Nov. 1, 1919, or any interest date thereafter. The proceeds of the bonds are to be used to reimburse the company to the extent of 75 per cent of the cost of extensions and improvements made necessary by the expansion of the business. The bankers say that during the last six years approximately \$7,000,000 has been spent on construction and improvements and that about \$1,300,000 of this amount has been supplied from net earnings. All the preceding bonds of this issue, with the exception of \$81,000,000, were printed in French and were sold in France, and the bonds which are now being offered constitute the first public sale in America of this refunding and general lien issue.

Oklahoma Railway, Oklahoma City, Okla.—John W. Shartel, vice-president and general manager of the Oklahoma Railway, has explained as follows the certificate of the increase in the capital stock of the company from \$3,000,000 to \$15,000,000 and the increase in the amount of authorized bonds from \$3,000,000 to \$12,000,000, mentioned in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, page 688: "We started in 1904 with \$1,000,000 capital and issued \$1,000,000 in bonds. In 1906 we found that this was inadequate and had to buy up the old bonds at a premium, increasing our capital stock and issuing \$3,000,000 in bonds. We have now had the same experience again and this time decided to make the increase large enough to care for the development for some years to come."

Piedmont (N. C.) Traction Company.—The Piedmont Traction Company has filed with the Secretary of State of North Carolina a certificate of the increase in its capital stock from \$100,000 to \$1,500,000.

San Jose & Santa Clara County Railroad, San Jose, Cal.—The Southern Pacific Company is reported to have concluded negotiations in the interest of the Peninsular Railway, San Jose, for the purchase of the property of the San Jose & Santa Clara County Railroad and the San Jose Railroads, controlled by L. E. Hanchett and his associates.

Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil.—The fifth annual pamphlet report of the board of directors of the Rio de Janeiro Tramway, Light & Power Company, Ltd., for the year ended Dec. 31, 1910, has been made public. The gross revenues of the tramway, light and power, telephone and gas departments of the company for 1910 were \$10,960,179, as compared with \$7,527,559 for 1909, an increase of \$3,432,620. The net earnings of these departments for 1910 were \$5,393,092, as compared with \$3,068,306 for 1909, an increase of \$2,324,785. After the payment of all fixed charges, interest and general expenses there was a surplus for 1910 of \$2,337,142, which, with the amount brought forward from 1909, \$1,707,935, makes a total of \$4,045,078, which the board has appropriated as follows: \$250,000 to meet the needs of the sinking fund for the year on first mortgage bonds, \$300,000 to a general reserve fund account, two quarterly dividends of 1 per cent each and two of 1¼ per cent each, absorbing \$1,462,438, and the balance, \$2,032,640, carried forward. The following reference is made in the report to the tramway department: "As a result of the complete electrical equipment of the entire system, the operation of this department has been conducted in a much more efficient, rapid and economical manner than in previous years, with the result that the service has been very satisfactory to the public and the gross revenue has steadily increased. The suburbs are growing rapidly, due to the increased facilities afforded by the tramways, and this should increase the revenues of the suburban tramways in the next few years. During the year sixty-eight 13-bench motor cars were manufactured in the company's shops and a large addition has been made to the company's equipment in its freight department."

Virginia Railway & Power Company, Richmond, Va.—There have been listed on the New York Stock Exchange \$4,446,500 of preferred stock of the Virginia Railway & Power Company and \$7,450,000 of common stock of the company, issued under the reorganization plan. The exchange has also authorized the listing of \$253,500 of additional preferred stock on notice of sale, making the total amount of preferred stock authorized to be listed \$4,700,000.

Youngstown & Ohio River Railroad, Youngstown, Ohio.—Gross earnings in the calendar year 1910 were \$208,706, as compared with \$166,689 in 1909. Operating expenses were \$113,946, as compared with \$84,072. Net earnings were \$94,760 in 1910, as compared with \$82,617 in 1909. Taxes and rentals were \$12,468 last year, as compared with \$11,016 in the preceding year. Net earnings amounted to \$82,292 last year, as compared with \$71,601 the preceding year. Of the net earnings last year \$37,500 was applied to bond interest and \$15,000 to dividends on the preferred stock, leaving a surplus of \$29,792. Gross earnings last year were derived from the following sources: Passengers, \$150,731; freight, \$45,330; power, \$11,142; miscellaneous, \$1,503. As the number of miles of main track operated was 36, the gross earnings per track mile were \$5,800 and the net earnings per track mile \$2,632. The number of passenger car miles run was 494,556 and of freight car miles run 138,789. The passenger revenue per car mile was 31.91 cents and the freight revenue per car mile 36.65 cents. A total of 711,439 passengers was carried. The company operates its passenger service electrically and its freight trains by steam locomotives.

Dividends Declared

Columbus (Ohio) Railway, quarterly, 1¼ per cent, preferred.

Detroit (Mich.) United Railway, quarterly, 1¼ per cent.

East St. Louis & Suburban Railway, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana (Cuba) Electric Railway, quarterly, 1½ per cent, preferred; quarterly, 1½ per cent, common.

Montreal (Quebec) Railway, quarterly, 2½ per cent.

Railway Companies General, New York, N. Y., quarterly, 1 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

		AMERICAN RAILWAYS COMPANY.				
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	Mar., '11	\$308,731	.....	.....	.....	.....
1 "	" '10	305,529	.....	.....	.....	.....
9 "	" '11	2,995,358	.....	.....	.....	.....
9 "	" '10	2,810,163	.....	.....	.....	.....
		BATON ROUGE ELECTRIC COMPANY.				
1m.,	Jan., '11	\$9,836	\$5,882	\$3,954	\$1,975	\$1,979
1 "	" '10	9,384	6,028	3,356	1,902	1,454
12 "	" '11	110,627	69,311	41,316	23,394	17,922
12 "	" '10	101,636	70,787	30,849	.....	.....
		BROCKTON & PLYMOUTH STREET RAILWAY COMPANY.				
1m.,	Jan., '11	\$7,471	\$5,879	\$1,592	\$1,584	\$8
1 "	" '10	6,875	6,861	14	1,799	1,785
12 "	" '11	120,222	83,681	36,541	19,944	16,597
12 "	" '10	130,575	93,735	36,840	21,311	15,529
		COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY.				
1m.,	Feb., '11	\$423,689	\$236,907	\$186,782	\$97,808	\$88,974
1 "	" '10	374,920	*216,755	158,165	101,248	56,917
2 "	" '11	896,805	*493,048	403,757	197,830	205,927
2 "	" '10	807,292	*453,176	354,116	201,616	152,500
		EAST ST. LOUIS & SUBURBAN COMPANY.				
1m.,	Feb., '11	\$168,680	*\$99,341	\$69,339	\$45,204	\$24,135
1 "	" '10	175,234	*99,485	75,749	44,882	30,867
2 "	" '11	357,404	*202,351	155,053	90,440	64,613
2 "	" '10	363,427	*202,524	160,903	90,035	70,868
		GALVESTON ELECTRIC COMPANY.				
1m.,	Jan., '11	\$28,533	\$17,392	\$11,141	\$8,348	\$2,793
1 "	" '10	27,694	21,099	6,595	6,261	335
12 "	" '11	370,177	220,944	149,233	90,057	59,176
12 "	" '10	369,546	221,813	147,733	75,168	72,565
		ILLINOIS TRACTION SYSTEM.				
1m.,	Feb., '11	\$531,028	*\$314,940	\$216,088	.....	.....
1 "	" '10	447,435	*270,459	176,975	.....	.....
2 "	" '11	1,100,970	*662,849	438,121	.....	.....
2 "	" '10	940,836	*559,202	381,634	.....	.....
		UNION RAILWAY, GAS & ELECTRIC COMPANY.				
1m.,	Feb., '11	\$251,685	*\$148,772	\$102,913	\$59,424	\$43,489
1 "	" '10	242,593	*146,102	96,491	58,031	38,460
2 "	" '11	528,067	*311,145	216,922	118,819	98,103
2 "	" '10	506,468	*309,601	196,867	116,299	80,568

Traffic and Transportation

Meeting of Lake Shore Interurban Traffic Association

The members of the Lake Shore Interurban Traffic Association met at Erie, Pa., on April 13, 1911, and discussed the different local combinations of rates for travel to the various resorts in New York and Pennsylvania to provide a suitable tariff for the summer traffic over the interurban electric railways which touch and connect with Erie. The Lake Shore Interurban Traffic Association is composed of the following roads, and they intend to publish a joint tariff, both passenger and freight: Buffalo & Lake Erie Traction Company, H. C. Allen, passenger agent; Cleveland & Erie Railway, R. W. Palmer, manager; Chautauqua Steamboat Company, E. W. Sturdevant, passenger agent; Erie Traction Company, C. M. Hatch, general manager; Jamestown, Chautauqua & Lake Erie Railroad, E. W. Sturdevant, passenger agent; Meadville & Cambridge Springs Street Railway, F. Windle, superintendent; Chautauqua Traction Company, C. J. Moynihan, acting general passenger agent; International Railway, George H. Dreybus, traffic agent.

The association proposes to issue interline tickets and joint folders so as to encourage travel by electric railway. The joint tariff will be issued by C. J. Moynihan, as agent, for the lines interested. No permanent officers, at this time, have been elected, C. J. Moynihan being appointed as temporary secretary and R. W. Palmer as temporary chairman.

"Near-Side" Stops in Trenton.—The Trenton (N. J.) Street Railway has adopted the practice of stopping its cars on the near side of street crossings.

Clocks and Stools in Louisville.—The Louisville (Ky.) Railway is using clocks connected with the trolley circuit to register the time cars pass certain points. The company has furnished stools for motormen on all its lines.

Parlor Car Service Between Peoria and St. Louis.—The sleeping cars operated by the Illinois Traction System between Peoria, Ill., and St. Louis, Mo., have proved so successful that the management have decided to place parlor cars in service between the same points.

Park on Lake Pontchartrain.—The New Orleans Railway & Light Company, New Orleans, La., has purchased a property called Spanish Fort, on Lake Pontchartrain, and is filling in the ground and preparing to establish a summer resort and park. The tract contains 35 acres.

Peculiar Accident in St. Louis.—The platform sill clamps of a car of the United Railways of St. Louis broke off while the car was in motion on April 12, 1911, and the passengers who were standing on the platform were landed in the street with the platform. The passengers were only slightly injured.

Pay-as-You-Enter Cars in Knoxville.—The Knoxville Railway & Light Company, Knoxville, Tenn., in putting into service its new pay-as-you-enter cars, carried a half-page advertisement in the daily papers illustrating the cars and explaining how they are to be used. The new service was begun on April 2, 1911.

Reunion of Confederate Veterans in Little Rock.—A reunion of the Confederate veterans is to be held at Little Rock, Ark., on May 16, 17 and 18, 1911. The Little Rock Railway & Electric Company, in honor of the event, has had a special letterhead engraved calling attention to the reunion and giving the dates on which it is to be held.

Interurban Steam Freight Agreement.—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has made a traffic arrangement with the Pere Marquette Railroad whereby they will exchange freight at Michigan City and freight may be billed from points east of South Bend on electric railways into Chicago or to way points.

Coupon Ticket Books on the Oneida Railway.—On April 4, 1911, the Oneida (N. Y.) Railway placed on sale at \$5 each, with the permission of the Public Service Commission of the Second District of New York, coupon ticket books containing 600 coupons of a face value of 1 cent each, good

between all local stations. Not less than ten coupons are detached for any ride.

Shelter Recommended.—The Board of Public Utility Commissioners of New Jersey has recommended the Public Service Railway to erect a shelter at or near the corner of Hillside Road and Palisade Avenue, West Hoboken, provided consent of the governing body of the town and of abutting property owners can be obtained. At the corner mentioned there is a transfer point.

Long Island Traffic Not to Be Diverted.—P. H. Woodward, secretary to Ralph Peters, president of the Long Island Railroad, says that the statement was unwarranted that the company proposed to divert suburban traffic from the station of the Pennsylvania Railroad at Thirty-third Street and Seventh Avenue, New York, by way of the Queensboro Bridge and the Steinway Tunnel, as reported in the daily press.

Information Bureau in Allentown.—The Lehigh Valley Transit Company, Allentown, Pa., has opened an information bureau in the waiting room at the corner of Sixth Street and Hamilton Street, Allentown, under the supervision of the traffic department of the company. The bureau will also be the uptown office of the Electric Express Company for the receipt of small packages for shipment over the lines of the company.

Decision Affecting Indiana Interurban Line.—Judge Downey of the Circuit Court of Dearborn County, Indiana, has quashed the indictment against the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio, charging the company with not complying with the Indiana law which requires interurban railways to equip their cars with toilets. Judge Downey held that as the company has only 13 miles of track in Indiana it did not come within the statute. The case has been appealed to the Supreme Court.

Fare Complaint in New Jersey.—A delegation of residents of Bergen County appeared before the Board of Public Utility Commissioners of New Jersey recently and complained about the fare that is charged over the Public Service Railway Company's line from Coytesville to Edgewater Ferry, opposite 125th Street, New York. It was submitted that the action of the company in arbitrarily changing the fare was not justified. The board advised the petitioners to prepare a formal complaint to which the company will be required to make answer.

Hearing in Minneapolis Suit.—The hearing before the United States District Court at Minneapolis in the suit brought by the Twin City Rapid Transit Company, Minneapolis, Minn., against the city of Minneapolis, to restrain the city from enforcing the provisions of the ordinance to limit the carrying capacity of cars was set for April 18, 1911. The reasons of the company for carrying the case to the courts was explained in a statement made by W. J. Hield, vice-president and general manager of the company, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 8, 1911, page 643.

Pensions for Michigan United Railways Employees.—The Michigan United Railways, Jackson, Mich., has announced through A. W. McLimont, vice-president and general manager, that the company is considering a plan to pension employees who have become disabled or incapacitated for work while in the employ of the company. This announcement follows the recent action of the company in financing a mutual aid and benefit association among employees in Lansing. It is proposed by the Michigan United Railways to follow the plan adopted by the steam railroads which have a pension system.

Petition for Increase in Fare Denied.—The Public Service Commission of the Second District of New York has denied the petition of certain residents of Dunkirk and Fredonia asking for a reduction of fare on the Buffalo & Lake Erie Traction Company's lines between Dunkirk and Fredonia. The present rate is 10 cents, with full transfer privileges in both Dunkirk and Fredonia. Further, the company issues a book of tickets allowing all the privileges of single fare, 24 rides for \$1.25, making a ticket charge of approximately 5¼ cents a trip. The commission believes that the

company is, under all the circumstances, charging a reasonable and just fare.

Car Delays on the Rochester, Syracuse & Eastern Railroad.—P. E. Emerson, superintendent of the Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., has made public a tabulation of train delays which covers the sixteen months that the road has been in operation from Rochester to Syracuse. During that period 97.54 per cent of the trains have been operated on time. In March, 1911, 98 per cent of the trains made their schedule and in February 97.60 per cent. In the period covered by the report the company operated 74,358 regular trains and carried more than 5,000,000 passengers. Practically all of the delays were caused by heavy traffic. Car failures, power off, overhead troubles and connections at junction points represent small items in the detention report.

By-laws of Railway Voluntary Relief Association Revised.—The constitution of the Columbus, Delaware & Marion Railway Voluntary Relief Association, adopted in 1907, has been revised. A. F. Elkins, auditor of the Columbus, Delaware & Marion Railway, Columbus, Ohio, was associated with A. L. Necreamer, who is now secretary of the Central Electric Railway Association, in writing and adopting the constitution of 1907 and Mr. Elkins was chairman of the committee on revision. The constitution in the beginning was, of necessity, elastic. Perhaps the most important changes are a reduction in dues from \$6.00 a year to \$4.00 a year, and an increase in the sick benefits from \$5.00 a week to \$6.00 a week. No restrictions whatever are placed on the officers or employees of the company.

Fruit Growing in Eastern Washington.—The Spokane & Inland Empire Railroad, Spokane, Wash., has issued an artistic pamphlet in which the orchard belt of Eastern Washington served by the company is illustrated and described. The booklet was prepared by Charles E. Flagg, publicity agent, under the guidance of Waldo G. Paine, traffic manager. It comprises 16 pages, 7 in. x 10 in., and a cover. The typography and presswork are especially fine. There are several full-page illustrations of fruit printed in natural colors, and at the top of each page of text is a picture of an orchard or a scenic view reproduced in colors. The ornaments used throughout the booklet are halftone reproductions of fruit blossoms. The text, which comprises about 3000 words, contains a description of the Spokane country and its tributary orchard sections. Separate pages are devoted to describing the packing methods, presenting statistics on apple production, describing the superior transportation facilities offered by the passenger and freight service of the Spokane & Inland Empire Railroad and to a full page four-color map in perspective of the Palouse orchard belt in Eastern Washington served by the company. This map was made by Poole Brothers, Chicago, Ill.

New Jersey Board Dismisses Complaint.—The Board of Public Utility Commissioners of New Jersey has dismissed the complaint of the Seventh Ward Improvement Association of Jersey City against the Public Service Railway in regard to service from the Pennsylvania Railroad ferry at Jersey City to Greenville. The complainant alleged that the company refused to issue transfers to passengers for Greenville who had, by mistake, boarded a car marked "Culver Avenue." The board found that the company operated a greater number of cars between the ferry and Culver Avenue than it did between the ferry and Greenville. The district beyond Culver Avenue is sparsely settled and the board considered that the issuing of transfers at Culver Avenue would tend to overcrowd short-line cars and discommode passengers on the short line. The right of passengers to transfer at Culver Avenue would not expedite the journey of passengers to Greenville, as such passengers would be obliged to wait at Culver Avenue for the Greenville car, which could be as conveniently taken at the ferry or at points between the ferry and Culver Avenue. The board expressed the opinion that the fact that persons by mistake boarded cars properly marked was not a good reason why they should be transferred, free, to other cars. It was the duty of the traveler to choose the proper car route to reach his destination. The company could not be held responsible for mistakes made by travelers.

Personal Mention

Mr. J. T. Walmsley has resigned as general storekeeper of the Metropolitan Street Railway, Kansas City, Mo.

Mr. J. S. Coleman has been elected president of the Asheville & East Tennessee Railroad, Asheville, N. C., to succeed Mr. John H. Carter.

Mr. A. E. Harvey has been appointed superintendent of way of the Metropolitan Street Railway, Kansas City, Mo., to succeed Mr. E. H. Packe, resigned.

Mr. Stanley Howland, who has been general manager of the Asheville & East Tennessee Railroad, Asheville, N. C., has also been elected vice-president of the company to succeed Mr. R. S. Howland.

Mr. E. E. Johnson has been appointed general storekeeper of the Metropolitan Street Railway, Kansas City, Mo., to succeed Mr. J. T. Walmsley, resigned. Mr. Johnson was formerly receiver of cash of the Metropolitan Street Railway.

Mr. W. R. Putnam, formerly superintendent of the Menominee & Marinette Light & Traction Company, Marinette, Wis., has been appointed general manager of the Dakota Power Company, Rapid City, S. D., with which he became connected in the capacity of electrical engineer.

Mr. Horace G. Burt, formerly president of the Union Pacific Railroad, has been selected by the electrification committee of the Chicago Association of Commerce as chief engineer to direct the investigation to be conducted by the committee in regard to the necessity for the electrification of the railroads into Chicago.

Mr. J. H. Pallister, chief engineer of the power station of the Lincoln (Neb.) Traction Company, will hereafter perform the duties of the position of electrical engineer of the company, relinquished by Mr. N. A. Remmish, who, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 8, 1911, has become general manager of the municipal electric lighting and pumping station at Alliance, Neb.

Mr. E. A. Stobart has been appointed general manager of the Mineral Wells (Tex.) Electric System to succeed Mr. L. M. Levinson, who, as announced in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, has accepted the position of general superintendent of the syrup and sugar plantation of Pennick & Ford, Ltd., New Orleans, La. Mr. Stobart was formerly connected with the A. R. Nutt Company, Ft. Worth, Tex.

Mr. F. W. Bacon has been elected vice-president of the Lexington & Interurban Railways, Lexington, Ky., in charge of operation. He was formerly general manager of the New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J., with which and its predecessors he was connected for ten years. A biography and portrait of Mr. Bacon were published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911. Mr. Bacon has entered upon the performance of his new duties.

Mr. Morrison R. Lash has been appointed electrical engineer of the Union Electric Company, Dubuque, Iowa, to succeed Mr. W. N. Keiser, resigned, who has become connected with the G. M. Parsons Company, Newton, Iowa, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911. Mr. Lash was graduated from Rose Polytechnic Institute at Terre Haute, Ind., and after graduation engaged for several years in the electrical contracting business at Indianapolis, Ind. Subsequently he was connected with the sales department of the Western Electric Company for ten years.

Mr. Tudor Jones, whose appointment as traveling auditor of the Indiana Union Traction Company, Anderson, Ind., was noted in the *ELECTRIC RAILWAY JOURNAL* of April 8, 1911, was born at Lougher, Wales, on Oct. 25, 1885, and came to America in August, 1898. After completing his school course Mr. Jones was employed by the Indiana Union Company as ticket agent at Anderson, serving in that capacity from September, 1905, to March, 1906. He was then transferred to the accounting department, where he has since been continuously employed. He is thoroughly familiar with electric railway accounting, having served in the various capacities in the accounting department from clerk to general bookkeeper.

Mr. M. C. Ludlum has been appointed general manager of the Riverside (N. J.) Traction Company. Mr. Ludlum was graduated from Rutgers College in 1890. His first railway experience was gained with the Fourth Avenue Railroad, New York, N. Y., in storage battery work. He next became connected with the Camden (N. J.) Horse Railroad, which later was taken over by the Camden & Suburban Railway and is now part of the Public Service Railway of New Jersey. Mr. Ludlum next entered the employ of the Westinghouse Electric & Manufacturing Company, which he served for two years in the factory and on the road in railway equipment work. Subsequently he was with the Consolidated Traction Company, Newark, N. J., and the North Jersey Street Railway, now part of the Public Service Railway, for seven years as master mechanic and division superintendent. From 1900 to 1904 Mr. Ludlum was general manager of the Camden, Gloucester & Woodbury Railway. In 1905 he became connected with the Little Rock Railway & Electric Company, Little Rock, Ark., as general superintendent for a year. For the last four years Mr. Ludlum has been in business in Philadelphia.

OBITUARY

Edward W. Snowden, of the Union Spring & Manufacturing Company, Pittsburgh, Pa., is dead.

Charles W. Goodyear, prominent in business circles in Buffalo, N. Y., is dead. Mr. Goodyear was a director of the General Railway Signal Company and the Netherlands Tramways.

Edward A. Moseley, secretary of the Interstate Commerce Commission, died at his residence in Washington, D. C., on April 18, 1911, of heart disease. Mr. Moseley was sixty-five years old and had been secretary of the commission since its organization twenty-four years ago.

L. J. Forget, a director of the Montreal Light, Heat & Power Company and president for many years of the Montreal Street Railway until control was acquired last November by the Robert-McConnell interests, died at Nice, France, on April 7, 1911. Mr. Forget was born at Terrebonne, Que., on March 11, 1853, and was a prominent stockbroker at Montreal for twenty-five years, having founded the firm of L. J. Forget & Company in Montreal in 1876.

The tests of wheel guards and fenders by the Board of Public Improvements in St. Louis begun last week have been continued during this week. On April 11 the combined fender and wheel guard of B. L. Ingram was tested, but as the inventor had not been fully informed as to the height at which his fender was hung above the rail, the board agreed to allow him another trial. On April 12-13 the Seeley automatic wheel guard was tested. The trial showed this device was fairly efficient. On April 1 tests were made of the Doss fender. This device was very efficient in taking up dummies in the three tests indicated for fenders. A few additional entries have been received by the board during the current week. No official records of the performance of the individual fenders have been given out by the board and none will be available until after the tests have been concluded.

The following announcement was made prior to April 1, 1911, in regard to the sale of tickets by the consolidated electric railway companies at Los Angeles and their use over the consolidated lines: "Ticket exchange between the Los Angeles Pacific and Los Angeles and Redondo at Redondo, enabling a person having tickets on one line to use it on the other if desired. In future all tickets will bear the name of the Pacific Electric, rather than that of a constituent line of the system. Interchange of tickets between the Los Angeles and Redondo and the San Pedro narrow gauge as far south as Hermosillo, which is on both roads. Sale for cash and on advertising account of books containing \$10 worth of 5-cent tickets for \$7.50, the tickets to be good on any line of the Pacific Electric Railway for paying a one-way fare. They are for use on interurban cars and when offered on cars in the city, two tickets will be taken up by the conductors, rather than the usual 5-cent fare."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Redwood City (Cal.) Railway.**—Application for a charter has been made in California by this company to build an electric railway from a point half a mile south of the county courthouse northeasterly to a point on San Francisco Bay, a distance of 5 miles. Capital stock, \$125,000. Directors: George A. Merrill, George W. Lovie, V. V. Greco, W. J. Drew and C. F. Morrison, all of Redwood.

Willimantic & Stafford Street Railway, Stafford Springs, Conn.—Incorporated in Connecticut to build an electric railway to connect Willimantic, Mansfield Center, South Willington, Spring Hill, Storrs and Stafford Springs. Capital stock, \$1,000,000. Incorporators: G. J. Kirby, Mansfield Center; L. J. Storrs, Mansfield; A. G. Gurley, C. S. Beach and Robert Mitchell. [E. R. J., Jan. 28, '11.]

Atlanta & Northwestern Railway, Atlanta, Ga.—Incorporated in Georgia to build a 47-mile electric railway to connect Cummins and Creighton, via Roswell and Alpharetta. Nearly all the rights-of-way have been secured. Officers: J. M. Ponder, Forsythe, president; J. R. Murphy, Atlanta, vice-president, and R. P. Jones, Atlanta, secretary. [E. R. J., April 2, '10.]

***Arkansas City, Wellington & Northwestern Railway, Wellington, Kan.**—Incorporated in Kansas to build a 100-mile electric railway to connect Arkansas City, Wellington, Conway Springs and Hutchinson. Capital stock, \$300,000. George Hunter, Wellington, president; W. H. Burkes, Wellington, secretary, and Roy Hitchcock, treasurer.

Dartmouth & Cow Bay Electric Railway, Dartmouth, N. S.—Chartered in Nova Scotia by this company to build an electric railway in Dartmouth and extend it to Cow Bay. Incorporators: Arthur C. Pyke, Halifax, and Robert Stanford. [E. R. J., April 8, '11.]

***Beaver Northern Street Railway, Beaver, Pa.**—Application for a charter will be made by this company in Pennsylvania to build an electric railway in the northern part of Beaver. Incorporators: J. S. Herron, F. J. Lobert, J. F. Hayes, E. A. Morton and Charles Pederson.

***Southern Traction Company, Dallas, Tex.**—Incorporated in Texas to build a 135-mile electric railway from Dallas to Waco, with a branch from Waxahachie to Corsicana via Ennis. J. F. Strickland, Dallas, president.

***Tyler Traction Company, Clarksburg, W. Va.**—Chartered in West Virginia to build an electric railway to connect Sistersville, Middlebourne and Shirley, and also in Tyler County. Capital stock, authorized, \$5,000,000. Incorporators: J. T. Ingraham, Pursley, W. Va.; W. J. Neuen-schwander, E. A. Durham, A. C. Jackson, Joseph McKay, Henry W. McCoy, S. G. Messer and John Kincaid, all of Sistersville, W. Va.

FRANCHISES

***Burlingame, Cal.**—Ansel M. Easton has asked the Board of Trustees for a franchise to build an electric railway through Easton, which was recently annexed to Burlingame.

***Jackson, Cal.**—C. V. Vicini, Jackson; V. Brignola and C. E. Jarvis, Sutter Creek, have asked the Board of Supervisors for a franchise to build a 50-mile electric railway to connect Jackson, Sacramento, Stockton and other towns in Amador County.

Stockton, Cal.—The Tidewater & Southern Railroad, Stockton, has received a franchise from the Council to build its tracks on the French Camp road for about 1½ miles. This line will connect Stockton, Atlanta, French Camp, Escalon, Modesto, Cens and Turlock. K. C. Brueck, Stockton, president. [E. R. J., April 1, '11.]

Augusta, Ga.—The Augusta Railway & Electric Company, Augusta, has asked the City Council for a franchise to extend its lines in Augusta.

Chesterton, Ind.—The Calumet United Railway, Indianapolis, has received a franchise from the Town Board to

build its tracks over certain streets in Chesterton and extend it to East Chicago. This is part of a plan to build an electric railway to connect Michigan City, Chesterton, Porter, Cary, Aetna, East Chicago, Whiting and Hammond. James A. Slattery, Philadelphia, is interested. [E. R. J., Jan. 21, '11.]

South Bend, Ind.—The South Bend & Logansport Traction Company has received a six months' extension of time on its franchise to build its tracks to Plymouth.

***Paducah, Ky.**—James Campbell, Jr., and Charles C. Baldwin, Centralia, have asked the Fiscal Court for a franchise to build an electric railway outside the city limits of Paducah. This is part of a plan to build an electric railway from Paducah to Lone Oak.

Chattanooga, Tenn.—C. E. James and associates have received a franchise from the General Council to build five lines of track covering a large part of Chattanooga. [E. R. J., Feb. 25, '11.]

Knoxville, Tenn.—The Knoxville Railway & Light Company has asked the Council for a franchise to double-track Central Street from Broadway to the city limits.

Memphis, Tenn.—The Memphis & Rugby Railway, Memphis, has received a franchise from the County Court to build its tracks in Memphis northward from Chelsea and Paine Avenues, along the Hindman Ferry Road across the Wolf River. Luke Seawell, Charlotte, is interested. [E. R. J., March 4, '11.]

Murfreesboro, Tenn.—J. E. Manson, Murfreesboro, advises that the Tennessee Rapid Transit Company, promoters of this proposed electric railway to connect Nashville, Murfreesboro and Nolensville, require that the country through which it runs shall take stock to the amount of \$50,000 and give right-of-way. [E. R. J., April 1, '11.]

***Brownsville, Tex.**—Claude Pollard, representing the Brownsville & Gulf Railroad, Brownsville, has asked the City Council for a franchise to operate a line over the right-of-way controlled by this company to the new International Bridge in Brownsville.

Dallas, Tex.—George W. Works, Dallas, and associates, have asked the City Commission that the franchise received by them be transferred to the Dallas Street Railway for building an electric railway on Ross Avenue and Henderson Avenue, to the city limits. [E. R. J., March 4, '11.]

Clarksburg, W. Va.—The Fairmont & Clarksburg Traction Company, Fairmont, will ask the City Council for a franchise to extend its tracks in Clarksburg to the Fair and Racing Grounds, a distance of 5 miles.

Altoona, Wis.—The Chippewa Valley Railway, Light & Power Company has received a franchise from the City Council to build its tracks through Altoona.

Waukesha, Wis.—The Milwaukee Western Electric Railway, Milwaukee, has received a franchise from the City Council to build its tracks in Waukesha.

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company has completed and placed in operation its 10-mile extension between Phoenix and Glendale.

Couteau Power Company, Vancouver, B. C.—This company advises that the building of this proposed 20-mile electric railway between Vernon and Lumby is in the preliminary stage. The company's power house will be located at Shuwap Falls and it will furnish power for lighting purposes. Albert E. Ashcroft, Vernon, B. C., is interested. [E. R. J., April 1, '11.]

Hanford & Summit Lake Railway, Hanford, Cal.—This company will extend its line from Hardwick to Jamison, a distance of 26 miles. Work will begin within a month. The line will connect at Mendota with the Southern Pacific Company. John B. Rogers, 52 Eleventh Street, San Francisco, chief engineer. [E. R. J., Sept. 10, '10.]

Pacific Electric Railway, Los Angeles, Cal.—This company has completed and placed in operation its extension from Riverside north to the San Bernardino County line. This extension will eventually connect Riverside and San Bernardino. The company will double-track its California Street line at once.

San Francisco, Oakland & San José Railway, Oakland, Cal.—This company has placed contracts for building 10 miles of track with 70-lb. A. S. C. E. rails.

Indianapolis, Nashville & Southern Traction Company, Indianapolis, Ind.—This company advises that work will be begun within a few weeks on its proposed 108-mile electric railway to connect Indianapolis, Trafalgar, Nashville, Bloomington, Bedford, Mitchell, Orleans and French Lick. Officers: J. A. Johnson, 812 I. O. O. F. Building, Indianapolis, president; J. A. Shaffer, vice-president and electrical engineer; Thomas Wakeland, 812 I. O. O. F. Building, Indianapolis, secretary, and R. J. Espy, treasurer. [E. R. J., Jan. 28, '11.]

Tri-City Railway, Davenport, Ia.—This company is now building about 5 miles of new track.

Iowa Light & Traction Company, Eldora, Ia.—Plans are being considered by this company to begin work shortly between Tama and Waterloo on its extension from Oskaloosa to Waterloo.

***Keokuk, Ia.**—A company is being organized to build an electric railway to connect Quincy, Carthage, Navoo, Hamilton, Niota, Powellson and Warsaw, Ill. Keokuk will be the power center and terminal point. Henry E. Dayton, Quincy, president, and Fred Swann, Navoo, secretary.

Osceola & Southwestern Railway, Osceola, Ia.—This company advises that preliminary arrangements are being made to begin construction about June 1 on its 20-mile electric railway to connect Osceola, Lacell and Hopeville. The company is asking financial aid of the towns through which it will operate. Capital stock authorized, \$100,000. Bonds authorized, \$160,000. The power house and repair shops will be located at Osceola. Directors: John E. Barnard, James H. Jamison, R. M. Lewis, P. L. Fowler and Henry Stevens, all of Osceola. [E. R. J., April 15, '11.]

***Arkansas City & Wellington Northwestern Railway, Wellington, Kan.**—This company has awarded a contract to Fremont Hill, Wichita, for surveying the route of this line, which will extend from Arkansas City northwest to Conway Springs via Wellington. George H. Hunter, president.

Louisville, Lincoln Farm & Mammoth Cave Traction Company, Glasgow, Ky.—Plans are being made by this company to secure rights-of-way and extend its proposed line to Gallatin, Tenn. This is part of a plan to connect Glasgow, Hodgenville, Lincoln Farm, Mammoth Cave and Louisville. J. M. Richardson, Glasgow, president. [E. R. J., Nov. 26, '10.]

***Shelbyville, Ky.**—It is reported that a syndicate of eastern capitalists contemplate the construction of a line between Shelbyville and Frankfort.

Alexandria (La.) Electric Railways.—This company will place contracts during the next three months to build 1 mile of new track in Alexandria.

Winnipeg (Man.) Electric Railway.—Plans are being made by this company to extend its railway to Sanford, a distance of 23 miles.

Frederick (Md.) Railroad.—Contracts will be placed during the next two weeks by this company to build a 3-mile extension, including a loop in the southern section of Frederick.

Boston (Mass.) Elevated Railway.—This company has placed orders for 600 tons of Bessemer rails with the Pennsylvania Steel Company. It has awarded a contract to the Bethlehem Steel Company for 1200 tons of open-hearth rails.

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass.—This company will soon award contract for extending its line from Colerain, Mass., to Wilmington, Vt. Frank L. Reed, Shelburne Falls, purchasing agent.

***Pentwater, Mich.**—Plans are being made to build a 20-mile electric railway between Pentwater and Walkerville via Crystal Valley. The requirements of the capitalists who are to build and equip this railway by April 1, 1912, are for a bonus fund of \$50,000 along the line.

Sauk Rapids, Mich.—The Commercial Club, of Sauk Rapids, is considering plans to build an electric railway from Sauk Rapids to a paper mill.

Mankato (Minn.) Electric Traction Company.—H. E. Hance, general manager of this company, announces that J. Devereaux O'Reilly, of New Orleans, has just completed surveys for an extension of its line which this company proposes to build from Mankato to St. Peter.

Mnneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—Work will soon be begun by this company on a 30-mile extension from Northfield to Owatonna.

Granite City Railway, St. Cloud, Minn.—This company expects to build soon a mile of new track in St. Cloud. All material is purchased and in hand.

***Ellisville, Miss.**—Guy M. Walker, A. M. Hughes and R. A. Pratt, New York, and Z. Stevens, Hattiesburg, are considering plans to build a 28-mile electric railway to connect Hattiesburg and Laurel via Ellisville, Moselle and Eastabuchie.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company, in co-operation with S. A. Tomlinson, of Gulfport, will soon build an extension into North Gulfport.

Vicksburg (Miss.) Traction Company.—This company is said to be considering plans to extend its line to Walters and to the National Cemetery, several miles from the city limits of Vicksburg.

Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B.—This company advises that work will be resumed this summer on its 5½-mile electric railway in Moncton. The company's power plant and repair shops will be located in Moncton and power will be furnished for lighting purposes. Capital stock authorized, \$1,500,000. Bonds authorized, \$500,000. Officers: J. A. Henderson, Main Street, Moncton, president; F. W. Sumner, vice-president; J. P. Chalmers, Moncton, secretary and treasurer; O. P. Boggs, general manager, and William Ritchie, electrical engineer. [E. R. J., April 8, '11.]

Little Falls & Johnstown Railroad, Little Falls, N. Y.—This company advises that work will be begun within three months on its 28-mile double-track line between Little Falls and Johnstown via St. Johnsville. This is the last link in the trans-State system of electric railways. Capital stock authorized, \$300,000; issued, \$30,000. Officers: J. L. Hees, 103 Park Avenue, New York, president; J. J. Gilbert, Little Falls, vice-president; A. J. Baker, Johnstown, secretary and treasurer; Anson Geimer, Johnstown, purchasing agent, and Frederick Hone, New York, chief engineer. [E. R. J., April 15, '11.]

New York, New Haven & Hartford Railroad, New York, N. Y.—It is reported that this company will electrify an 18-mile branch between Springfield and Tariffville in the near future.

Northern Ohio Traction & Light Company, Akron, Ohio.—It is said that a line will be built between Ashland and Cuyahoga Falls, connecting the lines of this company and the Cleveland, Southwestern & Columbus Railway, Cleveland. A contract has been awarded to Frank Wise, Macedonia, Ohio, to build 10 miles of track from Chittentons toward Cleveland to provide a double track. The entire line between Akron and Cleveland is to be double tracked as soon as possible.

Alliance-Akron Railroad, Alliance, Ohio.—The general contract to build and equip this railway has been awarded to Marasco & Serriani, Grove City. The line will be 20 miles long and will connect Alliance and Akron via Tallmadge, Brimfield and Rootstown. Charles Keith, Alliance, president. [E. R. J., Dec. 31, '10.]

Cleveland-Alliance & Mahoning Valley Railway, Cleveland, Ohio.—A mortgage for \$2,000,000, covering this property, has been filed for record in the Summit County Court at Akron, Ohio, by this company. It is drawn in favor of the United Banking & Savings Company, of Cleveland, Ohio. [E. R. J., April 8, '11.]

Bartlesville (Okla.) Interurban Railway.—This company expects to purchase 15 miles No. 6 wire with other line material for three-phase extension from Bartlesville to Dewey. It is also paving Fourth Street for eight blocks with brick cement base. H. Askin, general manager.

Oklahoma, Kansas & Missouri Interurban Railway, Miami, Okla.—M. C. Harper, general manager of this company, announces that work will be begun soon on the extension of the line from Hattenville, Okla., to Galena, Kan., to connect at Galena with the Southwest Missouri Railroad; also connecting with the Joplin & Pittsburg Interurban Railway at Columbus, Kan. The company is now ready to consider bids for the grading between Hattenville and Lincolnville, a distance of 6 miles.

Oklahoma Interurban Traction Company, Oklahoma City, Okla.—L. E. Patterson, president of the Oklahoma Interurban Traction Company, wrote under date of April 15, 1911: "The Oklahoma City Traction Company has recently purchased the operating lines, franchises and all other property of the Oklahoma Interurban Traction Company and has issued \$1,000,000 of first mortgage bonds, of which the St. Louis Union Trust Company, St. Louis, Mo., is trustee."

***Tishomingo, Okla.**—Surveys are being made between Tishomingo and the Devil's Den for an electric railway. It is expected to extend it to Denison, Tex., to connect there with the electric railway to Dallas. Power for this line will be generated at Tishomingo. It will be financed by local business men.

***Pacific Western Company, Grant's Pass, Ore.**—This company is reported to have been organized to build a 30-mile electric railway from Grant's Pass to the Applegate and then to William's Valley, with extensions to Josephine Caves. Among those interested are: A. D. Bowen, H. L. Chapin, J. W. Hofferlin and J. G. Riggs.

***Middletown, Pa.**—Fred Alleman, Summit, N. J., is planning to build an electric railway between Middletown and Elizabethtown, Pa. Franchises will soon be asked for in the towns along the route.

Johnson City (Tenn.) Traction Company.—This company has placed contracts to build a 1½-mile extension from Johnson City to the State Normal School.

***Southern Traction Company, Dallas, Tex.**—This company is reported organized to build an interurban electric railway from Dallas via Waxahachie, Hillsboro and Italy, to Waco, with a branch to Corsicana via Ennis, altogether about 135 miles. The contract for the engineering has been let to the Fred A. Jones Company and surveys will begin immediately. Officers: J. F. Strickland, Dallas, president; Osce Goodwin, Dallas, vice-president; T. A. Ferris, Waxahachie, treasurer; James P. Griffin, Dallas, secretary; M. B. Templeton, Dallas, general counsel.

Nooksack Valley Traction Company, Bellingham, Wash.—It is reported that this company is now controlled by Sir Edward Tennant, M. R. Pryor and F. R. S. Balfour, leading shareholders in Balfour, Guthrie & Company, London. This railway will connect Bellingham, Sumas, Ferndale, Lynden and Blaine. [E. R. J., March 18, '11.]

Yakima Valley Transportation Company, North Yakima, Wash.—This company is considering plans for building a 9-mile extension from North Yakima through the Selah Valley to Wenas. Rights-of-way have been secured.

Springdale & Long Lake Railroad, Springdale, Wash.—The contract for 30,000 ties has been awarded by this company to the Phoenix Mill Company. The final surveys have been completed. The line is being built by the Washington Water Power Company, which will also erect a new power plant. D. L. Huntington, Spokane, president. [E. R. J., March 4, '11.]

Milwaukee Northern Electric Railway, Cedarburg, Wis.—This company will build soon a second track between Milwaukee and Thiensville. It is reported that the company will build an extension in the fall from Sheboygan to West Bend.

Lake Geneva & Lake Delavan Electric Company, Delavan, Wis.—This company has filed for record in Elkhorn a mortgage in favor of the Central Trust Company of Chicago, as trustee, to secure an issue of \$200,000 of bonds. The company has projected an electric railway from Walworth to Delavan. Arthur T. Brown, Delavan, president. [E. R. J., March 4, '11.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company expects to begin construction at once on the extension of its Eleventh Avenue line in Mil-

waukee for the crosstown route over the Seventh Street viaduct.

SHOPS AND BUILDINGS

Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—This company will purchase during the next ten weeks one 300-ton lathe wheel press.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company, it is said, will award a contract at once for building a freight depot and passenger station. The structure will be 84 ft. x 42 ft., and will be located near the company's power plant in Concord.

Indiana Union Traction Company, Anderson, Ind.—This company has moved its local terminal station from the Masonic Temple to the west half of the basement of the Union Building, on Meridan Street, in Anderson.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company is considering plans for building a new freight depot and passenger station in Ft. Wayne. Arthur H. Mohr, secretary.

Boston (Mass.) Elevated Railroad.—The carhouse of this company, at the corner of Beach Street and Washington Street, Roslindale, was partly destroyed by fire on April 14. The building was formerly owned by the Old Colony Street Railway, and was used by the elevated for the storage of cars and snow plows. Some of the cars are said to be damaged. The loss is estimated to be about \$5,000.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—This company has moved its waiting room and office rooms into new quarters in the new Watson Building, on Jefferson Street, in Fairmont.

POWER HOUSES AND SUBSTATIONS

Phoenix (Ariz.) Railway.—This company has completed and opened for service its new substation at Phoenix. It contains a 100-kw Allis-Chalmers motor-generator set.

Jacksonville (Fla.) Electric Company.—Work has been begun by the Stone & Webster Engineering Corporation, Boston, on a new power plant for this company on Riverside Avenue in Jacksonville. The structure will be 133 ft. x 98 ft. and 58 ft. in height and will contain a basement and one story. The construction will be of brick, concrete and corrugated galvanized iron, while the entire framework will be of steel. The power house will be equipped with two 57-in. barometric condensers, three 600-hp boilers and two 1200-kw generators, besides various feed and vacuum pumps. A 200-ft. concrete stack will be built.

Chicago, Ottawa & Peoria Railway, La Salle, Ill.—Contracts will be placed during the next three weeks by this company for building three new substations, one at Morris, one at Minooka and one at Joliet. The approximate cost of each structure will be about \$5,000. W. A. Martin, Quincy, purchasing agent.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company expects to purchase a 3000-kw or 2000-kw turbine and an 800-kw generator to be connected direct to a compound engine which is to be run condensing. The company also expects to purchase a 500-kw, 60-cycle, two-phase rotary converter.

Bartlesville (Okla.) Interurban Railway.—A contract will be placed during the next three weeks by this company to build a new boiler room at its power plant in Bartlesville. The company will purchase a 500-kw turbine set, one 400-hp water tube boiler and 50-kw transformers. H. Askin, Bartlesville, general manager.

Mt. Hood Railway & Power Company, Portland, Ore.—This company has purchased a site on Fifth Street Road, near the garrison in Vancouver, on which it will build a substation. The company will expend about \$25,000 on this substation and distribution system in Vancouver.

Grays Harbor Railway, Light & Power Company, Aberdeen, Wash.—This company has purchased from the General Electric Company, a 1000-kw Curtis turbo-generator set as auxiliary equipment.

Union Utilities Company, Morgantown, W. Va.—This company expects to purchase soon three gas compressors and three motors, 2200-volt, 60-cycle, three-phase, for its power plant in Morgantown.

Manufactures & Supplies

ROLLING STOCK

San Juan Light & Transit Company, San Juan, Porto Rico, will purchase, through the Montreal Engineering Company, Ltd., 100 20-ton meter-gage freight cars.

Rockland, South Thomaston & St. George Railway, Rockland, Maine, may purchase a second-hand snow plow and a second-hand combination passenger and freight car.

Iowa City (Ia.) Electric Railway has ordered four single-truck cars mounted on McGuire-Cummings A-1 suspension trucks from the McGuire-Cummings Manufacturing Company.

Owens River Valley Electric Railway, Bishop, Cal., which is building a 4½-mile line between Bishop and Laws, Cal., is considering the purchase of several cars. H. N. Beard, Bishop, general manager.

Cincinnati (Ohio) Traction Company, which was noted in the *ELECTRIC RAILWAY JOURNAL* of March 25, 1911, to be in the market for fifty cars, has placed the order for these cars with the Cincinnati Car Company.

Interborough Rapid Transit Company, New York, N. Y., lost four elevated motor cars and three trailers and suffered damage to ten other elevated cars in a fire on April 13 which destroyed the grand stand at the Polo Grounds. The loss is about \$45,000.

Southern Pacific Company, San Francisco, Cal., it is reported, will increase its order for 125 all-steel cars, placed with the American Car & Foundry Company, to 200 or more. About twenty-five cars of the original order have been delivered at Oakland, Cal., and other shipments are being made from the St. Charles (Mo.) plant daily.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has ordered ten more cars of the prepayment type from the McGuire-Cummings Manufacturing Company. This order supplements the one for nine cars placed with the McGuire-Cummings Manufacturing Company, as mentioned in the *ELECTRIC RAILWAY JOURNAL* of Sept. 3, 1910.

Otsego & Herkimer Railroad, Hartwick, N. Y., which has ordered one baggage car and also a combination passenger and baggage car from the Cincinnati Car Company, has specified the following details for the baggage car:

Length of body.....	50 ft.	Couplers	M.C.B.
Width over sills...8 ft. 4½ in.		Fenders	low pilot
Height from top of rail to sills	3 ft. 4 in.	Gongs	14 in.
Sill to trolley base...9 ft. 4 in.		Headlights	Crouse-Hinds
Body	wood	Motors	GE
Underframe	composite	Roofs	monitor
Bumpers	steel plate	Sanders	air
		Trucks	Taylor M.C.B.

For the passenger and baggage car the following specifications have been prepared:

Length of body....	53 ft. 3 in.	Fenders	loco. pilot
Over vestibule....	64 ft. 9 in.	Gongs	14 in.
Width over sills...8 ft. 4½ in.		Hand brakes	Peacock
Height from top of rail to sills	3 ft. 4 in.	Heating system..	Peter Smith
Sill to trolley base...9 ft. 6 in.		Headlights	Crouse-Hinds
Body	wood	Motors	4-GE
Interior trim.....	mahogany	Roofs	monitor
Underframe	composite	Sanders	air
Bumpers	steel plate	Sash fixtures.....	Edwards
Car trimmings	bronze	Seats...Heywood Bros. & W.	
Curtain fixtures....	Forsyth	Seating material,	
Curtain material....	pantasote	plush and leather	
Destination signs	dash	Trolley retrievers.....	Earll
		Trucks	Taylor M.C.B.

TRADE NOTES

Hyatt Roller Bearing Company, Newark, N. J., has appointed Alexander Crawford purchasing agent of the company.

American Carbon & Battery Company, East St. Louis, Ill., has moved its executive offices to suite 700-2 La Salle Building, 509 Olive Street, St. Louis.

Massachusetts Chemical Company and Walpole Rubber Company, Walpole, Mass., will move their New York offices on May 1 to 80-82 Reade Street.

Charles T. Phillips, consulting electrical engineer, formerly in the Crocker Building, San Francisco, has opened offices in the Pacific Building, San Francisco.

McClintic-Marshall Construction Company, Pittsburgh, Pa., has opened a branch office in the Trussed Concrete Building, Detroit, Mich. R. B. Titsworth is in charge of the office.

Rodman Gilder has resigned as secretary of the Crocker-Wheeler Company, Ampere, N. J., to become associated with the brokerage house of Dick Brothers & Company, 30 Broad Street, New York.

Call Swith & Frog Company, Denver, Col., has been organized to manufacture track appliances. The plant will be located on West Eighth Avenue, Denver. R. A. Call is president of the company.

Perry Ventilator Corporation, New Bedford, Mass., has received a contract to supply the ventilators for the twenty-two cars for the Wilmington & Philadelphia Traction Company, Wilmington, Del., now being built by The J. G. Brill Company.

Carnegie Steel Company, Pittsburgh, Pa., has leased the fifth and sixth floors of the Frick Annex, and is connecting them with the Carnegie Building by two bridges across Relief Alley. This new space will give the company about fifty additional offices.

Cambria Steel Company, Johnstown, Pa., has appointed J. E. McLain sales agent of the Pittsburgh territory to succeed his father, William McLain, who has been connected with the company for twenty years. William McLain will remain with the Pittsburgh office in an advisory capacity.

McKeen Motor Car Company, Omaha, Neb., which was noted in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911, as having received an order from the Oregon Railroad & Navigation Company for one 70-ft. motor car, states that it has received a duplicate order from this company for another car of the same type.

R. M. Campbell, previously connected with the Ohio Brass Company and the Peter Smith Heater Company, has become associated with W. L. Conwell in the recently organized Transportation Utilities Company. Mr. Campbell, who is well known throughout the East, will be located at the main office of the company, 30 Church Street, New York.

Western Electric Company, New York, N. Y., has issued a report which shows March sales to be 10 per cent larger than during the same month in 1910. For the first quarter of its fiscal year to April 1, 1911, the company has done 11 per cent more business than in the same period a year ago. For the full twelve months this would mean total sales of \$70,000,000, or an increase of about 15 per cent.

Electric Storage Battery Company, Philadelphia, Pa., has contracted with John G. Brown, Witherspoon Building, to design and construct a new reinforced concrete building. This addition to its present plant will be approximately 300 ft. x 115 ft., six stories high, with one-story triangular extension about 80 ft. x 120 ft. The demand for storage batteries of this company's manufacture has increased to such an extent that it has been necessary to provide additional manufacturing facilities. The construction of these buildings is to begin at once and they are to be completed during the fall.

Wheeler Condenser & Engineering Company, Carteret, N. J., has recently been awarded the contract to build five large surface condensing equipments. Three of these equipments will be for the Waterside No. 1 plant of the New York Edison Company and will consist of circulating hot-well and vacuum pumps, together with specially designed base condensers, to operate in connection with three 20,000-kw turbo-alternators. The other two condensing equipments will be for 10,000-kw turbines, with pumps and other auxiliaries, to be supplied for the new power station of the Minneapolis General Electric Company.

Electric Service Supplies Company, Philadelphia, Pa., will move on or about April 25, 1911, its Philadelphia office and warehouse from the present location at 1020-4 Filbert Street to Seventeenth Street and Cambria Street, North Philadelphia. The company's factory, formerly

located at Keokuk, Iowa, has been moved and will be part of the new factory. The company has recently adopted the catch phrase "The Complete Arrester" for the Garton-Daniels lightning arrester, as this device offers an easy path to ground for static charges or lightning, prevents surges and similar disturbances, and further provides positive means for interrupting the flow of line current following a lightning discharge to ground, all of which are deemed essential qualities of a satisfactory lightning arrester.

ADVERTISING LITERATURE

Hayes Track Appliance Company, Richmond, Ind., has issued a circular in which models of its two-piece motor-operated derrails are described and illustrated.

Lewis Thompson & Company, Philadelphia, Pa., have issued a reprint from the *American Lumberman* describing Laguna mahogany. The publication is profusely illustrated.

Wonham, Sanger & Bates, New York, N. Y., have printed a catalog describing the "C. H." special ampere-hour car meter and also containing the opinions of several users of the meters as to their accuracy and the saving in current consumption.

Indianapolis Brass Company, Indianapolis, Ind., has issued Catalog No. 8, which lists and illustrates several hundred different styles and sizes of trolley ears, splices, frogs, crossings and other devices which it manufactures. The catalog also contains several pages of tables and other valuable data.

Crocker-Wheeler Company, Ampere, N. J., has issued Bulletin No. 130, on "Small Direct-Current Generating Sets." These generating sets consist of Crocker-Wheeler generators, driven by Giles type "E" engines, which are manufactured by the United States Rapid Fire Gun & Power Company.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1079, on "Steam Turbine Units," which contains a description of the machines and several illustrations which show both details of construction and complete installations. The company has also issued Bulletin No. 1624, entitled "Centrifugal Pumps—Standard Single Stage."

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4799, which illustrates and describes in detail several types of revolving field alternators manufactured by the company. Both horizontal and vertical shaft alternators are illustrated. Another bulletin, No. 4820, issued by the company, supersedes its previous bulletin on curvedrawing ammeters and voltmeters.

Philip Carey Company, Cincinnati, Ohio, has issued descriptive Catalog No. 411. It contains descriptions and illustrations of the following coverings: Eighty-five per cent carbonate of magnesia and 85 per cent magnesia, standard asbestos molded, air cell and felt pipe coverings; for ammonia, brine, ice and cold water pipes; underground and exposed steam pipe insulation; train pipe coverings, steam and hydraulic packings; fireproof paints; linofelt and lith deadening and sheathing for buildings; flexible cement roofing; asbestos materials and roofing paints and cements.

The Ontario Railway & Municipal Board of Ontario, Canada, has granted the application of William Kerley, St. Thomas, Ont., to bring action against the London & Lake Erie Railway & Transportation Company, London, Ont., to prevent it from operating cars on Sunday. The company was incorporated by the Dominion government, but under Section 9 of the Railway Act of Canada it comes under the jurisdiction of the province as far as operating cars on Sunday is concerned. Nothing in the act, however, applies to any railway which forms part of a continuous route or system between two provinces or between a province and a foreign country, or between any of the ports on the Great Lakes and such continuous route or system so as to interfere with or affect through traffic, nor does it apply to the Governor in Council when he declares the railway to be exempt from the section. It was not contended that the London & Lake Erie Railway & Transportation Company had been declared exempt from the provisions of the act. The question to be decided is whether or not the railway forms part of a continuous route or system between the Province of Ontario and the United States.

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CONTENTS.

Public Knowledge of City Schedules.....	735
Criticisms of the Efficiency Engineer.....	735
Another Aspect of the Motorman's Bonus Question.....	736
Stability of Earnings.....	736
The Latest Subway Offer.....	736
Improving Equipment Inspection.....	737
Business Car of the Michigan United Railways.....	738
Annual Convention of Iowa Association.....	741
Things Worth While in Shop Practice.....	743
Development of the Auxiliary Load for Railway Power Plants.....	746
Effective Methods of Handling Snowstorms.....	747
A Convenient Shop Scaffold.....	748
Electric Railway Problems of the Day.....	749
Reorganization of Southern Car Company.....	749
Public Utility Commission Conference in New Jersey.....	750
The New Jersey Utility Law.....	752
Sand-Drying Plant of the Metropolitan Street Railway, New York.....	753
President Taft Visits Annapolis in Electric Private Car.....	754
The Washington Utility Law.....	755
Metropolitan Street Railway Reorganization Plan.....	756
Reworking Scrap.....	757
Meeting of Committee on Construction of Schedules and Timetables.....	758
Meeting of the Committee on Education of the American Electric Railway Association.....	759
Baltimore Inspection Prints.....	760
A Removable Sand Hopper.....	760
Handling Varnish by Air Pressure.....	760
A Stand for Headlight Resistance Coils.....	761
Motorman's Seat in Philadelphia.....	761
Interpole Generators from 25-kw to 1000-kw Capacity.....	761
News of Electric Railways.....	762
Financial and Corporate.....	765
Traffic and Transportation.....	767
Personal Mention.....	769
Construction News.....	771
Manufactures and Supplies.....	773

Public Knowledge of City Schedules

It is a curious fact that most city riders who use the same lines day after day do not know that city cars are dispatched in accordance with a timetable. Their general impression is that the car is seldom at their home corner just when they want it. We do not mean that a company should overcome this difficulty by publishing a time card to cover the heavy traffic hours of the day, but it might be worth while for a company to do so for other periods of the day during which the headway exceeds, say, 10 minutes. Insurance solicitors, collectors, agents and others who do much riding would certainly appreciate such a convenience. Not long ago we heard one life insurance man telling his fellows of a wonderful time-saving discovery, namely, the existence of carhouse schedules with time-point data which he consulted from time to time with great profit in laying out his daily itinerary. Judging from this instance and others, we believe that it would not be a bad idea for a railway company to carry a small car notice mentioning the fact that patrons were welcome to inspect the carhouse schedules at any time. It might be still better to follow the Continental practice of posting a schedule notice in every car. A little thoughtful publicity of this kind ought to obviate a large number of the poor service complaints which are based upon imagination and not on facts.

Criticisms of the Efficiency Engineer

Ever since some rather startling testimony by a prominent Boston lawyer on the rate question before the Interstate Commerce Commission the subject of efficiency engineering has received considerable publicity in weekly and monthly magazines, and it is not surprising that the opposing viewpoint should also have been voiced more or less publicly. Railway managers who have given a lifetime to the study of their work could not be expected to accept with any tremendous amount of enthusiasm or equanimity the charge that they had been entirely wrong in everything which they had been doing, that their shops showed an efficiency of less than 50 per cent; in short, that the steam railroads were wasting through inefficient methods more than \$1,000,000 a day. A note of protest against the general acceptance of such claims, and even against the fundamental principles upon which the efficiency engineers base their theories, was sounded at the Congress of Technology at Boston by Henry G. Bradlee, of the firm of Stone & Webster. In addition to expressing the belief that the field of efficiency engineering was largely limited, as we all know is the case, to installations where the labor problem consists of a continuous repetition of some definite act or series of acts and under conditions which remain practically uniform, he showed that it becomes of still less practical value where, as on most

railway systems, the employees are distributed over many miles of track and a large territory. He concluded by emphasizing the statement that the manager who devotes the greater part of his attention to reducing expenses is by no means always the one who can best satisfy the public, maintain the enthusiasm of the employees and grasp the opportunities for extension when they are offered. This fact is sometimes overlooked in comparing operating costs and ratios.

Another Aspect of the Motorman's Bonus Question

The need for checks and counterchecks where platform men are placed on a bonus system is indicated by an odd controversy which arose recently in Radcliffe, Eng. A labor committee of that town complained that motormen often refused to stop for passengers on signal because of their anxiety to secure high premiums for low current-consumption records. The committee therefore requested the tramways management to return to the straight wages plan of payment. It so happened, however, that the conductors on the same railway receive bonuses in accordance with their success in attracting passengers to their cars and in collecting fares. The management therefore justified its retention of the bonus system by contending that the opposing interests of the conductor and motorman resulted in giving the most satisfaction to the public, to the railway and to the platform employees. Whether the Radcliffe motormen were justly accused or not, the fact remains that there are more angles to the car meter and bonus question than the saving in energy consumption. The manager who places his motormen on a competitive basis must not ignore the possibility that their combined wits may be capable of upsetting his best-laid plans for higher efficiency. To add a premium system for conductors as well seems to us to be not only unnecessary but to involve a number of objectionable features, among them that of interference with and derangement of the schedules. The car meter experience of the Berlin street railway, however, shows that a motorman's bonus system can be kept free from abuses if a careful study is first made to determine what constitutes a fair run under specified conditions. If thereafter any records are better than they ought to be, they should be regarded with mistrust.

Stability of Earnings

New testimony regarding the stability of electric railway earnings is furnished by a compilation in the *Commercial and Financial Chronicle* in relation to gross and net revenues during the calendar years 1909 and 1910. It supports the widely accepted claim that the earnings of properties of this class are ordinarily sustained in a remarkable manner during business depressions. Of 261 electric railway companies which reported only nineteen showed decreases in gross, and these, so far as large properties and amounts were concerned, were mostly instances where unusual conditions prevailed, as in Philadelphia, Columbus and Cleveland. For the total number reporting the gross was \$406,789,018 and the net increase, after deduction of the decreases, was \$29,145,400, or 7.71 per cent. Of the companies which reported, the net revenues are given for only 229, and these show an aggregate of \$151,193,368, a net gain, after deduction of the decreases, of \$10,404,451, or 7.39 per cent. Incidentally it may be mentioned that the operating ratio indicated by the combined results was 59.1 per cent in 1910 and 58.7 per cent in 1909. As the returns included in the

compilation represent those of urban, interurban and suburban lines, and of both large and small companies, they are representative. While steam railroads showed a slightly larger percentage increase in gross, their net revenue gained but one-half of 1 per cent. A similar compilation by the same authority in the previous year showed a gain for the electric railways, as compared with 1908, of 9.6 per cent in gross and 14.8 per cent in net, while in 1908, as compared with 1907, there was a gain of 0.67 per cent in gross and of 2.65 per cent in net. Of course, none of the compilations respecting electric railway earnings is complete for the country as a whole, but the facts herein set forth accord with the records made from time to time in regard to the well-sustained average earnings of electric railways. It is unfortunate that full statements of earnings for all companies are not available, but the fact that they are not casts no shadow upon the substantiality of the returns of hundreds of companies which contribute good average increases through periods of years and prove the well-known tendency of the earnings of such properties.

THE LATEST SUBWAY OFFER

A definite offer to build and operate a comprehensive rapid transit system in New York was presented to the Board of Estimate and to the Public Service Commission on April 25 by the Brooklyn Rapid Transit Company, and according to Mayor Gaynor a decision upon the long-discussed question will probably be reached by these bodies within a week. This seems almost too good to be true. The citizens of New York have been discommoded and their commercial interests have suffered for so many years through the lack of rapid transit facilities that they can hardly believe a beginning of the end is in sight. Necessarily several years must yet elapse before cars are in operation on any part of the new subway system not yet begun, but it will be more easy for New Yorkers to wait once the contract has been signed.

The routes proposed by the Brooklyn Rapid Transit Company do not extend west of Broadway between Vesey Street and Fifty-ninth Street, nor west of Lexington Avenue north of Fifty-ninth Street. Nevertheless, they would permit the supply of an excellent rapid transit service between the principal part of the business district in Manhattan and all parts of Brooklyn. They would also reach Bronx and Queens Boroughs. There are several points of interest in the proposal outside of the route. One is the promise of a 5-cent fare on all parts of the proposed rapid transit system, including the existing elevated lines of the Brooklyn Union Elevated Railway Company and its leased lines and the several proposed extensions, with the exception that at present the company would not give a 5-cent fare for travel to the Coney Island district.

The second point of interest is the terms of operation, which are quite different from those between the city and the operators of the present subway. Briefly, for the "original lines," or those which the company considers would be more profitable, the Brooklyn Rapid Transit Company is to retain from the gross receipts the operating expenses, depreciation, renewals, taxes and insurance and then an amount equivalent to the net earnings of the existing lines which will form part of the new system. From the balance remaining there will then be deducted the interest and amortization on the new capital supplied by the company for construction and equipment and then the in-

terest and amortization upon the cost to the city of the lines constructed by it. The remainder will then be divided equally between the city and the company. For the extensions which may be required by the city later and whose earnings are more problematical the company requires also practically a guarantee of the operating expenses, but offers three-quarters of their net earnings to the city. The amount to be invested by each party to the contract for subway construction and equipment would be between \$60,000,000 and \$75,000,000.

There is no doubt that the Brooklyn Rapid Transit System's proposal would, if carried out, be of great value to the city of New York. Brooklyn would expand enormously and as it is an integral part of the greater city the latter would benefit thereby. Bronx and Queens would also profit materially by the construction of the proposed road. It is true that the terms of operation do not make the city a preferred creditor as regards assets and income as in the present subway, but on such a basis no company could afford to construct and operate anything like such a comprehensive rapid transit system as that now proposed by the Brooklyn Rapid Transit Company. Such a system the city now seems to demand, and we think wisely, even if it has to assume some risk in receiving an immediate return upon its investment. The indirect return to the city from the construction of a comprehensive and well-planned rapid transit system will be worth all that it costs, provided it does not involve the city in municipal operation. This is true independent of the company which will be selected to operate the system.

Undoubtedly the Interborough Rapid Transit Company will now make a proposition to the city for an extension of its system. Mr. Shonts said recently that his company was waiting before doing so only to learn the proposal of the Brooklyn company. It cannot, of course, offer so extended a transportation service in Brooklyn as the Brooklyn Rapid Transit Company without paralleling some of the existing elevated roads of that company, but on the same general conditions it could construct and operate a very extensive system which might serve some of the other boroughs even better. Whatever decision is reached we trust that it will insure the early construction of ample transportation facilities in New York. These the city has never had, and it needs practically all that can be supplied.

IMPROVING EQUIPMENT INSPECTION

The recurrence of defects in car equipment justifies frequent reference to the importance of close and sustained inspection in the carhouse. In the multitude of duties which fall upon the shoulders of the carhouse foreman on a large system it is easy to relax the rigor of various inspection details, with the result that certain kinds of failures tend to multiply in certain months. In the later makes of motors there is a tendency toward narrow air gaps, and unless special pains are taken to watch the condition of shafts and journal boxes trouble is likely to develop through the striking of pole pieces by armatures. It is not unusual to find a motor shaft perhaps 1/32 in. below standard, with the resulting necessity of turning down and sleeving, and in some cases trouble has arisen from the insertion of new shafts of low gage instead of shafts of the proper diameter for the particular motor in hand. The cost of repairing damage arising from rubbing of pole pieces is high, and an accurate and regular inspection of air gap and bearing

conditions soon pays for itself in reduced maintenance costs in the armature shop.

Another source of trouble in service frequently appears in connection with the replacement of coils and other equipment parts. On account of the gradations required in car heating the heater coils may not in some cases be interchangeable, particularly where systems requiring a different number of total coils are used. The issuance of a heater-coil data sheet to carhouses enables the proper coils to be ordered for the particular car equipment in hand and serves to caution the local force against putting the coils of the wrong circuit into the wiring of a car equipped with coils of differently standardized resistance. The heater maintenance practice of the Brooklyn Rapid Transit System, described in the *ELECTRIC RAILWAY JOURNAL* for Feb. 18, 1911, not only calls for the use of careful data sheets, but also demands that the repair work be done by experts.

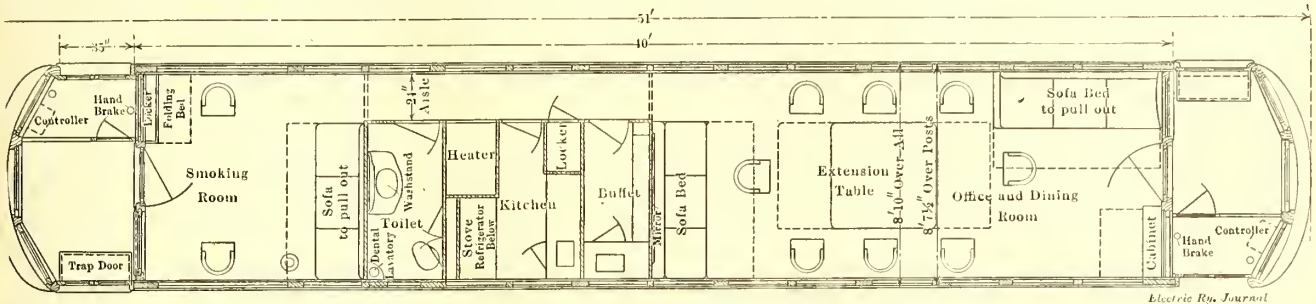
Again, in the stress of maintenance work on a large system it is frequently necessary that replacements of braking apparatus parts must be handled by men more or less unfamiliar with the details of such equipment. Unless the brakeshoe is properly placed and keyed, with the key driven through the lug instead of behind it, a shoe may drop off on the street at a critical moment. Special care is essential when such work is performed to give it close inspection from an experienced employee in the effort to avoid any complications resulting from improper adjustment of small though important parts.

In this connection there is room for improvement in many carhouses in the inspection of air compressors. Foremen often complain that it is necessary to take down a compressor in order to ascertain its condition, but where a considerable amount of compressor inspection is handled more can be learned by the sound of the compressor in operation than is generally realized. A defect in the crank shaft is announced by a decided thump; whereas a loose crank pin gives a positive click. In a recent case where 115 compressors were overhauled it was found that 91 of the equipments, or about 80 per cent, had broken connecting rods, or the rods were so badly worn that scrapping was necessary. Defective crank shafts were found in 25 and broken crank cases appeared in 8, the latter being caused by broken connecting rods. More thorough inspection would unquestionably have saved a considerable proportion of these failures. The failure of the check valves of a compressor to seat properly or the sticking of the governor may lead to serious results in service, due to continuous operation of the compressor pump. Few foremen realize the rapidity with which the temperature rises in a continuously running compressor. A recent test showed that the interior temperature rose to about 280 deg. Fahr. in one second after operation began, a final temperature of 440 deg. being reached in 75 minutes, at which point the check valves began to stick, necessitating a shut-down. A slight restriction of the flow of air may cause a temperature rise of several hundred degrees within a comparatively few seconds, and hence the importance of cleanliness cannot easily be overdrawn. Proper adjustment of the air gages is also a matter of consequence in connection with compressor maintenance and operation. Very few shops are equipped with a good instrument for gage calibration. A still more important part of the air brake maintenance department would be a triple-valve testing rack. Unfortunately, at the present time only the largest electric railways feel justified in purchasing this costly though accurate apparatus.

stained mahogany. The toilet room is 6 ft. x 3 ft. in floor dimensions and is finished in white enamel, thus making it sanitary and light. It has a floor covering of linoleum. The window is oval-shaped and is fitted with a hinged sash similar to Pullman standard car construction. The interior fittings of this room include a Duner hopper, dental lavatory and washstand with hot and cold water with Watrouse fittings and open

been built in the corner of the kitchen and serves for the storage of a step-ladder, brooms, dust pans and miscellaneous utensils for the porter. This locker opens into the passageway.

The serving buffet between the kitchen and the dining room is 2 ft. 6 in. wide x 6 ft. long. It connects with the kitchen through a serving window, 18 in. x 30 in. in size, the upper half of which is closed by a sash filled with clear glass. This sash



Michigan United Railways—Plan of Business Car

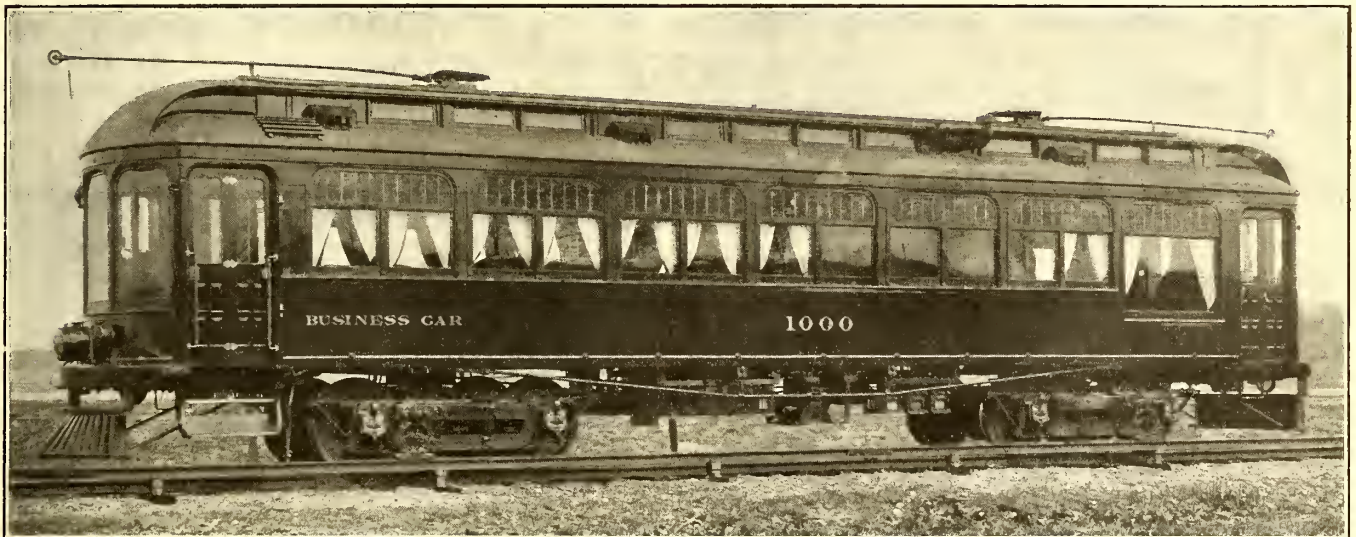
plumbing. The dental lavatory and washstand are made of polished white metal. A cabinet has been built into the partition wall and arranged for storage of toilet articles. Over the washstand is a plate-glass mirror 24 in. x 32 in. in size, having a pin tray beneath extending the full length of the mirror. The interior face of the toilet room door carries a plate-glass mirror, 14 in. x 60 in. in size, extending to within 8 in. of the floor. Hot water is supplied from the alcohol stove in the kitchen. All the trimmings in the toilet room are nickel-plated. The car heater compartment adjoins the toilet room. It is lined with galvanized iron and incloses a C-1 Peter Smith special car heater finished in nickel. Provision is made above the heater for storing fire extinguishers, markers, flags, torpedoes, etc., in especially built racks.

The kitchen and buffet are adjacent compartments connected by a service window. The kitchen equipment includes a McCray sanitary refrigerator finished in white enamel and an alcohol stove, which stands directly above the refrigerator. The filling point for the alcohol storage tank is located on the opposite side of the kitchen. The stove has two burners for frying, one burner for a coffee urn and one to heat the hot-water tank, which has a capacity of 5 gal. A warming oven is mounted

is arranged to swing so that large objects may be passed between the kitchen and the buffet. The furnishings in the buffet include two serving tables, one of which incloses a sink of the same size and design as that in the kitchen. Underneath the serving tables are storage lockers provided with sliding doors and locks. Above the serving tables on both sides of the buffet are rows of lockers with sliding doors and provision for storing dishes. A water cooler has been built on the buffet serving table. This cooler is 12 in. x 8 in. in section and 24 in. high. Two galvanized-iron tanks for water storage, supported by iron bands attached to the upper deck carlins, supply all of the water for the car.

BODY CONSTRUCTION

The car body of this interesting car is carried on an under-frame which includes four 6-in. I-beams and two channel sections reinforced by wooden stringers. Both platforms are covered with interlocking rubber tiling. The step openings in the platforms are covered with McGuire-Cummings steel trap-doors. Above each vestibule is a flat ceiling forming a compartment reached through doors opening into the interior of the car body. This compartment is utilized as storage space for bedding, camp stools, etc. The exterior of the car body has been



Michigan United Railways—Business Car Ready for Service

above the stove. This stove equipment was furnished by the Stearns Steel Range Company. On the side of the kitchen opposite the stove is a serving table, which includes a white enamel sink, 16 in. x 16 in. x 10 in. in size. The top of the serving table is covered with sheet brass. Above the sink are faucets for hot and cold water. Above and below the sink are lockers provided with sliding doors for storing cooking utensils. A locker about 16 in. x 20 in. in plan by 6 ft. high, has

finished in dark green, according to the Murphy Varnish Company's "A B C" system of application. The Gothics and oval windows are fitted with a brownish-tinted opalescent glass. Ventilation of the car is provided by eight Garland ventilators, so arranged as to afford ventilation in each of the sofa beds or berth sections, and in the toilet room and kitchen buffet.

LIGHTING SYSTEM

The interior lighting system is by storage battery only, there-

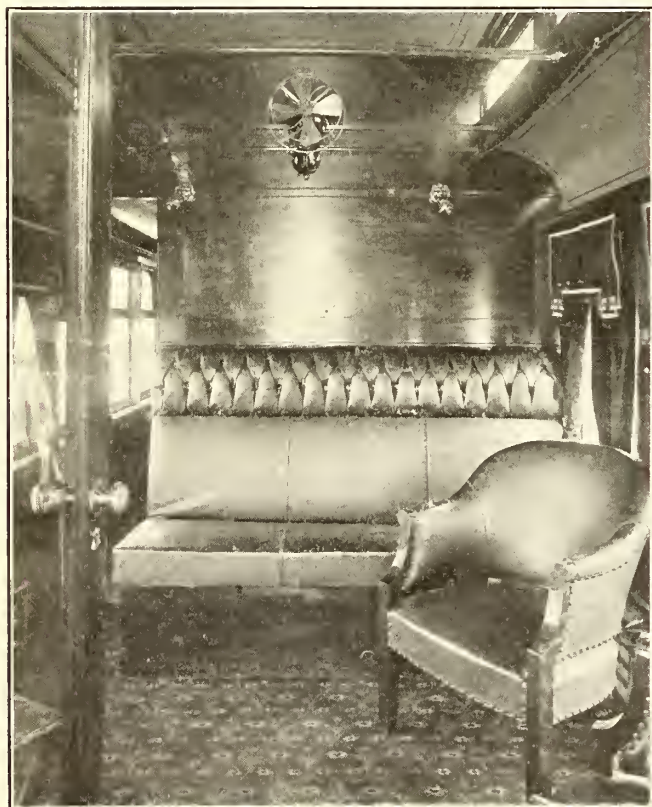
by doing away with possible interruptions due to trolley trouble and gaps in the third-rail at crossings. The storage battery is located beneath the car in such manner as to afford every facility for inspection and refilling. The battery is an Edison type A-4 with twenty-five cells of 150 amp-hour capacity, which



Michigan United Railways—Dining Room of Business Car

supply a 34-volt circuit. By means of a double-pole, double-throw switch the battery may be cut on charge or discharge. The charging current may be from trolley or third-rail through a resistance unit, also located beneath the car.

The lighting circuits are controlled from a lighting panel located in the kitchen. One circuit controls a five-light cluster



Michigan United Railways—Smoking Room of Car

in the dining room, another a three-light cluster in the smoker, a third controls the side lights in the dining room and a fourth the sidelights in the smoker, kitchen, buffet, toilet room and vestibule lights. Each individual light is provided with a socket switch. The vestibule lights are controlled by a two-way switch located in the motorman's cab. A separate switch

is provided for the fan circuit, which operates two 12-in. electric fans, one in the smoking room and the other in the dining room. Sockets are provided for individual lamps on each stenographer's desk. An annunciator system is provided to call attendants.

ELECTRICAL EQUIPMENT AND TRUCKS

The car is equipped with four GE-210 interpole motors and K-34-D controllers. U. S. 13 trolley bases and Allis-Chalmers A.A.-6 air compressors are used. The headlight is a General Electric luminous arc and is supplied either from trolley or third-rail. The car is equipped with railway company's third-rail appliances. The coupling equipment consists of M.C.B. radial couplers. Stanwood steps are used.

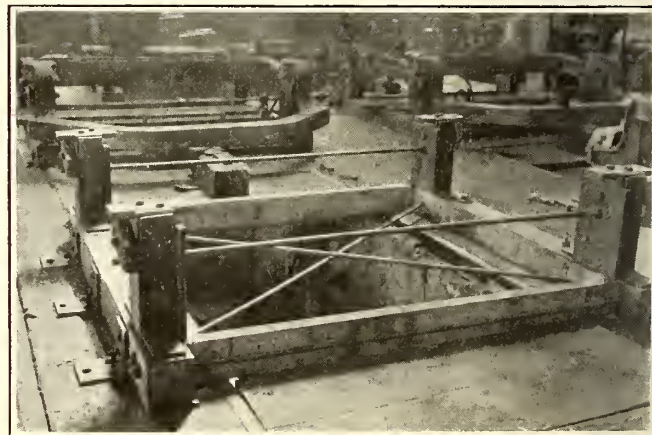
The body of the car is mounted on two pair of McGuire-Cummings standard No. 20-A M.C.B. type trucks with 37-in. Midvale rolled steel wheels and a wheelbase of 6 ft. 6 in. These wheels have a 3-in. tread and flanges 1 3/16 in. x 7/8 in. The axles have 5-in. x 9-in. M.C.B. journals. This car was designed and built by the McGuire-Cummings Manufacturing Company.

ORGANIZATION DIAGRAM

In connection with the description of the business car, it is appropriate to refer to the organization chart on page 738, which is designed to show the working and authoritative relations between the heads of departments and the higher officials of the Michigan United Railways. The lines connecting the different officers are slightly widened at the end toward which jurisdiction and authority are given; likewise, these lines narrow in the direction toward the superior officer to whom report is made. The dotted lines merely indicate that the men connected by them are to work together on some matters pertaining to their department without reporting directly to their superior. Besides the line indication of organization, the rings representing the different officials are gradually diminished as jurisdiction is diminished

JIG FOR TRUCK ASSEMBLY

The new repair shops of the Chicago Railways Company are now reconstructing the trucks on the 328 cars which are being rebuilt. Provision for speeding the truck work and assuring that the frames will be square has been made by building three assembly forms. As illustrated, these are made of heavy oak timbers reinforced with iron and bolted to the floor at the ends of the repair pits. In assembling a truck the side frame castings are first put on the assembly form and pulled up against



Jigs for Assembling Rebuilt Trucks

heavy iron plates, which give the correct location and spacing for the journal boxes. Next, the transom bars are placed between the frames and bolted in place. Then the angle-iron end bars are applied to the frame casting. The location of these bars is marked and the frame casting is chipped with air tools until the bars sit squarely.

ANNUAL CONVENTION OF IOWA ASSOCIATION

A very successful convention of the Iowa Street & Interurban Railway Association was held at Davenport, Ia., on April 20, 21 and 22. About fifty railroad representatives attended each of the sessions, which were presided over by the president, L. D. Mathes, general manager Union Electric Company, Dubuque. The manufacturers' representatives had a very attractive display of exhibits in the large Davenport Coliseum, where the sessions of the railway association and those of the Iowa Electrical Association were held. Through the courtesy of the local properties of Rock Island, Davenport and Moline, the convention guests were very generously entertained. On Friday, April 21, the members of the Iowa Street & Interurban Railway Association were guests of the Tri-City Railway Company on a special-car trip over the system in Rock Island, Moline and Davenport. A visit was made to the United States Arsenal on Rock Island, and the plans for the large new shop and carhouse facilities of the road were described and outlined on the trip. While at the repair shop in Davenport a demonstration of thermit welding was made. Next year's convention will be held at Des Moines.

PRESIDENT'S ADDRESS

The annual address of the president opened the proceedings of the association. This address is published elsewhere in this issue. Frank Hanlon, Mason City, then spoke a few words in appreciation of the valuable work which Mr. Mathes had rendered the association.

WOOD PRESERVATION

C. W. Rhoades, special sales agent St. Louis Surfacor & Paint Company, read a paper entitled "Wood Preservation." After a general review of the causes for decay, Mr. Rhoades took some specific instances to prove the economy of wood preservation. Thus, a pine tie costing 30 cents would last five years, but by treating it at an additional total cost of 30 cents the same tie could be made to last ten years. The cost of the untreated tie would be 30 cents plus 10 cents for putting it in the track, or 40 cents for five years' service, an average of 8 cents a year. The cost of ten years' service for the treated tie would be 60 cents, plus 10 cents for putting it in the track, or 70 cents, an average of 7 cents per year, to which must be added a yearly interest charge on the additional investment of 30 cents. At 4 per cent this charge would be 1.2 cents, or a total average yearly cost for the treated tie of 8.2 cents as against 8 cents for the untreated tie. Figured on this basis, 0.2 cent per tie per annum, or a yearly cost of \$5.60 to \$6 per mile of track, was the price paid to avoid disturbing the track substructure once in ten years.

The average life of untreated ties of all kinds was about six and one-half years, so that about 440 ties were removed from each mile of track each year. Assuming that chemical treatment would double the life of the ties, the use of this agency would reduce the annual number of removals by 220.

The cost of bar-tamping ties in general ballast, including digging out and filling in again, ranged from 2½ cents to 6 cents each, according to wages and various conditions of the work, but the average of a number of carefully kept records was 3.7 cents. The advantage of reducing the number of tie renewals by 220 per mile per annum represented a saving of from \$8.14 to \$16.28 that would otherwise be expended in tamping new ties. This saving stood against the figures of \$6 or \$5.60 in the first paragraph, which represented the extra cost of treated over untreated ties. The actual economy might be even greater, as much track surfacing expense might be due to the settlement of overburdened old ties.

Figured on another basis a more favorable showing for the treated tie was possible. The annual interest charge at 4 per cent on the amount necessary to purchase the untreated tie and place it in the track (40 cents) is 1.6 cents; and an outlay of 7.4 cents at the end of each year, if invested in a sinking fund, was sufficient to replace the tie in the track at the end of five years. The annual cost of the untreated tie was

then 1.6 cents plus 7.4 cents = 9 cents. The annual charge on the cost of placing the treated tie in the track (70 cents) was 2.8 cents, and the annual outlay toward the sinking fund sufficient to replace the tie in the track at the expiration of ten years was 5.8 cents. The annual cost of the treated tie was thus 2.8 cents plus 5.8 cents = 8.6 cents, or 0.4 cents in favor of the treated tie.

A less favorable showing was made for the treated tie when figured on the basis of higher first cost of tie, higher rate of interest or longer life for the untreated tie. In general the economy was greater the shorter the life of the untreated tie.

After reading his paper Mr. Rhoades said that the statistics contained therein had been made up largely from data presented before the American Railway Engineering & Maintenance of Way Association. He described a method of applying carbolineum having a boiling point of 590 deg. The supply of carbolineum was held in a tank and heated with steam coils. Wood to be treated was immersed in the carbolineum, which was kept at a temperature higher than the boiling point of the water, and thus the sap was boiled out, and its place in the wood structure was filled by carbolineum. Mr. Rhoades had seen ties that had been treated in this manner for five minutes, which were found to have been completely penetrated by the carbolineum. The company which Mr. Rhoades represented sold Barol carbolineum, the word "Barol" meaning that the material contained elements which afforded the antiseptic qualities of copper.

Mr. Rhoades stated that one of the most important things in connection with wood preservatives was the method of application. For instance, it had been shown that if only the bottom of a pole was treated with a preservative then the closed wood pores served to hold the moisture which drained downward from the upper unprotected parts. For that reason he advocated cutting 1 in. off the bottom of a pole after it had been treated to permit the moisture to leave the heart. Also it was advisable to make the bottom of a pole wedge-shaped and thus assist drainage.

P. P. Crafts, Davenport, stated that last year the Illinois & Iowa Railway had replaced 20,000 ties. The labor cost for inserting these ties in stone ballast was about 16 cents each, and the work had been scattered from one end of the road to the other. He called attention to the demand on the part of steam railroads for more and more hardwood ties. These were required on account of increased rail wear with heavier equipments.

Mr. Rhoades spoke of the great variation in the life of different woods in different parts of the country, citing, as an example, cypress wood, which lasted but a short time in the North, but if kept in wet ground in the South would last almost indefinitely. He also said that one of the objects of wood preservation was to bring the life of the wood up to the mechanical life of the tie.

Day Oakes, chief engineer Kettle River Quarries Company, Minneapolis, Minn., presented a paper entitled "Preservative Treatments for Railway Ties." He first summarized the main features of the principal wood preservation methods and the results obtained with them by steam railroads. He said that the plant cost of the various treatments figured on the basis of the use of a standard-size cross tie would be for ½ lb. of zinc per cu. ft., 16 cents; for full-cell creosote treatment, using 62-3 lb. of oil per cu. ft., 28½ cents, and with 8½ lb. of oil, 31 cents; for the empty coil treatments, using 4 lb. to 6 lb. of oil per tie, the cost would be approximately 31 cents; for the zinc creosote or card process, the cost would be about 24 cents per tie. Mr. Oakes also submitted three tables to show the economy of the use of the various treatments based on the cost of untreated white oak ties at 65 cents and untreated inferior timber ties such as red oak, gum, etc., at 45 cents. These figures naturally varied with the timber and treatment market, but the relation of their cost remained practically fixed, so that the comparative results shown in the tables would generally prevail. The life assumed for the untreated white oak tie was the average shown by extended experience.

The first table showed how long ties of different materials and treatment must last in order to be as economical as white oak costing 65 cents and lasting eight years. The resultant necessary life of treated ties for economical use as worked out in this table was below the minimum shown by experience. In his second table, which was based on an assumed life indicated by experience, Mr. Oakes figured the first cost which

should be obtained. Mr. Mathes said that these ties had been in about five years and had not required any renewals, while similar ties in macadam ballast laid at the same time had been renewed to the extent of 5 per cent.

DEVELOPMENT OF AUXILIARY LOAD.

A paper on "Development of the Auxiliary Load for Railway Power Plants" was read by J. C. Young, contracting

COST DELIVERED WHICH A WHITE OAK TIE, LASTING EIGHT YEARS, MUST REACH BEFORE IT WILL BE ECONOMICAL TO USE THE TREATED TIE HEAD-ING THE RESPECTIVE COLUMN OF THE TABLE.

Letter of Formula.	Description.	Interior Woods—No Tie Plate.						Interior Woods with Tie Plate.		
		White Oak Untreated.	Zinc Chloride.	Card Process.	1½ Gal. Creosote.	2 Gal. Creosote.	2½ Gal. Creosote.	Zinc Chloride.	Card Process.	2½ Gal. Creosote.
i	Assumed life of tie in years.....	8	12	14	14	18	20	18	24	30
s	Assumed rate of interest.....	4	4	4	4	4	4	4	4	4
s	Annuity to redeem \$1 during life of tie.....	.1085	.0665	.0547	.0547	.0390	.0336	.0390	.0259	.0178
	Spacing of ties c to c in feet.....	1.833	1.833	1.833	1.833	1.833	1.833	1.833	1.833	1.833
	Assumed cost of tie delivered.....	.65	.45	.45	.45	.45	.45	.45	.45	.45
	Cost of treating tie.....	.16	.24	.25	.285	.285	.285	.16	.24	.31
	Cost of putting in tie.....	.12	.12	.12	.12	.12	.12	.12	.12	.12
	Cost of 4 track spikes.....	.064	.064	.064	.064	.064	.064	.15	.15	.15
	Cost of 4 wood screws.....	..	..	..	..	..	..	.03	.03	.03
	Cost of 4 helical linings.....	..	..	..	..	..	..	.32	.32	.32
	Cost of 2 tie plates.....	..	..	..	..	..	..	.12	.12	.12
	Cost of application of fastenings.....	.03	.03	.03	.03	.03	.03	1.35	1.43	1.50
	Total cost of tie in track.....	.864	.824	.904	.914	.949	.974	.736	.780	.818
c	Cost of tie per lin. ft. of track.....	.471	.449	.493	.498	.517	.531	.0581	.0514	.0472
	Annual cost of tie per lin. ft. of track.....	.0698	.0478	.0466	.0471	.0408	.0391	.0581	.0514	.0472
	Annual cost of tie per mile of track.....	\$369	252	246	249	216	206	306	271	249
c ¹	Cost delivered which a white oak must reach before it will be economical to use tie at head of column.	....	.381	.360	368	.290	.269	.505	.420	.369
Formula		$c = \frac{x}{i \text{ plus } s}$		$c^1 = c \times 1.833 - 21.4$						

could be paid for different kinds of ties in order to be as economical as white oak costing 65 cents and lasting eight years. The third table, which is the only one reproduced, is a readjustment of the other two. It shows the cost which a white oak tie must reach before it will be economical to use the various treated ties at their assumed life and cost, and also the charge per mile of track for ties of the various treatments.

Mr. Oakes said that his company advocated the application of preservative compounds by pressure treatment. A plant for doing this work was located at Madison, Ill. It was a question whether the compound to be applied should be heated by live steam or by steam in coils of pipe. His preference was for the latter method, because the temperature could be controlled better, and because there was no possibility for the steam to weaken the wood fibers. In the pressure treatment the moisture was driven out of the wood by the hot oil, and then a pressure of about 120 lb. per square inch was applied to drive the oil into the wood.

Mr. Rhoades stated that the action of the sun tended to draw creosote out of a tie in contrast with its tendency to drive carbolineum into the wood; also, that creosoted ties sometimes were not used on steam railroad curves because the wood was greasy and the spikes did not hold so well in them.

In reply to Mr. Hanlon Mr. Oakes said that the use of a preservative on cedar ties was not recommended because of their low first cost and low mechanical resistance to wear. J. F. Porter, Davenport, called attention to the equality in price of untreated white oak ties and zinc-treated red oak ties. The mechanical lives of the two were practically the same.

Mr. Crafts said that the 20,000 ties installed last year cost about 61 cents each. The lot was made up of three-fourths standard No. 1 ties and one-fourth 5-in. face ties. From nine to ten years' life could be obtained from them under normal traffic conditions. They had not been treated.

Mr. Hanlon had cedar ties that had been in service fourteen years. His road handled freight to the amount of 25 to 75 cars daily and used 40-ton motor cars. These ties were the 7-ft. trolley size and still were in good condition after fourteen years' service.

Mr. Mathes said the Union Electric Company had about 10 miles of track laid with 6-in. x 8-in. x 8-ft. ties embedded in concrete and covered with brick pavement. The traffic was light, and ties had been carefully selected. He was desirous of knowing what life should be expected from them. Mr. Oakes said the life depended greatly on the drainage, but fifteen years or more

agent Cedar Rapids & Iowa City Railway & Light Company. This paper will be found on page 746. Mr. Mathes noted that the general trend now was for electric railways to increase their revenue in every possible way, and for this reason many roads had undertaken to sell power from the trolley wires or transmission line.

Mr. Crafts said that the Iowa & Illinois Railway a few years ago undertook the sale of power. The tendency then was to sell 500-volt current from the trolley wire and to have the purchaser build his line to the right-of-way fence, where protective devices were installed. Mr. Crafts criticised this plan because the expense for fuses, burned meters and upkeep overbalanced the profits from the sale of the current. He now had two d.c. motor customers, one with a 5-hp motor and the other with a 50-hp motor. The former installation was located near a carhouse and the latter near a substation, so the cost for attendance to the customer's service line and connection was not unduly large. At Princeton this company was furnishing energy for a circuit of 360-volt, 40-watt series tungsten street lamps. Another installation just had been made at a large country residence. Energy here was furnished for 40 hp of motor capacity and 500 lamps, all operated by alternating current transmitted at 2200 volts. The supply was taken from the secondary side of the substation transformers at 360 volts and stepped up for transmission. Energy was sold at the rates established by the large lighting company in Davenport. Mr. Crafts doubted the advisability of connecting a large number of power customers direct to the trolley line because railroad service might thus be hampered. On the other hand, however, if the power load was large enough a maintenance man might be employed and thus the possibility of interference be greatly reduced.

Frank McDonald, Waterloo, stated that the Waterloo, Cedar Falls & Northern, when first started, had some d.c. power customers, but that the business was not profitable, and so was turned over to the local lighting and power company. To-day, however, the road was considering the sale of energy along its interurban line to those towns in which substations are located.

Charles Munson, electrical engineer Cedar Rapids & Iowa City Railway & Light Company, said that the supply of d.c. power to customers by his road had not caused any line troubles. Heavy fuses were put at the line connection close to the lightning arresters, and light fuses, which could be replaced by the customer, were placed at the motors.

Mr. Mathes told of some power supply furnished from a suburban trolley line extending to the company's railway

park. One customer was a dairy establishment using a 10-hp motor to operate a machine for milking cows. The revenue from this customer averaged from \$35 to \$40 a month. Other customers on the trolley line had installed 5-hp motors for sawing wood. The gross revenue from the sale of energy along this suburban trolley line was about \$900 a year, and regular city rates were charged.

SHOP PRACTICES

A paper on "Things Worth While in Shop Practice," by Jacob Gerke, master mechanic Tri-City Railway Company, Davenport, was read by J. G. Huntoon, superintendent of the same property. An abstract of this paper will be found on page 745.

The discussion was opened by C. M. Feist, master mechanic Sioux City Service Company, who described his methods for testing motor coils and for removing wheels by the use of a special pit jack. Mr. Feist had not obtained very good results from impregnated field coils. At one time he purchased sixteen and found five to be imperfect. Other members spoke of having had coils impregnated, and were not highly enthusiastic regarding their succeeding life. Mr. Feist had obtained excellent results from 300 coils wound with Heney fireproof wire. The first cost of these coils was high, but results justified it. He also stated that the installation of automotoneers on sixty cars had very greatly reduced commutator and brush troubles. Formerly 7,000 brushes were used per year, but since the automotoneers have been used but 500 brushes a year are required. Mr. Feist thought that the application of trip wattmeters or coasting clocks to cars would soon bring about an economy. In this connection Mr. Mathes said that a small road might well afford to give premiums of \$50 every three months to the motormen having the best car power record.

CAST-IRON WHEELS

Mr. Feist then described his wheel practice, calling attention to the high mileages obtained as a result of careful attention and the use of a wheel grinder. The average life of cast-iron wheels on the Sioux City property, as determined for a period of six years, was 97,000 miles for 30-in. wheels and 137,000 miles for 33-in. wheels. These records were obtained only by careful watching for wheel troubles and the removal of the causes. One factor in shortening the life of wheels was the hard-center special work. To improve this condition Mr. Feist had built a special grinder for enlarging the throats of the special work layouts. The grinder was mounted on a 4-ft. truck, and had a 3-hp motor which drove an emery wheel that was $1\frac{3}{4}$ in. thick. Three men did the grinding work, going over the special work about once each year. Mr. Feist said that the cast-iron wheels used in Sioux City had about $\frac{7}{8}$ -in. chill, and were worn down about 1 in. in diameter before scrapping. All new wheels were ground before being put under a car, and thus assurance was had that they were round and of the same size. The grinding machine used had two grinding wheels driven by a 10-hp motor. The grinder cost \$1,600 in place.

Mr. Mathes described a Pittsburgh car hoist installed in his shops. This hoist had done very effective work and had cost \$600 at the factory. A representative of the La Crosse (Wis.) City Railway Company stated that his company obtained a mileage of about 55,000 miles for cast-iron wheels. Mr. McDonald said that the shop force at Waterloo had made a boom crane from the trucks of an old freight car, and that it was very useful in handling heavy parts around the shop.

At the conclusion of the session President Mathes read a telegram of greeting from J. R. Harrigan, the new executive of the Des Moines Railway property. Mr. Mathes also spoke of the early history of the Iowa Street & Interurban Railway Association, calling attention particularly to the important part which Mr. G. B. Hippee, the retiring president of the Des Moines City Railway and manager of the Des Moines Inter-Urban Railway, had taken in the early work. After this review of the history of the association during its nine years of existence, the association unanimously voted Mr. Hippee

to honorary life membership and instructed a committee to prepare and transmit resolutions of appreciation of Mr. Hippee's work in behalf of the electric railway industry.

HANDLING SNOWSTORMS

The first paper of the morning session of the second day was read by Frank S. Cummins, traffic manager the Inter-Urban Railway, Des Moines. This paper, entitled "Effective Method of Handling Snowstorms," will be found in abstract on page 747.

Mr. Huntoon said that the Tri-City Railway used six sweepers and one nose plow for handling the snow on 90 miles of track. Ordinarily the sweepers were sent out when the snow was about 1 in. deep, but it was hard to tell how to attack the snow problem except as experience had determined. It had been fifteen years since the Tri-City Railway had been tied up on account of snow. The practice was to use as small an amount of salt as possible on street tracks, because it formed a gum on the rails and made them slippery. All grades and curves, however, were salted and sanded. Each of the company's cars was provided with track scrapers at both ends, and these scrapers would care for 3 in. or 4 in. of snow.

C. D. Jones, president Marshalltown Light, Power & Railway Company, described the use of extension boards for clearing the streets near the tracks and called attention to the excellent snow-fighting service obtained from old motors as compared with later types.

L. C. Nash said that the Omaha & Council Bluffs Street Railway Company had twelve sweepers to care for about 140 miles of track. His experience had been that economy in snow-fighting equipment usually resulted in blockades. It was not advisable for the snow-fighting equipment to include or be driven by any but the best mechanisms obtainable. His company supplied the crews on the snow-fighting equipment with hot coffee and sandwiches.

Frank Hanlon had not found that salt made the rails slippery; rather the contrary. In handling freight after a storm the use of salt made it possible to pull a train of cars with a motor which, without salt on the tracks, could hardly move itself. He had found that ordinary storms did not interfere with operation if all the passenger cars were equipped with small plows. He was seeking for some device which would keep the flangeways clear. He had had trouble with the ridge of snow forming between the rails and had purchased an ice leveler, but had not yet had an opportunity to give it a thorough trial. For protection in the country dependence was put on snow fencing.

Mr. Crafts described a home-made snow plow that had been built from a 22-ft. flat car. The shear under the center of this car first was operated by a hand lifting screw. This year an air cylinder had been applied to raise and lower it, and considerable time was saved when the car was passing crossings. The snow plow was handled by an express car and usually was run over the road first to get car clearance and a second time to clean the track. He expected to equip the snow plow with an air-operated flanging outfit. Mr. Mathes spoke of the attitude of the public where a road was endeavoring to keep its tracks open during a storm. He planned to buy a new sweeper and build a salt car. He thought that a good sweeper with wings was more effective for street work than a plow.

B. Bohnsen, superintendent Clinton Street Railway, said his company had one plow for 14 miles of track. Last winter they had used but little salt, but the previous year one storm had required \$40 worth. He found that salt made the track greasy.

Mr. Nash said that the Omaha company frequently salted one rail and sanded the other. A great deal of the track was in streets paved with asphalt, and the track space was paved with granite. Thus in a heavy snowstorm the asphalt became slippery, and the only good path for teams was in the cleaned track. The teams turning in and out of the track would keep the rail covered with snow. Unless salt were used, it might often be necessary to get out the sweepers.

Several members spoke of using horse-drawn drags for smoothing down the ridges of snow alongside the tracks.

AMERICAN ASSOCIATION AFFAIRS

Mr. Mathes read a letter from Arthur W. Brady, president American Electric Railway Association, complimenting the Iowa association on its standing in the field and expressing his regret and that of H. C. Donecker, secretary of the American association, at their inability to attend the Davenport meeting. Next a general discussion was had on the probable location of the annual convention of the American association. This discussion resulted in a unanimous vote of the Iowa association in favor of Chicago as the next convention city for the American association.

STEEL WHEELS

J. C. Holding, Carnegie Steel Company, presented a paper on "Solid Steel Wheels." The solid steel wheel was superior to the steel-tired and cast-iron wheels from the standpoints of strength, safety and durability. He said that a steel wheel might be treated as a single-life wheel, but as a rule this was not advisable as in most cases the contour of tread and flange would be so greatly impaired before the available wearing body had been used that it would be unsafe to continue it in service but at the same time positively wasteful to scrap it while sufficient metal remained to obtain further wear if the contour were restored to its normal condition. The usual procedure, therefore, was to continue the wheel in service for a certain period, then remove it, place it in a lathe and restore the contour to its original form by turning. Actual results obtained by giving careful attention to the contour and experimenting with regard to the critical point at which to withdraw wheels for turning seemed to have established the amounts of wear and turning consistent with the best and most uniform condition of the contour as $\frac{3}{8}$ -in. wear, $\frac{1}{4}$ -in. turning; $\frac{3}{8}$ -in. wear, $\frac{1}{4}$ -in. turning, and so on until the available metal in the rim has been used up. By this practice a rim $2\frac{1}{2}$ in. thick, which must be discarded according to the M. C. B. rules when not less than $\frac{3}{4}$ in. thick, would give three periods of wear, each reducing the rim by $\frac{3}{8}$ in. and followed by a restoration of contour by turning $\frac{1}{4}$ in. The same procedure as to turning could be followed in street and interurban practice, but each case demanded careful study.

The allowable drop of the car due to reduction of wheel diameter was the determining factor in fixing the thickness of rim and consequent durability and economy of the wheel. For example, a road using a 33-in. cast-iron wheel would probably not be able to obtain an economical life from a steel wheel of the same diameter, because however thick the rim might be when new it would probably not be worn down to the minimum safe thickness, for by so doing the diameter of the wheel would be so reduced that there would not be sufficient clearance between the gear cases or motors and the pavement. For instance, if the allowable drop of a car mounted on trucks with 33-in. wheels were $1\frac{1}{2}$ in. it would be useless to provide 33-in. wheels with $2\frac{1}{2}$ -in. rim thickness, as only $1\frac{1}{2}$ in. of this metal could be utilized and the remaining life of the wheel would be wasted. In such a case, therefore, it was advisable, if possible, to use a 34-in. wheel when new in order to get the additional clearance above the street level and so permit the entire wearing body of the wheel to be used. Where city and interurban cars are operated by the same company it was a common practice to order large diameter wheels with thick rims. These wheels then were used under interurban cars until reduced to the minimum diameter for interurban service, whereupon they were applied to the city equipment.

Mr. Holding said it was a little difficult to give mileage records of steel wheels in city service on account of their comparatively recent introduction into that field, but, among the records obtainable, those furnished by the Brooklyn Rapid Transit Company were fair samples. On Dec. 18, 1908, the Brooklyn company reported an average of 33,510 miles per wheel for 504 wheels turned once and an average of 58,761 miles for 256 wheels turned twice. It also reported for the same date that it had 414 wheels which had never been turned

but which had given an average mileage of 71,471 miles per wheel. This variation in the mileage obtained per wheel might be due to local conditions on the individual lines, such as differences in the number of stops.

The solid steel wheel, Mr. Holding said, had not only been widely adopted for city service, but it was also coming to be recognized as the standard for high-speed interurban railways. The Metropolitan Street Railway, Kansas City, Mo., had obtained some remarkable mileage records and submitted one of 247,200 miles for one pair of wheels. The wheels were turned twice during their life to restore contours. Several of the leading elevated and subway roads in the United States had used steel wheels practically since their introduction. The Boston Elevated Railway and the Interborough Rapid Transit Company, of New York, were both users of steel wheels. The latter company had obtained very satisfactory results and had allowed one of the manufacturers to exhibit a pair which had run 60,400 miles with a tread wear of only $\frac{5}{16}$ in., or an average of 12,080 miles per $\frac{1}{16}$ in. of metal worn off. All of the foregoing facts led to the conclusion that solid steel wheels were the most economical in the end.

Mr. Holding said that the one difficulty with which manufacturers of steel wheels have had to contend was the multiplicity of designs called for by users. The adaptation of steel to the peculiarities of design frequently insisted upon was not so easy as in the case of cast iron, as the process of forging or rolling a mass of steel was not so simple as that of pouring the molten metal into a mold made from a wooden pattern. Therefore, one of the first things that had to be done in introducing steel wheels was to standardize as much as possible the designs for various classes of service. The Carnegie Steel Company gave this feature very careful consideration and finally settled upon twenty-one designs which it proposed to manufacture as its standard output. Of these, three were for engine trucks, two for tenders, two for passenger train cars, two for freight cars, two for electric street cars, eight for electric interurban cars and two for electric subway and elevated cars. The ten designs embodied in the 1910 report of the American Electric Railway Engineering Association conformed in all respects to ten Carnegie designs for the same service.

The manufacturers had been greatly assisted in the campaign for standardization by the action of the various railway associations, such as the Master Car Builders' Association, American Railway Master Mechanics' Association and the American Electric Railway Association, all of which had recognized the solid steel wheel as an important and growing factor in their respective fields and had adopted certain standard practices in connection with its use. In concluding his paper, Mr. Holding described the making of a solid steel wheel.

Several members spoke of their experience with steel wheels. Mr. Hanlon had three double-truck cars equipped with solid wheels and twelve with steel-tired wheels. These had not been in service long enough to determine the wheel mileage.

The solid steel wheels under two 40-ton interurbans had been run for one year and had just received their first turning. One pair of wheels had been unsatisfactory from the start. His cars were operated single-ended, and the principal wear occurred on the wheels of the leading trucks. He planned to increase the use of steel wheels.

Mr. Crafts had used steel-tired wheels on the Iowa & Illinois Railway for seven years. The service had been very satisfactory. Cars weighing 37 tons were operated at 60 m.p.h. The steel tires were held on with retaining rings, and at first some trouble was experienced with well-worn tires becoming loose. Later the size of the centers had been increased and this trouble obviated. He had found the wear to be about 9000 or 10,000 miles per $1\frac{1}{16}$ in. reduction in diameter. The principal cause of undue wear was the city girder rails and special track work. Tires were sent to a local machine shop for re-turning at a cost of about \$6.

F. O. Grayson, St. Louis Car Wheel Company, said that the depth of the chill on cast-iron wheels was about $\frac{7}{8}$ in. Mr.

Grayson also called attention to the high scrap value of iron wheels as compared with steel wheels. He said that one cause for undue shopping of steel wheels was the inability of roads to mate wheels on axles according to their degree of hardness and their size; also, that after a steel wheel had been slid flat, even though the flat spot did roll out, the character of the metal was so changed that it was difficult to re-turn the tire without considerable waste.

Mr. Friday said that the Chicago City Railway was grinding its steel wheels where necessary to reduce the diameter and thus reverse flange wear. Mr. Mathes asked Mr. Friday for the relative brakeshoe wear with steel and cast-iron wheels. It was stated to be from 8 per cent to 10 per cent in favor of cast-iron wheels.

Mr. Mathes some years ago had purchased steel-tired wheels for cars operating on a line that had 12 per cent grades. The original cost of these wheels had been about four times that for iron wheels, however; the steel-tired wheels had never developed flat spots, and had worn out without turning.

T. Woods, master mechanic of the Omaha & Council Bluffs Street Railway, described the wheel practice of his company, which showed a wheel life up to 80,000 miles before the first turning. Special care was taken to reverse the trucks whenever the flange wear became unbalanced. It cost about \$2 to reverse the trucks and obtain even flange wear. Mr. Woods said he had a few double-end cars on which cast-iron wheels had run 100,000 miles. During the last two years, however, on account of new special work and a large number of new motormen, the average service from cast-iron wheels had been about 35,000 miles. Mr. Mathes said for his property, including the hill line, the iron wheels had an average life of 50,000 miles on the single-truck cars. The average speed of operation for the entire road was 7.8 m.p.h.

NEW OFFICERS

The association held an executive session on the last day of its convention and elected the following officers for the coming year: President, L. D. Mathes, general manager Union Electric Company, Dubuque; vice-president, C. D. Cass, general manager Waterloo, Cedar Falls & Northern Railway Company; secretary, H. E. Weeks, secretary and treasurer Tri-City Railway Company, Davenport.

THINGS WORTH WHILE IN SHOP PRACTICE *

BY JACOB GERKE, MASTER MECHANIC TRI-CITY RAILWAY, DAVENPORT.

The most important special labor-saving device in our shops is a field tester. The prime defect in all field trouble is caused by baking and moisture, and unfortunately, a field damaged by moisture shows no evidence of deterioration on the outside. Even when stripped to the cotton-covered wire it looks white and new, but a test will undoubtedly disclose a bad short-circuit somewhere in the coil. Another advantage of the tester is that the field can be tested while in the motor. This is important because the turns of stiff wire are apt to spring apart when the field clamping plates are loosened, and some classes of defect apparently disappear.

We have installed an emery-wheel commutator slotter, and only 15 to 20 minutes are required to slot any of the commutators used on our system. Another very useful outfit in our repair shop is a reheating fixture for tightening loose controller cylinder sections on the shafts. With this device and the compound, furnished by one of the large electrical companies, we have eliminated 50 per cent of controller defects. Up to a few years ago we used to remove and replace car wheels by jacking the body from the trucks. This required a great deal of time and extra help. We have a wheel lift in our shop—a pit with a 40-in. section of rail to be removed after the car is in position. The body is supported by two jacks and a tripod and chain blocks are placed on the inside of the car to hold the motor, after which we raise a 3-in. screw lift, operated by

one man, until it reaches the center of the axle between motor axle bearings. We then remove these and the lower half of the gear case, then the wheels are ready to be lowered into the pit. We can remove and replace a set of wheels in an hour. Heretofore this work required from five to six hours.

In 1904 the company built thirty-eight double-truck closed cars with stationary side windows. This made a very good type of car during the cold winter months, but at the change of the season it was necessary to remove the windows and store them away in boxes. This caused much inconvenience and expense and furthermore made the cars uncomfortably cold on rainy days in the late spring and early fall. During the past few years we have remodeled these thirty-eight cars to semi-convertibles and have increased the aisle space by remodeling the seats. In the course of this reconstruction we changed the cables from the outside to the inside of the car and placed them in conduits. We also put the air pipes at the center and placed the air intakes for the compressors under the seats, a location which we have found to be more free from dust than any other part of the car. By these changes we have eliminated a great deal of trouble and delays in schedule due to grounded cables caused by the splashing of water and wheels cutting them in derailments.

The inhalation of dust by workmen when working over dust-covered motors has been obviated to some extent in our shop by the placing of a blower and pipes to draw away the dust and discharge it into the open air.

Another labor-saving tool which has proved very desirable in our shop is an air drill. It was used during the reconstruction of our cars for drilling the holes through the timbers and iron while under the cars, so that these parts did not have to be taken to a drill press. It was also used for redrilling the motor lead holes from the suspension side of the casings to the axle side. This avoids dismounting the motors.

We have also found a welding outfit very useful for repairing broken castings and especially broken motor castings. With this outfit the first step taken in the work of repairs is to clean the parts to be welded and clamp them in position. If the metal is very thick at the fracture a space from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. should be cut out before clamping. In case the part to be welded is a lug, it is a very simple matter to clamp it in position simply by bolting it to an angle-iron bar which is bent to the size. The next step is to adjust a collar of beeswax around the fracture. This should be from 2 in. to 3 in. wide and $\frac{3}{4}$ in. thick. Then an iron mold is placed in position to allow for a clearance of about 3 in. on either side of the collar. Next a small block is used for a narrow gate and another for a riser. We then leave a small hole at the bottom of the mold so that when the wax is heated it can run out. Next we put into the mold about 40 per cent of fireclay and 60 per cent of clean, sharp sand mixed dry and then moistened enough to dampen well. The mold is then thoroughly vented and the blocks for the gate and risers withdrawn. We then use a blow-torch in the hole at the bottom to heat until the wax has run out and the parts to be welded have been brought up to a cherry heat, after which we plug up the hole with dry sand to prevent leakage. We are then ready to make the charge with the necessary steel, powder, etc., from the crucible. For every pound of wax used we multiply by 32 to ascertain the amount of material which will be necessary to fill the mold.

In the Rock Island shop the company has the necessary machinery for building cars and office fixtures. During the past few years it has repaired several large interurban cars for one of the nearby railway companies. Our company has plans under way for a new, complete and modern car shop to be erected east of our present building, the larger portion of the roof to be of glass to minimize artificial light. Depressed floors between tracks at the overhauling pit are provided so that the work may be done on the sides of the trucks to better advantage. The company also intends to install modern types of machinery, such as electric traveling cranes, air hoists, wheel truing, pipe-bending and sand-papering machines.

*Abstract of paper read at the annual meeting of the Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

DEVELOPMENT OF THE AUXILIARY LOAD FOR RAILWAY POWER PLANTS*

BY J. C. YOUNG, CONTRACTING AGENT CEDAR RAPIDS & IOWA CITY
RAILWAY & LIGHT COMPANY

The possibilities for revenue from the distribution system of an electric railway can be divided into two classes—that from the a.c. lines and that taken direct from the 500-volt d.c. trolley. The first class is preferable because of the ability to utilize the a.c. motor and because the losses in distribution are lessened by the loss in transforming from alternating current to direct current. This loss varies from 9 per cent on rotary converters to 14 per cent on motor-generator sets. It is offset to some extent by the increased investment for purchasing the special transformer which is needed to reduce the potential of the high-voltage transmissions. It is possible to use standard transformers for this work at or near substations using motor-generators. The taking of d.c. business has its operating difficulties on account of the increased loss in delivering current and on account of such prevalent motor difficulties as running on a grounded circuit.

The opportunities we have are as follows: Local street railway line at both terminals; private lighting at all intermediate stations; street lighting at the largest of these stations; service for county and state institutions; power for stone crusher at quarries; power for sand pumps at river crossings; power for farmers at or near the right-of-way at any point on the line; power for country elevators and sawmills, and power for pumping city water.

Those who have combination lighting and street railway plants can safely base their rates on an increase of at least 10 per cent to 15 per cent over the rates charged in the cities. Those who are not acquainted with lighting rates should post themselves on what the local company is charging and figure accordingly. The lighting rate to-day is based on three main items: First, a consumers' charge which does not vary with consumption; second, an interest and depreciation charge based on the maximum demand, and, third, a charge based on the switchboard cost. The railway man might not consider the first two items in quoting a rate, and so would base his price on the manufacturing costs only. If he does he is surely giving a discriminating rate. If this is the case he not only is tearing down the system that is absolutely essential to the success of the central station, but he is also doing his own company an injustice by not getting all the revenue possible.

The exclusive railway plant of to-day has considerable difficulty in generating current at a lower cost than the city lighting plant. Intensive business methods are rapidly proving to the majority of power users the cheapness and the convenience of power from the central station. In consequence the load curve is much more conducive to low cost of power than that of the average railway plant without a storage battery. The dreaded and much-discussed peak load is gradually ceasing to be of importance in the mind of the central station manager. In our plant in Cedar Rapids the peak load during the six summer months comes at 2:30 p. m. This condition is due to a very active and successful campaign for power business, with the result that 78 per cent of the total number of our factories are run exclusively from the central station.

An increased rate for service in the country is justified, due to the increased cost to deliver the current. In the average distribution system for railway work the current is generated at a standard voltage, stepped up to high tension, transmitted and stepped down to the proper voltage for motor-generators or rotaries, transformed to direct current and distributed to the car by overhead trolley. Each step results in a loss. For lighting and power service the current is generated at the voltage at which it is distributed to the one set of transformers which is required to get the low voltage needed by the standard lamps and motors. That aggregate loss will

average 12 per cent to 13 per cent in well-designed plants, but in the railway example there must be considered an additional loss which will amount to a total of 25 per cent to 30 per cent, depending on the length of line and other factors. You are therefore justified in increasing rates by the difference of at least 10 per cent to 15 per cent. This does not handicap the company in any way in securing contracts because it is not difficult to create a demand.

Our policy in this regard follows our city practice on all a.c. connections made on or reasonably near the right-of-way. We buy the transformers, install them and run the line where there is a sufficient amount of revenue to warrant the investment. In some cases we have made the consumer stand the expense of the poles but we furnish the copper. Copper does not depreciate fast and one can well afford to follow this plan. This class of business is usually secured in villages and hamlets. The d.c. connection as a rule is made at quite an expense for line and we invariably insist on the consumer setting his own poles. This is the farmer's connection.

We furnish meters free of charge in all cases. All business taken on is contracted for on a meter rate with a minimum charge per annum to insure the fixed charges of the maximum demand. We employ, as in the cities, the two-rate method of charging. In case it is very apparent that the revenue to be received from the customer on the line is not sufficient to warrant a profit, we adopt the following method as far as the cost of the pole line is concerned. The pole line for this class of work costs about \$800 per mile. We will make a contract with the consumer whereby he pays us 15 per cent per annum on the cost of the line and, in addition to that, pays us for electrical energy at our regular rates. Should other consumers connect to the same line we leave it to them to settle the basis on which they pay us this 15 per cent. The 15 per cent covers interest and depreciation on the line in question and practically turns what would be a losing customer to one from whom we secure a profit.

The price of transformers for this work varies from \$32 per kilowatt for the 3-kw size to \$10 per kilowatt for the 25-kw size. Inasmuch as three phase is the prevailing transmission practice, three transformers are needed at each connection. It would be exceptional on the majority of interurban lines to secure a load for which transformer capacity of 75 kw was needed. In addition to this, special cut-outs are needed on the high-tension side of the transformers. These can be purchased for from \$40 to \$50.

As an example of the probable return and investment necessary to secure business in a small country town of 500 population I take the information from the report made for such a town. The city furnishes the following ultimate prospects.

	Kilowatts.
Connected load, power.....	15
Street lines connected load.....	16
Stores connected load.....	1½
Residences and churches, twenty-seven in number, connected load....	13½

Total connected load..... 46

On a basis of revenue for the same class of service in Cedar Rapids we have the following ultimate monthly returns:

Power, per month.....	\$20.00
Street lights per month.....	16.25
Stores, per month.....	10.00
Residences, per month.....	27.00

Total monthly revenue..... \$73.25

The investment necessary to connect up this load is given in detail below:

SUBSTATION EQUIPMENT:	
3-5-kw transformers, 16,500 volts, 220-110 volts.....	\$477.00
Remodel station for transformers.....	50.00
Switchboard and panel, high-tension.....	150.00
Switchboard for low-tension.....	150.00
Polyphase meter.....	80.00
	<hr/>
	\$907.00

DISTRIBUTION AT 220-VOLT, THREE-WIRE:

Seventy 35-ft. poles, complete set.....	\$700.00
Wire for commercial lighting 3 miles, No. 0.....	1,066.60
Wire for street lighting 2 miles, No. 8.....	145.60
Street lamps, complete with regulator.....	300.00
Meters for consumers, forty at \$15.....	600.00

\$2,812.20

Total investment..... \$3,719.20

*Abstract of paper read at annual meeting of the Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

The foregoing contemplates the placing of the transformers on a shelf in the freight room at the station. This will not interfere with the use of the room for freight purposes, but it will increase the insurance undoubtedly. All the figures given are the estimated maximum amounts that the company will ever realize without considering the growth of the town. It will be seen that this revenue of approximately \$900 per annum can be secured for an investment of \$3,600, or that the gross receipts per annum would be only 25 per cent of the investment for supplying the service.

It is expected that the station attendant will be responsible for operating this equipment and that he will also collect the bills, or perhaps the collections would be put in the hands of the local bank or merchant.

Within the last two years the farmer has been placed on an equality with the city man as far as electric service at his home is concerned. The development of the low-voltage tungsten lamp has made it possible and practical to use electricity for light as well as for domestic utensils, such as flatirons, toasters, etc. Twenty-eight-volt lamps are used, which voltage permits the use of a storage battery at a very small relative cost. It has been found by belting a 28-volt generator to the gasoline engine with which almost every farmer is supplied that two hours' charging a day will give ample energy to supply a twenty-four-hour demand.

The farm business can be made profitable to the inter-urban railway by displacing the gasoline engine with a motor when satisfactory lighting service cannot be furnished direct. That condition would be true if the service to the farmer was supplied from the trolley. The poor speed regulation usually incident to trolley supply would not affect the lighting from the low-voltage plant because the switchboard is so connected that the battery floats on the line when the motor is running. By figuring ahead it is possible to use the combined capacity of the generator and battery, thereby permitting the use of a fair-sized motor. This layout certainly puts the farmers within reach of every city advantage. By it they can have their homes and barns lighted by electricity and thereby reduce the fire risk. They can have other conveniences, such as washing machines, irons and hot plates. They can also pump their own water to improve sanitary conditions in plumbing and reduce the labor in handling water for the stock. This development is not generally known to the farmer and so should be thoroughly advertised by the railroad operators.

We are considering very seriously another feature in regard to securing revenue on interurban lines. It has been decided by our operating department that a block system would be greatly to our advantage. The system that has been quite favorably considered provides for two-phase, 2200-volt power lines, on separate poles, extending the entire length of the right-of-way. The specifications of this system recommend the use of No. 10 wire connected through transformers from the high-tension lines at each substation.

In figuring out the auxiliary power situation in connection with the signals, we have decided that it would be feasible to install a larger size copper for the signal line and utilize it as a feeder for power for the farmers and the cities and towns en route. This would reduce transformer investment very materially and permit longer transmission than direct current. In case of a.c. distribution the high-tension transformers must be at the substation on account of the labor costs of attendance. On the other hand, the 2200-volt transmission will permit standard lighting transformers to be located at the best center of distribution. The revenue from this line would no doubt pay very large interest on the investment for the line itself.

To sum up, I have endeavored to give you my view of the possibilities of revenue from this class of business. It certainly must be profitable because it is quite common now for some of the larger stations to extend their lines for service of this class for a considerable distance. If it is profitable to invest money and depend on this revenue to make a profit, it surely will be profitable for the railroad man to make it a side line.

EFFECTIVE METHODS OF HANDLING SNOWSTORMS*

BY FRANK S. CUMMINS, TRAFFIC MANAGER THE INTER-URBAN RAILWAY, DES MOINES

There are few troubles in the lives of a street or inter-urban railway man to be compared with the fighting of a snowstorm. From the first day until the last day of winter he anxiously studies his barometer and all bulletins of the weather bureau. Every little snow flurry worries him, for no two storms are exactly alike. An innocent looking flurry of snow-white flakes may within an hour develop into a howling blizzard.

To be ready for a snowstorm, the wise operating man will perfect, in the fall, his fighting organization, will issue his orders, will overhaul his equipment and will distribute the necessary material and supplies to the proper points.

To begin with his equipment, he needs in this territory adequate plows and sweepers. Sweepers are most effective in paved streets and with girder rails. As usually built and equipped, they have the power to handle snow of a considerable depth and weight, sweeping and pushing it well to one side, and with an adjustable rotary brush on each end they can give the greatest service on single or double tracks. While plows may be used effectively in paved streets, they are most efficient on exposed T-rail construction, such as is employed on outside city lines and interurban lines.

The snow sweeper is an independent motor car, but the push plow may be an independent motor car, a work car or electric locomotive temporarily equipped with plows, or even for interurban lines a gondola or flat car equipped with a plow and pushed by a motor car. All of this equipment should go through the shops early in the fall for a thorough overhauling. It should be tested, and then each motor car or plow should be assigned to the place where it will receive proper care and be held in readiness for instant service.

All sweepers, plows or cars used for fighting snow should then be equipped with shovels, brooms, picks, chains, jacks, re-railing devices, sand and salt. The tools may be necessary for removing the snow from deep drifts, for picking a way through ice, for cleaning switches, frogs and crossings and for re-railing cars, regular or snow-fighting, which may leave the rails. The track department should distribute to its various divisions sand and salt for use by the track men on hills, frogs, switches and crossings, and a list should be made of the tools of each section, so that the manager will know that they are sufficient for snow-fighting purposes.

The master mechanic, the roadmaster and the trainmaster should receive instructions as to what is expected of them, and then in turn they should respectively issue instructions to the carhouse foremen in charge of the equipment, to the track foremen in charge of the tracks and to the road foreman in charge of operation and of the men who will actually handle the equipment.

The selection of men to handle the equipment is of the greatest importance. They should be chosen for their willingness, judgment and ability. Not every motorman makes a capable snow fighter. To be successful he must not be either timid or reckless, but should combine judgment with nerve. Experience only will teach a motorman the speed which is safe under all circumstances and the speed which is so slow that there is liability of the car becoming stuck.

In selecting these men, those living near the carhouse and those with house telephones should be given preference because of the possibility of hurried and night calls. The names of all these men should be listed with trainmaster and carhouse foremen, and the lines to which each sweeper or plow is assigned should also be listed.

An organization having now been built up, all equipment and material being ready and men being instructed in their duties, we are ready for the first storm. And "being ready" means much. A good start is often half the battle, and an

*Abstract of paper read at annual meeting of Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

"ounce of prevention is worth a pound of cure." With the first warning of trouble the men, sweepers and plows should be started. The men are trained, picked and loyal fighters. Given a chance, they will keep ahead of the storm; otherwise they will clean up the track after it is over.

When instructions are issued to govern crews in the operation of cars during snowstorms, the crews on regular cars should be considered as well as those on snow-fighting cars. Careless operation of these regular cars will cause endless trouble, because a derailed car will block the line and delay the progress of the sweepers and plows. All motormen should be taught to take no chances. Every switch, frog and crossing should be swept, and the cars should be run slow. All regular cars should be kept running as long as possible. This will help to keep the line open. When the cars commence to stall they should be taken off and put away until the line is cleared.

In open country on interurban lines it is advisable to protect all bad cuts with snow fences. Great protection can be obtained from them, for the greatest trouble comes from drifted snow.

A push plow of "V" shape, with the power to lift and throw the snow to each side, will clean out the ordinary short snowdrift. When the snow becomes too heavy and the drifts too long or too deep, care must be used in bucking them. If the appearance of such a cut is not satisfactory, stop, go out and look it over. The hardest snow is usually found at the mouth of a cut, and a diagonal drift offers danger from derailing.

The electric car derives its power by rotary motion of the wheels, and this gives to it great efficiency in snow fighting. It can, so to speak, grind its way through a drift at a very low rate of speed. I have seen an electric car time and again forcing its way through a drift at a speed much slower than that at which a steam engine will stall.

The phrase "bucking a drift" comes from the method employed here in fighting snow, in which the car takes a run at the big drifts and hits them hard at a good rate of speed. If headway is lost and the car fails to get through the drift or the cut, it runs the chance of getting stuck and of requiring help or a shovel gang to release it. However, here again the electric motor has an advantage over the steam locomotive. It can and will respond to the reverse so quickly that this alone saves it many times from becoming stalled. Thus one electric car, without much help or protection, can buck a drift repeatedly until it gets through, always saving itself after each effort. But experience has taught me that an electric car or locomotive must not be allowed to stand still long and spin its wheels. This has a tendency to melt the snow at the point of contact with the rail, and the car is likely to freeze and stay until helped out.

On interurban track it is my belief that when the snow is not more than 2 ft. or 3 ft. deep, and not badly drifted, it may be kept cleared by the passenger cars if some sort of solid pilot is used. With deeper or drifted snow, say 4 ft. to 5 ft. in depth, a plow is required, but the use of a solid pilot on regular passenger cars is even then advisable, because with deep snow a cut for some time will partially refill. This condition can be cared for by regular cars.

When snow becomes packed in cuts and around switches only the pick and shovel is safe. Dig trenches through the cuts or, if this is not sufficient, dig out sections and continue to buck with the plow until the cut is cleared. It is not customary with us to couple engines together when bucking snow; we depend instead upon the ability of one engine to handle the work. However, we keep reserve power on the line behind the engine to give assistance in pulling it out of a drift if it becomes stuck.

The first and most important thing is to clear the main lines. Then, when the storm is over, the sidings and other miscellaneous tracks may be cleared. There is considerable work on the tracks after the storm, which largely falls to the lot of the section man; but there is one important duty for

the chief, and that is looking everything over, repairing the sweepers and plows, replenishing the stock of sand, salt, tools, etc., and getting everything in readiness for the next storm.

Rarely in a man's experience does he have the opportunity of witnessing such loyalty as is displayed by all employees in their fight to open their "line." This pride of keeping the road open adds zest to the fight, and long hours and hardships do not dismay these loyal railroad men.

All efforts of the chief are for the one purpose in three parts—to re-establish the service, to regain the regular revenue and to cut out the extraordinary expense. To accomplish this he gets on the job early and stays there until it is all over, because cleaning up a snowstorm is not play; it is a man's job.

A CONVENIENT SHOP SCAFFOLD

The electric car repair shop of the Long Island Railroad is fully equipped with a convenient form of permanent scaffolding between the repair tracks. Light body repairs and painting are done while the car bodies are jacked up for electrical over-



Adjustable Shop Scaffold

hauling and the scaffolding between pits permits painting to be done without obstructing the aisle floor space with ladders or horses. A row of 8-in. x 8-in. wooden posts spaced about 14 ft. apart is set in the floor of each aisle. On two sides of these posts are bolted $\frac{1}{2}$ -in. x 4-in. iron plates with holes punched in them at intervals of 8 in. The metal which is punched out is bent back at the top so that when the scaffold bracket is raised the lug which fits into the hole is forced out of engagement. A triangular wooden bracket arm is attached on each side of the post. At the top of the vertical member of the bracket are bolted two iron straps which are bent around the iron plate on the face of the post. At the bottom of the vertical piece is a lug which engages in the holes in the iron plate. Each bracket is counterweighted by a piece of cast iron attached to a small wire cable passing over a sheave on the top of the post. The brackets on each side of the posts can be raised or lowered independently to any desired height. The scaffold boards are 10-in. planks trussed on the underside with a $\frac{1}{2}$ -in. rod.

ELECTRIC RAILWAY PROBLEMS OF THE DAY*

BY L. D. MATHES, GENERAL MANAGER UNION ELECTRIC COMPANY

In reviewing events transpiring in the street and interurban railway field during the past year, we find little that can be termed startling in the way of development of new practice—in the line of either equipment or operation. American street railway practice has become so refined that so far as can now be foreseen by the leaders in the profession the future will develop no marked innovations. It is rather a case of improving step by step the practices now existent.

It is gratifying to know that during the past year there has developed a keener interest in the standardization of apparatus and specifications. This greatly-to-be-desired situation is largely credited to the good work done by the committees of the American Electric Railway Engineering Association. These committees are still actively engaged, and the results of their deliberations and recommendations are proving of great value to the electric railway industry as a whole.

A subject of the greatest importance is that involving the standardization of operating rules for interurban and city lines, particularly the former. Many years were required by the steam railroads of this country to formulate standard equipment specifications and standard operating rules. The value of these standards from both an economic and a public safety point of view is too apparent to warrant extensive discussion. During the past year many of the most important interurban systems in the country have devoted much earnest consideration to the subject of block signals. This is following in the footsteps of our steam railway brethren, and is along right lines, as in the adoption of a block-signal system the companies provide protection of life and limb to the traveling public, improve the efficiency of their schedules and cut off the large losses due to accidents.

The prepayment car has long passed the experimental stage through its acceptance by the public as a unit tending to the acceleration of the schedule movement and largely to the elimination of platform accidents. The prepayment car is being built in many attractive forms. From a physical point of view it is the most important development of recent years so far as strictly city service is concerned.

Since the first of the present year many street railways have experienced disappointing returns of gross income. The most optimistic now admit that there is a feeling of uncertainty in commercial circles the country over, and no man can predetermine when the tide will turn. Few industries are more sensitive to the touch of depression than the average street railway. In view of the situation as briefly outlined the great problem of to-day is to resist the constantly increasing tendency of the expense of operation to approach in volume the gross receipts. The cry is to increase the efficiency of the service and to decrease the operating expense. A gentleman who has achieved much fame of late through suggesting to the steam railroads the solution of this problem has not yet accepted the proposition of the railways wherein he was told that upon the accomplishment of that which he said could be done he would have a blank check book and pen and ink given to him and be left alone with his conscience to dictate his salary. To improve the service and at the same time to reduce its cost has to many of us a ring of an Arcadian dream; but at the same time such results are being attained in many instances. With the depreciation of the physical property, the increase of wages and in some cases of material, the operating expense naturally is inclined upward. In times of big business the increase of gross expenses, keeping step with that of operation, holds the general average down to that which is regarded as a normal figure.

Under conditions such as are being experienced by the street railways to-day there is little hope for an increase of income,

consequently the only salvation is to decrease the operating expenses. No intelligent management looks with favor on the reduction of operation through the curtailment of necessary and legitimate maintenance charges. The physical property must be maintained to a high standard regardless of what may be the status of the income. The Boston Elevated Railway has recently appointed a committee which will give its entire attention to the matter of reduction of operating expenses. No detail will be too small for the consideration of this committee, the work of which will be followed with keen interest by the fraternity at large.

Coming down to "home affairs," that is, situations within our own State, I am pleased to say that the most important development of the year has been a demonstration by the lately adjourned Legislature of the inclination of the people to give the corporate interests more favorable consideration than has, to some extent at least, prevailed in the past. This does not apply to electric railways in particular, but to every form of investment of a character tending to benefit or develop any section or community. The usual number of corporation-baiting measures were introduced, but so far as I know no new laws have been made in Iowa which could be considered unjust or unfair. The burning issue in our great State is, Why has Iowa suffered a loss of rural population? The State Legislature was not called on to answer this question, but it has certainly not placed itself in the position where it could be charged with further contributing to this undesirable condition.

A law was enacted at the late session making it legal to issue securities to cover certain promotion expenses incident to the construction of electric railways or other utilities. The law also makes it legal to provide for a discount on bonds which may be issued for the purpose of constructing such utilities. This certainly indicates a broader spirit. In the past Iowa has not been an attractive field of investment, particularly in the electric railway line, on account of its very stringent corporation laws. The people of the State through reports filed by interurbans have awakened to the fact that they are not gold mines as assumed. The small towns and the rural communities are desirous of interurban development and will lend a helping hand more readily at this time than ever before.

Many States have been considering the public service commission question. This issue has been before the Iowa public for the past two years. The bill as introduced two years ago was after some modification re-submitted at the recent legislative session. It passed the House, but was tabled by the Senate. While it is probably but natural for the public to assume that the wicked corporations were offering daily prayers for the passage of the Iowa utility bill, it is a fact that the utility companies gave the matter but scant attention. Iowa will undoubtedly have a commission in time, but beyond question a delay will be of advantage to both the corporations and the public. As the issue is a most important one, it will be well for this State to avail itself of the experience of other States which are now engaged with the problem.

REORGANIZATION OF SOUTHERN CAR COMPANY BY NEW INTERESTS

J. Elwood Cox, president of the Commercial National Bank, High Point, N. C., has interested in the Southern Car Company J. B. Duke, of the American Tobacco Company, New York, and Abraham Cook, formerly connected with the St. Louis Car Company, and R. W. Morrison, both of St. Louis, Mo. The Southern Car Company has been operated at a disadvantage since the disastrous fire which damaged its works several years ago. The plan worked out by Mr. Cox for the reorganization of the company will provide \$100,000 of cash working capital—with no debts—and the company will have eighteen acres of land and a well-equipped plant with some fifteen cars in process of manufacture and a goodly quantity of lumber and materials. A meeting of the company is to be held on May 1, 1911, to elect new officers and directors.

*President's address read at eighth annual convention Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

PUBLIC UTILITY COMMISSION CONFERENCE IN NEW JERSEY

In accordance with the request of the Board of Public Utility Commissioners for the State of New Jersey, a conference on electric railway matters was held in Trenton, N. J., on Friday, April 21, between members of the board and representatives of electric railways of the State. Those present at the conference were Thomas J. Hillery and Robert Williams, commissioners; Alfred N. Barber, secretary of the board; Philander Betts, chief inspector utilities division; two inspectors of the board, and about twenty-five railway men who represented sixteen companies.

The conference was opened by Mr. Betts, who said that he had been ordered to draw up a set of minimum requirements for governing the operation of street railways. These requirements could be considered under the following heads: Way and structures, including standard construction of bridges and protection of grade crossings; block or other signals and train dispatching; car equipment; conduct of and treatment by employees.

WAY AND STRUCTURES

Among the minimum requirements suggested by Mr. Betts under way and structures was that the right-of-way should be kept free from obstruction; that track and roadway should be maintained in a substantial manner by properly ballasting tracks, renewing trestles and maintaining rail fastenings, joints and special work; no stub-end switches should be allowed except on tracks under construction; the paving should permit the proper crossing of tracks by teams at authorized crossings and be so smooth as not to interfere with the proper operation of fenders or wheel guards. The floor systems of bridges and trestles should be similar to those used by steam railroads. In general, he recommended the bridge standards laid down by the Massachusetts Railroad Commission, which he quoted as follows;

"Ties shall be of hard pine, and not less than 5 in. x 7 in., and not less than 8 ft. long. The board suggests the length of 9 ft. ties should be spaced not over 8 in. in the clear. The board suggests a spacing of 6 in. in the clear. Ties should be properly fastened to the stringers by spikes or bolts. Along the ends of the ties should run on each side a wooden guard timber not less than 6 in. x 6 in., notched 1 in. over the ties and bolted to every third or fourth tie. The office of this guard timber is not to prevent a derailed wheel from running off the bridge, but simply to keep the ties in place. With ties 9 ft. long, this guard timber will be 15 in. to 18 in. clear outside of the track rails.

"In order to prevent a derailed truck from running far from the track even if it should be derailed before reaching the bridge, inside guard rails should be provided. These rails should be of the same height as the track rails, and should be extended across the entire bridge, and for a distance of some 50 ft. beyond—the ends coming to a point in the center of the track—the point being protected by a casting or frog point."

Continuing, Mr. Betts said that if there is a sharp curve on the approach, the guard rails should be extended around the curve. These rails should not be less than 8 in. in the clear inside of the track rails and should be securely spiked down to every tie. Such inside guard rails, in most cases, guide a derailed truck safely across the bridge.

Drawbridges used exclusively for street railroading should be provided with smashboards so located as to give ample opportunity to bring the cars to a full stop before reaching the bridge and so interlocked with the mechanism of the draw as to assure the dropping of the smashboard whenever the draw is opened.

The overhead system must be maintained to eliminate danger from falling wires. High-tension crossings should be constructed in accordance with the specifications adopted as standard by the American Electric Railway Association.

At road crossings on interurban lines proper signs should be installed to warn teams of the approach to a railroad line. At important crossings, which may also be stations, clusters of lights should be installed.

At each crossing of a steam or high-speed electric line by the line of an electric railway the electric railway should provide derailing switches in its track, located at least 120 ft. from the line of the steam railroad. Where the derails are not operated from a tower, the operating device is to be so located that the conductor or other authorized person, when operating the derail, can have a full view both ways along the line of the steam railroad tracks. The trolley wire should have approved trolley guards. If the crossing is not already lighted by the municipality, the electric line should provide illumination which should at least be sufficient to indicate to the motorman of the electric car the presence of a crossing with another railway.

BLOCK SIGNALS

All high-speed electric railways and all suburban or semi-suburban single track lines should be equipped with some method of positive block signals or else an approved method of dispatching, operated by telephone or telegraph from a single office, with manually operated signals; the signal boxes should be of a type which can be operated only by a special key or handle in the possession of the motorman, and the motorman should never allow any one to operate the signal except himself.

The approach to every trestle, drawbridge, grade crossing, sharp curve, turn-out or other dangerous point should be marked by a cluster of lights to give notice to the motorman that special care on his part is required.

CAR EQUIPMENT

All closed cars in operation between Oct. 15 and May 1 should be equipped with heating apparatus to be used whenever the outside temperature is lower than 40 degrees Fahr. The interior of the car should be kept at a temperature of not less than 50 degrees Fahr. nor more than 60 degrees Fahr.

Cars in cities and towns should be provided with either fenders or automatic wheel guards. The front end of projecting fenders should be not more than 6 in. above the rail when in the normal position; and the front end of automatic wheel guards should not be more than 4 in. above the rail when in the normal position. All cars not equipped with automatic wheel guards should have some type of rigid pilot board with a clearance of not more than 4 in. above the rail. In cities where there is much congestion automatic wheel guards are more desirable than projecting fenders. Interurban cars operated over a private right-of-way should be equipped with pilots mounted not more than 5 in. above the rails.

All new cars or reconstructed cars having the car floor more than 30 ft. above the street level should be provided with two steps between the rail and car floor. No step of any such type of car should have a rise of more than 17 in.

Every suburban electric car in motion between sundown and sunrise should have a headlight located on the front dash and a tail-light located on the side of the car near the roof at the rear end. The tail-light should show red toward the rear and green toward the front, and should be supplied by energy from sources independent of the supply of power to the car. No car, when operated over city streets, should exceed a speed of 15 m.p.h. No car moving at a speed exceeding 10 m.p.h. should follow another car moving in the same direction at a shorter interval than 100 ft. unless coupled thereto.

All cars whose loaded weight exceeds 20 tons should be equipped with air brakes and cars in interurban service should also have air whistles. All cars, except those on seashore roads, should be equipped with efficient sanding apparatus. All cars must be equipped with gongs for sounding a warning to approaching persons or vehicles, and should have route and destination signs. All cars operated over trestles exceeding 10 ft. in height should be equipped with some type of bars or guards to prevent passengers from falling.

On single-truck closed cars not more than three persons,

besides the motorman, should be allowed to ride on the front platform. On open cars not more than four persons should be allowed on the front seat. On double-truck closed cars and on all interurban cars no passengers should be allowed to ride on the front platform. No one should be allowed to ride on the platform steps of a car at any time. On interurban lines, with cars at half-hour or longer intervals, shelter sheds should be erected at regular stations and at transfer points.

CONDUCT OF AND TREATMENT BY EMPLOYEES

All car service employees should be courteous and forbearing in their treatment of passengers. They should endeavor to assist passengers in getting to their destination by announcing important street intersections, transfer points and other important steps for the benefit of passengers, particularly of strangers. All companies should adopt the standard operating rules of the American Electric Railway Association.

DISCUSSION ON WAY AND STRUCTURES

The discussion on way and structures was opened by Martin Schreiber, engineer maintenance of way Public Service Railway. Mr. Schreiber said that there were not many things in Mr. Betts' paper to which exception could be taken, but some things could be added, such as the standardization of rails. He spoke in favor of the T-rail, except for the heaviest traffic over paving.

Referring then to paving, Mr. Schreiber said that the use of asphalt or other monolithic pavement directly against the rail was undesirable because the pavement would be broken by rail vibration. The best pavement was natural stone block, like granite or a trap-rock, but brick or wooden block was far more desirable than asphalt. Some city engineers were demanding the use of concrete under ties. Four or five years ago there had been a wave of sentiment in favor of concrete in street railway track construction, but many companies which had used concrete under ties had returned to broken stone ballast. He said with regard to bridges that it would be impracticable in many cases, especially in towns, to have a smashboard interlocked with the drawbridge. It was inconvenient even to have the rail-lifts interlock with the drawbridge mechanism. On the Public Service Railway circuit-breakers were inserted in the trolley wires about 1000 ft. from the drawbridge, so that when the draw opened the current would be automatically cut off the trolley. Hence there would be very little chance of a car running up to a drawbridge without the motorman noticing that the power was off.

DISCUSSION ON RAILROAD CROSSINGS

R. E. Danforth, general manager Public Service Railway, said that railroad crossings had been illuminated in many instances. However, it was rather dangerous to use a bank of five lights to call the attention of the motorman to a danger point because in a thunderstorm the lights might be burned out. It was better to have a mark which could not be changed by ordinary elements. He preferred to have the poles placed reasonably near the track, painted white and marked with black rings or some other sign. Such poles could be easily seen from a car equipped with a good headlight.

G. A. Gilfillan, consulting engineer Morris County Traction Company, doubted whether 120 ft. was a good limiting distance for a derailing switch. He believed that 50 ft. to 75 ft. would be better. Really, every crossing was a study in itself. The type of crossing, signal tower, etc., to be used should depend upon the importance of the location. Mr. Schreiber also thought that 120 ft. was too great a distance from the crossing for a derail, especially in congested streets where wagon traffic might obscure the view. In towns a distance of 60 ft. to 75 ft. would be more reasonable. J. N. Akarman, general superintendent Atlantic City Electric Company, also argued against a long distance. Mr. Danforth suggested that Mr. Betts amend his suggestion to read that the switch be put at such a distance as would insure the derailment and stopping of the car before it reached the nearest railway track.

DISCUSSION ON WAITING ROOMS

H. H. Archer, manager Morris County Traction Company, opened the discussion on waiting rooms. He agreed with Mr. Betts that on interurban lines, and especially where the head-

way is 15 minutes or more, waiting stations would be both a convenience to the public and a means of increasing the railway's returns. It was difficult, however, to prevent such structures from being converted into nuisances. Mr. Akarman said that he had found it necessary to take out the fronts of every shelter station which originally had had doors and windows because of nuisances, although the structures were in sparsely settled territory.

W. O. Hay, general manager Northampton Traction Company, said that he had built over 100 shelters with the south side open. He had found the use of whitewash on the walls effective against defacement. The shelters had been erected at a very trifling cost because local merchants were offered the use of the shelters for advertising purposes provided they paid for the material. The shelters were three-sided and were large enough for 10 to 15 people. The company's expense was about \$3.80 each, including cartage, roof-covering and foundation poles. Mr. Hay said that there was keen competition for the shelter advertising privilege.

It was suggested by Mr. Betts and others that the defacement of shelter walls could be effectively prevented if the walls were covered with sand after the first coat of paint.

DISCUSSION ON CARS AND EQUIPMENT

The discussion on car equipment was opened by Mr. Danforth, who did not agree with the recommendation that all cars not equipped with automatic wheel guards, fenders or pilots should be supplied with a pilot board having a clearance of not more than 4 in. above the rail. He said on many macadamized country roads the street surface rises more than 4 in. in winter and the amount of rise is generally limited only by the motor clearance, which usually is about 4½ in. A pilot board which extended along the front of the truck would act simply as a drag for slush and snow. This requirement, therefore, would be a bad one for small companies who could not afford snow-fighting equipment, plows and scrapers. He agreed with the step recommendations if it was understood that the step from the platform into the car was included in one of the two steps. He said that Mr. Betts' remarks on car lights called for practically the standard steam railroad tail-light on all suburban cars. Such practice was advisable on high-speed interurban cars, but not on city cars running over suburban tracks. Referring to car speeds, Mr. Danforth thought that it was a hardship to restrict the speed of cars to a lower maximum than automobiles. Trolley cars should be given at least the same speed limit. They were confined to specified tracks, they did not turn corners unexpectedly and they were a much greater public convenience. Any regulation regarding speed limits should define the character of the traffic and state the locality to which it is intended to apply.

The discussion on car signs was opened by Rankin Johnson, general manager Trenton Street Railway. He did not believe in a multiplicity of signs and thought that a sign at each end of the car was enough. The principal thing was to have a sign which was legible at a reasonable distance. Signs on the sides of a car were unnecessary.

Mr. Betts thought that the use of initials or numbers for indicating routes was not satisfactory because strangers in the city would not understand them. Mr. Danforth considered the old display destination sign, in conjunction with a sign denoting the route, the most satisfactory. He said that the Board of Supervising Engineers, Chicago Traction, advocated the use of a side destination sign in the upper panel of one of the center windows rather than a sign near the step because people could see it before they attempted to board the car.

Mr. Betts brought up the subject of using platform gates on closed cars and bars on open cars when crossing trestles. A discussion followed on the necessity of this precaution.

DISCUSSION ON OPERATING RULES

N. W. Bolen, superintendent of transportation, Public Service Railway, gave a brief description of the method used by his company to insure obedience to the operating rules. He said that the Public Service Railway's system of training employees was first to send them to a school of instruction, where

they were taught that courtesy to patrons and obedience to the rules were the prime considerations. After the school course a student had to answer certain questions put to him in order by the instructor, the supervisor, the depot master and the platform instructor, who gave him the final lessons. The Public Service Railway used the American Electric Railway Association's Denver code of city rules.

Mr. Danforth said that he was radically opposed to having passengers ride on the platforms any time anywhere. Mr. Betts mentioned that the Pennsylvania Railroad Commission does not permit front platform riding except on the first bench of open cars, and even there the number is limited to four passengers. In reply to a question by Mr. Betts, Mr. Danforth said that the Public Service Railway did not oppose the use of the rear exit on prepayment cars, although passengers were encouraged to leave by the front door, as at transfer points.

MISCELLANEOUS

In reply to Mr. Mead, inspector of the board, Mr. Schreiber said that on the Public Service Railway regular monthly bridge and trestle inspections were made by the division roadmaster, and that these inspections were checked up by the operating men. If anything serious was discovered it was reported at once by the operating department or by the track walkers who went over the bridges every day. The engineering department also made a thorough inspection at the end of the year when recommendations were prepared for any extensive repairs.

Recommendations were also made by outside engineers in special cases. The maintenance of bridges was often a matter of special agreement with each municipality.

Mr. Betts brought up the classification of car miles and car hours. He submitted a pamphlet embodying proposed additions to electric railway reports under these heads. He divided car miles into passenger car miles, active, idle and special. He also specified car-mile records for mail, express, freight, mixed, non-revenue and electric locomotive. He classified car hours into active and idle for passenger cars, special cars, mail cars and express, freight and mixed cars. These data were to be accompanied by general statistics on the number of passengers carried. There was a discussion as to what should be considered as constituting a car mile and a car day. It was generally agreed that eighteen hours could be considered a car day, so that if a car was running three hours it would be entered as having served one-sixth of a car day.

THE NEW UTILITY LAW FOR NEW JERSEY

The recommendations of Governor Wilson of New Jersey to the Legislature urging the enactment of a bill to increase the jurisdiction and powers of the Board of Public Utility Commissioners of New Jersey were carried out by the enactment of Senate bill No. 364 just before the legislative session closed on April 21, 1911. This measure is a conference committee substitute for Senate bills Nos. 5, 14, 19 and 30 and Assembly bill No. 167, and was signed by the Governor the day that it was passed. The act is quite a voluminous one and consists of four articles and forty-three sections, which may be briefly summarized as follows:

According to Article I, the commission will consist of three persons to be appointed by the Governor with the consent of the Senate. The present board shall be the new board until the term of office of each commissioner expires. The Governor can remove any commissioner for neglect of duty or misconduct after public hearing. The compensation of each member is to be \$7,500 per year and traveling expenses. No member or employee of the board shall be connected with, or hold stock in, any public utility company of the State. The total expenses of the board, including salaries, are not to exceed \$100,000 per annum. The term "public utility" is defined as any individual, co-partnership, stock company, etc., which may "own, operate, manage or control within the State of New Jersey any steam railroad, street railway, traction railway, canal, express, subway, pipe

line, gas, electric light, heat, power, water, oil, sewer, telephone, telegraph system, plant or equipment for public use under privileges granted or hereafter to be granted by the State of New Jersey or by any political subdivision thereof."

Article II defines the powers of the board. It can act on its own initiative or on complaint. It can conduct appraisals of the property of public utilities. It has power after a hearing to fix rates and to require just and reasonable tolls, regulations, measurements, services, etc. It may test meters. It can require steam and street railways to make reasonable connections to promote the convenience of shippers of property or passengers, to maintain their property and equipment in adequate condition, to make extensions when the business to be obtained and the financial condition of the company warrant the construction, to adopt a standard system of accounting, to establish and maintain adequate depreciation accounts, to investigate accidents. When a company increases its rates the board, either upon written complaint or upon its own initiative, shall have power to determine whether the increase is reasonable, and during the hearing to require the old rate to remain in force.

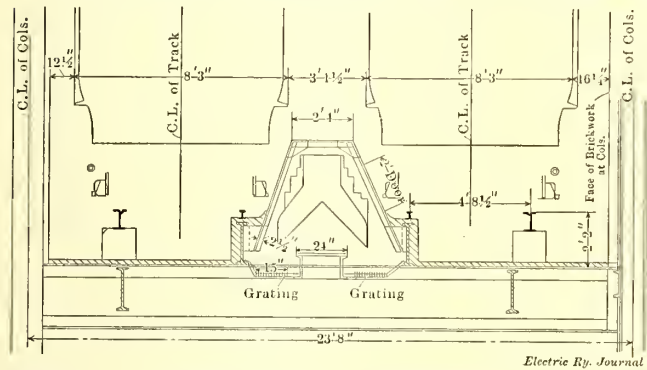
Article III prohibits public utilities from charging unreasonable and discriminatory rates, from issuing stock and bonds or other evidences of indebtedness payable more than one year from their date without obtaining authority from the board, to capitalize the franchise to be a corporation or any franchise in excess of the amount (exclusive of any taxes or any annual charge) actually paid to the State or any political subdivision thereof as a consideration of this franchise, to capitalize any contract for consolidation, merger or lease except that stock may be issued subject to the approval of the board by any lawfully merged or consolidated public utilities. Discrimination or free service is prohibited to any local, municipal or county officer. No sale, lease, mortgage or consolidation is to be made without the permission of the board, and any made without such permission is void. No public utility, without the approval of the board, shall sell its stock to any other public utility in the State, or shall sell or allow the transfer on its books to any corporation, domestic or foreign, of a majority interest in its stock. No passenger or freight station is to be abandoned, and no more grade crossings between railways, either steam or electric, shall be made without the approval of the board, which has power to order the installation of gates or other safety provision at any existing crossings. Every public utility at the request of the board must file with it a statement of the authority, powers and duties of different officers. No franchises are to be granted in the future in any political subdivision of the State unless approved by the board.

Article IV describes the procedure of the board. It can draw up rules for its own hearings and need not be bound by the technical rules of legal evidence. The board can compel by subpoena the attendance of witnesses and the production of papers, books, accounts, etc. No person shall be excused from testifying or producing any book, document or paper upon order of the board on the ground that it may tend to incriminate him, but no person shall be prosecuted on account of any act concerning which he shall testify under oath or shall produce documentary evidence by order of the board. A fine of \$100 a day may be imposed for default of compliance with any order of the board, and individuals are also liable to prosecution for misdemeanor. Orders of the board may be reviewed by the Supreme Court, to which is given authority to set aside any order when there is clearly no evidence before the board reasonably to support such order, or if it is without the jurisdiction of the board. The institution of proceedings to review any order of the board by the Supreme Court shall not stay the order of the board unless the Supreme Court or some justice thereof shall so direct. Proceedings in any court of the State directly affecting an order of the board to which the board is party shall have preference over all other civil proceedings pending in the court. The act goes into effect on May 1, 1911.

SAND-DRYING PLANT OF THE METROPOLITAN STREET RAILWAY, NEW YORK

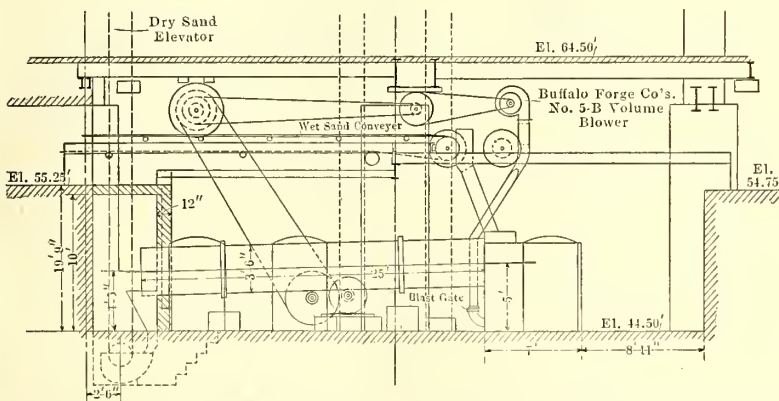
The Metropolitan Street Railway, New York, dries all of the sand required for supplying the car boxes and the sand cars operated on the entire system in a large rotary drier plant located in the basement of the new carhouse at Ninth Avenue and Fifty-fourth Street. From 200 cu. yd. to 300 cu. yd. of sand is required per week during the winter months, but the drier has a guaranteed capacity of 100 cu. yd. per day of 10 hours, so that ample reserve capacity has been provided. The wet sand bin will hold 1600 cu. yd. and the dry sand bin will hold 700 cu. yd. In addition to this supply about 1000 cu. yd. is stored under cover in a carhouse at Tenth Avenue and Fifty-fourth Street. This sand is available in case of emergencies when no fresh supply of wet sand can be obtained to replenish the bins in the Ninth Avenue carhouse.

The sand used is a fine sharp quartz, free from loam, pebbles



Metropolitan Street Railway—Cross-Section Through Dry Sand Conveyor

and other foreign matters. It is dredged from the bottom of Long Island Sound and is delivered on barges in quantities up to 500 cu. yd. to a convenient pier on the North River. From the barges the sand is hauled to the Ninth Avenue carhouse in dump wagons having a capacity of 2 cu. yd. each. These wagons and their drivers are furnished by the maintenance of way department, which keeps them at work at other times hauling track material. The wagons are backed in on the sidewalk



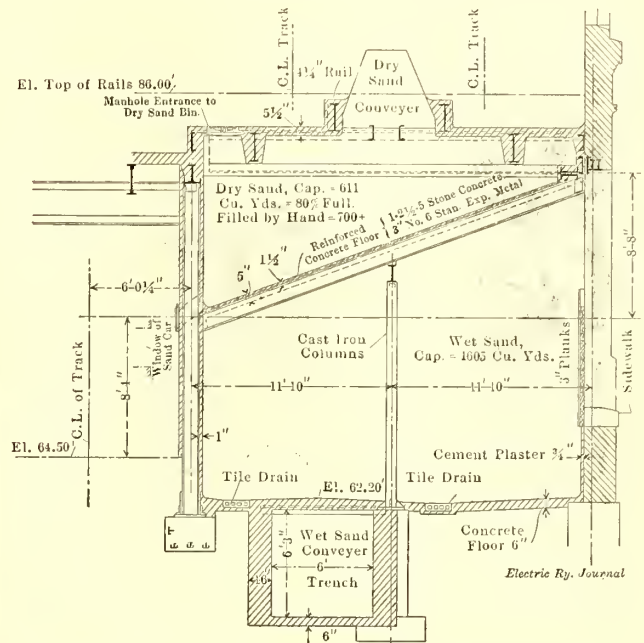
Metropolitan Street Railway—Longitudinal and Cross-Section of Drier Room, Showing Driving Shafts

of Fifty-fourth Street and the sand is dumped into any one of the seven openings in the north wall of the wet sand bin which occupies the center of the building on the Fifty-fourth Street side with the floor 4 ft. below the level of the sidewalk.

The wet sand bin is 165 ft. long, 22 ft. wide, 11 ft. high at the back and 18 ft. high at the front. The sloping ceiling, which is of reinforced concrete, forms the floor of the dry sand bin above. The floor is of plain concrete, 6 in. thick, and is sloped toward two longitudinal rows of tile drains which discharge the seepage water into the transfer table pit drains. The interior walls of the bin are formed of 8-in. cement-faced brick arches, built in between the twin channel

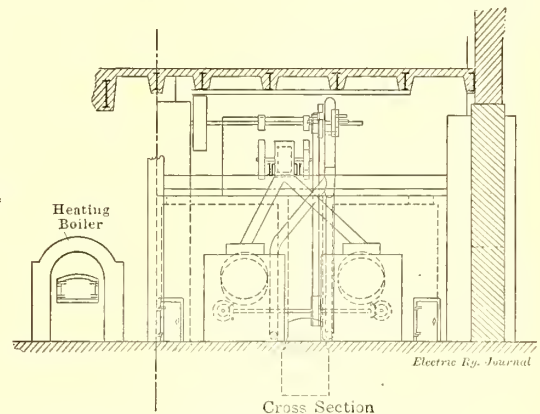
columns. The seven dumping doors in the outside wall are closed with rolling steel shutters and removable plank gates are provided on the inside to relieve the shutters of any pressure when the bin is piled full. There are no partition walls in the wet sand bin.

A concrete tunnel 6 ft. wide and 5 ft. 8 in. high is built under the entire length of the wet sand bin to house the wet sand belt conveyor. Eleven hoppers in the floor of the bin dis-



Metropolitan Street Railway—Cross-Section Through Wet and Dry Sand Bins

charge the wet sand onto the conveyor below. This conveyor has a 14-in. rubber belt which runs at a speed of 250 ft. per minute when both driers are being run, and at half that speed when only one drier is being run. The belt is driven by a 22-in. pulley on a jack shaft which in turn is belted to the main countershaft suspended from the ceiling of the drier room. This countershaft is belted to a 40-hp C. & C. motor running at 535 r.p.m. When only one drier is being run the



conveyor driving pulley shaft is belted to a second jack shaft so as to reduce the number of revolutions per minute by half and lower the speed of the conveyor to correspond with the capacity of the single drum.

The wet sand conveyor discharges into a divided chute which drops the sand down into the front ends of the two rotary drying drums which are mounted on the basement floor, 20 ft. below the floor of the wet sand bin. The drier room is 46 ft. x 34 ft., and provides space for the steam-heating plant boiler in addition to the two drier drums and furnaces. The heating boiler and drier furnaces are designed to burn anthracite pea coal and storage space for 165 tons is provided in

two vaults under the sidewalk of Fifty-fourth Street. Ashes are removed in cans which are hoisted on a hand elevator through a shaft opening onto the sidewalk.

The sand driers, which were furnished by the American Process Company, consist of a furnace for burning the coal and sheet-iron cylinder into which the hot gases from the furnace discharge under forced drafts. The drying drum or cylinder is 25 ft. long and 42 in. in diameter. On the interior are riveted a number of iron shelves which catch the



Metropolitan Street Railway—Wet Sand Storage Bin

sand at the bottom of the drum, lift it as the drum rotates and drop it at the top so that it falls through the blast of hot furnace gases. The drum rotates on two steel tires which rest on a pair of rollers driven through bevel gearing from the main countershaft suspended from the ceiling of the furnace room. It has a slope of 7 in. from the furnace end to the dry sand end and the wet sand hopper discharges into the upper end. As the drum rotates the sand is continuously raised and dropped through the hot gases, and the slope of the drum is sufficient to cause the sand to work its way slowly out to the discharge end. The rate of drying is regulated by varying the volume of hot gases sent through the drum by the blast fan. This fan is mounted under the ceiling of the furnace room and is belt driven from the main countershaft. The blast is controlled by slide dampers in the pipes leading to each furnace. Either drum may be rotated independently of the other by means of clutches on the bevel-gear driving shaft.

The two drums project 15 in. into a concrete flue chamber 10 ft. high and 4 ft. 9 in. deep at the discharge end, and the dry sand falls into a sloping hopper which carries it down to the hood of the dry sand elevator. The gases are carried off from this chamber through breeching which connects with the stack in southeast corner of the furnace room. The dry sand elevator is a 10-in. belt carrying buckets 8 in. x 5 in. spaced 24 in. apart and running at a speed of 232 ft. per minute. It lifts the sand to the level of the second floor of the carhouse and discharges it over a screen onto the dry sand conveyor, which distributes it to the dry sand bin. The distributing conveyor is a 12-in. belt running at a speed of 150 ft. per minute. It is housed in a dirt-proof casing built in between two storage tracks on the second floor of the carhouse and extends the full length of the dry sand bin. Continuous openings 15 in. wide and covered with coarse screens allow the sand to drop through into the bin from the spouts of the automatic tripper on either side of the conveyor track. The elevating and distributing conveyors are both driven by a 6.8-hp motor, running at 816 r.p.m., which is mounted on the

floor near the elevator head. Special care was taken in installing the dry sand conveyors to inclose them in dust-proof coverings so as to prevent fine dust and grit from being liberated on the second floor.

On the first floor a sand car loading track is built along the inside wall of the wet sand bin, and collapsible spouts with undercut gates are placed at intervals of 11 ft. 6 in. in the bottom of the dry sand-bin wall. These spouts are designed to discharge the sand through the window openings of the sand cars, and they are spaced so that two spouts can discharge simultaneously into both ends of a car. The loading track will accommodate six cars at one time.

The plant requires one fireman, one laborer and a helper to operate it at its full capacity. One or both driers are operated for a full day's run for two to four days per week, according to the demand for sand. During May, June and July, 1910, 868 cu. yd. of sand was dried at a cost of 15.87 cents per cubic yard. The labor charge for two men at \$2 per day and one man at \$1.75 per day was \$65.35, and 57,590 lb. of coal, costing \$2.80 per gross ton of 2240 lbs., was burned. The total cost of operating the plant for the three months was \$137.77.

The plant is operated under the direction of H. H. Adams, superintendent of rolling stock and shops of the Metropolitan Street Railway.

PRESIDENT TAFT VISITS ANNAPOLIS IN ELECTRIC PRIVATE CAR

The Washington, Baltimore & Annapolis Electric Railroad recently completed a very fine private car, principally for taking parties of government officials, foreign visitors and other sightseers from Washington to the Naval Academy at Annapolis. The car was first placed in service on Tuesday, April 18, when it had the honor of transporting President Taft and a party of distinguished guests from Washington to attend the unveiling in Annapolis of a monument to the French soldiers who fought in the American Revolution. This monument had been erected on the campus of St. John's College, where it was dedicated after addresses by Dr. Thomas Fell, president of St.



President Taft at Annapolis

John's College; William H. Taft, President of the United States, and J. J. Jusserand, French Ambassador at Washington.

The formal presentation of the monument to the college was made by Edmund Wetmore, acting president of the Sons of the Revolution. The monument was unveiled by Miss Amelia de Paun Fowler, a descendant of the Count de Grasse, and the Count de Chambrun, a descendant of the Marquis de Lafayette. Among those who were in the presidential party,

besides the President and Mrs. Taft, were the Secretary of War and Mrs. Dickinson, Secretary of Agriculture Wilson, Major General and Mrs. Leonard Wood, Admiral and Mrs. Wainwright and Mr. Wetmore. All arrangements for the trip were made by J. N. Shannahan, vice-president and general manager Washington, Baltimore & Annapolis Electric Railroad.

THE WASHINGTON UTILITY LAW

The Governor of Washington on March 18, 1911, signed the act to create the Public Service Commission of Washington to succeed the Railroad Commission of Washington, the members of which are to continue in office as members of the Public Service Commission until the expiration of their terms of office. The new commission is to consist of three persons to be appointed by the Governor with the consent of the Senate. The first commissioners are to serve for six years, four years and two years respectively. Thereafter the term of office of each commissioner is to be six years. Each commissioner is to receive a salary of \$5,000 a year. A secretary to receive \$2,000 a year salary is to be appointed by the commission. Other officers of the commission are to be a rate clerk and statistician at not more than \$3,000 a year, an engineer at not more than \$3,000 a year, an inspector of safety appliances at not more than \$3,000 a year, an expert accountant at not more than \$1,800 a year, a stenographer at not more than \$1,800 a year, and such engineers, inspectors, accountants and other assistants as the commission may deem necessary. The commission is to have jurisdiction over all public service companies in the State.

No street railway is to charge more than 5 cents for one continuous ride within the limits of any city or town, and every street railway is to furnish its passengers with transfers entitling them to a continuous trip over and upon portions of its lines within the same city or town not reached by "the originating car * * * upon such terms as are just and reasonable."

The commission is authorized to fix rates, fares or charges, and where rates, fares or charges are insufficient to yield reasonable compensation the commission is empowered to determine the charges and to fix the same by order. It is also given power to fix joint rates and through routes on railroads. Every public service company is to notify the commission of every accident which results in death or injury to any person. The commission is authorized to investigate all accidents and to order repairs or changes in railroad property wherever it deems changes or repairs necessary. It may even compel the suspension of traffic until repairs are made.

Copies of all complaints are to be served upon the companies affected and not less than ten days are to intervene between the date of service of the complaint and the hearing. All orders and findings rendered by the commission are to become operative twenty days after service, unless the commission deems that additional time is reasonably necessary to comply with the order. Every company that violates an order of the commission is liable to a fine of \$1,000 a day for each offense and every officer or employee of a company who violates an order of the commission is to be deemed guilty of a gross misdemeanor.

Appeal for a writ to review the finding of the commission may be made to the Superior Court of the county in which the proceeding was instituted within thirty days of the date of the order of the commission, and the court is empowered to restrain the commission from enforcing its order pending the determination of the suit. Appeal from the finding of the Superior Court may be made to the Supreme Court of the State. The transcript of the proceedings before the Superior Court is to constitute the record on appeal to the Supreme Court.

When complaint has been made to the commission concerning the reasonableness of any rate or charge and the commission has determined that the charge is excessive, the commission may order the company to pay to the complainant the amount of the overcharge with interest from the date of collec-

tion. If the overcharge is not paid within the time fixed in the order, suit may be instituted to recover same, and the findings and order of the commission are to be *prima facie* evidence of the facts therein stated. "All complaints concerning overcharges shall be filed with the commission within two years from the time the cause of action accrues, and the petition for the enforcement of the order shall be filed in the court within one year from the date of the order of the commission."

Every street car is to be equipped "with proper and efficient brakes, steps, grab irons or hand rails, fenders or aprons or pilots, and with such other appliances, apparatus and machinery necessary for the safe operation of such street car as the commission may prescribe." The commission is empowered to change or modify standards of equipment at any time or to provide different standards of equipment under different circumstances and conditions and is to fix a time within which such modification or change is to become effective or obligatory. The inspector of safety appliances of the commission is to report to the superintendent of the road affected all defects in equipment and appliances which render their use dangerous and is empowered to order any car or locomotive out of service until repaired and put in good working order. In the case of a defect in any track, bridge or structure the inspector is to report to the commission and to the official in charge of the railroad upon which the defect is found.

The commission is authorized to inspect the books and other documents of any public service company and to examine under oath any employee. Every company is to report annually to the commission and answer specifically all questions propounded by the commission. The annual reports are to include the amount of capital stock issued, the dividends paid, the surplus fund, if any, the number of stockholders, the funded and floating debts and the interest paid thereon, the cost and value of the company's property, details of franchises and equipment, the number of employees and the salaries paid each class, the accidents to passengers, employees and other persons, the cost of the accidents, the amounts expended for improvements and such information in relation to rates, charges and contracts as the commission may require. The commission is also empowered to require any public service company to file a monthly report of receipts and expenses.

In regard to the valuation of the property of the public service corporations the measure says in part:

"The commission shall ascertain the cost of construction and equipment and the cost of reproducing in its present condition the property of every public service company; the amount and present market value of the capital stock and funded indebtedness of every company; in the case of companies engaged in interstate business, the relative value of the use to which such property in this State is actually put in the conduct of interstate business and State business respectively; the total market value of the property of each company; the time intervening between the expenditure of money in the cost of construction and the time when returns in the shape of dividends were first received; the probable earning capacity of each company under the rates now charged and the sum required to meet fixed charges and operating expenses, and in case of a company doing interstate business the probable earning capacity of intrastate business and the sum required to meet fixed charges and operating expenses on intrastate business, and the relative proportion of intrastate and interstate business, the relative proportion of the operating expenses connected therewith, the relative proportion of the revenue which should be derived therefrom; the density of traffic and of population tributary to every company; the existence of grades, curvatures and other physical conditions affecting the movement of traffic and business of common carriers, and whether the expenditures made in procuring property were justified by the existing conditions, and whether the money expended has been reasonable for the present needs of the company, and for such needs as may reasonably be expected in the immediate future."

The sum of \$118,146.68, or such sum as may be necessary, is appropriated to carry out the provisions of the act.

METROPOLITAN STREET RAILWAY REORGANIZATION PLAN

At the hearing before the New York Public Service Commission, First District, in regard to the reorganization plan for the Metropolitan Street Railway of New York on April 18, testimony was offered by Prof. Mortimer E. Cooley and Prof. Dugald C. Jackson. Their testimony related to the exhibits offered by Ford, Bacon & Davis concerning the value of the property, which were published in last week's issue.

TESTIMONY OF PROF. M. E. COOLEY

Prof. Mortimer E. Cooley, dean of the department of engineering, University of Michigan, testified that as a whole the report, showing a cost of reproduction of the Metropolitan Street Railway of \$102,000,000, exclusive of some items, impressed him as being conservative. The allowance of 8.8 per cent for incidentals was lower than that which he was accustomed to use. He divided this item into two parts, one for incidentals of construction and the other for incidentals of contingencies or inventory omissions. The allowance for incidentals in uncompleted inventories was about 1½ per cent, and ordinarily he should not think of using less than 5 per cent. In the appraisal for the Michigan Railroad Commission of the steam and hydroelectric plants of the State, on which he had been engaged since last July, the work was done from inventories and without access to the actual records of construction costs. Almost invariably these costs, when he had access to them afterward, proved to be greater than the inventory results. He would not think of allowing less than 10 per cent for the total incidentals, and he was not sure but that more would be permissible, especially under the conditions which existed in New York. The allowance of 10 per cent for general contractor's profit was an average figure, but to the extent to which subcontractors' profits were omitted the appraisal was lower than it ought to be. The estimate of 10 per cent would be based on the theory of cost and percentage and it would not be fair to allow only that percentage if the contractor assumed the hazard on a lump bid.

The allowance of 5 per cent for engineering, Professor Cooley thought, was not unfair. He had used from 4 to 8 per cent. It would not be safe to allow less than 5 per cent. He had rarely found steam piping in power plants to be valued at more than one-half or two-thirds of its actual value. An allowance which equaled 10 per cent of the total involved for interest and taxes during construction seemed low. The usual method of providing capital was an arrangement whereby the money was secured in advance by the sale of securities on which interest had to be paid during the construction period.

Professor Cooley disagreed with the assumption that the power plant might be completed for operation in two years. He should not want to think of less than three or four years and would not be surprised if it took longer. Assuming that the period of construction of the entire property was five years from the time the contracts were let until the last line went into operation, the sum of \$7,300,000 would not be excessive for interest during construction and taxes. It would take, however, eight or ten years to complete such a system.

In testifying in regard to development expenses Professor Cooley eliminated some items with which he was not familiar and which appeared to be due to local conditions. He omitted from consideration the property owners' consents and initial payment for franchise and trackage rights, amounting to about \$7,400,000.

Under the head of organization and legal expense there were items amounting to a little less than 4 per cent of the cost of the property. In the experience of Professor Cooley these had run from 4 to 6 per cent. The same comments which he made regarding interest during construction applied to interest during development. The other items in the development period might be charged to the cost of financing, \$3,733,000, which appeared to be a little less than 4 per cent. He thought that the appraisal had been conservatively prepared.

Professor Cooley, in discussing the subject of discount on bonds, said he thought that it was rather favorable to the public to capitalize the discount, but he should prefer to write it off through a sinking fund that would redeem bonds in a certain time. If it were possible he should prefer to pay the discount and expenses connected with the bonds during the life of the bonds.

After a new property was used its physical condition might stand between 75 and 90 per cent and it could never again go to the condition at which it started. There was some point around, say, 15 or 20 per cent below the cost of reproducing the physical elements new at which the property would be maintained throughout its life and at which it would earn the full value which the property was capable of earning. It would earn more in this condition than when it was new, because the new machine had to be "shaken down" before it could perform its duty most efficiently. In the question of value of a property, what was called the present value was of no use except as a factor to show the physical condition. It had not anything to do with the value of the property as an earning proposition any more than that if it was said that if the property was maintained at 70 per cent of its cost to reproduce new, it was going down and was probably below a point at which it could work effectively and efficiently. On the other hand, if the property was maintained to run about 90 per cent the probabilities were that elements were thrown out before they were worn out and when they still had good life left in them. Ordinarily the management should aim to maintain the property at, say, 85 per cent.

In the valuation of the Michigan steam railroads all that was taken out for depreciation was restored by consideration of the properties as going concerns, capable of earning. If a property was maintained and operated properly and was suitable to meet the requirements it would maintain its full value by development of a going value. It often cost a good deal of money to develop the going value. With a new property several years would be required before all of the different elements were brought into harmony. Ordinarily a new property did not earn enough to meet this expense and the money borrowed therefor was the cost of procuring a going value.

Steam railroad properties would average about 80 to 81 per cent of the cost to reproduce new, but electrical properties involving copper, which did not depreciate and cost large sums of money, would run toward 90 per cent.

In answer to a question by Commissioner Maltbie, Professor Cooley said that the value of a going concern was represented by the sum of money which would express the difference between the dynamic and the static condition of the property.

The going value would run from 5 to 15 per cent, or possibly more, but no definite limit could be put. The value of the going concern was equal at least to what it would cost a new company to take the place of the present company in excess of its earnings up to the time when the lines of gross earnings crossed.

TESTIMONY OF PROF. D. C. JACKSON

Prof. Dugald C. Jackson, of D. C. & William B. Jackson, Boston, testified that the incidentals in the estimate of the cost of reproduction were probably less than an actual construction would produce. He would expect these costs to be more than the 8.8 per cent estimated, and probably more than 10 per cent. If a contract of this magnitude were let at cost, plus percentage, the general contractor would probably get 10 per cent. If the general contractor were expected to estimate and to live upon his proposition he would probably include 15 or 20 per cent as his estimated profit. The amount which would come to the general contractor on cost plus percentage, included a large part of administrative expenses, and the like, such as maintenance of his force and plant and the contractor was fortunate if he got four-tenths of the 10 per cent for his own good. If the contractor bore all responsibilities and the possibilities of loss by making a lump sum bid originally, he ought to have an even 10 per cent or even more actual profit. The contractor would expect to let sub-

contracts for as much as could be handled advantageously in that way, and would expect his 10 per cent to apply upon the sub-contractors' prices.

The cost of engineering would be fully as much as the 5 per cent estimated and probably more. The cost of engineering of the Boston Transit Commission for the East Boston tunnel, taking the cost down to and including contractors' profit as the denominator, was 7 per cent. The general expenses, which were the administrative expenses of the commission and the commissioners' salaries, amounted to 6.1 per cent, and the interest paid during construction on the bonds and indebtedness was 9.4 per cent. The cost in this case was \$3,200,000. In the case of the Tremont Street subway, Boston, the cost of which was \$4,400,000, the engineering percentage was larger. In the case of the Washington Street tunnel, Boston, which cost \$8,000,000, the engineer's office expenses were 6.1 per cent, the commissioners' administrative and salary and like expenses were 3.2 per cent and the interest during construction was 9.7 per cent. Professor Jackson spoke of the thoroughness of the plans made by the Public Service Commission for the proposed triborough system in New York. Commissioner Maltbie said that the cost of preparing those plans was less than 1 per cent on the estimated cost of the work to be done.

Professor Jackson said that when the plans had been put into execution and the expenses of resident engineers paid and all the work completed it would probably be found that the cost was 5 per cent.

Commissioner Maltbie said that these were only the preliminary plans and that the large expense would arise when the engineers prepared the working drawings.

The allowance in the estimate for interest and taxes during construction appeared to Professor Jackson to be reasonable. The estimate of five years as the possible time of construction in a work of such magnitude was a bit pessimistic, especially if operation of parts of the plant should be carried on while the construction of other parts proceeded.

There was a state of affairs in an operating plant which had been under operation and had "settled down to the collar" that made it more valuable than a new plant. This added an element of value that did not exist in a new plant. A good deal of expense went into a plant to bring about this condition. Capitalists who desired to invest in a plant preferred to purchase a well-organized, well-moving property operating with certain fixed rates rather than a perfectly new one.

Professor Jackson did not use the phrase "going concern," because it had had so many definitions at different times, but it was perfectly obvious that there was a value. The process of "ironing out the creases" enabled a property to serve its customers better, to do more business for a given annual expenditure, and, with the same investment, to get greater gross earnings and greater net earnings with the same rate.

The hearing was then adjourned until April 24.

A CONSCIENCE LETTER

The following letter was received recently by Edgar S. Fassett, general manager United Traction Company of Albany:

"A short time ago I was on a Red line Car Soth bound, and as the Car got about to 2th St N. End it left the track and I was thrown off the seat and was shaken up quite bad, your clame agent come to see me and we come to a settlement of \$200 I wasent hurt as much as I made ought to be but the money is gone and I have no way of fixing the thing now but the Lord has saved me from all sin and I felt it my place to confess this to you.

"And I this ladyes husband worked on the cars some time before that, and I took several Springs ought of them lamps in the cars for candels and me and my wife has had several rides on the cars that we didnt pay for and I keep a cuple of those little locks of from the redesters and used my passes on the**** line after I was discharged, but the Lord has forgived me for all this and I hope you will forgive us for all our rong duings toword you and the Company."

COMMUNICATION

REWORKING SCRAP

NEW YORK CITY, April 18, 1911.

To the Editors:

The editorial on "Reclaiming and Reworking Scrap" in the *ELECTRIC RAILWAY JOURNAL*, issue of April 8, 1911, gives timely emphasis to the importance of "camping on the scrap pile," for conservation of waste material is one of the fundamental principles of scientific management toward which so many traction executives are turning in their efforts to find a solution for the ever-insistent problem of preserving the balance between disappearing profits and increasing expenses.

The writer does not wish in any degree to depreciate the significance of the scrap pile, but there is perhaps opportunity here for directing attention to one phase of the matter sometimes overlooked, namely, the possibility of overdoing the thing. In other words, there is a nice distinction between economical reclamation of scrap and unprofitable "tinkering" of partly worn material and parts. This calls for thorough supervision and accurate check as to the cost of redeeming the salvage, including all proper charges, otherwise there is opportunity for spending more in repairing a given article than it could be purchased for new—and still having a second-hand article.

An important city traction company recently instituted an analysis of its shop expenses with results somewhat startling to all concerned. One specific result was that, much to the surprise of everyone, and to that of the master mechanic most of all, the shop cost of reclaiming bolts, including cleaning, re-threading, fitting nuts and dipping, was found to be one-third greater than the price which the purchasing department was paying for new bolts of identical size and grade. The natural comment on this statement will be, "There must have been something radically wrong." Obviously so, but it was a condition that actually existed nevertheless. If adequate percentage to cover overhead expense had been added, the discrepancy would have been even more evident. Needless to say, a thorough revision of the method of treating scrap bolts in these shops was immediately instituted.

The moral of this is manifestly not to discourage a watch on the scrap, but that there should be intelligent supervision first over the decision as to what shall be reclaimed, and, second, as to the methods and cost of doing the work.

As a rule the scrap which accumulates on an electric road is much more diversified than that on a steam road. That is to say, there are more grades of scrap, but the quantity of any one grade is less. This fact would probably deter, for instance, the average electric road from going to the extreme cited in the editorial referred to in the case of the Illinois Central Railroad, whose reclaiming department built a small re-rolling mill for reclaiming scrap iron. Few electric roads would regularly accumulate sufficient iron to make such an investment profitable.

To illustrate the need of a thorough analysis of all the conditions in connection with the reclamation of waste material there is room for argument as to the economy of working over paint skins and slops in a street railway paint shop. The writer knows of a repair plant where formerly this was done, but the practice was discontinued, partly on account of the cost of obtaining a suitable mixture and partly because of the limited opportunity for utilizing the inferior paint thus obtained. The idea was to use it in painting car floors and trucks, but the management decided that the artistic effects secured did not come up to the company's rather high standard of attractive appearing rolling stock, and decided that the small saving in salvage paint over new mixtures was not worth the effort. A steam road that could use paint leavings on freight cars, for instance, or an electric road differently situated might reach an entirely different decision.

The importance of corraling all scrap, of carefully safeguarding it against theft and of securing accurate accounting and credits can hardly be overestimated. A practical method

of handling is to assign to one man the responsibility of supervision over scrap. All of the returned material from shops, carhouses, track and electrical work so far as possible should be brought to one central point daily and should be intelligently sorted and classified. The man in charge must be competent to decide what is to be reclaimed by repairing or reworking and what can more advantageously be disposed of as scrap. If reclamation is decided upon the repairs should be made only on a job or work order, properly approved, in order to obtain an accurate check on the cost. In this work the material should be charged at scrap value, to which should be added the cost of any new material used, all labor involved and a percentage for non-productive or overhead expense. This record should be compared with prevailing prices for similar articles new. Anything short of this procedure is apt to lead to that most unprofitable sin, deceiving oneself.

After the redeemable material has been sorted out the scrap metals should be classified in bins as to bare copper, insulated copper, brass, steel, heavy melting, malleable, spring, etc. The cost of this extra handling will be far more than compensated by the higher quotations obtainable for sorted metals than for mixed.

Instead of attempting to hold accumulations of scrap metals for favorable market with the intention of selling only when quotations are high, several progressive traction companies are handling this matter on an annual contract basis. That is, a contract is made with a responsible bidder to take all the scrap metal the company has to offer for a year, deliveries to be made once or twice a month and the price to be based on current quotations at the time of delivery. For instance, on scrap copper the bid might be made and the contract accepted on the basis of 1½ cents under the prevailing market quotations as published in some accepted authority. Then if in a given month the quotation for lake copper was 14 cents, all the scrap copper delivered during that month would be sold at 12½ cents.

This plan offers several advantages. Few electric roads are equipped for storing accumulations of scrap under proper safeguards and the material is apt to litter up yards and store-rooms. When the accumulation extends over several months the accounting is not always accurate, and monthly statements of operating expenses are distorted. Under the contract plan all scrap is listed once or twice a month and notice to the scrap firm of this list acts automatically as a bill of sale against which invoice is made at once without further correspondence, thereby getting the credits into the corresponding month's account. The safeguarding and removal of the scrap are then up to the contractor. The only objection that can be brought against this method of handling is that scrap is sometimes sold on a low market, but the answer to this is that the results average themselves. Moreover, when attempt is made to "follow the market" and sell only at high quotations, the records show that in the long run there are enough losses to balance the profits. The greater advantages are all in favor of the contract plan.

SUBSCRIBER.

A NEW CARHOUSE

The Public Service Railway, Newark, N. J., in the near future will build a combination railway station, carhouse and shops to be located on Washington Avenue, Nutley, N. J. The carhouse will be 53 ft. x 442 ft. and will have a capacity for 40 cars. The shops will be 53 ft. x 466 ft., of which 60 ft. of depth will be used as offices. The second floor of the building will be used by the employees as a large assembly hall, to which will be connected a banquet room, smoking room and dressing rooms. The building will be of brick, steel and concrete, will be equipped with rolling steel doors and will be arranged for double-end operation. It will be built 70 ft. back from the street with a loop on which cars can be turned. From this loop tracks will be run to the side of the building, where there will be open storage room for 80 cars. The site is on such a grade that it will necessitate the building of a retaining wall.

MEETING OF COMMITTEE ON CONSTRUCTION OF SCHEDULES AND TIMETABLES

The committee on construction of schedules and timetables of the Transportation & Traffic Association held a meeting at the office of the association in New York on April 24 and 25. Those present were N. W. Bolen, Public Service Railway, chairman; I. H. McEwen, Oneida Railway; Alexander Jackson, Public Service Railway; F. L. Hubbard, Toronto Railway; Timothy Connell, Boston Elevated Railway, and H. C. Donecker, secretary of the association.

The first subject taken up was the standard form of working timetables for interurban roads. Mr. McEwen presented for consideration a number of questions designed to bring about a discussion on the most important features of such a timetable. He had submitted these questions in advance of the meeting to two other members of the committee, Frank I. Hardy, Fort Wayne & Northern Indiana Traction Company, and J. J. Doyle, Washington, Baltimore & Annapolis Electric Railway. Neither of these gentlemen was able to attend the meeting, but both sent letters replying to Mr. McEwen's questions.

Mr. Donecker suggested that the new code of interurban rules which is to be presented at the convention this year be examined before proceeding with recommendations for a standard form of timetable. J. W. Brown, chairman of the interurban rules committee, was thereupon invited to enter the meeting. Mr. McEwen pointed out several inconsistencies and inaccuracies in the wording of rules relating to timetables in the 1909 Denver code, but Mr. Brown explained that most of those to which Mr. McEwen referred had been corrected by the interurban rules committee this year. Attention would be given to those rules in which such inaccuracies had not been discovered before.

The committee then took up the replies to questions contained in the 1910 data sheet relating to interurban schedules and timetables. This information was not included in the report of the committee last year. Some of these data will be included in the report in the form of a table for general information only. This table will include statistics of mileage, car miles per day, average number of cars operated, average speed of local and limited cars and maximum free-running speed. A summary of the answers to other questions will be made a part of the report.

A proposed standard form of working timetable was considered next. It was decided to recommend the use of a single sheet folded in convenient form in preference to a book form with timetables on separate sheets. The proposed standard form for single-track roads is a single sheet with the timetable printed on one side and special instructions on the reverse side. This sheet is 6 in. deep and from 24 in. to 30 in. long, with from four to five folds so as to make it fold to a size, 3 in. x 6 in., which can be slipped easily into a trainman's coat or vest pocket. The list of stations is printed in the center, with the timetables of trains in opposite directions on each side. The sheet is folded so as to open in the center to the list of stations. The columns in which the times of trains are printed are ½ in. wide, so that from twenty-two to twenty-eight trains in each direction can be shown on the single sheet. When it is necessary to show a larger number of trains the length of the sheet and the number of folds can be increased and the list of stations can be repeated on each end for convenience in reading. The title is printed on the first page as folded. Where regular meets are shown by continuous rows of black-face figures guide lines are inserted half way between such rows, and where the meets are irregular guide lines are inserted between every fifth and sixth line. For double-track roads the same form of folded sheet can be used by folding it once across and printing the time of trains in opposite directions on the two exposed faces. The special instructions can be printed on the next to the last page as folded.

The committee agreed that where second-class trains are

operated the time of such trains in at least one direction should be included in the timetable in order to insure safety and reduce the number of train orders which would have to be issued if all such trains were operated in both directions as extras. The time of trains of inferior class should be shown in columns at the extreme end of the timetable and should be separated from the time of first-class trains by a heavy rule. When the stations are shown in a single column in the center of timetable the time of trains in one direction should read down and in the opposite direction read up. Where separate tables are used for trains running in opposite directions on double track, and the stations are repeated in each table, they should be arranged in each case so that the time will read down.

The distances between each station and the two division terminals should be included in working timetables in separate columns on each side of the list of stations. It was agreed that it was not necessary to give the distance between adjacent stations. All distances should be shown in decimal hundredths of a mile.

The committee was divided on the advisability of adhering to even-hour schedules without regard to the traffic or the "lay-over" time required for such schedules. It will call attention in its report to the advantages from an operating and revenue standpoint of adjusting the leaving time of trains to volume of traffic at different hours and to the local conditions of running time, "lay-over" time, etc. On the other hand, the committee recognizes the convenience to the public of hourly schedules and the difficulty of making changes where this practice has been established for a long time.

Where the cars of one company operate over the tracks of another company the time of such cars on foreign lines is to be shown on the working timetable in italics for information only. With regard to showing Sunday or Saturday and Sunday trains on the timetable where the service on these days varies from the regular week-day service, it was decided to recommend that such trains should be shown on the timetable in their proper order of leaving time, with explanatory headings in the columns, such as "Sunday Only." The use of typographical symbols to indicate such trains on the working timetable was not approved.

The next question was the method of numbering trains. The committee decided to recommend that odd numbers be used for northbound and westbound trains and even numbers for eastbound and southbound trains, as this corresponds with the usual practice of the steam railroads. The first train out after midnight should be numbered 1 westbound and 2 eastbound, and succeeding trains should be given higher numbers in the order of their leaving time from the terminal. If there is a probability of adding trains in the future, blanks may be left in the proper places for numbering such trains. Trains operating over different divisions from the same terminal may be given numbers beginning with different hundreds. Second-class trains should be given numbers of three figures to distinguish them from first-class trains.

The committee intends to prepare a sample of the proposed standard timetable embodying all of its recommendations.

DEFINITIONS

The committee formulated the following definitions of terms used in making up schedules and timetables for city operation:

Patch.—A substitute for a portion of the timetable in effect, applied in such a way as to cover parts of the timetable, for the purpose of increasing or decreasing the service.

Run.—A group of trips shown on a timetable, which constitutes a day's work for a car crew.

Run Number.—An arbitrary number assigned to a run.

Run Guide.—An index of the time on and time off and the total working time of each run shown on a timetable.

Train Number.—An arbitrary number or a symbol used to designate a given trip or group of trips.

Assignment Sheet.—An index of the names of the car crew assigned to each run.

MEETING OF THE COMMITTEE ON EDUCATION OF AMERICAN ELECTRIC RAILWAY ASSOCIATION

A meeting of the committee on education of the American Electric Railway Association was held at 29 West Thirty-ninth Street, New York, N. Y., April 22. Prof. H. H. Norris, of Cornell University, and Prof. A. S. Richey, of Worcester Polytechnic Institute, were present. In addition W. G. Gove and C. E. Roehl, of the Brooklyn Rapid Transit Company, and H. A. Benedict, of the Public Service Railway, were in attendance upon invitation.

Professor Norris outlined the plans of the committee on education this year, which are to conduct a course of instruction for the benefit of a number of young men in the employ of several of the member companies which have agreed to bear the expenses of this course of instruction. Up to this time three companies have definitely agreed to designate five men each to participate in the plan, and at least one, and possibly two, other companies are expected to do the same before May 1, when instruction will begin. This will give at least fifteen students, or a maximum of twenty-five. For this service each company will pledge itself to the payment of \$150 to cover actual expenses of instruction.

Professor Norris said that the object of the committee on education this year was to determine the practical value of a course of this kind. If the methods to be followed were based on correct principles of pedagogy, and if the results secured were what the committee hopes and expects, it would be possible in another year to enlarge the field if the association should look favorably upon such a proposal. If conducted on a larger scale the expense per pupil would be very much less. Professor Norris said that if any such permanent arrangement should be made he believed it would be very desirable that the individual men receiving instruction should personally defray at least a part of the expense. His experience in teaching had indicated to him that any instruction secured without some direct or indirect sacrifice on the part of the student was not regarded by him as highly as it would otherwise be and that he did not have the same incentive or receive as much benefit as if he paid directly or indirectly for the instruction. The benefit of the proposed plan to the company came from the development of a more efficient set of men. The plan could, in a sense, be regarded as supplementary to the apprenticeship courses conducted by a number of companies.

The plan to be followed is as follows: Each company will first select from among its young employees in mechanical, electrical or steam work a certain number, say, fifteen or twenty, as candidates for the course. These men, or boys, are not to be technical graduates, but preferably should have had a good grammar-school or high-school education and should be from seventeen to twenty-one years of age so as to be adaptable and not too far removed from the "school age." Each candidate will then prepare on forms which will be furnished to the participating companies by the committee a statement giving his experience, names of his previous employers, if any, and the work at which he has been engaged. From these reports the company, or the committee on education, will select from each company five men to receive the course of instruction.

As soon as possible after the formation of the several groups each class will be addressed by a member or a representative of the committee, who will outline the purpose of the course and explain to the men what is expected of them. Each student will then be assigned to some subject upon which he is to prepare a report within a definite time, say, one week. The subject selected will be connected with the work upon which he has just been engaged. If, for instance, he has been at work repairing some type of motor, he may be asked to submit a report on the construction of the armature of that motor, or upon its brush holders, or upon some other part of the motor, and he is expected to look up his own sources of information. These may be the technical papers, textbooks or manufacturers' catalogs, or the student may obtain his information from the

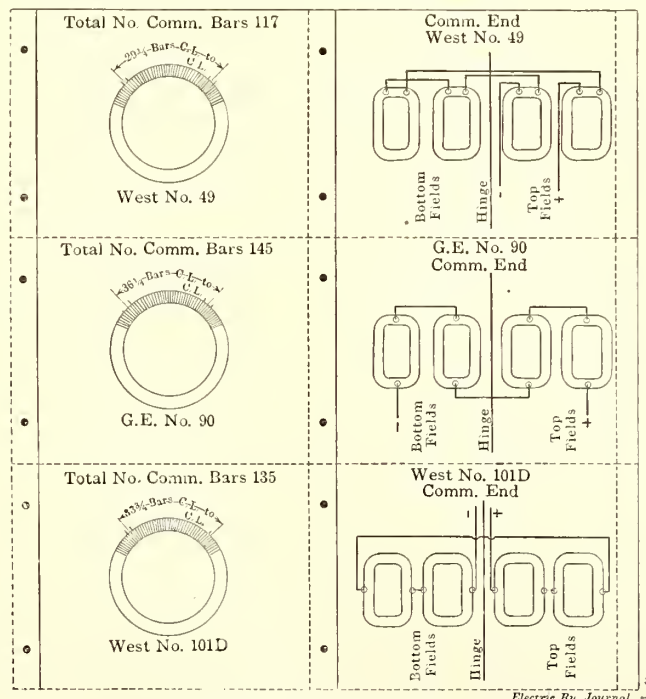
foreman of the shop. These reports will be sent to the committee in care of the New York office of the association. When received they will be corrected, the errors will be explained to the students and the latter will be told to revise their reports and submit final drafts to the main office. Here they will be kept on file so that members of the committee, officers of the co-operating companies or others interested in the plan can inspect them at any time. It is expected that reports will be required of students about once a week. At any time any student has the privilege of applying to the committee for information.

The main object of the instruction is to wake up the boys and encourage them to use their brains on the work they are doing. If any student shows that he is not taking enough interest in the work, or is incapable of benefiting from it, he will be dropped and the expense of instruction to the company employing him will be reduced in proportion. The committee expects that in addition to this instruction by correspondence each group of boys will be met by a member or representative of the committee several times during the period of instruction. The course will continue until about Sept. 1, so that the committee will be able to report upon the results at the October convention of the association.

In general, the plan outlined is somewhat similar to that of the American Gas Institute, which conducts a course of instruction on the construction and use of gas appliances for the benefit of employees of member companies of the institute. The course of the Gas Institute, however, corresponds more closely to that of the correspondence schools than that proposed by the Electric Railway Association, because printed questions are used, whereas in the electric railway course no general form of questions and answers will be employed, but each student will be sent special topics and must investigate them independently.

BALTIMORE INSTRUCTION PRINTS

Employees of the car maintenance shops of the United Railways & Electric Company, of Baltimore, are furnished with instruction prints prepared under the direction of A. T. Clark,



Baltimore Instruction Prints

superintendent of rolling stock and shops. A recent group of these prints is reproduced in the accompanying drawings, which show the spacing of brushes and the diagrams of field connections on Westinghouse No. 49, GE-90 and Westinghouse No. 101-D motors. These prints are made up into books from sheets about $5\frac{3}{4} \times 4\frac{1}{4}$ in. in size.

A REMOVABLE SAND HOPPER

As a substitute for a sand hopper under the car seats, the Fishkill (N. Y.) Electric Railway uses a substantial flat-bottom galvanized iron fire pail. In the bottom near the periphery is cut a 2-in. round hole which registers with a cast-iron mouth-piece fastened on the bottom with stone bolts. This mouth-piece fits into the pipe leading down through the car floor to the sand valve and track spout. A wooden plug fastened to the pail with a chain is used to close this hole in the bottom and it is withdrawn when the pail is in place over the sand valve. A number of pails filled with sand are kept on hand around the sand-drying stone and when a pail on a car is emptied it is lifted off and replaced by a full pail. The object in attaching the spout eccentrically is to permit the spout to be inserted in the sand valve pipe and then to turn the pail around under the seat where it is out of the way. The steep grades on the lines of the Fishkill Electric Railway make it necessary to use sand on both rails and no failures of this simple device have been recorded.

HANDLING VARNISH BY AIR PRESSURE

The paint stockroom of the Chicago Railways Company makes use of the shop air supply for a number of operations. Among these is the transferring of oil, turpentine and varnish from the barrels in which they are received into large elevated storage tanks.

A barrelful of turpentine or varnish is rolled in front of one of the storage tanks and the plug is knocked out of the bung-hole. Then a special emptying siphon is inserted. This device consists of a cone-shaped collar threaded to fit tightly into the bung-hole. Inside of the brass collar is a piece of 1-in. wrought-iron pipe of such length that one end will reach to the bottom of the barrel and the other extend into the top of the high storage tank. The brass collar around this pipe includes a gasket so that when tightened in place the barrel is easily put

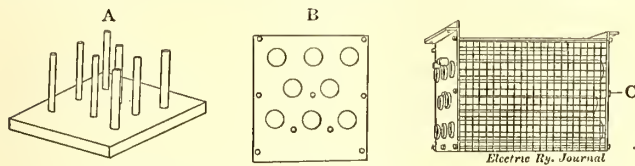


Handling Varnish by Air Pressure

under pressure by attaching a hose to a connection in the side of the brass collar. The shop air pressure is reduced to 10 lb. for this use. With this device the following time is required to transfer a barrel of new material into one of the elevated storage tanks: Turpentine, three minutes; oil, seven minutes; varnish, eight or nine minutes.

A STAND FOR HEADLIGHT RESISTANCE COILS

The stand shown in the accompanying sketches will be found very helpful in repairing the Crouse Hinds headlight resistance coils, when it is necessary to repair broken wire or to replace broken tubes. Any one accustomed to repairing this resistance will find that after either end plate is removed the tubes will fall together and it is very difficult to replace them in their proper places. The base of this stand is an inch board 8 in.

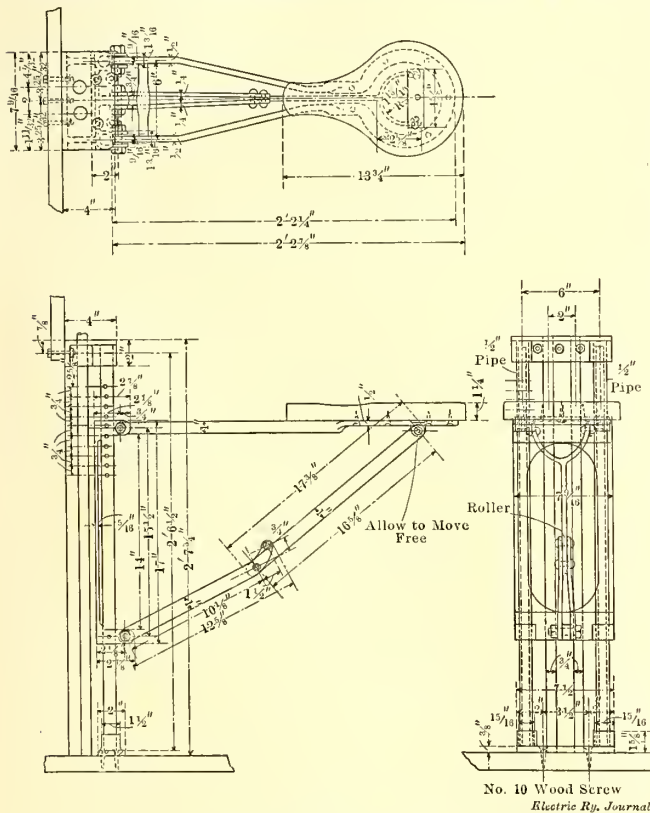


Repair Stand for Headlight Resistance Coils

x 8 in. in size, with 1/2-in. holes laid off to correspond to the holes in the end plate "B." One-half-inch pins are made 4-in. long, and these are driven into the holes in the base-board. When the resistance is to be taken apart the center rod "C" is reversed so the nut will be on the other end. The other rods are taken out and the resistance placed on the stand, then the nut on the center rod is removed. It will be found that the stand will hold the tubes apart in their respective positions, whereupon the repairs can be easily made. By making two of the stands, the resistance can be inverted and the other end plate also removed.

MOTORMAN'S SEAT IN PHILADELPHIA

The Philadelphia Rapid Transit Company is making arrangements to equip all of its air-brake cars with folding seats for the use of the motormen. The constructional features and dimensions of this malleable-iron seat are shown in the ac-

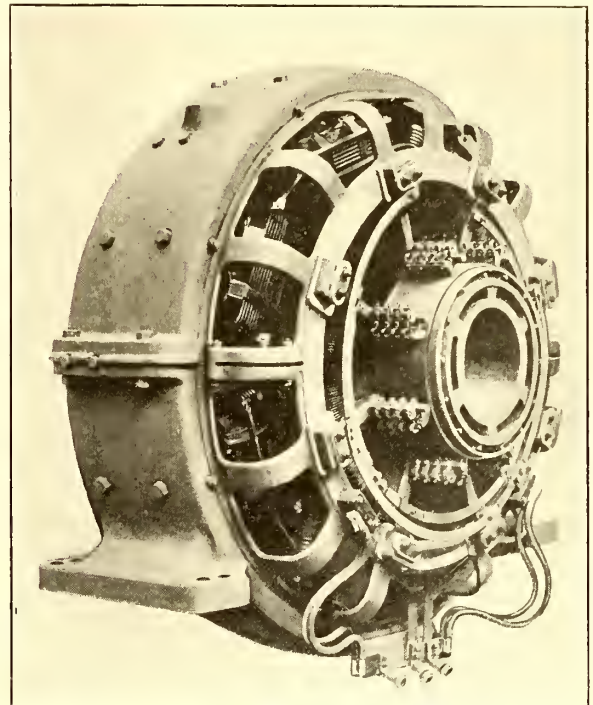


Construction Details of Folding Seat for Motormen

companying drawing. The cost of this seat is about \$1.75 for labor and material. The management was desirous of equipping all of its cars with similar seats, but their installation on the hand-brake cars was not practicable since they would have prevented the motormen from operating the brake-spindle effectively.

INTERPOLE GENERATORS FROM 25-KW TO 1000-KW CAPACITY

The Westinghouse Electric & Manufacturing Company has brought out a new line of d.c. interpole generators known as type "Q." The interpole construction is said to provide perfect commutation, with a definite brush position covering all ranges of load. Heavy overloads may be imposed without sparking or flashing, and wear on commutators and brushes is reduced to a minimum. The frames are of cast steel, a material of high magnetic permeability. The rotors or armatures are designed for direct mounting on the shaft of the prime mover. The stators or fields are arranged for mounting on masonry foundations or directly on the bedplate of the prime mover. Ventilation has received particular attention. The design of all the windings is such as to give shallow coils, with the result that the heat in any part has but a very short distance to travel to



Direct-Current Interpole Generator for Ratings from 25 kw to 1000 kw

the surface from which it is radiated. This, with a thorough system of air circulation, is said to insure an entire absence of hot spots.

These generators are standardized for desirable and usual ratings from 25 kw to 1000 kw, with speeds conforming to the best engine practice. Up to 100 kw in capacity the standard potentials are 125 volts or 250 volts. From 100 kw to 300 kw these machines are also wound for 600 volts; from 300 kw to 1000 kw they are wound for 250 volts and 600 volts. Machines of 250-volt rating are regularly equipped for three-wire operation.

The interpoles have their windings in series with the armature and set up a magnetic field which annuls the effect of the field formed by armature magnetization and generates in the commutated coil an emf which assists the reversal of the current. Since the interpole coils are in series with the armature the interpole field strength varies in proportion to the load and it thus has the proper corrective effect at all loads. Since the emf due to the interpole, which assists reversal, has a definite position under the interpole, the coil which is being reversed must be located accurately with respect to this reversing emf. Therefore the correct position of the brushes must be determined exactly before the generator is put into service. When this point has been properly located shifting the brush position is not only unnecessary but detrimental.

News of Electric Railways

Formal Subway Offer from Brooklyn Rapid Transit Company

The Brooklyn Rapid Transit Company formally presented its subway offer to the city of New York on April 25, 1911, in a letter to Borough President George McAneny, who is chairman of the transit committee of the Board of Estimate, and William R. Willcox, chairman of the Public Service Commission. The letter shows the result of the conferences that followed the submission of its offer of March 2, 1911. It includes the operation of the Broadway-Lexington Avenue subway in Manhattan and its extensions in the Bronx, with the subway and elevated extensions in Brooklyn, Manhattan and Queens, covered in the earlier proposition, and establishes a 5-cent fare in all boroughs, except to Coney Island, but includes a possible extension under the Narrows to Richmond.

The company proposes to spend \$75,000,000 of its own capital in extending its elevated lines, connecting its old steam surface lines in South Brooklyn and Flatbush with the proposed new subways and equipping the new subways and elevated for operation. It estimates the maximum financial requirement for the city at \$83,500,000. This, however, is based on the large tube originally planned for the triborough subway. On a reduced bore the proposed use of the city's credit is reduced to \$73,500,000.

The company points the way to a further reduction of \$19,000,000 in the requirement for immediate employment of municipal bonds, by offering to build the Broadway subway from Ninth Street to Fifty-ninth Street and across to the Queensboro Bridge for \$5,000,000, if the city decides to adhere to the original extensions of the Fourth Avenue subway to Fort Hamilton and Coney Island. On July 1, 1911, the letter declares, the city will have \$80,000,000 available for subway construction.

At a conference with the members of the Public Service Commission on April 25, 1911, Col. Timothy S. Williams, president of the Brooklyn Rapid Transit Company, assured Mr. Willcox that the company had arranged through Anthony N. Brady, who is chairman of its executive committee, to finance the needs of the company.

In concluding its formal offer the company said:

"The adoption of the plan which we have outlined presents a comprehensive scheme of transportation reaching every borough of Greater New York and capable of indefinite expansion without unnecessary duplication of capital. It permits the realization within a few years, instead of within a generation, of a unified city transit system with through cars and a single fare. It is the only plan before the authorities which gives assurance of return on the \$30,000,000 of city capital already invested or contracted for in the Centre Street and Fourth Avenue subways. It is the only plan which assures the city interest and sinking fund requirements on municipal investment in subway construction, past, pending and now proposed, with equal participation in additional profits which are not problematical but probable. It is the only plan which insures financial return to the city from the growth, not merely of lines embraced in new franchises now to be granted, but of 67 miles of existing rapid transit routes doing a large volume of business. It is the only plan which guarantees to the city an operator of future extensions, whether offering promise of profit or not, under conditions which insure the most economical operation, create no additional fares, and offer the maximum facilities for public convenience. It is the only plan which furnishes a complete trunk system from which branches may be extended according to transportation needs, symmetrically and efficiently. Each borough might by some local or less comprehensive plan get lines of rapid transit—but unless these are connected up and operated with such a widely extended trunk system as we have proposed their usefulness would be comparatively slight, and the fares for transportation would be doubled or trebled. Equal advantages under any other plan could not be obtained with twice the expenditure of city or private capital."

The Philadelphia Loan

The finance committee of the Councils of Philadelphia was to confer during the week commencing on April 24, 1911, with Charles O. Kruger, president of the Philadelphia Rapid Transit Company, and Ellis Ames Ballard, general counsel of the company, in regard to the \$10,000,000 loan which it is desired to negotiate in order to rehabilitate the physical property of the company. The special committee requested a statement more in detail than the original one submitted by T. E. Mitten to E. T. Stotesbury as to the disposition of the proceeds of the loan, and a statement in accordance with the request for more specific information was submitted, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 22, 1911, page 711. There seems to be a division of opinion among the Councilmen in regard to the method of procedure. The charge was even made that action on the loan was being needlessly delayed. J. R. C. McAllister, chairman of the finance committee of Councils, which has the matter in hand, is reported to have said:

"There is no delay. We are waiting for the corporation to give us further information. I do not say that we have asked for it, but it seems to me that there should be more told that would enlighten the public concerning the expenditure of the loan money. I am not in favor of passing this ordinance without incorporating into it specifically the items given by Mr. Stotesbury. On the contrary, I insist that a contract between a corporation and the municipality should be as specific and as binding as a contract between an individual and a corporation. Unless this idea is carried out in the ordinance I will oppose it."

George McCurdy, president of Common Council, expressed the opinion that incorporating in the measure specific provisions that the \$10,000,000 shall be spent in any certain way in rehabilitating the system would cause capital to hesitate to buy the bonds. He is reported to have said:

"At the recent meeting of the finance committee I was on the point of offering the motion that the loan be favorably reported when Mr. Seger made the motion that the correspondence connected with the negotiations be printed. I cannot help feeling that if it is insisted that the moneys to be expended are to be specified item by item in the ordinance Mr. Stotesbury will have difficulty in marketing the bonds. If the bonds could not be marketed by Mr. Stotesbury the last state of the company would be worse than the first. The company needs to be rehabilitated and I think the Councils should take Mr. Stotesbury at his word. The company is now in such a position that if Councils do not pave the way for the Stotesbury rehabilitation we shall run the risk of being plunged into a condition that will be worse than anything we have ever yet experienced. By this I mean that if the company should be disintegrated we would be compelled to pay, instead of 5-cent fares, as high as 15 cents to travel ordinary distances."

Several letters have passed recently between Mr. Kruger and Peter Driscoll and H. B. Barron, who represent the employees whose request for an increase in wages to 28 cents an hour was made recently. Under date of April 19, 1911, Mr. Kruger addressed a letter to the representatives of the men in which he quoted the terms under which the men returned to work following the strike of February, 1910, the concession of the company in agreeing to pay the men who returned under the provisions of the strike settlement \$2 a day until they were assigned to regular runs, and the pension and death benefit funds of the company. Mr. Kruger said that the company in carrying out the understanding with the men in regard to paying the men until they were assigned to permanent runs had paid out \$123,192 and that the company is now paying the men so unemployed a sum averaging \$3,000 a month. He concluded his letter as follows:

"Taking into consideration the advance promised by the company's published announcement and effective July 1 next, the wages now paid are quite all that the company's earnings will support, and as bearing upon the desirability of the employment it may be said that there is an over-

supply of competent men now seeking employment with the company at these wages."

A meeting of the men to consider the reply by Mr. Kruger will be held on April 27, 1911.

The New Jersey Employers' Liability Law

The Edge employers' liability law, passed by the New Jersey Legislature and signed by Governor Woodrow Wilson, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 8, 1911, page 646, is said to be the most comprehensive and sweeping law of the sort enacted by any American commonwealth. The act is to go into effect on July 4, 1911. It is applicable to all classes of employers and workers and provides that compensation for injuries to or for the death of an employee "by accident arising out of and in the course of his employment shall be made by his employer without regard to the negligence of the employee," "in all cases except when the injury is intentionally self-inflicted or when intoxication is the natural and proximate cause of the injury." Under even the rule of exceptions the burden of proof is placed upon the employer. The law would seem to apply to all occupations, the measure stating:

"'Employer' is declared to be synonymous with 'master' and includes natural persons, partnerships and corporations; 'employee' is synonymous with 'servant' and includes all natural persons who perform a service for another for financial consideration, exclusive of casual employment."

A feature of the law is a table of fixed compensations to be awarded. The compensations to be paid to injured employees in case of temporary disability would be 50 per cent of the wages received at the time of the injury—the maximum to be \$1 a week and the minimum \$5. Persons receiving less than \$5 a week are to receive the entire wage, and in all cases of such temporary disability the payment is to be made for the full term of disability not exceeding 300 weeks. For permanent disability the term would be extended to 400 weeks. For some other injuries a schedule follows: For the loss of a hand, 50 per cent of daily wages during 150 weeks; for the loss of an arm, 50 per cent of daily wages during 200 weeks; for the loss of a foot, 50 per cent of daily wages during 125 weeks; for the loss of a leg, 50 per cent of daily wages during 175 weeks; for the loss of an eye, 50 per cent of daily wages during sixty weeks.

The compensation for dependents and next of kin in case of death are to be as follows: Total dependents—If orphans, 50 per cent of wages of deceased; if widow alone, 25 per cent of wages; if widow and one child, 40 per cent of wages; if widow and two children, 45 per cent of wages; if widow and three children, 50 per cent of wages; if widow and four children, 55 per cent of wages; if widow and five children or more, 60 per cent of wages; if widow and father or mother, 50 per cent of wages.

There are also elaborate provisions for dependents and partial dependents not provided for in the foregoing table, and when there are no dependents provision is made for the expenses of the last illness and burial. The compensation ranges from a maximum of \$4,000 for total disability to \$600 for the loss of a thumb. The burden of proof falls upon the employer.

Wilful negligence on the part of the worker is defined as follows:

"For the purposes of this act, wilful negligence shall consist of (1) deliberate act or deliberate failure to act, or (2) such conduct as evidences reckless indifference to safety, or (3) intoxication, operating as the proximate cause of injury."

Progress of Negotiations in Toledo

The attention of Mayor Whitlock and A. E. Lang, president of the Toledo Railways & Light Company, was almost entirely taken up in a discussion of the interurban railway question at the sessions on the franchise extension which were held during the week which ended on April 22, 1911. As a result a tentative agreement has been reached to the effect that the city shall have the right to permit the operation of interurban cars over the tracks of the Toledo Railways & Light Company under such conditions as it may fix if the companies disagree. This is subject to change, however.

At the session on April 18 Mr. Lang pointed out several objections to the Schreiber draft which relate to interurban business. He said that the plan to require the consent of the city to contracts with interurban companies would often stand as a barrier against the construction and entrance of new roads and that the provision that interurban cars should stop for city passengers and carry them between points within the city would make such roads competitors of the local lines. Competition was not sought in these negotiations. His company was prepared to erect an interurban station at a cost of \$250,000, but he felt that it would only be fair in return for this accommodation to leave the company free to deal with the interurban companies.

Mr. Lang objected especially to the provision that all existing contracts between the Toledo Railways & Light Company should be surrendered before the proposed new franchise goes into effect. These contracts were based upon the life of the old franchise, but were renewable with the renewal of the franchise. Mr. Lang considered his company obligated by the contracts. He could not agree to accept any provision that would negative the contracts which his company has with other companies.

It was agreed that the incoming interurban cars should stop to discharge passengers, but that they should not be required to stop on outgoing runs to take on passengers who wished to ride only within the city limits. It was expressly provided in all present contracts that the interurban railways should not become competitors for city business.

A plan to have a line to be used expressly for the entrance of interurban railways was discussed, but later it was found that at least four such lines would be necessary and this was considered out of the question. Mr. Lang said that the local company received no benefit from the 3 cents to 3½ cents per passenger charged the interurban railways for using its lines.

On April 20, 1911, the subject of transfers between the cars of the local company and cars of the interurban companies was opened, but the talk soon reverted to regulation of interurban operation by the city. The Schreiber draft puts all interurban cars upon the same basis as city cars in respect to operation and fares. The requirement about free transfers between local and interurban cars had been incorporated since the original draft was submitted. Mr. Lang said that his company received a certain amount of each fare and that free transfers would prevent it from securing any more.

On April 21, 1911, it was agreed that attorneys for the city should examine the contracts with the interurban railways to give the administration a better understanding of the matter under discussion. Mr. Lang contended that the question of fares to be charged by interurban railways for city passenger service and the provision for the interchange of transfers should be eliminated from the franchise.

Mr. Lang and Attorney Fuller objected to the stipulation that the company should furnish a bond of \$500,000 as a guarantee that the company would perform its obligation under the franchise. Mayor Whitlock proposed to reduce this to \$100,000, but Mr. Lang insisted that \$50,000 would be sufficient.

Michigan United Railways Plans for Development

Having secured an entrance to Detroit some time ago, the Michigan United Railways is said to have concluded negotiations to complete a through passenger and express line between Detroit and Chicago by making the Kalamazoo, Lake Shore & Chicago Railway part of the Michigan United system. The Kalamazoo, Lake Shore & Chicago Railway is a steam road, known as the Fruit Belt Line, and extends from Kalamazoo to South Haven, a distance of 55 miles. It will be extended from South Haven to Benton Harbor, whence a line of steel steamers will connect it with Chicago with a two and one-half-hour service. The plan is to electrify the steam line at once and to continue it in operation until this work is completed. The distance between Benton Harbor and Chicago is 51 miles. Terminal and docking facilities have been arranged at Chicago. The running time between Detroit and Chicago will be about ten hours.

The system now covers the territory between Jackson and Kalamazoo and Jackson and Lansing. Within a short time the new line from Lansing to Owosso will be in operation

and as arrangements have been completed with the Detroit United Railway by which cars of the Michigan United Railways will be operated through Ann Arbor and Ypsilanti to Detroit the company will draw business from nearly all parts of the State. Limited cars will be run between Detroit and Benton Harbor to connect with the boats for Chicago. The express cars will be operated at night. The steam service on the extension will be replaced with the third-rail system.

The Kalamazoo-Jackson division of the Michigan United Railways is 68.4 miles long, 44 miles of which are operated by third-rail. The limited running time from Jackson to Kalamazoo is two hours and twenty minutes. The Jackson-Lansing division is 37 miles long, operated by third-rail, with limited running time of one hour and ten minutes. The Lansing-St. Johns trolley division is 20.5 miles long, all local trains, fifty-five minutes' running time. The Lansing-Owosso division, now very nearly completed, will be operated by the third-rail for the entire 36 miles.

Trade Journals Change Hands.—The Class Journal Company, which publishes the *Automobile* of New York, *Motor Age* of Chicago, *Automobile Trade Directory*, *Official Blue Book* and *Commercial Vehicle*, has been sold, for a consideration of more than \$1,000,000, to the United Publishers Company, New York, N. Y., which controls the *Dry Goods Economist* and the *Iron Age*.

Fender Tests in St. Louis.—The fender tests being conducted by the Board of Public Improvement of the city of St. Louis have been continued during the present week according to the schedule originally mapped out. The devices demonstrated during the week ended April 22 were the Parmenter wheel guard, the H-B universal life guard, the Berg folding fender and the Berg automatic wheel guard. It is expected that the tests will continue until about May 20.

Report of Committee of Cleveland Chamber of Commerce.—The special committee of the Cleveland Chamber of Commerce appointed to consider proposed changes in the Taylor grant is preparing its report. It is expected that the committee will pay special attention to the feature relating to security; that it will advise that this be made as strong as possible under the State laws, and that it will recommend that the city rate of fare be extended to Collinwood, which has been admitted to the city since the grant was made.

Meeting of Society for Promotion of Engineering Education.—The nineteenth annual meeting of the Society for the Promotion of Engineering Education will be held at Pittsburgh, Pa., on June 27, 28 and 29, 1911. The headquarters will be at the Carnegie Technical Schools. At the meeting special attention will be given to the reports of the committees on the teaching of mathematics to engineering students and entrance examinations for technical schools. Particulars regarding the meeting can be obtained from Prof. H. H. Norris, Cornell University, Ithaca, N. Y.

The Defeat of the Sammis Utilities Bill in Iowa.—J. U. Sammis, member of the State Senate of Iowa, has made the following statement in regard to the failure of the Legislature at the recent session to enact the public service bill introduced by him: "My public utilities bill was a creature of unfortunate circumstances. Several members of the Senate who would have voted for the bill were absent at the time it came up. The session was drawing to a close, and there was no time to postpone consideration. But the bill will be brought up again. It is not dead. Many members of the Senate who voted against it considered their decision more as an act to postpone action than as one to kill the bill."

LEGISLATION AFFECTING ELECTRIC RAILWAYS NEW JERSEY

The Legislature of New Jersey adjourned on April 21. The session was remarkable in that all of the reform measures urged by the Governor were enacted. The substitute utilities bill went through at the eleventh hour slightly amended. The principal feature of the measure is that it confers rate-making powers on the commission. Two of the members of the present commission are to be con-

tinued until their terms expire. Prof. W. M. Daniels succeeds F. H. Sommer, the third member. A digest of the new bill is published elsewhere in this issue. The annual appropriation for State expenses is \$6,636,885. The Hudson County subway bill, which provided for the construction of a subway under Hudson Boulevard, was defeated in the Assembly. The Assembly killed the bill to give governing bodies in municipalities the right to grant franchises to electric railways for indeterminate periods with the right to revoke on notice.

PENNSYLVANIA

The first public hearing on the new public service commission bill before the House Judiciary General Committee was held on April 19, 1911. Electric railways and water companies were represented. Among the representatives who argued for the electric railway interests were H. B. Gill, Philadelphia, who appeared for the American Railways Company; William H. Bedford, for unidentified corporate interests, including the Wilkes-Barre Railway Company, and Charles L. Bailey, for the Central Pennsylvania Traction Company. Attorney-General Bell argued for the bill. Mr. Gill declared that the bill was unfair because it would regulate all companies and not protect them adequately. Regulation and protection should go hand in hand, he said. The bill imposed obligations on holding companies that were not fair. The instance cited was that the commission could compel a holding company to take funds out of its treasury to equip and maintain a subsidiary company. Mr. Gill contended that the bill enlarged the scope of the law of negligence in that it surrounded the public carrier with innumerable regulations as to safety devices and conveniences, which, if not carried out by the companies, would render the company liable in damages. The bill should be so amended as to prevent increased liability. The clause referring to the right of appeal to the Dauphin County courts was declared unjust by the speaker in that it prevented the defendant companies from producing additional testimony when appearing before that court. The position of the commission in this instance would be one of a jury to review facts and render a verdict, and the appeal would only permit a review of the law. Attorney-General Bell explained that this provision was included in order to expedite business and reduce litigation. The appeal to the courts was purely optional and left to the companies the right to institute equity proceedings in any court and consequently would permit further testimony.

In a letter sent to Jesse K. Johnston at Charleroi, his home town, on April 16, 1911, the Governor expressed the opinion that the bill as presented meets the demands of the people. He said: "There is a pressing necessity for the regulating of public utilities or public service companies and the creation of a commission before which any resident of the State may file complaint against a public service corporation for violation of the law and to compel those companies to give such reasonable and satisfactory service as the public has a right to expect and which it was intended should be given when these companies were given privileges by charter rights."

The introduction of new bills was stopped on April 20, and thus far about 700 bills and resolutions have been reported to House committees, or less than one-half the total number introduced. Among the new bills introduced last week were these: To require street railways to remove tracks to center of highways in villages under penalty of \$25 for each day notice to do so is disregarded; to amend anti-railroad discrimination act so as to permit the granting of free transportation to members of the Legislature or other State employees when traveling on State business; to require railroads to fence in rights-of-way, maintain lights under all bridges and watchmen at all grade crossings; to enforce provisions of Section 5 of Article 17 of the Constitution, prohibiting railroads from engaging in mining or manufacturing. The penalty for violation is \$10,000 fine and imprisonment for not more than two years.

Governor Tener has signed the bill reorganizing the Bureau of Railways in the Internal Affairs Department and establishing the offices of chief and assistant chief of said bureau. Freeman C. Gerberich, of Dauphin, late assistant superintendent of the bureau, is made chief and one of the clerks will be made assistant chief.

Financial and Corporate

New York Stock and Money Markets

April 25, 1911.

Trading in Wall Street has shown activity but prices have declined. In to-day's market the entire list fell off, with United States Steel leading actively. Bond market transactions were in excess of daily totals for several weeks and a gain in prices was registered at the close. Money continues abundant and cheap. Quotations to-day were: Call, 2@2 $\frac{3}{8}$ per cent; ninety days, 2 $\frac{1}{2}$ @2 $\frac{3}{4}$ per cent.

Other Markets

Aside from a slight rally in traction issues during the early part of the week, the Philadelphia Exchange has shown no features of interest since last report. Prices have been irregular and trading dull.

In Chicago a limited amount of trading has been done, with price fluctuations prevalent throughout the week. Trading in tractions has been secondary and barring a fractional advance in South Side Elevated bonds the markets show little of interest.

The Boston Exchange has been fairly active since the middle of the week and to-day's market showed a strong undertone. Trading in tractions has been nominal. Interest has been centered chiefly in coppers.

Norfolk & Portsmouth Traction 5s showed substantial gains in the Baltimore market to-day and general trading has been the most active for some time, with prices firmer than for the earlier part of the week.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 18.	April 25
American Light & Traction Company (common).....	a287	a288
American Light & Traction Company (preferred)....	a106	a106
American Railways Company.....	a44 $\frac{1}{2}$	a44 $\frac{1}{2}$
Aurora, Elgin & Chicago Railroad (common).....	a44	a40
Aurora, Elgin & Chicago Railroad (preferred).....	a88	a86
Boston Elevated Railway.....	a128	127 $\frac{1}{2}$
Boston Suburban Electric Companies (common).....	a16	a15
Boston Suburban Electric Companies (preferred)....	71	72
Boston & Worcester Electric Companies (common)...	9 $\frac{1}{2}$	8
Boston & Worcester Electric Companies (preferred)...	44	a47
Brooklyn Rapid Transit Company.....	76 $\frac{1}{4}$	77 $\frac{1}{4}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s..	83 $\frac{3}{4}$	84
Capital Traction Company, Washington.....	*126 $\frac{1}{2}$	a126 $\frac{1}{2}$
Chicago City Railway.....	a190	a190
Chicago & Oak Park Elevated Railroad (common)....	3	3
Chicago & Oak Park Elevated Railroad (preferred)...	6	6
Chicago Railways, ptcping., ctf. 1.....	a90	a90
Chicago Railways, ptcping., ctf. 2.....	a23 $\frac{1}{2}$	a22 $\frac{1}{2}$
Chicago Railways, ptcping., ctf. 3.....	a9 $\frac{1}{2}$	a9
Chicago Railways, ptcping., ctf. 4.....	a5 $\frac{1}{2}$	a5 $\frac{1}{4}$
Cincinnati Street Railway.....	*130	a131
Cleveland Railway.....	a95 $\frac{1}{4}$	a97
Columbus Railway (common).....	*96	a96
Columbus Railway (preferred).....	*100	100
Consolidated Traction of New Jersey.....	a76 $\frac{1}{2}$	a76
Consolidated Traction of N. J., 5 per cent bonds....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	100	100
Detroit United Railway.....	71 $\frac{1}{2}$	a71
General Electric Company.....	150	151 $\frac{3}{4}$
Georgia Railway & Electric Company (common).....	a133	a132
Georgia Railway & Electric Company (preferred)....	a91	91
Interborough Metropolitan Company (common).....	17 $\frac{1}{2}$	18
Interborough Metropolitan Company (preferred)....	50 $\frac{3}{4}$	49 $\frac{1}{2}$
Interborough Metropolitan Company (4 $\frac{1}{2}$ s).....	78 $\frac{1}{2}$	78 $\frac{1}{2}$
Kansas City Railway & Light Company (common)....	21 $\frac{1}{4}$	a21
Kansas City Railway & Light Company (preferred)...	70	a70
Manhattan Railway.....	137	137
Massachusetts Electric Companies (common).....	a16 $\frac{1}{2}$	16 $\frac{1}{4}$
Massachusetts Electric Companies (preferred).....	a87	a87 $\frac{1}{2}$
Metropolitan West Side, Chicago (common).....	24	a24
Metropolitan West Side, Chicago (preferred).....	67	a68
Metropolitan Street Railway, New York.....	15	*15
Milwaukee Electric Railway & Light (preferred)....	110	110
North American Company.....	70 $\frac{3}{4}$	70 $\frac{1}{2}$
Northern Ohio Light & Traction Company.....	45	a44
Northwestern Elevated Railroad (common).....	a21 $\frac{1}{2}$	a21
Northwestern Elevated Railroad (preferred).....	a104	65
Philadelphia Company, Pittsburgh (common).....	a53	a53 $\frac{1}{4}$
Philadelphia Company, Pittsburgh (preferred).....	a43	a43
Philadelphia Rapid Transit Company.....	a16 $\frac{3}{4}$	a17 $\frac{1}{2}$
Philadelphia Traction Company.....	83 $\frac{3}{4}$	83 $\frac{3}{4}$
Public Service Corporation, 5% col. notes (1913)...	100 $\frac{1}{2}$	100 $\frac{1}{2}$
Public Service Corporation, ctf. s.....	a106	a106
Seattle Electric Company (common).....	a106	a107
Seattle Electric Company (preferred).....	a98	a98
South Side Elevated Railroad (Chicago).....	a71	*a71 $\frac{1}{2}$
Third Avenue Railroad, New York.....	a10	10 $\frac{1}{4}$
Toledo Railways & Light Company.....	a7 $\frac{1}{2}$	a8
Twin City Rapid Transit, Minneapolis (common)....	a108 $\frac{1}{2}$	a108 $\frac{1}{2}$
Union Traction Company, Philadelphia.....	a44 $\frac{1}{2}$	a45 $\frac{1}{2}$
United Rys. & Electric Company, Baltimore.....	18 $\frac{1}{4}$	a18 $\frac{1}{2}$
United Rys. Inv. Co. (common).....	42 $\frac{1}{2}$	a42
United Rys. Inv. Co. (preferred).....	72	a72
Washington Ry. & Electric Company (common).....	37	a35 $\frac{1}{2}$
Washington Ry. & Electric Company (preferred)....	89	a90
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	103	a103 $\frac{1}{2}$
Westinghouse Elec. & Mfg. Co.....	a66	a67
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a117	a117 $\frac{1}{2}$

aAsked. *Last sale.

Annual Report of the Twin City Rapid Transit Company

Revenues and expenses of the Twin City Rapid Transit Company for the calendar years 1910 and 1909 compare as follows:

	1910.	1909.
RECEIPTS.		
Revenue from transportation.....	\$7,481,696	\$6,924,656
Revenue from operation other than transportation...	49,952	45,119
Total operating revenue.....	\$7,531,648	\$6,969,775
EXPENSES.		
Maintenance of way and structure.....	\$315,766	\$256,989
Maintenance of equipment.....	373,065	345,753
Traffic expenses.....	49,414	41,834
Conducting transportation.....	2,323,577	2,038,577
General and miscellaneous expense.....	604,880	611,473
Total operating expense.....	\$3,667,702	\$3,294,626
Net revenue.....	\$3,863,946	\$3,675,149
Interest on debts and taxes.....	1,466,394	1,466,527
Surplus available for dividends and depreciation...	\$2,397,552	\$2,208,622
Dividends preferred stock.....	\$210,000	\$210,000
Dividends common stock.....	1,206,000	1,055,250
Total dividends.....	\$1,416,000	\$1,265,250
Surplus from operation.....	\$981,552	\$943,372
Appropriated for renewals.....	736,000	703,000
Income account, surplus.....	\$245,552	\$240,372
Percent total operating (including taxes and renewal appropriations) to total revenue.....	64.77	64.20

C. G. Goodrich, the president, says in part in the report:

"A comparison of the statement with that of the previous year shows an increase in gross earnings of 8.06 per cent, an increase in expense of operation of 11.32 per cent and an increase in net earnings of 5.13 per cent.

"The low stage of water in the Mississippi River during the year caused an abnormal increase in the operating expenses of approximately \$115,000, while an increase in trainmen's wages added \$30,000 more, making a total increase of \$145,000.

"The payments for dividends during the year were \$150,750 more than for 1909.

"The property of the company has been maintained at the usual high state of efficiency as evidenced by the actual charges for maintenance during the year, which have amounted to \$605,684, an increase of \$82,185 over the previous year.

"In addition to the above, there has been expended in renewals during the year and charged against the renewal funds \$483,826.42.

"To the renewal funds a direct appropriation from surplus of \$736,000 has been added, together with the interest on the invested renewal fund bonds amounting to \$58,000. The direct appropriation for the previous year was \$703,000 and the interest \$50,050, so that the total amount carried to the renewal funds for the past year exceeds that of the previous year by \$40,950. The renewal funds now stand at \$1,932,087, of which \$1,173,500 is invested in the 5 per cent consolidated bonds of the company.

"The amounts appropriated for maintenance and renewals for the past five years, with their percentage of gross earnings, are as follows:

Year.	Maintenance and Renewal.	Per Cent of Gross Earnings.
1906	\$917,253.34	16.25
1907	985,456.92	16.27
1908	1,070,475.56	16.73
1909	1,276,548.91	18.31
1910	1,399,684.34	18.58

"The surplus for the year, after providing for the large operating and maintenance charges, depreciation, taxes and increased dividends, amounts to \$245,552, an increase of \$5,179, or 2.16 per cent over last year.

"The insurance fund has been further increased during the year by the addition of \$28,501 and now stands at \$162,968, of which \$107,000 is invested in the 5 per cent consolidated bonds of the company and the balance is in cash.

"The expenditures during the year for new construction amounted to \$1,072,976.

"As shown above, the expenditures for new construction during the year amounted to \$1,072,976 and for renewals \$483,826, a total of \$1,556,802. This has been done without the sale of additional stock or bonds."

The number of revenue passengers carried in 1910 was 146,980,553 and the number of transfers redeemed was 48,813,577. The corresponding figures for 1909 were 135,729,811 and 44,124,296.

Richmond, Portsmouth and Norfolk Properties to Be Merged

The following official announcement has been made in regard to a plan to merge the Virginia Railway & Power Company, Richmond, Va., and the Norfolk & Portsmouth Traction Company, Norfolk, Va.:

"Announcement is made that an agreement has been reached between the interests controlling the Virginia Railway & Power Company and the Norfolk & Portsmouth Traction Company for the merger and consolidation of the Norfolk & Portsmouth Traction Company with the Virginia Railway & Power Company.

"The Virginia Railway & Power Company has outstanding \$4,500,000 par value of 5 per cent preferred stock, \$7,450,000 par value of common. The company has paid a dividend of 1½ per cent on preferred stock for the fiscal year ended June 30, 1910, and since has been paying 5 per cent on preferred stock, payable semi-annually.

"The Norfolk & Portsmouth Traction Company has outstanding \$3,000,000 of 5 per cent preferred and \$3,000,000 common. The company has been paying dividends on the preferred stock at the rate of 5 per cent per annum, payable quarterly since its issue in the early part of the year 1910.

"The combined properties are earning at the rate of approximately \$4,500,000 per annum gross and it is believed that by the consolidation of the properties considerable economy can be effected in the operation of the same, with increased efficiency of the same in the service rendered, and the result of the operation of all the properties under one management and control will be to the benefit of the holders of the securities of both companies and give a broader market for the securities of the consolidated companies.

"The stocks of the Virginia Railway & Power Company are now listed on the exchanges of New York, Philadelphia and Baltimore, and the stocks of the Norfolk & Portsmouth Traction Company are listed on the exchanges of Philadelphia and Baltimore.

"Details of the proposed consolidation, including basis of exchange of stocks, are being worked out and it is anticipated that the completed plan will be submitted to the board of directors and stockholders of the prospective companies for their action thereon in the near future.

"The present plan is to have the merger become effective July 1, 1911, since the fiscal years of both companies close on June 30."

Annual Report of the General Electric Company

Profits of the General Electric Company for the year ended Dec. 31, 1910, including \$78,651 from securities sold and \$2,198,099 from royalties, income from securities owned, etc., after deduction of all patent and general expenses, fixed charges and allowances for depreciation and losses, and writing off \$4,661,175 from factory plants were \$10,855,692. Dividends, including the payment of Jan. 14, 1911, were \$5,214,368, leaving a surplus of \$5,641,324. The surplus at the end of the previous fiscal year was \$17,381,382, making a total surplus on Dec. 31, 1910, of \$23,022,706.

C. A. Coffin, the president, states in his report to shareholders:

"The valuation at which the stocks and bonds owned by the company a year ago were then carried on its books has not been changed. While there has been an appreciation in value of some items therein, such increase is held in reserve to offset possible shrinkage in others.

"As was the case last year, liberal depreciations have been written off factory plants, a considerable part of the expenditures thereon having been for purposes other than those of actual production. In some of your company's shops there is still a considerable amount of idle facilities due to a lessened demand for certain articles of manufacture, while large expenditures have been necessary to provide for the production of other articles for which there has been an increased demand."

Total orders received for the year were \$71,182,391, as compared with \$54,360,562 in the preceding year, and were the largest for any year since the organization of the company.

J. R. Lovejoy, vice-president, says in part, in his report upon sales:

"The increased business this year came largely from our

many thousand established customers in small contracts and current orders, rather than from new enterprises requiring large amounts of electrical apparatus.

"Our high-voltage direct-current railway system has most satisfactorily fulfilled the requirements of interurban electric railways and steam railroad companies. The reliability of this system has been fully demonstrated by its continued successful operation on many electric and steam railways. A number of these railways have during the past year placed orders with us for additional equipments. Over 85,000 hp of our 1200-volt d.c. motor equipments are in service and on order.

"Our facilities for the manufacture of Curtis steam turbines have been taxed to the maximum during the past year. Increased facilities are being provided to meet the demand. Curtis steam turbines of our manufacture in excess of 2,600,000 hp are now installed and on order in the United States and abroad. Several turbine generators of a capacity of 27,000 hp each are now in process of manufacture for the Commonwealth Edison Company of Chicago and the New York Edison Company. The Curtis steam turbine, because of its high economy and low cost of maintenance, is replacing steam engines, thus effecting great savings in fuel and cost of operation. We have standardized a complete line of vertical and horizontal shaft Curtis turbines for operation with high, mixed and low-pressure steam for driving electric generators and for many other purposes.

"The outlook for the future is promising. The business of lighting and power companies is growing rapidly; electric railway companies are improving their service and extending their lines in keeping with the increased population. Steam railway companies are electrifying their shops, terminals and branch lines. The use of motors and other electrical appliances for industrial purposes is extending as their utility and value are more thoroughly understood and demonstrated."

Chicago (Ill.) Consolidated Traction Company.—Judge Grosscup in the United States Circuit Court at Chicago, Ill., has entered an order discharging John M. Roach, David R. Forgan and A. L. Drum as receivers of the Chicago Consolidated Traction Company and its subsidiary companies.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C.—Stockholders of the Columbia Electric Street Railway, Light & Power Company will vote on May 15, 1911, to increase the authorized stock of the company from \$1,600,000, consisting of \$1,000,000 of common stock and \$600,000 of 6 per cent cumulative preferred stock, to \$3,000,000, to be composed of \$2,000,000 of common stock and \$1,000,000 of preferred stock. At the same time the stockholders will vote to change the name of the company to the Columbia Railway, Gas & Electric Company.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—Judge Lacombe has authorized F. W. Whitridge, as receiver for the Dry Dock, East Broadway & Battery Railroad, to issue \$350,000 of 6 per cent gold certificates, the proceeds of which will be used to substitute electric battery cars for the present horse cars on the line.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—The Greenville, Spartanburg & Anderson Railway has been granted permission by the State of South Carolina to increase its capital stock from \$300,000 to \$4,000,000.

Metropolitan Street Railway, New York, N. Y.—The sale of the property of the Metropolitan Street Railway under foreclosure has been adjourned again, this time from April 20, 1911, to June 22, 1911, on account of the proceedings which are pending before the Public Service Commission of the First District of New York.

Second Avenue Railroad, New York, N. Y.—George W. Lynch, receiver for the Second Avenue Railroad, has applied to the Supreme Court for permission to spend \$27,306 in making connections in Fifty-ninth Street so as to permit the running of cars through Fifty-ninth Street and up First Avenue to 125th Street.

Southwestern Street Railway, Philadelphia, Pa.—At the sale of the property of the Southwestern Street Railway under foreclosure on April 21, 1911, the road was purchased by David Wallerstein for \$177,000 in the interest of the bondholders.

United Railways & Electric Company, Baltimore, Md.—Gross earnings of all lines of the United Railways & Electric Company for the year ended Dec. 31, 1910, were \$7,687,895, an increase of \$477,911, or 6.63 per cent over the preceding year. Operating expenses were \$3,601,896, an increase of \$240,024, or 7.14 per cent. Net earnings from operation were \$4,085,999 and other income was \$2,490, making total income of \$4,088,489. Fixed charges, taxes and sinking fund requirements amounted to \$2,861,635, leaving a balance of \$1,226,853, of which \$864,049 was credited to extraordinary expenditures. The final balance of \$362,804 was carried to the credit of profit and loss. President William A. House refers in his annual report to the substantial consummation of the plans for the rehabilitation of the property.

Dividends Declared

Cape Breton (N. S.) Electric Company, \$3, preferred; \$2, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 1¼ per cent, preferred.

Hartford & Springfield Street Railway, Warehouse Point, Conn., 3 per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Mexico (Mex.) Tramways, quarterly, 1¾ per cent.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Toledo, Bowling Green & Southern Traction Company, Bowling Green, Ohio, quarterly, 1¼ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

CAPE BRETON ELECTRIC COMPANY, LIMITED.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Jan. '11	\$27,443	\$14,811	\$12,631	\$6,132	\$6,499
1 " " '10	25,335	15,462	9,873	6,174	3,699
12 " " '11	328,118	169,536	158,582	73,793	84,788
12 " " '10	290,158	169,780	120,378	74,030	46,349

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.

1m., Feb. '11	\$75,263	\$45,727	\$29,536	\$30,174	†\$638
1 " " '10	64,260	45,144	19,116	29,794	†10,678
2 " " '11	156,068	93,995	62,073	59,894	2,179
2 " " '10	135,292	93,277	42,016	59,588	†17,572

EL PASO ELECTRIC COMPANY.

1m., Jan. '11	\$61,769	\$33,962	\$27,807	\$8,247	\$19,560
1 " " '10	57,958	29,489	28,469	8,633	19,836
12 " " '11	644,469	373,530	270,939	98,625	172,315
12 " " '10	607,404	359,310	248,094	98,955	149,139

JACKSONVILLE ELECTRIC COMPANY.

1m., Jan. '11	\$52,765	\$27,607	\$25,158	\$10,254	\$14,904
1 " " '10	46,880	24,976	21,904	9,223	12,681
12 " " '11	581,967	313,869	268,098	114,029	154,069
12 " " '10	495,722	271,950	223,772	112,690	111,082

KANSAS CITY RAILWAY & LIGHT COMPANY.

1m., Mar. '11	\$656,062	\$354,952	\$301,109	\$197,944	\$103,165
1 " " '10	622,555	347,084	275,472	174,893	100,578
10 " " '11	6,426,210	3,733,381	2,692,829	1,899,523	793,306
10 " " '10	5,961,714	3,354,467	2,607,247	1,718,458	888,789

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1m., Feb. '11	\$172,413	\$104,868	\$67,545	\$44,357	\$23,188
1 " " '10	146,207	92,513	53,693	43,292	10,402
2 " " '11	358,684	211,772	146,912	88,786	58,126
2 " " '10	311,151	187,014	124,137	86,583	37,554

NORTHERN TEXAS ELECTRIC COMPANY.

1m., Jan. '11	\$124,009	\$69,132	\$54,877	\$24,484	\$30,394
1 " " '10	105,849	61,134	44,715	18,190	26,526
12 " " '11	1,460,967	774,218	686,749	241,911	444,838
12 " " '10	1,276,463	699,326	577,137	205,145	371,991

PUGET SOUND ELECTRIC RAILWAY.

1m., Jan. '11	\$142,251	\$118,959	\$23,293	\$48,314	†\$25,022
1 " " '10	144,369	105,824	38,545	50,236	†11,691
12 " " '11	1,913,172	1,265,545	647,627	606,157	41,470
12 " " '10	1,890,607	1,257,971	632,636	576,230	56,406

TAMPA ELECTRIC COMPANY.

1m., Jan. '11	\$53,224	\$28,676	\$24,548	\$6,082	\$18,466
1 " " '10	53,361	30,309	23,051	4,566	18,485
12 " " '11	592,827	326,330	266,497	66,153	200,344
12 " " '10	598,685	346,449	252,237	56,025	196,212

Traffic and Transportation

Transfer Talks in Kansas City

The Metropolitan Street Railway, Kansas City, Mo., is using the backs of its transfers in a campaign of "messages" to its patrons. Perhaps the most important statement which the company has made in this way relates to the disposition which is made of each nickel in fare which the company receives. This statement follows:

"Adhering to the principle that it is far 'more blessed to give than to receive,' the Metropolitan's officials claim the company should be placed on a very high pinnacle. The following will show to every party who paid a nickel for transportation during the year ended Dec. 31, 1910, how that nickel was disbursed by the Metropolitan Street Railway.

"You pay 5 cents. It was paid out as follows:

Maintenance track, roadway and structures.....	.5860 ct.
Maintenance rolling stock and equipments.....	.4146 ct.
Car service (wages trainmen, etc.).....	1.2002 cts.
Motive power.....	.4123 ct.
Injuries and damages.....	.3412 ct.
Administration, insurance, etc.....	.1503 ct.
Taxes.....	.4119 ct.
Fixed charges.....	1.4270 cts.
Construction and equipment expenditures.....	.7898 ct.

Total expended..... 5.7333 cts.

"Above statement indicates that the company has expended 5.7333 cents for every 5 cents received from passengers."

Other recent paragraphs on transfers follow:

"Good nature divides our burdens and carries three-fourths of them. If the car is a bit crowded when everybody wants to go downtown or home at once, try to keep sweet. It always helps."

"Conductors and motormen have their troubles. They are instructed to treat you politely, and naturally prefer to do so. Be fair with them."

"Why not occupy the vacant space in the front part of the car, thus avoiding the crowd and the pushing when you want to get off?"

"There are natural discomforts when everybody wants to go home or downtown at once. All cities have them. To be grouchy about it only aggravates the trouble."

Albany-Rensselaer Fare Case Argued Before Court

The appeal of the Cohoes (N. Y.) Railway from the order of the Appellate Division affirming the determination of the Public Service Commission reducing the fare between Albany and Rensselaer on the company's cars from 6 cents to 5 cents was argued at Albany on April 24, 1911. The action was first brought before the Public Service Commission on a complaint against the railway made by Francis P. Lithgow, of Rensselaer, and a stay of execution of the lower court's order was granted pending the decision of the Court of Appeals.

Lewis E. Carr, for the company, argued that on April 29, 1895, the Albany Railway made a contract with the Albany & Greenbush Bridge Company to build a double railway track on the bridge, the railway company in return agreeing to keep and render each month an account of the number of passengers carried in its cars over the bridge, and during the continuance of the contract to pay 1 cent for each and every passenger so carried. The contract also provided that the railway should not charge more than 6 cents fare. On April 27, 1897, the city of Rensselaer granted the Albany Railway a franchise authorizing it to construct certain lines of street railway, with a 5-cent fare in Rensselaer and not to exceed 6 cents to the corner of Broadway and State Street, Albany. On March 22, 1905, the Cohoes Railway leased the street railroad in Rensselaer from the United Traction Company, which had succeeded to the properties and franchises of the Albany Railway on Dec. 30, 1899.

Mr. Carr contended that the relator in collecting 6 cents from each passenger in its cars crossing the bridge collected 5 cents for itself and 1 cent for the bridge company, acting as its agent for that purpose, and did not therefore violate the Barnes act of 1905, providing for a 5-cent fare, as is contended. The right of the Greenbush Bridge Company to charge tolls was not affected by the Barnes act, which was Chapter 358 of the Laws of 1905, and the act

did not confer a right on the passenger to cross the bridge without payment of toll. The fact that the Albany Southern Railway does not collect the extra cent from its passengers for the bridge toll did not in any way affect the right of the Cohoes Railway. Chapter 358, as construed by the Public Service Commission, Mr. Carr declared, was unconstitutional because it impaired the obligation of contracts and denied to the railroad company the equal protection of the laws. The law attempted to create a distinction between the United Traction Company in Rensselaer and Albany and street railways in the other cities of the State. It denies this railroad a right which every other one engaged in similar service is permitted to enjoy.

Ledyard P. Hale, counsel for the Public Service Commission, held that the people of the State had not delegated to any municipal corporation the right to exempt common carriers from regulation by law, nor the power to enter into contracts with them which so operate, and that the collection of 6 cents instead of 5 cents could not be justified as being the collection of 5 cents for "fare" and 1 cent for "toll." Mr. Hale contended that Chapter 358 was within the power of the Legislature. Under a familiar rule the construction of ordinances would not be considered as contracts forever binding upon the inhabitants of Rensselaer and the people of the State unless they must be; and if they must be so construed they were voidable at the volition of the Legislature. It seemed clear that the Legislature intended, as between the company and the public, to effect a reduction to 5 cents in the fare in question, to which no toll should be added.

The decision of the commission in regard to the fare between Albany and Rensselaer was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 3, 1910, page 1127, and a summary was published of the ruling of Commissioner Decker in the case.

Fare Complaint Against Schenectady Railway Dismissed

The Public Service Commission of the Second District of New York has dismissed the complaint of the Mayor of Schenectady against the Schenectady (N. Y.) Railway asking the commission to direct the company to sell six tickets for 25 cents as was the practice prior to March, 1909. The commission holds that it has no power to order the relief asked for by the complainant. In an opinion written by Chairman Stevens the commission states that the precise relief asked by the Mayor in his complaint is not that the maximum rate charged by the company shall be less than 5 cents, but that if a person shall buy six tickets at one time he shall get them at a less rate than the maximum for one trip. The power to fix a maximum rate does not include the power to fix a rate for which a number of tickets shall be sold in a block. The regular cash fare for one ride in Schenectady is 5 cents, and in the complaint before the commission it was not alleged that this rate is unreasonable. The powers of the commission in relation to the matter provide that it may determine reasonable rates, fares and charges to be observed and put in force as the maximum to be charged for the service to be performed. The company may upon its own motion establish a fare for a service less than the maximum directed by the commission provided that such action upon its part is not open to the charge of being discriminatory and the commission itself can determine nothing but the maximum charge for the service under consideration.

The complaint was dismissed without prejudice, however, to the filing of any other complaint by either the Mayor of the city or any resident of Schenectady as to the reasonableness of the 5-cent fare.

Subsequently a complaint was received from Charles C. Duryee, Mayor of Schenectady, directed against the rate of fare charged by the Schenectady Railway in that city. He alleges that the rate of 5 cents is excessive and unreasonable and that a maximum rate of 4 cents would return to the company ample revenues for the operation, maintenance and improvement of its property and service and render a reasonable profit upon the investment. The petition alleges that prior to March, 1909, the company was transporting many of its passengers for 4 1/6 cents per passenger, which rate yielded ample revenue, and that at this time it obtained many franchises from Schenectady upon the agreement, express or implied, that such rate

would be maintained, but that since March, 1909, the company has charged 5 cents for the transportation of passengers except for school children at certain hours of the day.

"Strap-Hanger" Ordinance Defined in Minneapolis

On April 21 Judge Willard, of the Federal District Court in Minneapolis, rendered a decision defining the "strap-hanger" ordinance recently passed by the Minneapolis City Council. This ordinance limits the number of passengers upon any car of the Twin City Rapid Transit Company to seventy-five and imposes a fine of not more than \$100 in each case where this limit is exceeded. It also provides that if a person should wish to board a car already containing seventy-five passengers he must be permitted to do so provided there is no other car within 300 ft.

Judge Willard held this ordinance valid, except that inter-urban cars crossing the city limits with more than seventy-five passengers would not be obliged to discharge the excess over the limiting number. He said, however, that the law plainly relieved the company from stopping cars at street corners when such cars had the legal number of passengers. The provision quoted above also relieved the company from penalties for a crowded car when there was no other car with less than the legal number of passengers within 300 ft. In extraordinary occasions where passengers overpowered the conductors and boarded cars the company also could not be held responsible. Briefly, then, an interpretation of the decision would seem to indicate that the legal limit need not be respected except when cars are closer together than 300 ft. Under such circumstances the conductor of every car having seventy-five passengers must be careful not to allow any more passengers to board his car unless the car immediately ahead and the car immediately behind him also have the legal number of passengers each.

On the same day Judge Willard also rendered a decision on the "extension" ordinance in Minneapolis in which the Council demanded that the company build 9 1/2 miles of new track. He held that the Council was within its rights in asking for these extensions, but that no penalty attached to the refusal of the company to build them.

Through Service Between Worcester and Providence.—The New England Investment & Security Company, Springfield, Mass., has decided to establish through service between Worcester and Providence, but the schedule has not yet been fully determined. The company now operates through cars between Springfield and Worcester, 59 miles, on hourly schedule, connecting at Worcester with through cars for Boston. With through service between Worcester and Providence there will be only one change in the 100-mile run between Boston and Springfield or Boston and Providence.

"Transit."—The Brooklyn (N. Y.) Rapid Transit Company has begun the publication of *Transit*, an eight-page monthly paper to be devoted to its interests. The first issue of the publication is dated April and is devoted exclusively to the company's plans for development. Like every other large city, Brooklyn is divided into sections the inhabitants of which may be likened to clans, each obsessed with the idea of its own importance. To carry home the idea of what is likely to happen unless all Brooklyn co-operates with the company it shows a map of Brooklyn being torn to pieces on account of the sectional selfishness which dominates the transit question. It asks if this is the way to boost Brooklyn. There is also a map which shows the rapid transit routes of the Brooklyn Rapid Transit system with proposed extensions in Brooklyn, Queens, Manhattan and Richmond, and a summary of what the company's offer means to residents of Brooklyn in the way of saving of time. The company says that the offer means an average saving to Brooklynites who are engaged in business in Manhattan of fifteen minutes a day in each direction. This indicates three hours saved in a week and 150 hours in a year. A detailed schedule is also published which gives the running time from Brooklyn points to Manhattan without change of cars. There is also a summary of opinions from prominent men of Brooklyn who indorse the plans of the company.

Personal Mention

Mr. H. C. Guiteau has resigned as general freight and passenger agent of the San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.

Mr. L. Paxson, who has been electrical engineer of the Evansville & Southern Indiana Traction Company, Evansville, Ind., for the last six years, has resigned.

Mr. L. Butler has been appointed electrical engineer of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to succeed Mr. L. Paxson, resigned.

Mr. J. C. Woodsome, who has been connected with the Stone & Webster properties in Dallas, Tex., has been appointed general manager of the Tampa (Fla.) Electric Company to succeed Mr. J. A. Trawick, resigned.

Prof. Winthrop Moore Daniels, who is connected with Princeton University, has been appointed a member of the Board of Public Utility Commissioners of New Jersey to succeed Mr. Frank H. Sommer, whose term of office has expired.

Mr. G. H. Dodge has become connected with the Northern Illinois Electric Railway, Amboy, Ill., in charge of construction and operation. Mr. Dodge was formerly acting superintendent of the Syracuse & South Bay Electric Railroad, Syracuse, N. Y.

Mr. Charles J. Munton, who has been connected with the Milwaukee Electric Railway & Light Company for twelve years, has been appointed general manager of the Toledo & Chicago Interurban Railway, Kendallville, Ind., to succeed J. McM. Smith, deceased.

Mr. W. T. Maddox, formerly superintendent of the Los Angeles & Redondo Railway, Redondo Beach, Cal., has been appointed superintendent of the south division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines in Los Angeles, to succeed Mr. Thomas McCaffery, resigned.

Mr. Herbert B. Flowers has been appointed assistant superintendent of the Pontiac division of the Detroit (Mich.) United Railway. Mr. John C. Clark has been appointed assistant superintendent of the Orchard Lake division of the company. Mr. Flowers was formerly assistant superintendent of the Orchard Lake division, in which capacity Mr. Clark succeeds him.

Mr. J. C. McPherson, formerly superintendent of the Los Angeles city lines of the Pacific Electric Railway and later assistant superintendent of the north division of the company, has been appointed superintendent of the north division to succeed Mr. J. B. Rowray, resigned. Mr. McPherson has been connected with the Huntington interests for the last thirteen years. Before going to California he was connected with the Santa Fé Company with headquarters at Albuquerque and Las Vegas, N. M.

Mr. J. B. Rowray has resigned as superintendent of the north division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines to become superintendent of the Northern Electric Railway, Chico, Cal., which operates 130 miles of road. Mr. Rowray recently had his jurisdiction with the consolidated electric railways at Los Angeles extended by the addition of the Glendale line and the Pasadena city line. Besides these lines Mr. Rowray had charge of the Mountain division, Glendora, Covina, Sierra Madre, El Molino, Pasadena Short Line, South Pasadena, Annandale, Oak Knoll and San Gabriel lines.

Mr. Thomas McCaffery has resigned as superintendent of the south division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines in Los Angeles to become manager of the Automatic Distributing Company, Los Angeles, Cal. Mr. McCaffery was appointed master of transportation of the Los Angeles division of the Pacific Electric Railway in 1907. Later he was made superintendent of transportation of the company and subsequently was made general superintendent of the Pacific Electric Railway and the Los Angeles Interurban Railway. Before becoming connected with the Pacific Electric Railway Mr. McCaffery was in the employ of the Southern Pacific Company for thirty years.

Mr. J. A. Trawick has resigned as general manager of the Tampa (Fla.) Electric Company, a Stone & Webster prop-

erty, to become connected with the Keokuk & Hamilton Water Power Company, which is building a dam across the Mississippi River between Keokuk, Ia., and Hamilton, Ill. The Keokuk & Hamilton Water Power Company is being financed by Stone & Webster and Mr. Trawick will be associated in his work with the company with Mr. Hugh L. Cooper, New York, N. Y., who is well known for his work in connection with the developments of the Electrical Development Company at Niagara, the McCall's Ferry Power Company, on the Susquehanna River, and the Great Western Power Company in California.

Mr. James Campbell, president of the North American Company, New York, N. Y., has been elected president of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, Milwaukee, Wis., to succeed Mr. John I. Beggs, resigned, who, as previously announced in the *ELECTRIC RAILWAY JOURNAL*, has been elected president of the St. Louis Car Company. Mr. Campbell is a resident of St. Louis, where he has been very prominent in banking and financial circles for many years. He began his career as a civil engineer. He has a large financial interest in the St. Louis & San Francisco Railroad and is first vice-president of the Union Electric Light & Power Company, St. Louis, Mo., and a director of the Laclede Gas Company, St. Louis, and the United Railways of St. Louis.

Col. E. C. Spring, who since October, 1910, has been assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa., in charge of traffic, has been appointed assistant to the president of the Philadelphia & Western Railway, Upper Darby, Pa. The Philadelphia & Western Railway is building a high-speed double-track extension from Strafford to Norristown and North Wales to connect with the Lehigh Valley Transit Company's line at the latter point and enable that company to run through cars from Allentown to the Sixty-ninth Street terminus of the elevated lines of the Philadelphia Rapid Transit Company. In his position as assistant to the president, Mr. Spring will have charge of the operation of the road and the construction of the extension. Mr. Spring will probably make his headquarters at Bryn Mawr or Villa Nova.

Mr. Edward M. Raver, for several years connected with the Ft. Wayne & Northern Indiana Traction Company as city superintendent in Ft. Wayne, Ind., has recently become connected with the Michigan United Railways as city superintendent at Jackson, Mich. Mr. Raver began his street railway career in 1892 as a motorman with the Ft. Wayne & Northern Indiana Traction Company in Logansport, Ind. He was made road officer of the company in 1902 and a short time later his jurisdiction was extended over the interurban division from Logansport to Wabash, Ind. In October, 1904, Mr. Raver was appointed division superintendent of the Ft. Wayne & Wabash Valley Traction Company's lines between Logansport, Peru and Wabash, and in May, 1907, he was transferred to the Ft. Wayne city division as superintendent, in which capacity he remained until April 10, 1911, when he resigned to accept the position of city superintendent at Jackson, Mich., with the Michigan United Railways.

Mr. William McClellan, vice-president of the Campion McClellan Company, New York, N. Y., has been appointed electrical engineer to the Public Service Commission of the Second District of the State of New York. Mr. McClellan is a graduate of the University of Pennsylvania and for a time was engineer in charge of construction with the Philadelphia Rapid Transit Company. In 1905 he came to New York City to become associated with Westinghouse, Church, Kerr & Company, and took an active part in the installation by that firm of the single-phase equipment on the Erie Railroad. He has always maintained an especial interest in electric railway work and has served as chairman of the railway committee of the American Institute of Electrical Engineers and is a member of the committee on the electrification of steam railroads of the New York Railroad Club. Mr. McClellan is also a director in the Automatic Train Stop Company and president of the McClellan-Lines Company, manufacturers.

Mr. James D. Mortimer, who was elected vice-president and secretary of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Com-

pany, Milwaukee, Wis., in February, 1910, and who has been acting as general manager of the company, has been elected to the position of general manager and will hereafter have the titles of vice-president, secretary and general manager. Mr. Mortimer was born in Elmhurst, Ill., and was educated at the Throop Polytechnic Institute, Pasadena, Cal., and at the University of California, from which he was graduated in 1900. After completing his college course Mr. Mortimer taught for more than a year and then entered the service of the Tacoma Railway & Power Company, Tacoma, Wash. When Stone & Webster, Boston, Mass., took over the Tacoma Railway & Power Company and the Puget Sound Electric Railway in 1903 Mr. Mortimer was retained as engineer. Mr. Mortimer became identified with the development of the property of the Telluride Power Company while Mr. James Campbell, president of the North American Company, was president of that company, and later he was elected first vice-president of the North American Company, which controls the railway and light properties in Milwaukee. Mr. Mortimer is also receiver of the Toledo & Chicago Interurban Railway, Kendallville, Ind.

Mr. John I. Beggs, retiring president and general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was tendered a farewell banquet at the Hotel Pfister, Milwaukee, Wis., on the evening of April 13, 1911, by the heads of the departments of the company. Mr. C. N. Rosencrantz on behalf of Mr. Beggs' associates in the company presented him with a bronze tablet "as a permanent testimonial of their appreciation and regard for him as a man, and as the chief executive of a great property, to the successful administration and upbuilding of which he has given the best years and work of his life." In response Mr. Beggs said that he would not take the tablet with him to St. Louis, but that he would install it at his country home near Oconomowoc, Wis., where his associates in Milwaukee who visited him there could see it. Among those present at the banquet were: Mr. F. V. Benz, chief clerk and purchasing agent; Mr. F. J. Boehn, assistant treasurer; Mr. C. J. Davidson, chief engineer; Mr. C. N. Duffy, comptroller; Mr. G. W. Kalweit, auditor; Mr. George Kummerlein, Jr., superintendent of transportation; Mr. H. A. Mullett, assistant superintendent of rolling stock; Mr. R. H. Pinkley, chief draftsman; Mr. O. M. Rau, chief electrician; Mr. M. S. Rausch, claim agent; Mr. H. A. Rogers, superintendent of the print shop; Mr. C. N. Rosecrantz, attorney, and Mr. F. G. Simmons, superintendent of way.

OBITUARY

Edward H. Wardwell, secretary of the Barrett Manufacturing Company, New York, N. Y., and the United States Gypsum Company and a director of the American Coal Products Company, died at his home in New York on April 22, 1911.

Henry M. Watson, a director of the International Railway, Buffalo, N. Y., and president of the Buffalo Street Railroad and the Buffalo East Side Street Railway before the organization of the International Railway, is dead. Mr. Watson was born in Unadilla, N. Y., on May 18, 1835. His first business connection was with the Albany & Susquehanna Railroad at Albany, N. Y. In 1868 he went to Buffalo and soon thereafter identified himself with the Buffalo Street Railway. Upon the death of S. V. R. Watson, who was president of that company, Mr. Watson succeeded him and held the position until 1899. In 1879 Mr. Watson organized the Bell Telephone Company, Buffalo, N. Y., and was made president of the company. He retained this position until the Bell Telephone Company of Buffalo was amalgamated with the New York Telephone Company about a year and a half ago. Mr. Watson was then made a director in the New York Telephone Company. While he was an officer of the street railways in Buffalo Mr. Watson took an active interest in the affairs of the American Street Railway Association and was president of the association in 1890-91, and a member of the executive committee in 1891-92.

Jacob Wendell, Jr., president of the Wendell & MacDuffie Company, New York, N. Y., died on April 22, 1911, of pneumonia. Mr. Wendell was graduated from Harvard University in 1891 and after leaving college entered the passenger department of the New York Central & Hudson

River Railroad. In 1896 he organized with Mr. R. L. MacDuffie, a Harvard graduate of 1890, the firm of Wendell & MacDuffie, dealers in electric railway supplies, and the firm was appointed the agent in New York of a number of well-known manufacturers. Although Mr. Wendell gave a great deal of attention to the affairs of this firm and made several trips abroad in its interests and to establish European offices, he found time to take an active part in amateur theatricals and was a member of the Comedy Club, the leading amateur dramatic club in New York. Through his courtesy performances by members of this club were given at several conventions of the American Electric Railway Association. Two years ago Mr. Wendell decided to become a professional actor and the firm of Wendell & MacDuffie was incorporated, Mr. Wendell becoming president of the company. He was invited to join the staff of the New Theater Stock Company, with which his rôles, particularly that of the dog in "The Blue Bird," met with great success. He was to have taken the leading part in a new play entitled "What the Doctor Ordered" at the Astor Theater April 21, but the production of the play has been postponed indefinitely on account of his untimely death. He was forty-two years of age, married and had four children.

John D. Keiley, electrical engineer of the New York Central & Hudson River Railroad, died of pneumonia at his residence in Yonkers, N. Y., on April 21. Mr. Keiley was the son of Major J. D. Keiley, member of the Board of Education of Brooklyn, and a director of the Brooklyn Rapid Transit Company. He was born Feb. 6, 1871. After graduation from St. Francis Xavier College of New York City he took a four years' scientific course at Johns Hopkins University, where he specialized in electrical engineering. Upon finishing this course in 1893 he engaged in civil engineering in South Carolina. In 1897 he entered the employ of the Brooklyn Rapid Transit Company and after a few months he was made assistant engineer. Subsequently he was transferred to the electrical engineering department and when train movement tests were inaugurated by the Brooklyn Heights Railroad he invented an instrument to record automatically the movement of the trains and simultaneously the readings of electrical instruments. This device was called by his associates the "Keileyograph," a name which it still bears. Later he was appointed assistant master mechanic of the company. When the electric traction commission of the New York Central Railroad was organized he became its assistant electrical engineer. His familiarity with civil, mechanical and electrical engineering and his high mathematical talents were of the greatest assistance to the commission, and in recognition of his services he was appointed electrical engineer in 1906. He developed many of the practical details of the New York Central type of under-contact third-rail, but his most valuable contribution to the art of electric railroading was probably the circuit-breaker house system of third-rail connection, which has been the means of reducing the investment in copper cables and of increasing the safety of electrically operated railways. In 1907 Mr. Keiley, collaborating with Prof. S. W. Ashe, brought out a book entitled "Electric Railways," which is largely used in technical colleges throughout the country. Mr. Keiley belonged to the Engineers', the Transportation and the New York Railroad clubs.

The Board of Utility Commissioners of New Jersey has been advised by the Attorney-General that it has power to require a street railway to provide and maintain a waiting room or shelter to be used by passengers at transfer junctions or connecting points. The Attorney-General, in his opinion, directs attention to the fact that the act defining the jurisdiction of the board declares that it shall have power, among other things, to require a public utility, as defined by the act, to furnish safe and adequate service. The Attorney-General comments on this as follows: "I think it may be fairly contended that a waiting room or shelter shed, under conditions suggested by the inquiry, is a part of the adequate and perhaps safe service which may be enforced by your board. The word 'adequate' in its common acceptance means equal or proportionate to requirements presented. What would be a reasonable exaction in any given case must depend upon the particular circumstances which are presented for your consideration."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Vincennes, North & South Traction Company, Vincennes, Ind.**—Incorporated in Indiana to build interurban railways in Indiana. Capital stock, \$100,000. Directors: E. D. Logsdon, B. M. Willoughby and J. M. House.

***Elizabeth, New Brunswick & Trenton Railroad, Newark, N. J.**—Incorporated in New Jersey to build an electric railway between Newark and Trenton. Capital stock, \$500,000. Officers are those of the Public Service Corporation. This railway will eventually be turned over to the Public Service Corporation.

***Pottstown & Phoenixville Railway, Pottstown, Pa.**—Application for a charter has been made in Pennsylvania by this company to build an electric railway from Spring City to Saratoga, via Royersford, thus connecting the Pottstown & Reading Street Railway and the Chester line extending from Spring City to Phoenixville. Incorporators: George N. Malsberger, Harry F. Swinehart, Pottstown, and C. Taylor Leland, Philadelphia.

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—Application for a charter has been made by this company in Tennessee to build a 30-mile railway between Nashville and Gallatin. Capital stock, \$750,000. Incorporators: H. H. Mayberry, John A. Pitts and R. W. McLemore. [E. R. J., Feb. 25, '11.]

FRANCHISES

Oakland, Cal.—The Oakland & Bay Shore Railway Company, allied with the Oakland & Antioch Railway Company, has asked for a fifty-year franchise to build on Shafter Avenue at Fortieth Street and along Shafter Avenue beyond Kieth Avenue. This line will form the connecting link between these lines. [E. R. J., Jan. 21, '11.]

Connecticut Company, New Haven, Conn.—This company will double-track its Bank Street line in Waterbury for almost its entire length, including a new double-track crossing, with connecting curves in Exchange Place.

Boise, Idaho.—The Boise Valley Railway, Boise, has received a franchise from the City Council to extend its tracks on Bannock Street in Boise.

***Bloomington, Ind.**—A survey is being made and franchises will soon be asked for building an electric railway to connect Bedford, Oolitic, Harrodsburg, Smithville, Sanders, Clear Creek and Bloomington.

Gary, Ind.—The Calumet United Railways, Indianapolis, has asked the Board of Public Works for a franchise to build its tracks in Gary. This is part of a plan to build an electric railway to connect Michigan City, Chesterton, Gary, Aetna, East Chicago and Hammond. James A. Slattery, Philadelphia, is interested. [E. R. J., April 22, '11.]

***Emporia, Kan.**—The City Council of Emporia recently granted a franchise to a company composed of men from Dayton, Ohio, to build an electric railway in Emporia, on condition that Judge Dennis Dwyer, Dayton, build the lines.

Louisville, Ky.—The Louisville Railway has asked the General Council for a twenty-year franchise to build a cross-town line in Louisville to connect the Twenty-eighth Street line at the West End and the Barret Avenue line at the East End.

Baltimore, Md.—The Towson & Cockeysville Electric Railway, Cockeysville, has received a franchise from the Highways Commission in Baltimore to build its railway from Towson to Cockeysville. [E. R. J., March 25, '11.]

Springfield, Mass.—The Springfield Street Railway has received permission from the Railway Commissioners to build an extension across the Ludlow Bridge over the Chicopee River, into Ludlow, and to build an extension in Palmer.

Worcester, Mass.—The Worcester Consolidated Street Railway has asked the City Council for a franchise to

build extensions and double-track three of its lines in Worcester.

Benton Harbor, Mich.—The Benton Harbor-St. Joe Railway & Light Company has received a thirty-year franchise from the City Council to extend its tracks in Benton Harbor and continue them to Dowagiac.

Wayzata, Minn.—The Electric Short Line Railroad, Minneapolis, has received a franchise from the Village Council to build its tracks in Wayzata. This line will connect Minneapolis, Medicine Lake and Wayzata. It has been built to a point midway between Medicine Lake and Parker Lake. Earle D. Luce, president. [E. R. J., Nov. 5, '10.]

Kansas City, Mo.—The Metropolitan Street Railway, Kansas City, has received a franchise from the City Council to extend its tracks over certain streets in Kansas City.

St. Louis, Mo.—The Southern Traction Company of Illinois, East St. Louis, has received a franchise from the City Council to operate its line into St. Louis over the Free Municipal Bridge and over downtown streets in St. Louis.

South Orange, N. J.—The Public Service Railway has received permission from the South Orange Township Committee to build connecting switches and crossovers on certain avenues in South Orange.

New York, N. Y.—The Union Railway, New York, has received a franchise from the Council to build an extension on St. Ann's Avenue, from 161st Street to the Southern Boulevard, in New York.

Westchester Street Railway, Mount Vernon, N. Y.—The Public Service Commission, Second District, has approved of the exercise of a franchise granted to the Westchester Street Railway by the Council of Harrison, Westchester County, for the extension of its lines in Underhill Avenue, in Harrison. This company will also reconstruct its Chester Hill line.

Dayton, Ohio.—The City Railway, Dayton, has again asked the City Council for a franchise to extend its Kammer Avenue line westwardly to Brooklyn Avenue and Hoover Avenue, in Dayton.

Erie, Pa.—The Buffalo & Lake Erie Traction Company has received a franchise from the City Council to build extensions and double-track several of its lines in Erie.

Phoenixville, Pa.—The Phoenixville, Valley Forge & Stafford Street Railway, Phoenixville, has received a franchise from the Council to extend its tracks on Nutts Avenue in Phoenixville.

Pittsburgh, Pa.—The Pittsburgh, Neville Island & Coraopolis Street Railways has asked the County Commissioners for permission to build a line on a portion of Narrow Run Road from Coraopolis to the Sewickley Bridge.

Cleburne, Tex.—Daniel Hewitt, representing the Cleburne Street Railway, has asked the City Council for a franchise to extend its lines in Cleburne.

Bismarck, Wash.—The Tacoma Railway & Light Company, Tacoma, has received a twenty-five-year franchise from the Council to extend its McKinley Avenue line in Bismarck.

Hoquiam, Wash.—The Gray's Harbor Railway & Light Company, Aberdeen, has received a franchise from the Council to build in Hoquiam.

***Wenatchee, Wash.**—Louis W. Pratt and Walter M. Harvey will ask the Municipal Council for a franchise to build an electric railway in Wenatchee. This is part of a plan to build a line through the Wenatchee Valley. Application will also be made to the Chelan County Commissioners to build outside the city in the county.

TRACK AND ROADWAY

Turlock Traction Company, Modesto, Cal.—The directors of this company have authorized the issuance of \$500,000 worth of bonds to be used for the construction of this 4-mile electric railway between Turlock and Denair. S. N. Griffith, Turlock is interested. [E. R. J., Apr. 15, '11.]

Pacific Electric Railway, Los Angeles, Cal.—This company will award contracts at once for building its 4½-mile extension from Fourth Street, Glendale, to Burbank. It has secured all rights-of-way for the line connecting Burbank and Los Angeles.

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—Contracts will be awarded by this company during the next two months for building 10 miles of single track. M. McIntyre, Napa, general superintendent.

Central California Traction Company, San Francisco, Cal.—This company will build an extension from Lodi to Woodbridge, a distance of about 2 miles.

***St. Petersburg, Fla.**—J. J. Farnsworth, Fort Lauderdale, is interested in a plan to build an electric railway from St. Petersburg to John's Pass, 7 miles.

***Twin Falls, Idaho.**—W. L. Cherry and associates are negotiating for the purchase of ties and rails for constructing an interurban railway from Twin Falls to Snake River Canyon. The line will be built this summer.

Chicago (Ill.) Railways.—This company is in the market for 1250 tons of girder rails.

Cincinnati, Madison & Western Traction Company, Indianapolis, Ind.—Bids will be received until May 30 by this company for building its 41-mile electric railway to connect Hanover, Madison, Scottsburg and Lexington. J. E. Greeley, Louisville, president. [E. R. J., April 1, '11.]

Gary & Southern Traction Company, Crown Point, Ind.—Work has been begun by this company on its extension from Gary to Crown Point. The company is building from the present terminal of the Gary & Interurban Railway on the Calumet River and will proceed southward.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—This company is planning to let contracts about May 20 for the 5-mile line from Hobart to Broadway, Gary, Ind. U. P. Hord, Aurora, president. [E. R. J., April 8, '11.]

South Bend, Richmond & Southeastern Traction Company, Richmond, Ind.—Preliminary surveys have been completed for building this 110-mile electric railway to connect Richmond, Union City, Brownsville, Brookville and Harrison. The line will follow the old Whitewater Canal from Brookville. The promoters state that there will be no difficulty in securing necessary capital. F. C. Charles and Charles W. Jordan are interested. [E. R. J., April 8, '11.]

Albia (Ia.) Interurban Railway.—Plans are being made by this company to extend its tracks to Buxton. Right-of-way have been secured and construction will begin as soon as the weather permits.

Iowa City (Ia.) Electric Railway.—This company will begin work at once building two extensions in Iowa City. One line will be extended to the City Park north of Iowa City, and another line will be built south to the Rock Island Station.

New Orleans Railway & Light Company, New Orleans, La.—This company has ordered 500 tons of rails from the Carnegie Steel Company.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company will place contracts during the next few months for building approximately 3½ miles of new track. Alfred S. Black, president.

Electric Short Line Railroad, Minneapolis, Minn.—Plans are being considered by this company for building a 120-mile extension from Minneapolis to Clara City. Frank E. Reed, Glencoe, secretary. [E. R. J., Nov. 5, '10.]

***Bismarck, Belleview Valley & Western Railway, Bismarck, Mo.**—Plans are being made by this company to build a 20-mile electric railway between Bismarck and Sunlight.

Morris County Traction Company, Morristown, N. J.—This company has begun work on Main Street near the Chatham line in Madison on the extension of its line from Morristown eastwardly through Convent, Madison, Chatham and Summit.

Catskill (N. Y.) Traction Company.—This company will begin at once making surveys and securing rights-of-way for building two extensions of its line. One will be from Catskill to Alsen and Cementon, and another from Leeds to Cairo.

New York & Queens County Railway, Long Island City, N. Y.—The New York & Queens County Railway is in the market for 600 tons of rails.

Interborough Rapid Transit Company, New York, N. Y.—This company has received bids on 80,000 tons of plates and shapes for widening the tracks and extending the lines of the Second, Third, Sixth and Ninth Avenue elevated roads. Deliveries are to start within three months of the contract and are to be completed within two years.

***Denver, N. C.**—Plans are being considered for building a 20-mile electric railway to connect Denver, Triangle, Lowesville and Mount Holly. Dr. H. N. Abernethy, chairman; R. E. Proctor, secretary. Others interested are W. C. Proctor, Denver; R. Nixon, Triangle, and I. C. Lowe, Lowesville.

Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, Ohio.—This company will double-track its line between North Baltimore, Ohio, and Toledo. New bridges will be built and complete rehabilitation of the road bed accomplished.

Western Ohio Railway, Lima, Ohio.—It is said that plans are being made by this company to build an 18-mile extension between Fremont and Port Clinton on the lake.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—A contract will be awarded by this company for building a new culvert at Mosier. The work will cost about \$10,000.

Oklahoma City (Okla.) Railway.—This company has arranged for a \$12,000,000 bond issue and extensions of its lines will be made from Oklahoma City to Guthrie, El Reno and Norman.

Oregon Electric Railway, Portland, Ore.—This company is having surveys made for extensions of its lines north and southwest of Albany.

***Chester, Concordville & West Chester Electric Railroad, Concordville, Pa.**—This company is being organized to build an electric railway to connect Chester, West Chester and Concordville. Joseph Shortlidge, Concordville, is interested.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—This company advises that it will begin construction about May 1 on its proposed 23-mile electric railway to connect Ephrata, Lincoln, Clay, Hopeland, Schaefferstown and Lebanon. Capital stock, authorized, \$450,000. Capital stock, issued, \$250,000. The company's power station and repair shops will be located at Ephrata. Officers: H. H. Singer, Ephrata, president; W. B. Horst, Schaefferstown, vice-president, and M. H. Shirk, Lincoln, secretary and treasurer. [E. R. J., Apr. 8, '11.]

Philadelphia & Western Railway, Philadelphia, Pa.—Stone & Webster, Boston, Mass., have been awarded the contract to complete the extension of this railway from Stafford to Norristown and North Wales, to connect with the lines of the Lehigh Valley Transit Company at the latter point. It is estimated that the cost of this line outside of damages for right-of-way will be \$2,000,000.

Tarentum, Brackenridge & Butler Street Railway, Tarentum, Pa.—Bids have been asked by this company for the construction of its line from Tarentum to Birdville. It will be extended eventually to Freeport. Surveys have been made and work will begin as soon as the weather permits. McKinstry Griffith, president. [E. R. J., April 8, '11.]

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—This company will award the contract within the next month for building its 13-mile electric railway between Waynesburg and Blacksville. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., Mar. 11, '11.]

Sioux Falls (S. D.) Traction Company.—Two extensions will be built by this company in Sioux Falls, one to the cemetery on the east and another to a new park on the west.

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—Within six weeks contracts will be awarded by this company for building its railway between Nashville and Gallatin. H. H. Mayberry is interested. [E. R. J., Feb. 25, '11.]

Utah Light & Railway Company, Salt Lake City, Utah.—This company is making arrangements for building several extensions in Salt Lake City.

Spokane (Wash.) Traction Company.—This company will begin work soon building extensions on North Madison Street and North Howard Street in Spokane. It expects to spend \$60,000 on construction work.

***American Undercurrent Company, Ellenboro, W. Va.**—This company is making plans for building an electric railway to connect Ellenboro, St. Mary's and Pennsboro. It will also build a power plant near Ellenboro.

SHOPS AND BUILDINGS

Connecticut Company, New Haven, Conn.—This company has begun the construction of its new car house on State Street and James Street, in New Haven. The Berlin Steel Company had the contract for the steel to be used in the construction. [E. R. J., Feb. 4, '11.]

Tampa (Fla.) Electric Company.—Stone & Webster Engineering Company, Boston, Mass., will at once proceed with the building of new car houses on block one, Toland subdivision, near the Hillsborough River, in Tampa. The cost is estimated to be about \$150,000. [E. R. J., Feb. 18, '11.]

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company is considering plans for building new car houses and repair shops in Ft. Wayne. Arthur H. Mohr, Ft. Wayne, secretary.

Wichita Railroad & Light Company, Wichita, Kan.—This company will build a car house and repair shop on Waco Avenue, between First Street and Second Street, in Wichita, in the near future. The cost is estimated to be about \$100,000.

Great Falls (Mont.) Street Railway.—This company will place contracts during the next few weeks for building a new car house and repair shops in Great Falls. The structure will be 88 ft. x 168 ft. E. I. Holland, Great Falls, general manager.

Piedmont & Northern Railway, Charlotte, N. C.—It is reported that this company is considering plans for building its car house and repair shops in Greenville, S. C.

Dayton & Troy Electric Railway, Dayton, Ohio.—It is reported that this company will build a new car house. The structure will be one-story, of concrete construction.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—This company is making plans for building a new car house and repair shop in Clarksburg. The structure will be 65 ft. x 200 ft., and will accommodate thirty cars on five tracks. The repair shop will be erected on one side of the car house, and will be 20 ft. x 80 ft. The buildings will be of brick and steel construction. James O. Watson, Fairmont, general manager.

POWER HOUSES AND SUBSTATIONS

Geary Street, Park & Ocean Railroad, San Francisco, Cal.—This company is considering plans for building a new power house at North Beach.

Escanaba (Mich.) Traction Company.—This company will construct a second power dam, and develop 2500 hp, on the Escanaba River.

Nebraska Transportation Company, Omaha, Neb.—It is reported that this company will build its new power house near Elk City, on the Platte River, capable of generating 21,000 hp. C. W. Baker, Omaha, president.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—This company has ordered one 400-kw rotary converter, transformers and switchboard from the General Electric Company.

Jamestown (N. Y.) Street Railway.—Work has been begun by this company on an addition to its power station at the end of West Eightieth Street, in Jamestown. The old portion of the power station will be razed and an up-to-date structure erected in its place.

Metropolitan Street Railway, New York, N. Y.—This company has ordered one 150-kw engine-driven generator from the General Electric Company for its Ninety-sixth Street power station in New York.

Dayton & Troy Electric Railway, Dayton, Ohio.—A joint power house for this company and the Oakwood Street Railway, Dayton, will be built at Tipp City. Work on the details will begin at once. The cost is estimated to be about \$150,000. R. A. Crume, Tippicanoe City, purchasing agent. [E. R. J., March 4, '11.]

Warren & Jamestown Street Railway, Warren, Pa.—The Warren Construction Company has begun the erection of a substation for this company in North Warren. A substation at Fentonville is also being built.

Columbia Electric Street Railway, Light & Power Company, Columbus, S. C.—This company has ordered, through J. G. White & Company, New York, one 2500-kw turbo-generator from the General Electric Company.

Manufactures & Supplies

ROLLING STOCK

Davenport & Muscatine Railway, Davenport, Ia., will purchase several new cars later in the year.

Lincoln Railway & Light Company, Lincoln, Ill., has ordered one double-truck closed car from the American Car Company.

Colorado Springs & Interurban Railway, Colorado Springs, Col., is building seven closed trailer cars in its own shops.

Second Avenue Railroad, New York, N. Y., has ordered ten double GE-216 motor equipments from the General Electric Company.

Lehigh Valley Transit Company, Allentown, Pa., is considering the purchase of ten cars. Details for this equipment have not yet been decided upon.

Marquette County Gas & Electric Company, Ishpeming, Mich., has purchased one set of Brill Eureka maximum traction trucks and two GE-80 motors.

New York, Westchester & Boston Railway, New York, N. Y., has ordered one gasoline electric equipment from the General Electric Company for use on a construction car.

Third Avenue Railroad, New York, N. Y., has ordered thirty-five double-motor equipments from the General Electric Company for use on the storage battery cars which it has ordered from The J. G. Brill Company.

Atlantic Coast Electric Railway, Asbury Park, N. J., has ordered three 28-ft. closed motor car bodies, mounted on 27 G-1 trucks, and three 15-seat open motor car bodies on No. 22 trucks, from The J. G. Brill Company.

Indianapolis, Crawfordsville & Western Railway, Indianapolis, Ind., noted in the ELECTRIC RAILWAY JOURNAL of April 8, 1911, as receiving bids for several new cars, has ordered four 35-ft. interurban cars from the Danville Car Company.

TRADE NOTES

American Electrical Works, Phillipsdale, R. I., has removed its New York office to 165 Broadway.

Pressed Steel Car Company, Pittsburgh, Pa., is improving its North Side Pittsburgh plant and installing additional equipment.

Under-Feed Stoker Company of America, Chicago, Ill., has moved its general offices to the eighteenth floor of the Harris Trust Building, Chicago, Ill.

Chicago Pneumatic Tool Company, Chicago, Ill., has enlarged its office in the Fisher Building, Chicago, by acquiring nearly the whole tenth floor.

Ackley Brake Company, New York, N. Y., has received second orders for Ackley brakes from Melbourne, Australia, and Wellington, New Zealand.

Joseph Dixon Crucible Company, Jersey City, N. J., has appointed Sherman Paris to succeed H. S. Snyder in the advertising department of the company.

Wendell & MacDuffie Company, New York, N. Y., in order to take care of increased business, has moved its offices to suite 1131 at 165 Broadway, New York.

American Car & Foundry Company, Wilmington, Del., will erect a steel and concrete structure in Wilmington to replace a frame building. Estimated cost is \$10,000.

John C. Dolph Company, Long Island City, N. Y., has moved its factory from 153 West Avenue, Long Island City, to 317 New Jersey Railroad Avenue, Newark, N. J.

D. P. Chase has resigned as superintendent of the New York Car Wheel Company, Buffalo, N. Y., to become secretary of the Albany Car Wheel Company, Albany, N. Y.

Walpole Rubber Company, Walpole, Mass., announces that E. C. Green has again become connected with the company as general purchasing agent of the consolidated Walpole companies.

Kennicott Company, Chicago, Ill., has moved its sales offices from the sixth to the fourth floor of the Corn Exchange Bank Building. The company will occupy about half of the entire floor.

Upson Nut Company, Cleveland, Ohio, has elected W. A. Hitchcock president of the company to succeed the late Andrew S. Upson. F. H. Rose, assistant treasurer of the company, will succeed Mr. Hitchcock as secretary.

Frank B. Hart, formerly sales manager of the Ohio Steel & Foundry Company, Lima, Ohio, has resigned and organized the firm of Hart, Doane & Hart, Rector Building, Chicago, Ill., dealers in railway and industrial supplies.

W. J. Oliver & Company, Raleigh, N. C., have been chartered with a capital stock of \$200,000 to build electric and steam railroads. Among the incorporators are: W. J. Oliver, Knoxville, Tenn.; Hayden Clement and Thomas J. Jerome, Salisbury.

Gulf & Rio Grande Construction Company, San Antonio, Tex., has been chartered to engage in the railway construction business. Capital stock is \$100,000. Among the incorporators are: A. W. Liliendahl, Robert P. Coom, Albert Tolle and K. Valentine.

Morgan T. Jones has resigned as president and inspecting engineer of the American Bureau of Inspection and Tests, Chicago, Ill., to engage in the same line of business under the title of Morgan T. Jones Company, with offices in the Monadnock Building, Chicago.

Republic Engineering & Construction Company, Columbus, Ohio, has been incorporated to construct electric and steam railways. Capital stock is \$75,000. The incorporators are: John W. Duffy, M. Crosswell, J. W. McPherson, Edwin S. Duffy and Alexander DeWitt.

Haskell & Barker Car Company, Michigan City, Ind., has acquired five city blocks adjacent to its present factory at Michigan City, on which it intends to build a plant for the manufacture of steel cars. The plant will cost \$1,250,000. The company now manufactures wood cars exclusively.

Spencer Construction & Equipment Company, Rockport, Ind., has been incorporated with an initial capital stock of \$25,000, to construct and equip electric and steam railroads, telephone and telegraph lines, bridges, power plants, etc. Among the directors are: Benjamin F. Hoffman, Robert S. Crowder, John G. Rinslid, Rockport; E. C. Cox and H. C. Watkins, Louisville, Ky.

Pressed Steel Car Company, Pittsburgh, Pa., has appointed John C. Anderson as mechanical engineer in the sales department of the company in New York, effective May 1, 1911. Mr. Anderson was formerly connected with Westinghouse, Church, Kerr & Company, New York, N. Y. He was graduated from the Sheffield Scientific School and has been connected with the Canadian Pacific Railroad and the Boston & Maine Railroad.

Union Steel Casting Company, Pittsburgh, Pa., at the annual meeting of the stockholders on April 18, 1911, authorized the increase in capital stock of the company from \$1,500,000 to \$2,500,000. The proceeds of the stock will be used to erect an addition on a site adjoining the ground recently purchased between the Allegheny River and the Allegheny Valley Railroad, the property being 527 ft. x 530 ft. The addition will double the capacity of the present plant.

F. N. Speller, metallurgical engineer of the National Tube Company, Pittsburgh, Pa., was to read a paper on locomotive boiler tubes on Friday evening, April 28, at the monthly meeting of the Pittsburgh Railway Club. In the afternoon the National Tube Company was to invite the members of the club to visit the Ellwood City plant, where they would have an opportunity to observe the manufacture of Shelby cold-drawn steel tubes and Shelby hot-rolled seamless steel tubes.

Boss Nut Company, Chicago, Ill., has arranged for the United States Steel Corporation to manufacture the Boss nuts at the Joliet, Ill., plant. J. A. McLean, formerly with the American Arch Company, New York, N. Y., has joined the sales department of the Boss Nut Company, with headquarters in Chicago. The Adreon Manufacturing Company, St. Louis, Mo., has been appointed Southwestern representative of the company. A branch office has been opened recently in the Candler Building, Atlanta, Ga.

United States Electric Company, New York, N. Y., has received orders from the Canadian Pacific Railroad for 255 Gill selectors, from the Seaboard Air Line for selectors

for seventy-four telephone stations and from the Atlantic Coast Line for eighty-eight stations. The Cincinnati, New Orleans & Texas Pacific Railway has completed the construction of a telephone train-dispatching circuit paralleled by a local message telephone circuit on its second district, which extends from Danville, Ky., to Oakdale, Tenn., 134 miles.

Power Specialty Company, New York, N. Y., has received orders from the following companies, among others, for Foster superheaters: Cleveland Electric Illuminating Company; Cleveland, Cincinnati, Chicago and St. Louis Railroad; Solvay Process Company; Milwaukee Electric Railway & Light Company; Winnipeg Electric Railway; New York, New Haven & Hartford Railroad at its Waterbury and Zylonite plants; Stone & Webster Engineering Corporation, in the plants of the Minneapolis General Electric Company; Jacksonville Electric Light Corporation, and the El Paso Electric Company, which will install a total of 45,060 hp in boilers. With one exception these contracts are all from previous users of Foster superheaters and in many cases the contracts represent from the fifth to the fifteenth repeat order.

William S. Turner, late Northwestern manager of W. S. Barstow & Company, has opened an office in the Spalding Building, Third and Washington Streets, Portland, as consulting engineer. Mr. Turner is prepared to furnish plans and specifications for electric railways, lighting and power plants, hydroelectric developments and power transmission systems, and will undertake the supervision of the construction of such systems. He will also make examinations and reports on existing or projected engineering works, estimates of the cost of construction and earning capacity and valuations of physical property. Mr. Turner is a member of the American Institute of Electrical Engineers and has had an active experience of twenty-five years as an electrical engineer in the United States and abroad. His biography was published in the issue of this paper for April 2, 1904.

ADVERTISING LITERATURE

Richard J. Flinn, West Roxbury, Mass., is mailing a circular descriptive of the Flinn differential steam trap.

MacGovern, Archer & Company, New York, N. Y., have issued a special list of engines, condensers, pumps and heaters which they have ready for immediate shipment.

Burton W. Mudge & Company, Chicago, Ill., are mailing a circular which describes and illustrates the Adams motor car. It also contains specifications for this type of car.

Bishop Gutta-Percha Company, New York, N. Y., has printed a 20-page booklet entitled "Econometrical Car Wiring," which discusses the merits of Paraxel insulated wire.

Reinforced Rail Joint Company, St. Louis, Mo., has issued a booklet which describes and illustrates the three types of Roach rail joints, viz., regular track joint, insulated joint and combination joint.

Ohio Brass Company, Mansfield, Ohio, has printed the "O-B Bulletin" for March-April, 1911, which contains among others the following articles: "Practical Talks on O-B Insulators," "Some Interesting Overhead Construction," "A New Live Adjustable Cross-Over" and "Tomlinson M. C. B. Car Coupler."

Sangamo Electric Company, Springfield, Ill., is distributing a 24-page bulletin describing the construction, principle of operation and application of its improved type H induction watt-hour meter. The illustrations, which show a radically new type of magnetic circuit, will be of particular interest to electrical engineers interested in alternating-current measurements.

General Electric Company, Schenectady, N. Y., has issued bulletins describing its type F oil switches. Bulletin No. 4821 deals with switches for use on circuits the voltage of which does not exceed 15,000, and No. 4823 refers to switches designed for voltages of from 22,000 to 110,000. Bulletin No. 4822 illustrates and describes the GE-98 railway motor which was designed to meet the demands of heavy city and suburban service, and is suitable for either two or four-motor equipments. The motor is rated at 50 hp. The publication contains dimension diagrams, characteristic curves, a table of schedule speeds and a form for a prospective customer to fill out and forward to the company when desiring further information on this motor.

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CONTENTS.

Atlantic City Selected for the Convention.....	775
The Location of the Heater Switch.....	775
The Continuity of Committee Work.....	776
Accidents on Open Cars.....	776
Mileage and Capital Investment of Electric and Steam Roads.....	776
Testing Interpole Shop Motors.....	777
Car Illumination.....	778
Legal Status of Free Transportation of Employees.....	779
Comparative Results of Twin City Rapid Transit Company.....	779
The Jersey City Yards and Shops of the Hudson & Manhattan Railroad.....	780
Committee on Electricity of the Maintenance of Way Association..	783
Single-phase Electrification of the London, Brighton & South Coast Railway.....	784
Electrification of the Kiruna-Riksgränsen Line of the Swedish Railways.....	788
Iron-Bar Overhead Construction on Brooklyn Bridge Loops.....	789
Light-Weight Cars, Their Construction and Operation.....	790
The Cause and Prevention of Accidents.....	790
Investigation and Care of Return Railway Circuits.....	793
Boiler Economy and the Application of Flue Gas Analysis.....	794
Sub-Committee Meeting of the Joint Committee on Engineering Accounting.....	795
Amount of Maximum Tender.....	796
Aluminum Wire for Field Coils.....	796
Chicago Subway Plans.....	797
Meeting of Southwestern Electrical & Gas Association.....	797
Metropolitan Street Railway Reorganization Plan.....	798
Instruction Room for Berlin Motormen.....	799
Pittsburgh Meeting of Committee on Equipment.....	800
Atlantic City for the 1911 Convention.....	803
Motor-Driven Machine for Cleaning Screens.....	804
Rapid Finishing of Trolley Wheels.....	805
Paper on Low-Pressure Turbines.....	805
10,000-kva Water-Cooled Transformers.....	805
Automatic Switch for Emergency Car Lighting.....	806
Car Watt-Hour Meters with Mercury Flotation.....	806
Gas-Electric Car for Buffalo, Rochester & Pittsburgh Railway.....	807
Electric Railway Legal Decisions.....	808
News of Electric Railways.....	810
Financial and Corporate.....	815
Traffic and Transportation.....	819
Personal Mention.....	820
Construction News.....	822
Manufactures and Supplies.....	825

Atlantic City Selected for the Convention

The question of the place of meeting for the 1911 convention of the American Electric Railway Association was settled this week by the choice of Atlantic City. This decision was not reached, however, until a very great effort had been made to find a Western city which was able to provide the facilities required by the association. A careful examination of the hotel situation in the principal cities in the West disclosed the fact that Chicago was the only city which was able in this respect to care for the convention, but that Chicago was not available because the Coliseum, the only building capable of housing the exhibits, had been rented for other purposes from Sept. 12, 1911, to Dec. 1, 1911. As readers of this paper know, we have advocated the choice of a city in the Central West this year if any city could be found which would be able to furnish reasonable accommodations in the way of hotel and exhibit facilities, but the choice of Chicago would have meant either the abandonment of an exhibit or the selection of a date for the convention prior to Sept. 12 or after Dec. 1. The committee was not willing to adopt either of these alternatives, and, as Atlantic City was the most desirable convention location in the East, reluctantly decided in its favor. We believe that this conclusion was adopted wisely. Atlantic City is able to provide all the requisites of a successful convention and will be able to accommodate the association this year even better than before, because another hotel, the enlarged Dennis, will be open this year. Moreover, the Atlantic City hotel management has agreed to provide 100 more rooms with baths than last year and better meeting halls than last year for the Engineering and Accountants' associations. The time selected for the convention is from Oct. 9 to Oct. 13. This date is the usual one, being the second week in October. It is announced, however, that the committee will secure an option for the use of the Coliseum in Chicago during October, 1912. We believe that the majority of the members of the association will be sorry that the meeting will not be in Chicago this year, but will recognize that the choice of Atlantic City was the only course for the committee to take. There is nothing to prevent the association from holding a very successful convention there, and undoubtedly in the future there will be many years when the association will wish to meet there again. It seemed to many that this year was a good time to visit the Central West, but next year will probably be just as good.

The Location of the Heater Switch

One of the details which is sometimes lost sight of in car equipment is the convenient location of the heater switch. Frequently this switch is placed under one of the seats or on the

seat riser. Where this is the case the switch is not adjusted as frequently as it should be, because the conductor does not like to disturb the passenger who is sitting over or near the switch. On interurban cars, of course, the heater switch can be located in the motorman's cabinet and changes in its position can be signaled to the motorman by the conductor if it is inconvenient for him to go through the car. On city cars the heater switch should be located on some part of the bulkhead within easy reach of the conductor. To avoid meddling by passengers the switch should be operated by a conductor's key only. There is little doubt that by making the switch accessible for frequent adjustment an appreciable saving in heating current will be made possible.

The Continuity of Committee Work

A very good feature of the work of the joint committee on engineering accounting of the Engineering and Accounting Associations has been the appointment of a sub-committee "on review of the 1910 report." This should result in a better utilization of the work done by committees than has always been the case in the past. Too often an association's committee has rendered a good report at a convention at which comments of a valuable character have been elicited during the discussion of the report, but the conclusions thus reached have been lost to sight in the rush of work of the following year. What has been needed has been some action by which the report itself and the points brought out in the discussion should be rounded out and associated logically with the work of the committee of the following year on the same subject. The duties of the sub-committee just appointed on engineering accounting, however, are broader than that simply of reviewing the 1910 report, because the sub-committee will also make a study of the reports of all previous committees on the same subject and of discussions at the convention and after the convention. In this particular case, for instance, such work will include also the papers and discussion at the quarterly meeting on Dec. 7, 1910, of the Street Railway Association of the State of New York, as well as letters from men who have been considering the subject independently. A digest made in this spirit of thoroughness is most encouraging evidence that the final report of this committee will embody the best thoughts obtainable on engineering accounting, no matter where they originated.

Accidents on Open Cars

As the season for open cars is here it is well to be forewarned as to the greater liability of accidents with this type of equipment. Just how much greater is the danger on open cars than on other types of cars is strikingly shown in the paper by C. W. Kellogg, Jr., on "The Cause and Prevention of Accidents" which is printed elsewhere in this issue. The records of five Texas roads which he quotes showed that 59 per cent more accidents per 10,000 car miles operated occurred with open cars than with closed and semi-convertible prepayment type cars. It is true, of course, that open cars have large carrying capacity and may be loaded and unloaded quickly, which makes them particularly useful in handling large crowds at baseball games and amusement parks, but the much greater liability to accidents is the price paid for these advantages. No conductor can guard the entire length of the running board, especially when it is crowded two and three deep, nor can he prevent passengers on the inside seats from sticking out their heads and arms and being struck by poles or passing cars and teams. The open

car is not so popular as it once was. Our records of cars built during 1909 and 1910 show that only 454 open cars were built for city service during these two years, as compared with 5554 closed and semi-convertible cars. The cross-seat semi-convertible car is almost as comfortable as the open car for summer riding, and when combined with the prepayment feature is far safer.

MILEAGE AND CAPITAL INVESTMENT OF ELECTRIC AND STEAM ROADS

The desirability of strengthening the borrowing capacity of steam railroads was advanced as an argument in the cases in which the Interstate Commerce Commission denied recently the desired advances in freight rates. As the position of the companies in general is one with which our readers are perfectly familiar, it is not necessary to say more than that, in brief, the railways urged that they be allowed to charge higher rates and thus be able to earn a reasonable return and, in addition, such surplus as would provide them with a physical and financial strength that would attract capital. As some aspects of the steam railway case are analogous to the prevailing conditions in the entire electric railway industry and, furthermore, as they are intimately associated with the interurban situation, some analysis thereof is fruitful.

Upon the question of money borrowed the commission states in one decision, written by Commissioner Lane, that the total bonded debt of the steam lines increased, during the ten years 1899-1909, from \$5,518,943,172 to \$9,801,590,390, or 77 per cent, and the miles of track from 244,820 to 332,955, or 36 per cent. To demonstrate the immensity of the increase in funded debt the commission compared this sum with historical amounts. It also showed that the rate of interest on the total decreased from 4.55 per cent in the earlier year to 3.9 per cent ten years afterward. It may be added that, according to the annual reports of the commission, the stock of these companies was increased in the same period from \$5,512,063,578 to \$7,576,335,321, or 37 per cent. Combining the stock and bond capitalization we find that the increase in securities of both classes during this period was 58 per cent, and these figures do not show as great a discrepancy with the increase in mileage as those which the commission places in juxtaposition. It appears, moreover, that a good part of the new investment went toward the improvement of existing roads and terminals, with equipment therefor. That is to say, the steam railroads built up their existing properties to a greater extent than they built new lines. The reasons for this are found in part in the definite policy of some companies to develop main lines and avoid the construction of branches of doubtful profitability and in part in the civic and corporate need for better terminals.

Whatever may have been the reasons in individual cases, the final result is somewhat at variance with the corresponding development in railways of the street and interurban types now generally operated by electricity. The record of American street railway investments shows outstanding stock of these companies in 1899 of \$991,012,762 and in 1909 of \$2,427,935,397, an increase of 145 per cent. Funded debt increased from \$782,963,471 in 1899 to \$2,224,800,236 in 1909, or 184 per cent. The increase in total capitalization was 162 per cent. In the same period miles of track increased from 18,942 miles to 40,490 miles, or 114 per cent. As these returns show

greater proportionate development than the records of the steam properties, it is well to mention the primary cause, namely, the application of electricity to many existing and new properties and the upbuilding of outlying urban and suburban territory which rapid transit made possible. A contributory cause is, of course, the rise of the interurban railway, which fills a gap that would otherwise be occupied in many instances by the branch line of a steam system. Much of the interurban construction was inexpensive in the first instance, and its development in the next decade will be more intensive in character than in the past and will involve probably greater proportionate increase in capital liability than in mileage.

Coming to the point mentioned by the commission in reference to the decline in the average rate of interest on bonded debt of steam railroads, we think that the significance of this does not lie just where it is placed by the public. One strong reason for the improved credit of the steam railroads is the resort by the companies with the best standing to issues of stock and convertible bonds for their capital needs, with the result that the margin of security behind the mortgage bonds has been protected and immeasurably improved. The stocks which have been issued at par in accordance with this policy have borne materially better returns than the 3.9 per cent mentioned as the average rate on outstanding bonds. Similarly, the convertible bonds, many of which bear $3\frac{1}{2}$ per cent or 4 per cent interest, derived their marketability not from the rate of return which they carried, but from the speculative possibilities of enhancement in value and subsequent exchange for a stock giving a higher rate of return.

Again, the outstanding securities of 1890 contained a much greater proportion of the 6 per cent and 7 per cent bonds issued in the earlier days of the companies than were outstanding a decade later. Practically no long-time bonds bearing interest at these high rates have been issued by these companies for many years. In their refunding operations, not only during the last decade, but also for some years preceding, all companies participated in the advantages arising from the world-wide decrease in the earning power of money, which was then in the full flush of its progress and encouraged great capital expansion. Some roads issued $3\frac{1}{2}$ per cent long-time bonds at better than par. Such securities rose for a time to about 110. In fact, one of the larger life insurance companies made a canvass about 1899 of banking sentiment throughout the country, and the consensus of the opinion which it found was that the interest rates in this country were descending permanently to the low level of those prevailing in Europe, and that therefore it could not figure with safety upon a return of over 3 per cent to $3\frac{1}{2}$ per cent for the next twenty years. Of course, this tendency has been checked by the unanticipated increase in gold production and by the panic of 1907 and its effects, and at the present time it appears to be wholly reversed.

There are no statistics of electric railways to indicate the average rate of interest in the decade. The rate of interest on bonds has not varied greatly from 5 per cent, but companies in good financial standing have secured better prices for their securities, and in the case of new or comparatively new properties bankers do not receive the same concessions that they asked five or ten years ago. Electric railway securities, where no tangles on account of limited-term franchises exist, have increased generally in public favor. They have not the same character of a market as the standard steam railway securi-

ties, because they are limited to amounts much smaller than the general mortgages of the steam properties. Hence their purchase and sale are restricted more closely to the localities in which the properties are situated and do not reach the large amounts which characterize trading in the active securities of the trunk lines. The best basis for advancement of electric railway credit is the continuation of increases in gross revenues year in and year out in most properties. If all limited-term franchise complications and other adverse conditions, such as agitation for reduced fares, could be eliminated further improvement in the credit of the companies would follow.

It is a curious fact that both classes of railways appear to have fostered internal development of their existing plants rather more seriously than they have spread into new territory with extensions. In the great cities intensive development, through the construction of rapid transit facilities, is the order of the day, and the everlasting costly extension of the fare limit is less popular than it was, while interurban lines are paying more attention than they did to the vital questions of terminal facilities and increased investment to increase safety of operation. It will be interesting to see what increases of capital investment these changes will involve in the future and how they will compare with the additions to the older class of transportation properties.

TESTING INTERPOLE SHOP MOTORS

The increasing use of motors of the interpole type in the driving of machine tools is certain to exert a considerable influence upon electric railway shop practice in the near future. The advantages of interpole construction are well known to be the close speed regulation permitted; sparkless commutation over a wide range of loads, including a large overload capacity; low commutator temperatures resulting from the absence of sparking, leading to long life in the commutator structure; a considerable range of speed, and low weight and space occupied for a given output. These points are of direct interest in securing the maximum production from a given tool plant, combined with thoroughly reliable service and low maintenance requirements. In the movement for the use of direct-connected motors in electric railway shops, which is certain to result in the elimination of many expensive and inefficient existing tool drives, the interpole motor will inevitably become popular where variable speed is a vital issue—and how vital variable speed is to-day in shop economy remains to be much more generally appreciated.

Relying upon the reputation of certain manufacturers of wide experience in the production of interpole motors, the usual practice is still to install these equipments without special tests other than the placing of the apparatus in service as soon as it can be unboxed and the casual notation of its performance with respect to sparking. Sooner or later, however, companies which are interested in the finer points of operation will insist on making acceptance tests of motors for shop service through the economic necessity of saving time on repair and new construction jobs as well as cutting down the energy consumption to the minimum.

The important points in connection with the operation of interpole shop motors are the brush spacing, brush fit, brush position and the correctness of the winding. Sparkless commutation is absolutely dependent upon accurate brush spacing.

It is not common to find interpole motors giving bad commutation, but a small error in the machine work in the factory or a bad spot in the yoke casting may easily produce a lack of symmetry which will give no little trouble in service. In practice it has sometimes been necessary to correct poor commutation by placing one brush stud out of its normal mechanical spacing in order to locate the brush on the neutral point. Similarly, the brushes must be set and if necessary sand-papered to bear upon the whole commutator area beneath them, as in ordinary shunt or series-wound machines. Where adjustment of the neutral points is necessary fine regulation can be secured by the use of a shunt around the interpole coil directly concerned, and in cases where the interpole winding is slightly weak a minute shortening of the air gap by a shim or other polar adjustment has been found to work out well. The methods of testing polarity and correctness of windings of interpoles need not be repeated here, as they are those which have been utilized in ordinary motor testing for many years. Bad commutation quickly follows a partial short-circuit in an interpole winding, with excessive temperature rise in the defective coil if the machine is kept in service. The questions of heating, speed variation, efficiency and mechanical performance are all of interest in analyzing the operation of interpole motors, but the checking of the brush setting with relation to the determined neutral point is probably the most important question for consideration. This is a fundamental responsibility to the manufacturer, and it needs handling with great care by the purchaser, combined with close scrutiny of the commutation under changes in the loads placed upon a given motor.

CAR ILLUMINATION

We wish that in the study which is being made by car builders and operating companies of increasing the comfort of passengers on electric railway cars greater attention would be given to the subject of better illumination. By this we do not mean more illumination, because on most cars the lamps at normal voltage are bright enough—in fact, are so bright that they offer a glare which at times is uncomfortable to the eye. What we have in mind is a more extended application to electric car illumination of the principles of shaded or reflected light which have proved so successful in recent house lighting. At present car lighting is not carried out according to any generally accepted plan. But if a logical system should be followed we believe not only that the cars will be more comfortable for the passengers but that there will be a reduction in cost of lamps and energy.

In the first place, there seems to be no very good reason why electric railway companies should not make more extended use than they do at present of the metal filament lamp. A few companies are now employing these lamps to a greater or less extent, and an account of the practice of the Chicago Railways Company in this respect was published in the issue of this paper for Dec. 17, 1910. Considered on a basis of 1800 hours illumination per year, and with four circuits of five 16-cp lamps and one circuit of five 32-cp lamps, the tantalum lamps showed an energy saving of 1726 kw-hours per car at the switchboard, compared with carbon lamps of like candle-power, or practically 1 kw-hour per car less demand during the lamp-burning period. The energy demand

from a car burning twenty-five 16-cp tantalum lamps compared with a like installation of carbon lamps showed a saving of 1301 kw-hours at the switchboard for an 1800-hour year. It was found, also, that during a test covering 600 car months the renewals were about twice as frequent with carbon lamps as with tantalum lamps, the exact figures being 4.269 renewals per car month for carbon lamps and 2.21 renewals per car month for tantalum lamps. These results were not obtained by any sacrifice of the comfort of the passengers. On the contrary, the illumination of the car interior was even better than before.

The second direction in which improvement may be sought is in that of maintaining the full voltage at the lamp terminals, irrespective of the fluctuations on the trolley wire. There is more need for this change on interurban roads than on city roads. So long ago as 1907, in a paper before the Central Electric Railway Association, R. C. Taylor, then with the Indiana Union Traction Company and now with the Illinois Traction Company, suggested the great value of some form of potential regulator for car lamp circuits. Some experiments have been conducted along this line, but so far as we know no regulator of this kind has met with general favor or has been a very conspicuous success. Here is a hint for the inventor of electrical appliances.

The third part of the general problem which we are considering is that of the proper position and arrangement of the lamps. The illumination of a car interior is of itself no easy task, partly because of the large expanse of opaque surfaces presented by the windows and partly because regard has to be given to both standing and seated passengers. Nevertheless, some things can be done. We think, for instance, that it would be worth while to consider the use in some installations of shades, in spite of their maintenance cost and of the inconvenience which they would present in car cleaning. General illuminating practice has conclusively shown that a shade when properly chosen will greatly increase the illuminating efficiency of a lamp. This improved efficiency is obtained largely by the elimination of the bright sources of light, because the pupil of the eye contracts and does not permit so much light to enter as when the bare filaments are not within the range of vision. Shades also would greatly improve the light distribution, and this would be particularly noticeable when the voltage is low. Again, most railway lamps have a low end candle-power as compared with the horizontal candle-power. Usually lamps are installed at an angle rather than in a vertical or horizontal position, but the life of a lamp is greatest when its axis is vertical, and this position also makes the application of a shade easiest. With a lamp depending from a short horizontal bracket and inclosed in a properly chosen shade the diffusion will be such that a plane at the level of the tops of the seats can be uniformly illuminated from lamps supported from the deck rails. A light-colored ceiling also increases the general illumination greatly.

The economies which have been mentioned would make possible the use of lower wattage lamps and so would reduce the power cost by a not inconsiderable amount. In addition, they would be of convenience to passengers because they would give better light to those who desired to read and they would not force the other passengers to look directly at bright sources of light.

LEGAL STATUS OF FREE TRANSPORTATION OF EMPLOYEES

In a few States the passage of employers' liability acts has changed radically the legal relations between employer and employee so far as accidents to the latter while engaged in their work are concerned, but in most parts of the country the liability of the employer for an accident to an employee is still that of the common law. Under such circumstances, it is sometimes difficult to determine when one employee begins to be the "fellow servant" of another employee and when he ceases to occupy that relation. An interesting case involving this point was decided March 14 in the Court of Appeals of West Virginia, where suit was brought against one of the Wheeling railway companies because of a collision which caused the death of one of the employees at the power station, an ash hauler, who was riding on a car to his work. There was no question that if the man had been an ordinary passenger the company would have been liable because the collision occurred through the negligence of the motorman of one of the cars. But as he was riding "on his badge" and had not paid fare the question arose whether he was not, under the law, a fellow servant of the negligent employee who caused the accident.

The court admitted that the line drawn was close. Cases where brakemen, conductors or other trainmen are injured while engaged in train operation by the negligence of a fellow servant clearly fall under the fellow-servant doctrine, because these employees have to be on the trains to carry out the business for which they are employed. In other words, the danger of accident to them is one of the risks which they assume when they engage in railroad service.

A different state of affairs is presented when an employee other than a trainman is injured, and here there are also grades of responsibility. Perhaps the next step in the chain, after the liability to trainmen, is that to workmen engaged out on the line, like surveyors or carpenters who repair the fences along the right-of-way and travel on passes to the place of employment. Injuries to workmen of this kind have been considered differently in different States. In New York and Massachusetts in certain cases they have been held to come under the fellow-servant doctrine, but that is not the view which has been held by the courts in the majority of the States. There the position has been taken that the liability of the railroad company depends upon whether or not the injured person occupied the position of employee at the exact time of the injury and whether his contract of employment required him to ride upon the actual trains or cars on which he was when the accident occurred.

As this view of the subject was taken by the West Virginia court, it decided that an ash hauler or even a motorman is in no sense engaged in his employer's business when he uses the cars of the company in going to or returning from his day's work, and that his presence on a car is not in the direct line of his employment. Hence he must be regarded under the law as having all the rights of a passenger for hire. Whether the court would have decided differently if the employee had accepted his pass, or badge, with the understanding that the company would not be liable for personal injuries sustained by him when he was using the badge to secure free transportation on the cars of the company does not appear from the record. No evidence of any such agreement was presented, however, and the court said that it made no difference whether his badge or pass had been obtained by him gratuitously or not.

COMPARATIVE RESULTS OF TWIN CITY RAPID TRANSIT COMPANY

Comparison of the operations of the Twin City Rapid Transit Company for two years under the Interstate Commerce Commission classification of accounts is possible with the publication of the last annual report, an abstract of which was published in our last issue. The calendar years 1909 and 1910 are the first two full years of operation under the Interstate classification, and their results therefore permit an analysis which derives value from the use of the same accounting principles throughout the period. The company still continues the publication of the amounts charged to the general operating expense accounts, and its consistent example in this respect is one that all companies should follow.

The total operating revenue of \$7,531,649 in 1910 is divided between \$7,481,696, or 99.3 per cent, revenue from transportation and \$49,953, or 0.7 per cent, revenue from operation other than transportation. As compared with the preceding year the increase in total operating revenue was \$561,873, or 8.1 per cent.

There was a small change in the operating ratio, which, including taxes and renewal appropriations in the calculation, was 64.77 per cent in 1910 and 64.20 per cent in 1909, or, exclusive of those two items, was 48.7 per cent last year and 47.3 per cent in the preceding year. Of course the amounts appropriated for renewals were proper operating expense items so far as they represented depreciation of physical property which it was not necessary to make good in the current year. Though their actual expenditure was deferred, they amounted to 9.8 per cent and 10.1 per cent of total operating revenue in 1910 and 1909 respectively and, when considered in connection with the maintenance accounts, change materially the aspect of the upkeep expenditures of the year. The maintenance of way expenditures were \$316,766 in 1910, and the maintenance of equipment expenditures \$373,065. These are, respectively, 4.2 per cent and 5 per cent of the total operating revenue. They total 9.2 per cent of the revenue or, with the renewal appropriation from surplus, 19.3 per cent. In 1909 the maintenance of way costs were \$256,990 and those for maintenance of equipment were \$345,753, equal to 3.7 per cent and 5 per cent respectively of the total operating revenue for that year. The total 1909 maintenance expenses were thus equal to 8.7 per cent of the revenue, or with the renewal appropriations for that year to 18.8 per cent.

Taking the same expenditures in another way, we find that of the operating expenses of \$3,667,702 in 1910 the actual maintenance expenses were 18.8 per cent, or with the renewal appropriations 38.8 per cent. In 1909 the corresponding figures were 18.3 per cent and 39.6 per cent. It thus appears that neither in percentage of gross revenues nor in percentage of operating expenses was there much change in the proportionate maintenance expenditures of the two years.

Conducting transportation costs were \$2,323,577, or 30.9 per cent of total operating revenue, last year, as compared with 29.2 per cent in 1909. Traffic expenses were 0.7 per cent and 0.6 per cent respectively of the operating revenue in 1910 and 1909, and the corresponding ratios for general and miscellaneous expense were 8 per cent and 8.8 per cent.

The net revenue during the year increased \$118,797, or an increase of 5.13 per cent.

THE JERSEY CITY YARDS AND SHOPS OF THE HUDSON & MANHATTAN RAILROAD

BY HUGH HAZELTON, ELECTRICAL ENGINEER OF THE COMPANY

The storage yards and maintenance shops of the Hudson & Manhattan Railroad Company are located on the surface in Jersey City, near one of the tunnel lines. A plan of the yard and shops appears on the accompanying inset. The cars are brought up from the tunnel through an approach track at grades varying from 2 per cent on curves to $4\frac{1}{2}$ per cent on straight track. This approach track is covered by a reinforced concrete shed, extending from the portal to a point where the track passes through the shop building. The approach track ends in a half circle having a radius of 90 ft., and when the train has reached the surface it has made a complete revolution. The yard is laid out in such a manner as to provide the maximum storage capacity, and, although the property meas-

7 ft. 1 in. above the floor on a level with the floor of the cars. They serve instead of scaffolding for window cleaners and obviate the necessity of men climbing up and down from the floor of the inspection shed to the car floor. The third rail has been omitted from the inspection tracks, but a Coburn trolley, which is suspended near each side wall, serves to supply current for moving the cars through the shop. The inspection shed is built with a structural steel frame and reinforced concrete walls, floors and roof. At the center of the inspection shed a signal tower has been built from which all of the yard switches and signals are operated. From this elevation the towerman has a view of all the yard tracks.

PAINT SHOP

The paint shop accommodates six cars. At the entrance of one of the paint shop tracks a corrugated steel building is to be built to serve as a sand-blasting and washing house. The cars are thoroughly sand-blasted before they are painted and are then passed directly into the paint shop.



Hudson & Manhattan Railroad—View of Inspection Shed, Showing Suspended Walkways

ures only 200 ft. x 500 ft., this yard, with the shops, will accommodate 119 cars. The compact arrangement of the yard and shops tends to increase the efficiency of operation and to facilitate their management.

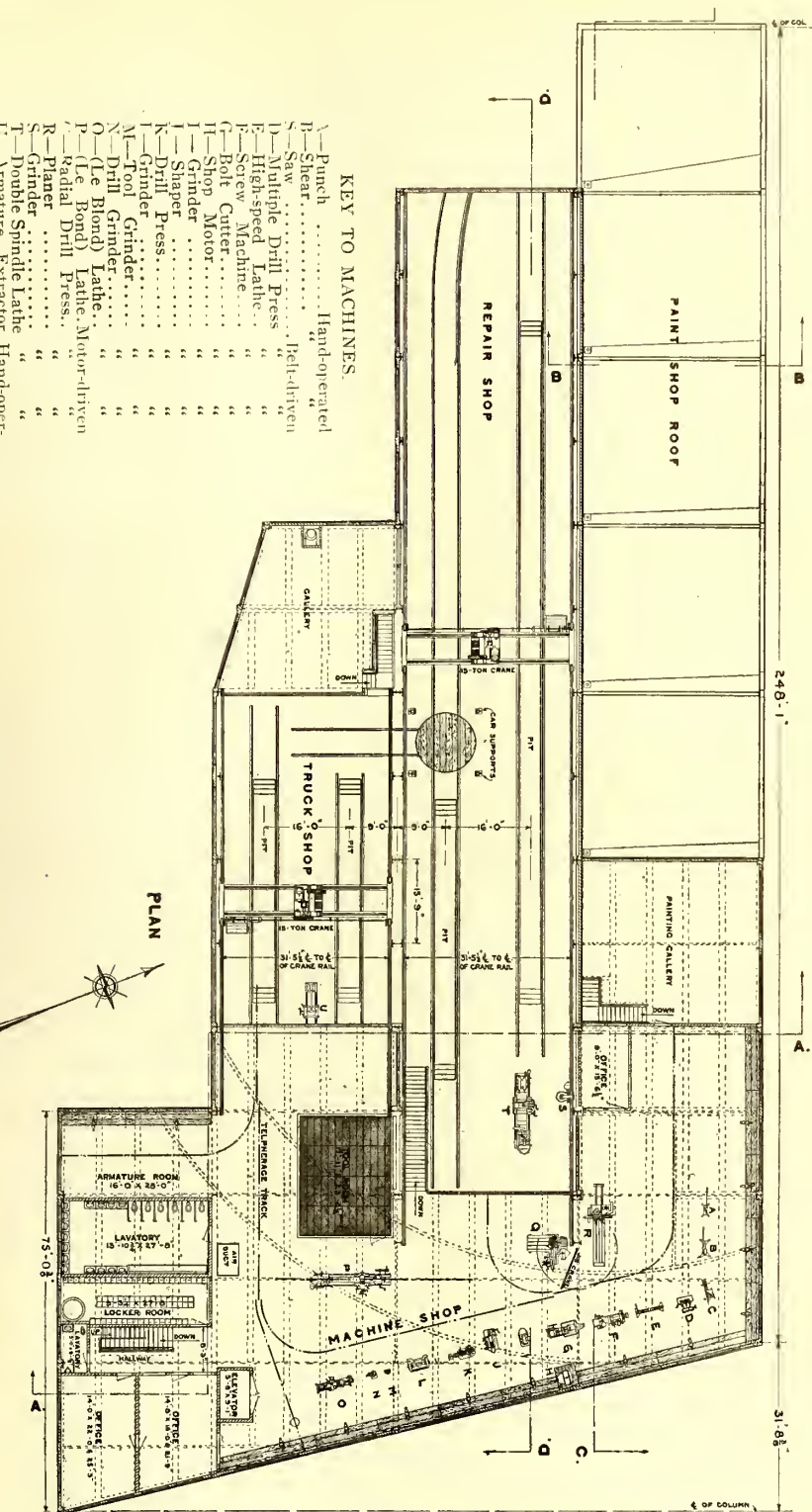
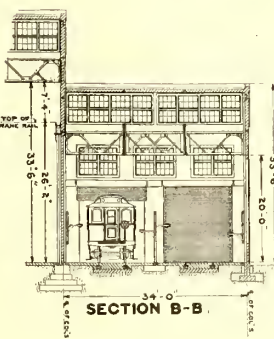
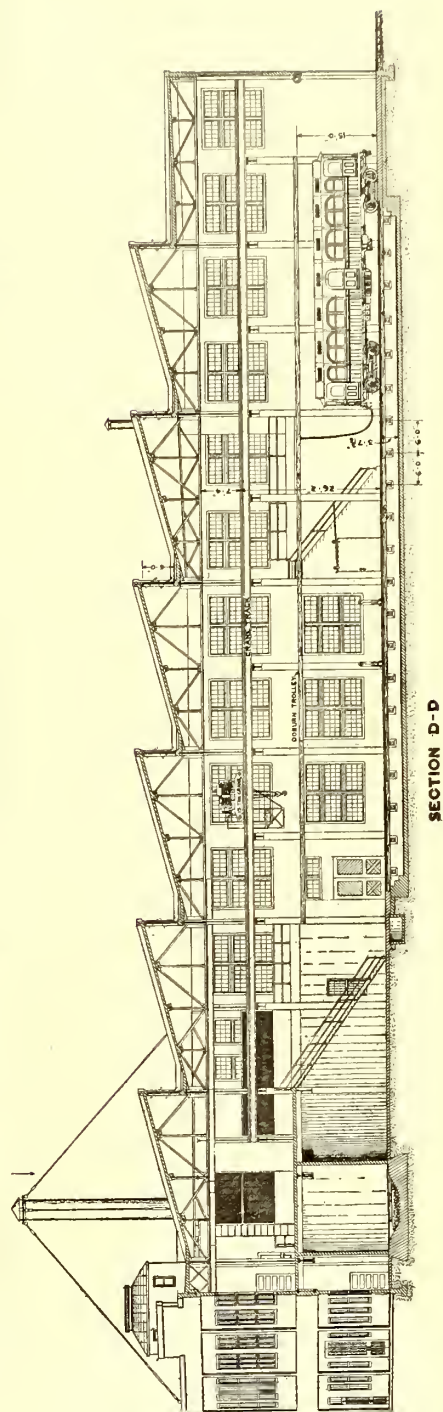
INSPECTION SHED

The inspection shed, which is 397 ft. long, contains the two longest tracks running diagonally through the center of the yard and accommodates sixteen cars, or two trains of eight cars each. The longest trains now operated are made up of five motor cars. The inspection tracks are connected at each end to the main tracks of the yard, so that trains can run in either direction through the inspection shed.

The inspection tracks are supported on concrete columns so that the top of the rails is 40 in. from the floor of the inspection shed. These columns are capped by wooden blocks to cushion the rails and to facilitate their attachment. Three suspended walkways are provided, one on each side wall and one in the center between the tracks. These walkways are

REPAIR AND MACHINE SHOPS

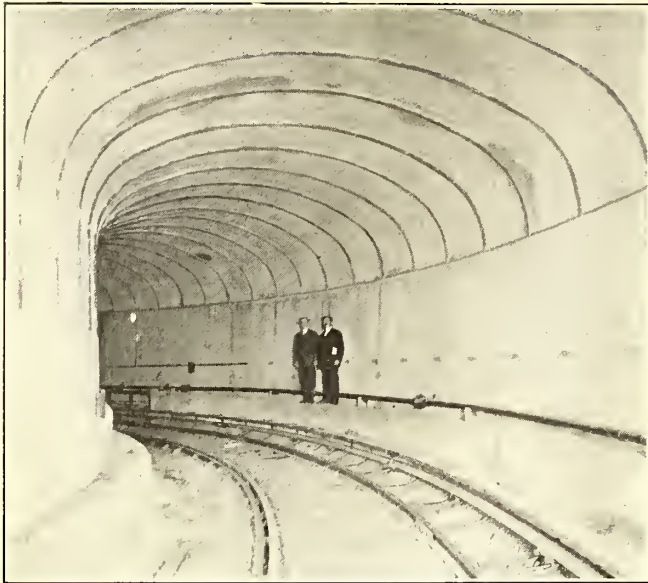
The repair shop is adjacent to the paint shop and has space for six cars. The 15-ton Whiting electric crane which is provided in this shop is of sufficient capacity to lift one end of the car body from the truck by means of a steel yoke, as illustrated. A turntable is provided for turning the trucks so that they can be transferred to the truck room adjacent to the repair shop. Car supports are provided at each side of the truck turntables to support the car body while the truck is being cleaned, thus allowing the crane to be used for other purposes. Both the truck shop and the repair shop are provided with pits having a depth of about 43 in. All of the heavy repair work is done on the ground floor of these shops. The lighter machine work is done on the second floor of the front portion of the building. The truck shop also has a 15-ton Whiting crane, so that material in each shop may be lifted from the floor to the machine shop level. A 5-ton electric telfer running throughout the machine shop serves to dis-



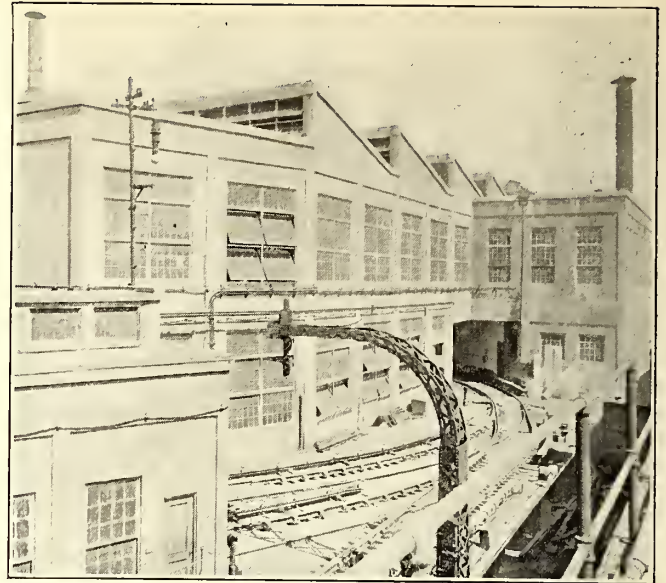
KEY TO MACHINES.

- P—Punch.....Hand-operated
- S—Saw.....Hand-operated
- M—Multiple Drill Press.....Belt-driven
- H—High-speed Lathe.....“
- S—Screw Machine.....“
- C—Roll Cutter.....“
- M—Motor.....“
- G—Grinder.....“
- S—Shaper.....“
- D—Drill Press.....“
- G—Grinder.....“
- N—Tool Grinder.....“
- O—Die Grinder.....“
- P—Die Grinder.....“
- R—Radial Drill Press.....“
- G—Grinder.....“
- T—Double Spindle Lathe.....“
- E—Armature Extractor.....Hand-operated.

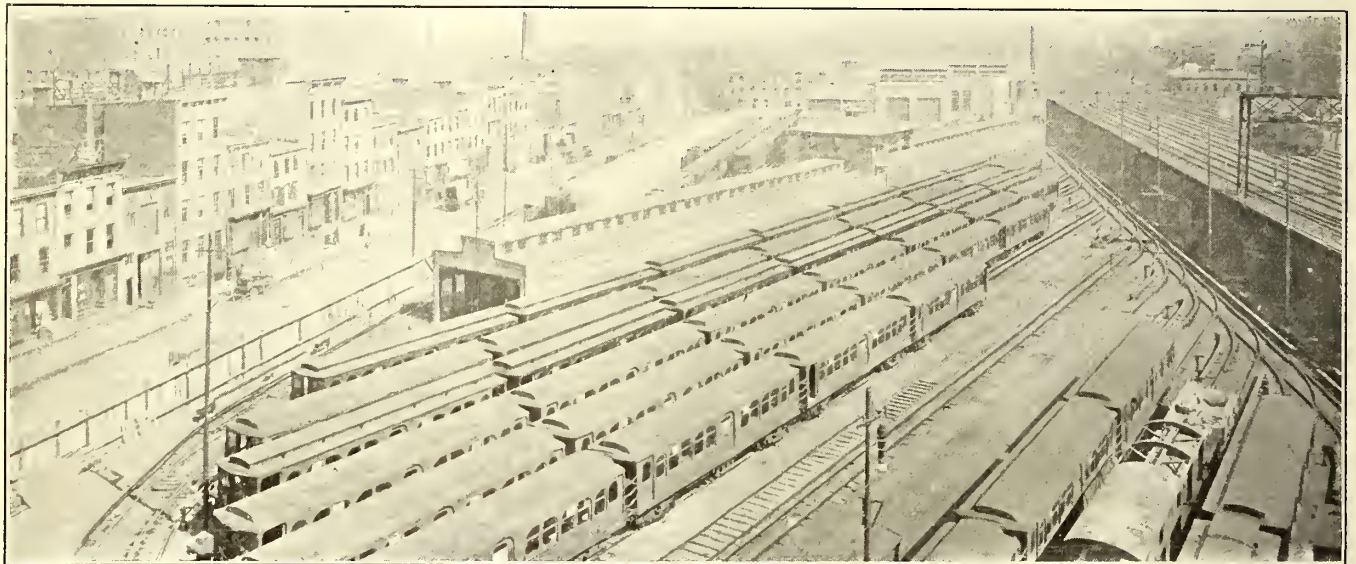
Hudson & Manhattan Railroad—General Plan, Transverse Sections and Longitudinal Section of the Jersey City Shops



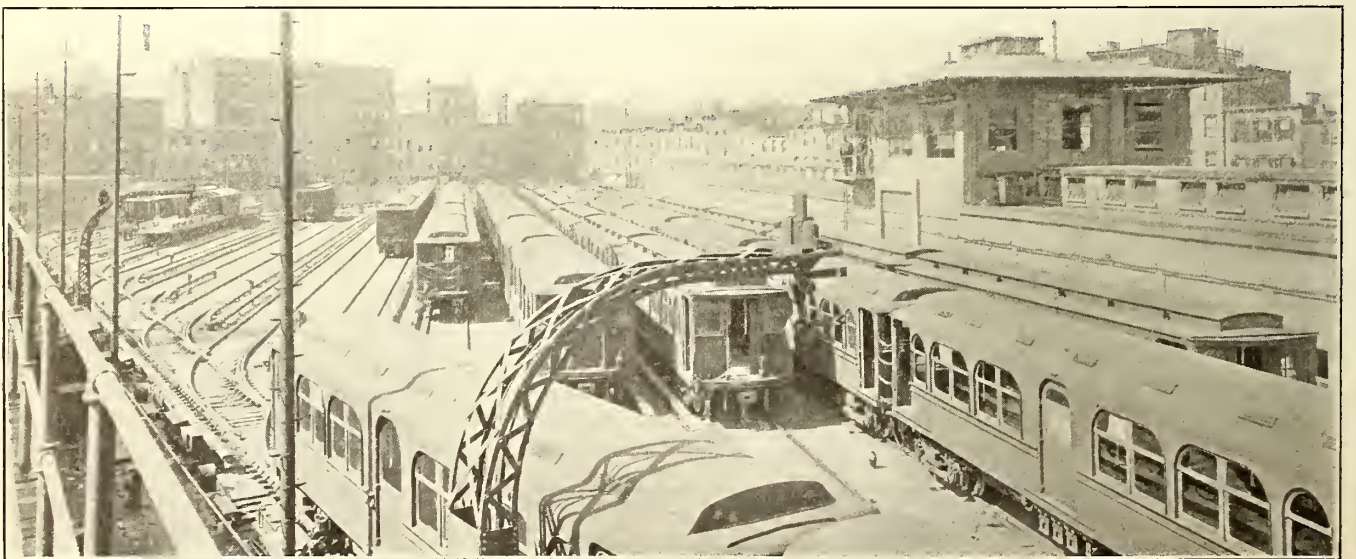
Hudson & Manhattan Railroad—Interior of the Tunnel Under the Shop Near the Portal



Hudson & Manhattan Railroad—Tunnel Portal Tracks Leading to Inspection Shed and Yard



Hudson & Manhattan Railroad—General View of the Jersey City Yard and Shop



Hudson & Manhattan Railroad—General View of Yard with Inspection Shed and Switch Tower on the Right

tribute to individual machines the material placed on the floor by the crane.

The plan of the shops on page 781 gives a complete list of the tools in the machine shop with the exception of a new No. 4 Brown & Sharp miller and a Davis expansion borer. Practically all of the other important tools, including the lathe, hydraulic press and boring mill in the wheel-handling section, were furnished by the Niles-Bement-Pond Company. The larger shop tools are operated by direct-connected motors and the smaller tools in the machine shop are driven from line shafting, which in turn is belted to an electric motor. All of the motors are 600 volts d.c. There are also installed a Fox sand-drying stove and a home-made conduit pipe bender of the air-cylinder type. A recent alteration in machine shop practice has been the replacement of carbon drills by high-speed drills whereby the output has been increased six to eight times. The ground floor below the machine shop is used as a storeroom and heater room.

HEATING, LIGHTING AND VENTILATION

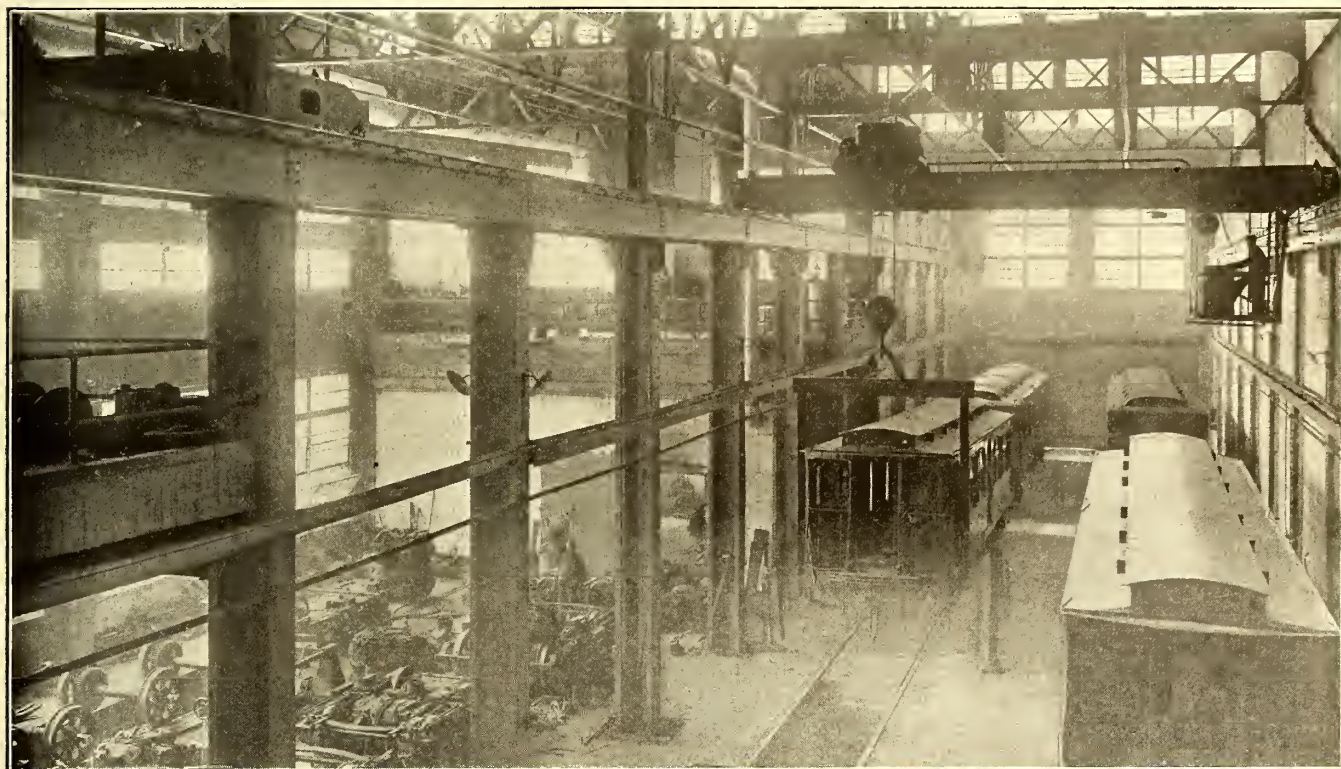
The shops are warmed by a hot-air heating system, in which

COMMITTEE ON ELECTRICITY OF THE MAINTENANCE OF WAY ASSOCIATION

The American Railway Engineering & Maintenance of Way Association has appointed the following gentlemen as members of the committee on electricity: G. W. Kittredge, New York Central & Hudson River Railroad, chairman; J. B. Austin, Jr., Long Island Railroad, vice-chairman; N. E. Baker, Illinois Central Railroad; R. D. Coombs; A. O. Cunningham, Wabash Railroad; L. C. Fritch, Chicago Great Western Railroad; George Gibbs, Pennsylvania Tunnel & Terminal Railroad; G. A. Harwood, New York Central & Hudson River Railroad; E. B. Katte, New York Central & Hudson River Railroad; C. E. Lindsay, New York Central & Hudson River Railroad; W. S. Murray, New York, New Haven & Hartford Railroad; J. R. Savage, Long Island Railroad.

The subjects assigned to this committee for consideration during 1911-1912 are:

(1) Continue the consideration of the subject of third-rail clearance.



Hudson & Manhattan Railroad—General Overhauling and Truck Shops, Showing Car Hoist

air is passed by motor-driven fans through the heater tubes of three Harrison heaters directly over the furnaces. The hot air is then led by means of galvanized-iron ducts to the different portions of the building. The heater room also contains a 600-cu. ft. capacity Chicago pneumatic compressor for supplying air to the signal system. This is used for emergencies only, as ordinarily the 85-lb. tunnel pressure is employed. This compressor is tested regularly once a week.

All of the shops have been provided with very ample lighting and ventilation from the large and numerous windows. The shops are lighted at night by means of 100-watt tungsten lamps operating on 25-cycle current at 110 volts. This lighting has been found very satisfactory both in the shops and throughout the yard.

ENGINEERING

The design of yard and shops was made at the office of L. B. Stillwell, consulting electrical engineer. The track work was done by Jacobs & Davies, the civil engineers for the Hudson & Manhattan Railroad Company, who also built the concrete work of the structures. The detailed plans for steel and concrete for the buildings were made by J. B. French.

(2) Continue the preparation of a standard specification for overhead transmission line crossings.

(3) Report on the effect of electrolytic action on metallic structures and the best means of preventing it.

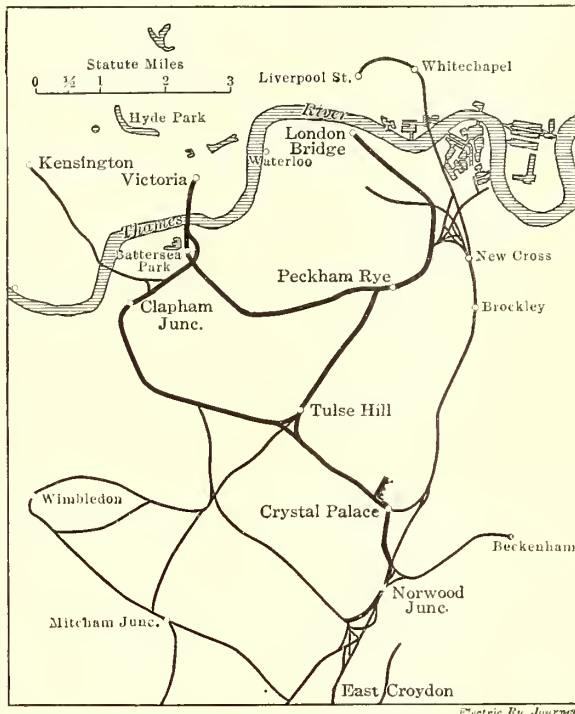
(4) Report on methods of insulation and protection.

MILEAGE OF BLOCK SIGNALS IN THE UNITED STATES

The Interstate Commerce Commission has issued a bulletin giving statistics of block signals in use Jan. 1, 1911, on the steam and electric railways in the United States. Only those electric railways which are engaged in interstate commerce and are equipped with automatic absolute block signals are included in the tables. The total length of railways worked under the block system was 71,269 miles, an increase over 1910 of 5511 miles. Of this amount 17,711.5 miles were equipped with automatic block signals. The increase in automatic block signals was 3474 miles. Telephones were used for train dispatching on 41,717 miles of road, an increase of 15,373 miles during the year.

SINGLE-PHASE ELECTRIFICATION OF THE LONDON, BRIGHTON & SOUTH COAST RAILWAY

Shortly after the London County Council took over and electrified the tramways in that city, the London, Brighton & South Coast Railway began to feel the effects of their competition for the suburban business south of the Thames. Parliamentary powers to convert the entire system of the London, Brighton & South Coast to electric operation were obtained in 1903, and Philip Dawson was retained as consulting engineer to investi-



London, Brighton & South Coast—Map of Suburban Lines; Electrified Sections Shown by Heavy Lines

gate and report on the system to be adopted and the details of the installation. Mr. Dawson's report was so favorable that he was instructed to prepare specifications and ask for bids on an initial contract covering the electric equipment of what is known as the South London line, which connects the two terminals of the road at Victoria and London Bridge and passes through East Brixton, Denmark Hill and Peckham Rye. This line is 8.7 miles long and is double-tracked. Including the yard and station tracks the total length of single track to be equipped was 20.5 miles.

The decision as to what system to adopt was not made until after the most careful examination of existing installations and consideration of the many special problems involved in the possible electrification of the entire system of the London, Brighton & South Coast Railway. Very heavy traffic was being handled by steam locomotives between London and Brighton, and it seemed probable that if electric operation proved successful on the purely suburban lines it might soon afterward be extended at least as far as Brighton, a distance of 52 miles from London. For this reason the single-phase, alternating-current system was selected as being the most economical, and the results of more than a year's operation of the South London line have justified the installation of that system.

The contract for the equipment of the South London line was awarded early in 1906 to the Allgemeine Elektrizitäts Gesellschaft, whose bid was considered by the railway company to be the most favorable from all points of view. Experimental trains were run early in 1909 over parts of the South London line, and in December of that year full electric operation was begun from terminal to terminal. The results of operation of the South London line proved so successful from the start that in May, 1910, the directors of the railway company decided to extend the electric zone to include the suburban lines from

Battersea Park and Peckham Rye to Tulse Hill, Crystal Palace and Norwood Junction. These lines, comprising a total of 13½ route miles and 41½ miles of single track, are now being equipped. When they are completed the electric zone will include 62 miles of single track. On the accompanying map of the suburban territory served by the London, Brighton & South Coast Railway the electrified routes are shown in heavy black lines and the routes still worked by steam in lighter lines.

The South London line traverses a thickly populated district on the south side of the River Thames. It has many sharp curves and numerous grades up to 1 per cent. There are nine intermediate stations, making the average distance between stops 4590 ft. The shortest distance between stations is 1386 ft. In Victoria Station five tracks have been equipped with overhead trolley wires and in London Bridge Station six tracks have been equipped. One of the engravings on page 785 shows the electric train platforms in Victoria Station. The running time between London Bridge and Victoria, a distance of 8.7 miles, including stops of twenty-six seconds at each of the nine intermediate stations, is twenty-four minutes, or an average rate of 21.7 m.p.h. The steam trains formerly made the run in thirty-six minutes. The rolling stock of the South London line consists of sixteen motor cars and sixteen trailer cars. During the hours of light traffic the trains are made up of two third-class motor cars and a first-class trailer car, while during the morning and evening rush hours two such trains are coupled together and operated as one unit. Both the motor and trailer cars are of the side-door type with an aisle on one side. This arrangement permits the cars to be loaded and unloaded at terminals in less time than would be possible with end-door cars. It has proved very satisfactory. The cars are 60 ft. long and 9 ft. wide. The motor cars have a motorman's and baggage compartment at one end only and will seat sixty-six passengers. The trailer cars have nine passenger compartments and a total seating capacity of fifty-six. The motor cars are mounted on pressed steel, four-wheel trucks, each of which carries two Winter-Eichberg compensated-repulsion type motors. These motors have a capacity of 115 hp for one hour and 57 hp continuously, with a temperature rise not exceeding 75 deg. C.

On the extensions which are now being electrified a somewhat different type of cars and make-up of trains will be used. Thirty motor cars and sixty trailers have been ordered, and the trains will be made up of two trailers and one motor car dur-



London, Brighton & South Coast—Three-Car Train at Wandsworth Road Station

ing hours of light traffic and four trailers and two motor cars during the rush hours. The new cars are only 56 ft. long and 8 ft. wide, and while they have side doors opening into each compartment no side corridor is provided. The motor cars are equipped with four Winter-Eichberg motors, each of 175-hp hourly capacity and 100-hp continuous capacity. The type of motor truck used is shown on page 786.

The underframes of the cars are of structural steel, but the bodies are of wood sheathed with aluminum to provide a metallic path to ground for any leakage of current from the bow collectors on the roof. The floor is built up independently of the underframe and all the conduit and wiring was installed

used for running in opposite directions. They are raised and lowered by pneumatic cylinders, to which air is admitted through a valve mounted near the master controller in the motorman's cab. Only one bow can be raised at a time, and the operating valve handle is interlocked with the master controller



London, Brighton & South Coast—Overhead Construction in Yard of London Bridge Station

before the bodies were erected. An engraving on page 787 shows a car floor turned upside down in the shop for the purpose of installing the conduit. The bottom of the car floor is covered with a layer of "uralite" fireproofing $\frac{1}{4}$ in. thick, which in turn is protected by sheet aluminum.

in such a way that the direction of movement of the car controls the selection of the proper bow. Two aluminum collector strips are mounted on each bow. The leading strip is rigidly attached to the main bow, while the trailing strip is carried by a light auxiliary bow which is kept up against the wire by the



London, Brighton & South Coast—Train Shed of Victoria Station, Showing Tracks for Electric Trains

Current is collected on each motor car from the overhead trolley wire by a special form of sliding bow collector. Owing to the limited overhead clearance at a number of bridges, particularly at the entrance to Victoria Station, the collectors are mounted on the roof over the motorman's compartment, which is lowered somewhat to give sufficient clearance when the collectors are folded down. Two bows mounted on one base are

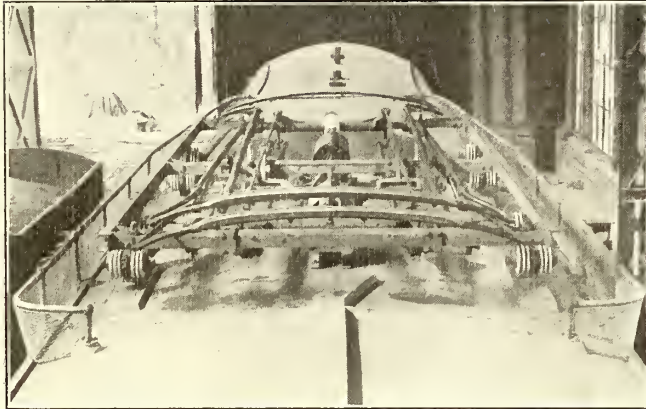
pressure of light springs. This arrangement of double collectors on one bow insures continuous contact with the trolley wire, since if the collector on the main bow leaves the wire for an instant the auxiliary collector of small inertia remains in contact. The aluminium collector strips are grooved on their contact surfaces and the grooves are filled with heavy grease. The wear on the copper contact wires is inappreciable after

eighteen months' operation while the life of the collector strips is from 5000 to 6000 miles. The collector bows work through a range of 6 ft. from the highest to the lowest position, and they are mounted so that the pressure against the trolley wire remains practically constant.

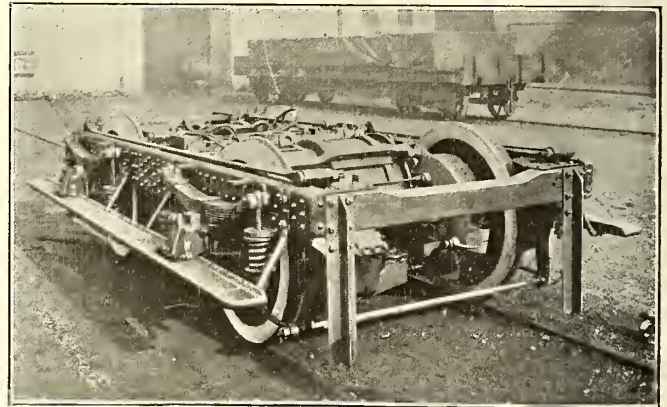
The control apparatus is arranged in two duplicate groups for the operation of the four motors in pairs. The high-tension power circuit passes from the bow collector through a

terlocked with the collector bows so that it cannot be opened unless both bows are down. Furthermore, when the door is open the air in the cylinders holding the bows up against the wire is exhausted and the high-tension circuit is automatically grounded.

Electrical energy at 6700 volts and 25 cycles for the operation of trains is purchased from the London Electric Supply Corporation. It is delivered from the generating station at



London, Brighton & South Coast—Bow Collector on Roof of Motor Car



London, Brighton & South Coast—Pressed Steel Motor Truck

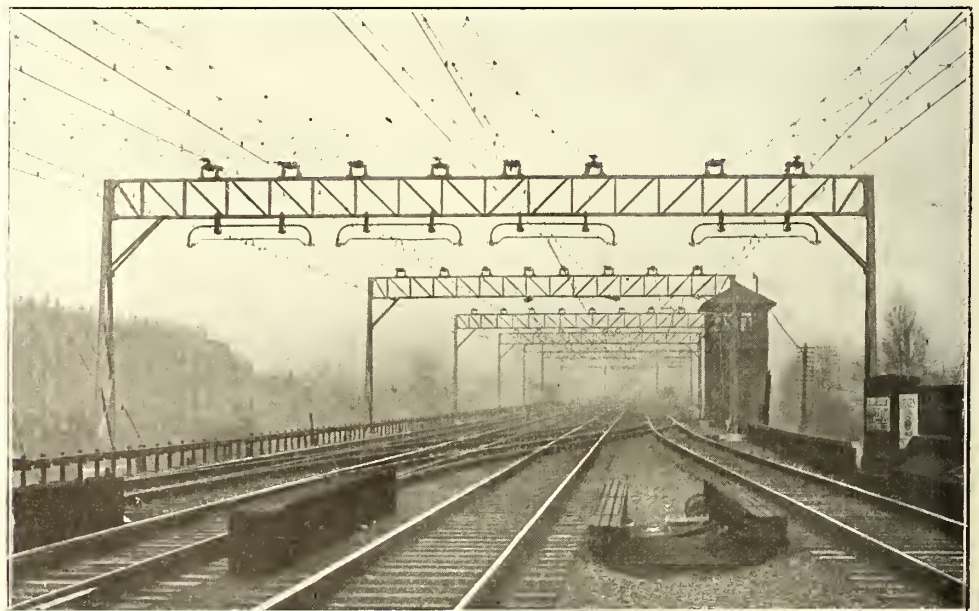
choke coil, fuse and primary of an overload relay transformer to the circuit breaker. From the circuit breaker it divides and passes through the primaries of the two main transformers to ground. Each branch of the circuit may be cut out by opening an isolating switch inserted between the transformer and the circuit breaker. Current for the lights, compressor motor and control is obtained from the secondary of an auxiliary transformer which is wound to give 300 volts.

Seven contactors are required for each pair of motors, and the control is divided into five steps. A schematic diagram of

Deptford to the signal cabins at Queens Road and Peckham Rye Junction, where it is metered and fed to the overhead distributing system. The Board of Trade fixed 20 volts as the maximum permissible drop in the return circuit, and this requirement made it necessary to install two-conductor booster and distributor cables throughout the electric zone. The overhead line is sectionalized at each signal cabin, and series booster transformers, with a ratio of 1:1, are located at every cabin. One side of these boosters is connected across the section break and the other is in series on the outer conductor of the



Bow Collector with Two Contacts



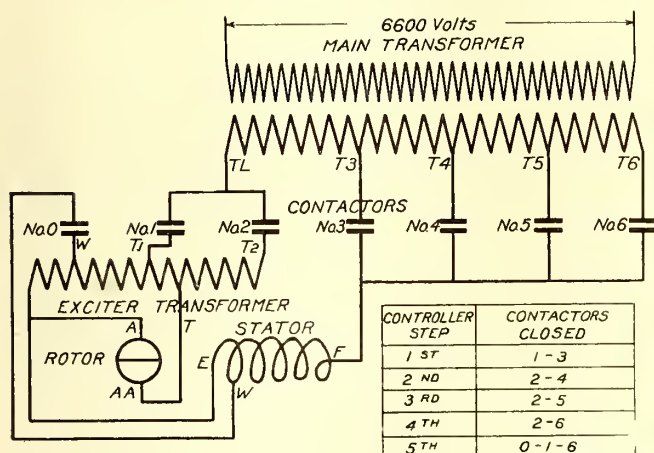
London, Brighton & South Coast—Four-Track Overhead Construction at Balham Junction

the control circuits is shown herewith. The taps from the secondary of the main transformer give four voltages varying from 450 volts to 750 volts, and the exciter transformer has two ratios. Combinations of these give five speeds, forward or reverse. Special precautions have been taken to prevent accidental contact with any of the high-tension apparatus on the cars. All of the high-tension apparatus, with the exception of the main transformers, is mounted in cabinet built in the motor-man's compartment. The door to this cabinet is mechanically in-

booster cable. The outer conductor of the distributor cable is bonded to the track rails and the inner conductors of both the booster and distributor cables are connected to the trolley feeder busbars in the signal cabins.

The overhead trolley construction is especially interesting. For the most part the wires are supported by structural steel girders or bridges carried on A-frame posts. In some places cantilever bridges and side bracket posts have been used. The single conductor wire is hung from two catenary cables each

consisting of twelve-stranded galvanized steel wires. These cables are not continuous over the supporting bridges but are attached with turnbuckles adjusted so that the sag is evenly balanced on the two sides of each bridge. The trolley wire is round copper, of grooved section, with an area of 0.197 sq. in. It is hung from the catenary cables by dropper wires spaced about 10 ft. apart. These dropper wires are looped over the catenary cables so as to permit about 2 in. of vertical play, and where they exceed 2 ft. 6 in. in length they are made in two pieces with a connecting link which gives an additional 2 in.

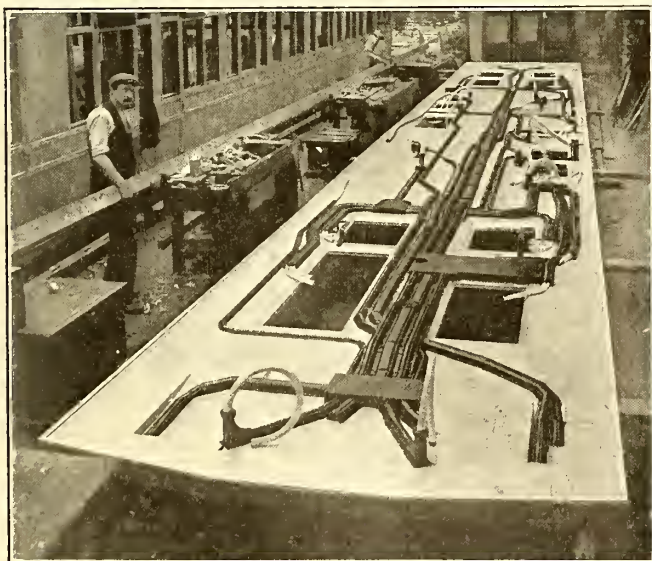


London, Brighton & South Coast—Diagram of Motor Circuits

of vertical play. The two catenary cables are tied together at 10-ft. intervals by wires of approximately the same length as the droppers.

Special care was given to the insulation of the overhead lines. Corrugated porcelain spool insulators were used in all cases, the choice of this type having been made after exhaustive tests extending over nearly twelve months.

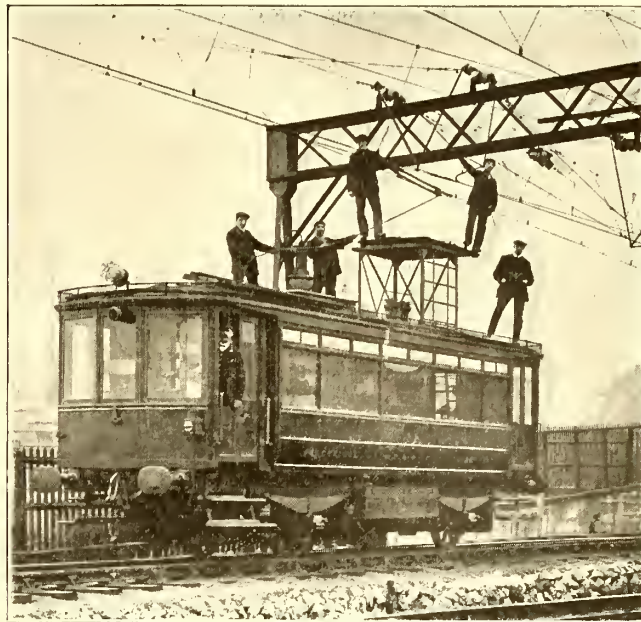
The trolley wires are supported normally at a height of 16-ft. above the rails, but in the two terminal stations the wires are 19 ft. 9 in. above the rails. The minimum height of wire is 13 ft. 9 in. under a highway bridge. The wire is staggered



London, Brighton & South Coast—Wiring Bottom of Car

9 in. on each side of the center line of the track at alternate bridges. No tension device is inserted in the trolley wire, as experience has shown that the variations of temperature of the English climate are not sufficiently great to cause excessive slack or tension in the wires. For making line repairs a gasoline-electric motor car is used. This car is shown in one of the engravings.

The acceleration obtained with the single-phase motors used on the South London line has been quite satisfactory, and the energy consumption compares favorably with that of direct-current roads. The average acceleration, from 0 to 30 m.p.h.,



London, Brighton & South Coast—Gasoline-Electric Line Repair Car

is at the rate of 1 m.p.h.p.s. The energy consumption per ton-mile, making no allowance for weight of passengers and for non-revenue mileage of cars but including all energy used in the repair shops and leakage from all sources, was 75.4 watt-hours. This figure was computed by dividing the total meter readings at the feeding-in point for eight months of 1910 by the total ton-miles run during that period. This is a very low consumption, notwithstanding the fact that all trains make all stops on the line. The total weight of an empty four-car train on the South London line is 150 tons, of which the weight of the electrical apparatus represents 18 tons. The weight of a three-car train of the type to be used on the Crystal Palace extension is 102 tons and the electrical equipment will weigh 19 tons. During trial runs on the South London line the average energy consumption was found to be 63.1 watt-hours per ton-mile as measured by instruments on the train. The transmission losses between the distributing room at Peckham Rye and the trains on the line are only about 3 per cent.

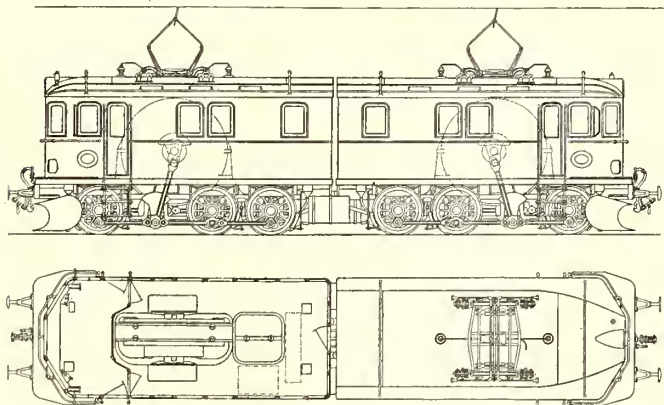
According to Mr. Dawson, the results of operation so far secured justify the claim that the single-phase system costs less to install and to operate than the direct-current system. It possesses the additional advantage that it is entirely suitable for extensions as far as may be thought necessary by the railway company. The experience of eighteen months shows that the cost of maintenance of single-phase car equipment is at least no greater than the cost of maintaining direct-current equipments of the same type. During the first twelve months of operation the motor cars averaged more than 58,000 miles.

The financial results of electric operation have been equally satisfactory. Within a few years after the competing tramways were electrified the South London line lost traffic amounting to more than 5,000,000 passengers a year. Although very little change was made in the rates of fare after electric operation was begun the whole of the traffic which had been lost was regained inside of twelve months and the number of passengers carried is steadily increasing.

All of the work of converting the South London line and the more recent extensions to Crystal Palace was carried out under the supervision of Philip Dawson, consulting electrical engineer. The names of the principal contractors for the equipment were published on page 582 of the issue of this paper for April 1, 1911.

ELECTRIFICATION OF THE KIRUNA-RIKSGRÄNSEN LINE OF THE SWEDISH RAILWAYS

The railway administration of Sweden is now buying \$1,900,000 of coal a year while private railway companies are buying English coal to the same amount. Sweden itself has no coal deposits with the exception of the mines at Höganäs in the southern part. The output is so small compared to



Electric Freight Locomotive Proposed for Swedish Polar Zone Railway

the consumption that the mines supply but approximately 5 per cent of the total amount consumed. In view of the numerous waterfalls available for supplying electric energy the Swedish Parliament appointed a commission in 1902 to investigate the matter of railway electrification.

From 1905 to 1907 tests were made upon the stretches Tomtebodavärta and Stockholm-Järfva. As the result of these trials the commission concluded to adopt a single-phase system of 15 cycles as the most feasible for the conditions. The next step was to choose the line first to be electrified. The committee concluded that it would be desirable to select one with a practically constant schedule, heavy haulage and adjacent to a waterfall so that the energy could be supplied with a minimum length of feeders. The Kiruna-Riksgränsen line satisfied these conditions. This section is within the polar circle and has the distinction of being the most northern railway in the world.

This railway has some tourist traffic in the summer, but it is used principally for transporting iron ore from the mines to the boundary at Riksgränsen and thence across Norway to the seaport of Narvik. The run between Kiruna and Riksgränsen is 129 km (80 miles). Under present conditions the freight handling is done by steam locomotives which haul 28 cars, the weight of each car being 11 metric tons empty and 35 tons loaded. The allowable drawbar stresses now limit the length of the train to 28 cars. It has been calculated that 35-car trains will be possible with electric locomotives because the decreased pulsating movement of the latter will diminish the maximum strains in the drawbars. The present steam locomotives use 2000 kg (15,868 lb.) of coal a day and require two firemen.

The polar latitude of this railway has made it necessary to have elaborate precautions against snow blockades. The conditions are most favorable along the southerly part from Kiruna to about 6 km (3.7 miles) beyond Abisko at the mouth of the Nuolja tunnel where the line can be kept clear with rotary plows. The northerly part from the Nuolja tunnel to Riksgränsen is subjected to such severe weather that it has been found necessary to construct concrete tunnels and snow galleries for 7 km (4 miles).

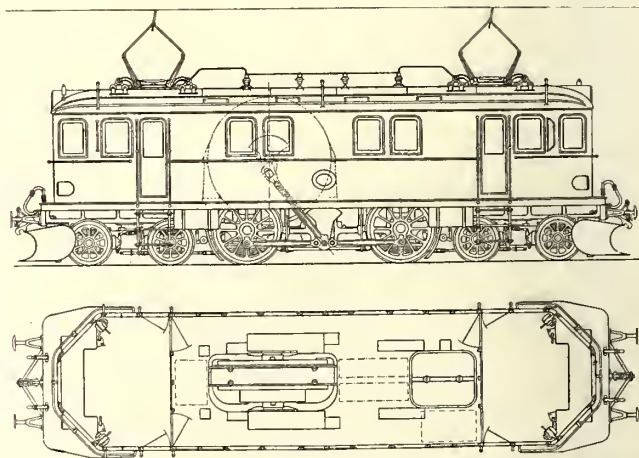
The line is single track of 4-ft. 8½-in. gage with a minimum radius of curvature of 500 m (1640 ft.). The grade for most of the way is a steady incline of 1 per cent from Riksgränsen to Kiruna. Two power-station sites were available, one 20 km (12.4 miles) distant from Kiruna; the other at Porjus Falls,

120 km (74.4 miles) from Kiruna. The latter location was selected owing to the favorable conditions for enlarging the plant at a later date. The falls, which are situated at the outlet of Porjus Lake, will give 65,000 hp obtained with a total fall of 50 m (164 ft.) within 3 km (1.9 miles). Both the intake canal and the tailrace will be blasted through solid rock. A dam 1000 m (3280 ft.) long will have to be built at the outlet of the lake for controlling the waters. It is planned to install five units of 12,500 hp each, three of which will be single-phase, 5000-volt, 15-cycle generators for the operation of the railway; the other two will be three-phase, 25-cycle generators of the same voltage for industrial purposes such as electric-reduction ovens.

There are to be four railway substations which are to be situated at Kiruna, Torneträsk, Abisko and Vassijaure. Each substation will have three transformers of 1000-kva capacity, stepping down the transmission potential of 80,000 volts to 15,000 volts for the overhead line. The transformers are constructed to stand a momentary load of 2700 kva each. The intention is to use only two transformers for regular operation and have the third as a spare.

The overhead line will be of the simplest kind. Wooden poles will be used, spaced approximately 30 m (98 ft.) apart. The overhead line will be carried on pipe brackets guyed by steel cables. Both the arms and cables will be insulated from the wooden masts. The ears will allow the wire to slip in its own direction so that displacements due to temperature changes and collector-bow pressures can be easily adjusted. Tension take-up devices will be installed at regular intervals.

Two classes of locomotives will be employed for hauling trains. The freight locomotives will be of the two-part interchangeable type to minimize the number of spare locomotives, so that if one-half becomes defective the other part can be coupled to a reserve half. Each locomotive will weigh 100 metric tons. Each half will be equipped with a 1000-hp motor operated directly at 15,000 volts and connected to two cranks set 90 deg. apart which will drive an intermediate shaft as shown in one of the drawings. The freight trains will be pulled by two locomotives. It is expected that a pair of these locomotives will be able to draw 40 flat cars and one freight car at a speed of 50 km (31 miles) per hour on the 1 per cent up grade. The total draw-bar pull will amount to 31,200 kg (68,764 lb.). The freight schedule will call for eight trains each way



Electric Passenger Locomotive Proposed for Swedish Polar Zone Railway

per day, transporting a total load of 11,000 metric tons. The electrical companies which are constructing these machines have guaranteed that each locomotive will cover a distance of 90,000 km (55,800 miles) a year at the speed mentioned.

The passenger locomotives will be similar in construction to those for the freight service but will be of the single-unit type. Each will have one 1000-hp motor of exactly the same construction as the motor for the freight locomotives. Pony trucks will be used at each end as illustrated. The total weight of

each locomotive will be approximately 70 metric tons and it is to haul a 200-ton train at a speed of 100 km (62 miles) per hour. These locomotives have been guaranteed to run 100,000 km (62,000 miles) a year.

Before any other steps are taken a temporary steel road will have to be built from Gellivare to Porjus to transport material and machinery for the construction of the power house. According to contract the line must be completed by the year 1914. The work is being carried out jointly by the Siemens-Schuckertwerke, G. m. b. H., of Berlin, Germany, and Allmänna Svenska Elektriska Aktiebolaget, of Vesteras, Sweden.

IRON-BAR OVERHEAD CONSTRUCTION ON BROOKLYN BRIDGE LOOPS

The Brooklyn Rapid Transit System has charge of the eight surface loops over which all cars reaching the New York terminal of the Brooklyn Bridge return to Brooklyn. The maintenance of the overhead work on these loops has always been a hard problem because of the heavy traffic, the sharp curvature and the limited clearances. The upward slope of the bridge promenade is so great that at the eighth loop there is a clearance of only 12 ft. between the head of the rails and the floor girders of the elevated railway terminal station overhead. The original trolley installation was of the ordinary wire construction. This was soon succeeded by a design comprising a wooden trough lined with sheet iron.

After a couple of years' service the troughs were replaced by iron trolley contact pans which varied in width from 1 ft. to 4 ft. These pans were in use for over ten years, until something better was found in the iron-bar construction originated for places with heavy traffic by the line engineers of the Brooklyn Company. The pans were expensive to construct and maintain. It was especially difficult to insulate them properly against the leakage of water. In some cases the only barrier against the floor girders overhead was one inch of wood and a sheet of rubber. The collection of mois-

loops with the least clearance have $2\frac{1}{4}$ -in. x $\frac{3}{8}$ -in. conductor bars, but elsewhere a longer life is being obtained by using $2\frac{3}{4}$ -in. x $\frac{3}{8}$ -in. bars. The bar is suspended in the center line of the curves at places of minimum clearance in order to allow for high trolley stands, bent poles and the like. The elimination of the usual offsets naturally prevents the trolley wheels from running true under such sections, but this is not scri-



Bar Conductor Over Track at the Brooklyn Bridge Terminal

ous in view of the slow car movement conditions at this terminal.

In general, the frogs and other fittings on this job do not differ materially from other iron-bar work of this company. The principal departure is the use of a double iron-bar conductor, one for each four loops, over a short portion of the up-grade common roadway into which all the loops enter. The new construction is proving entirely satisfactory. The upper four loops and the lower four loops have each an automatic circuit-breaker and in the event of either breaker opening the other set of loops will be operative on the up grade. There appears to be no question but that the iron-bar construction will prove superior to the pans in sightliness, in freedom from destructive sparking, in maintenance cost and in the reduction of interruptions to traffic.

INSPECTION OF HIGH-TENSION OIL SWITCHES

In the regular inspection of transmission lines, which is the price of continuous service, it is important not to overlook the periodical examination of high-tension oil switches, particularly with regard to ascertaining the character of the oil and the condition of the contacts and terminals. The frequency of the inspection may properly depend on the use of the switches and the voltage carried, but, in any event, an annual overhauling, in which the contacts are tested and cleaned and, if necessary, the oil is renewed, is essential to the best results. Some companies may go so far as to keep monthly records of the number of times the switches are operated and establish a system of inspection on such a basis. In a representative case the practice is to test the oil weekly in all oil switches by taking out a sample and measuring its dielectric strength with a spark gap of from 0.15 in. to 0.30 in., and also to make this test on any switch immediately after it has been opened on short-circuit or through other trouble. A series of tests made on a sample taken from one switch which had opened a severe short-circuit showed very low resistance at first, but the resistance gradually increased for forty-eight hours, when the resistance came back to practically normal. The reduction in dielectric strength was doubtless due to the free carbon which was formed in the oil by the arc at the time of the rupture and finally settled at the bottom. The importance of filtering the oil as soon as possible after a break of violent character was thus clearly indicated.



Double-Bar and Single-Bar Overhead Construction at the Brooklyn Bridge Terminal

ture at the pans occasionally resulted in grounds which were severe enough to cause interruptions to traffic.

The new overhead work is of the iron-bar type illustrated and described in detail on page 1017 of the *ELECTRIC RAILWAY JOURNAL* for June 11, 1910. In brief, it consists of an oak bottom board with insulated clevis hangers to hold the bar iron. This bottom board is carried from the girders overhead. The use of the iron bar permits either the same or greater clearances than were possible with the pans. The

LIGHT-WEIGHT CARS, THEIR CONSTRUCTION AND OPERATION *

BY R. T. SULLIVAN, GENERAL SUPERINTENDENT HOUSTON ELECTRIC COMPANY

Two years ago we put into service a car seating forty passengers and weighing approximately 43,000 lb. To-day we plan to put in service a car seating the same number and weighing 30,000 lb., or a decrease in weight of 30 per cent. The principal changes which have effected this decrease are as follows:

The monitor roof has been eliminated; the cars have been built for single-end operation, and the side post spacing has been reduced from 32 in. to 29 in., giving a reduction in the length over the corner posts of 2 ft. The truck centers have been kept the same, which permits lighter body construction. The changes made reduced the weight of the car body approximately 5500 lb. The air-brake equipment has been left off, reducing the weight about 1500 lb. A single-motor truck has been adopted, which further reduced the weight about 2000 lb., and this arrangement permitted a reduction in electrical equipment of approximately 4000 lb.

The economy effected by this decrease in weight is in power plant investment, power consumption, maintenance of electrical equipment and rolling stock investment. The first two items are reduced approximately one-third; the third item one-half, and the fourth item one-eighth. We assume the car body maintenance to be the same for the two cars, and the track maintenance to be the same.

We feel that if we are correct in the assumption that the car seating forty passengers is the proper size car we have arrived at a satisfactory type for city service, and shall standardize on it. The one disadvantage of the lighter car is its weakness in collisions. We have decided, however, that this factor is not sufficiently important (in the operation of single-unit trains) to offset the benefits of decreased weight. To reduce car weights further we should be obliged to change the seating capacity.

Public opinion, which has sometimes led operators into putting on heavy, handsome cars, might, I believe, be easily swayed by a proper educational campaign in which the advantage of a short headway with lighter and shorter cars was made more conspicuous than slightly increased comfort while riding.

Smaller cars and shorter headway would permit greater rapidity in loading and unloading and hence allow an increase in speed. They would increase the platform expense and the auditing expense. They would increase the accident risk due to the increase in the number of units, but would decrease the risk because of the lighter weight of the unit and greater facility in handling it. They would increase the superintendence of transportation and the number of trippers. Given the above variables and constants, it is an interesting problem in maxima and minima to determine the proper seating capacity of cars to be operated.

We are studying the law governing this change by keeping statistics of travel on lines on which we are obliged at any time to change the headway. The law governing the accident hazard must be determined by cumulative records. The statistics which we have on this point cover a period of two years, but are not yet conclusive. The effect upon the other factors mentioned must be determined in like manner, viz., by experiment and cumulative records.

After having applied this test to any particular line it should be applied to a group of lines. Probably the result would show that certain sections would warrant the operation of large cars, while others would require a very much smaller car. Possibly the ideally operated system would have two standard types. We have but begun the solution of this problem in Houston. Does any manager know the answer to the problem in his own city?

THE CAUSE AND PREVENTION OF ACCIDENTS *

BY C. W. KELLOGG, JR., MANAGER TEXAS SECURITIES DEPARTMENT, STONE & WEBSTER

The large part of operating expenses of the street railway companies in Texas which is expended in the settlement of damage claims resulting from accidents is the reason for this paper being written. A few figures will show how accidents as a financial factor are affecting public service corporations in Texas. Statistics recently published by thirty-two of the largest steam railroads in the State show that in the twelve years from 1891 to 1903 the percentage of gross earnings paid out in connection with damages increased 400 per cent. From figures published by the Interstate Commerce Commission covering the period from 1900 to 1907, both inclusive, it appears that the number of persons killed per million revenue train miles in Texas was 6.45 as against 9.69 for the rest of the United States. And yet the cost per passenger killed in Texas was over five times as much as in the rest of the country. The prevention of accidents, therefore, is five times as important in Texas as in the United States as a whole. The electric railway companies in the State are in even worse case, so far as the cost of accidents is concerned, than the steam railroads. The proportion of gross earnings paid out in settling claims resulting from accidents has reached in one case the huge total of 19 per cent, and from 3 to 4 per cent seems about as good a showing as any company of any size has been able to make in Texas. The problem of decreasing this cost is fully as much concerned with the handling of claims as with the prevention of accidents.

The causes of accidents may be said to be the failure or unexpected behavior of:

- (1) Equipment, including track and rolling stock.
- (2) The human element, including the company's passengers or other members of the body politic.

The prevention of accidents, therefore, involves the study and correction of any factors which seem in any way to affect either of these two main causes.

Several of the larger Texas street railway companies, representing about 275 miles of track, have made a study of the accidents occurring on these lines, with the following results:

	Per Cent of Total.	Per Cent of Total.	Per Cent of Total.
	1907.	1908.	Average.
Car collisions.....	4.66	4.57	4.62
Other collisions.....	28.48	27.93	28.20
Derailment.....	6.82	5.95	6.39
Motorman lost control.....	.01	.11	.06
Defects.....	3.22	2.39	2.80
Step accidents.....	34.79	33.08	33.99
Other passenger accidents.....	6.26	7.84	7.05
Miscellaneous.....	15.76	18.13	16.89
Total.....	100.00	100.00	100.00

The foregoing table shows that the number of accidents due solely to failures of equipment is comparatively small. But here the question of other complications comes in. The most numerous single class of accidents was step accidents. While it was felt that such accidents might be due to the carelessness of either the trainmen or the public, or both, yet it was thought that the situation could be helped by rebuilding the cars in such a manner that it would be practically impossible for a passenger to get on or off while the car was in motion. The prepayment type of car with full vestibules and provided with doors at the exit and entrance, which are kept closed except when the car is at rest, solves this problem. The writer knows from actual experience that this type of car construction, if carefully handled by the trainmen, can be made practically to eliminate step accidents. It can be therefore fairly considered the most useful innovation in accident prevention which has been made in recent years. Like any other piece of apparatus, however, it must be properly operated in order to show satisfactory results, and it has been shown by experience that the prepayment type of car will not materially reduce step accidents unless it is

*Abstract of paper read at annual meeting of Southwestern Electrical & Gas Association, Houston, Texas, April 27-29, 1911.

*Abstract of paper read at annual meeting of Southwestern Electrical & Gas Association, Houston, Tex., April 27-29.

carefully and intelligently operated by the trainmen in charge. The success of this type of car construction will doubtless make it advisable not only to adopt it in all new cars purchased, but also to spend the necessary money to reconstruct along these lines such existing cars as are of the proper type and can be converted without unreasonable expense.

With regard to the type of car on which the fewest accidents occur per car mile, the result of a recent investigation of five of the larger street railway companies of Texas shows the following figures as to the comparative number of accidents which occurred during one year with various type of equipment:

ACCIDENTS PER 10,000 CAR MILES OF TEXAS STREET RAILWAY COMPANIES, ACCORDING TO TYPE OF CAR.

Type of Car.	Twelve Months Ending Oct. 31, 1910.		Accidents per 10,000 Car Miles.
	Number of Accidents.	Cars Miles Operated.	
All cars.....	7,142	11,945,000	5.98
Double truck.....	3,493	6,291,000	5.66
Single truck.....	3,649	5,654,000	6.47
Air brake.....	3,141	5,442,000	5.78
Hand brake.....	4,001	6,503,000	6.15
Closed or semi-convertible.....	5,498	9,581,000	5.73
Open.....	1,270	1,793,000	7.08
California type.....	374	571,000	6.55
Prepayment.....	1,992	4,486,000	4.45

*Includes prepayment cars.

NOTE—Open cars have 59 per cent more accidents than prepayment cars, and the average closed or semi-convertible car (including prepayment cars) has 29 per cent more accidents than prepayment cars alone.

From this it will be seen that the cross-bench, open car is nearly twice as prolific as an accident breeder as the closed or semi-convertible car, but in this connection the much larger carrying capacity of the open car and the great convenience of quick loading and unloading in time of heavy travel should not be lost sight of. The figures for the prepayment car shown on the above table are the lowest of any type of car. They covered the period when these cars were just being introduced and are not indicative of their true value as preventers of accidents. Subsequent results have shown a considerably smaller number of accidents per car mile than the figures contained in the above table.

The matter of furnishing adequate notice of the approach or presence of a car is becoming of increasing importance. Nothing smaller than a 14-in. gong should be used on cars, and some companies have transferred the gong from underneath the car to the vestibule roof, in order to prevent the gong from becoming foul with dirt. The repeating gong which can be used on air-brake cars has been found very effective in calling the attention of pedestrians and others to the presence of a car. Street railway companies are no longer justified in neglecting to install some form of fender or life guard. Life guards are now manufactured in a form which is practically certain in operation and simple and easy to maintain. In several cities a small mirror is placed at the corner of the front vestibule in such a position that the motorman by glancing into it can see back down the side of the car, in order to ascertain whether anyone is in the act of boarding or alighting, before he starts his car. The companies which have not adopted prepayment operation and which have not gates or doors on their car platforms find these mirrors a great help in accident prevention. Most roads of any size have had serious accidents resulting from controller flashing or other trouble with the electrical equipment of their cars. Controller flashing can be traced either to the result of an excessive current entering the electrical system of the car, or to an arc forming between parts of the controller itself. To eliminate the first difficulty, all cars should be equipped with automatic circuit-breakers, or some device for interrupting the flow of current; and to largely help in eliminating the second, there have been designed, although not put into general use, contactor devices which render arcing between controller points almost impossible.

It should be distinctly borne in mind that the best equipment obtainable will fail frequently if not properly maintained. Many street railway companies have been remiss in the rigidity of the system used for daily or weekly car maintenance, and possibly also in the strict accountability to which the mechanical

department is held for accidents which occur as a direct result of the condition of the equipment. In the case of accidents due to equipment failures the burden of proof should be on the mechanical department to show that the fault was not theirs. Many companies have failed to follow up completely and consistently the advantages in preventing accidents which can be secured from improved equipment. When some new device in car construction or equipment is discovered which produces good results in accident prevention, careful consideration should be given to the question of adopting the same in all of the cars of the company, as well as on new cars purchased.

THE HUMAN ELEMENT

Having hitherto discussed the effect of the equipment on the accident situation, we will now take up the other general causes of accidents which may be classified. The human element can be divided into two parts, namely the company's employees and the public. The employee who fully obeys complete and satisfactory rules will have practically no accidents. The question of instruction in obeying the rules (that is, in car operation) and the enforcement of the rules (that is, in inspection and discipline) is a very live question and one intimately connected with the accident situation.

The handling of trainmen is the most difficult and most fascinating part of the street railway business. There are two old notions which have been prevalent to some extent, which the writer believes are founded on fallacies:

- (1) That a new man is necessarily more of an accident breeder than a man old in the service.
- (2) That trainmen as a class have no sense, or they would not be on the job.

Both of these propositions rest on the error of thinking of trainmen as a conglomerate mass, instead of as a number of distinct and different individuals.

A Texas company which makes a most excellent showing with regard to the cost of damages made the following record with respect to the length in the company's service of the trainmen connected with the accidents:

TWO YEARS' ACCIDENTS, CLASSIFIED ACCORDING TO THE PERIOD OF EMPLOYMENT OF THE TRAINMEN CONNECTED WITH THEM.

Period of Employment.	Accidents per Man per Month.		
	Motormen.	Conductors.	Average.
First month.....	1.04	0.77	0.90
Second and third month.....	1.05	1.29	1.17
Fourth to sixth month, inclusive.....	1.46	1.86	1.66
Seventh to twelfth month, inclusive.....	2.02	1.67	1.85
Second year.....	1.29	1.08	1.19
Third year.....	1.53	1.04	1.28
Fourth year.....	1.21	1.13	1.17
Fifth year.....	1.21	1.25	1.23
Sixth year.....	1.13	0.69	0.91

According to these figures, the highest number of accidents per trainman per month occurs during the period from the seventh to the twelfth month, inclusive, and there is no time until the sixth year when this average gets as low as it is for the first month. The low average in the early months is due largely to the fact that in the beginning the trainman, working through the extra list, operates considerably fewer car miles than the older men; but even making allowance for this difference in car miles operated, the new trainmen make practically as good a showing in the first few months as at any time during the first year or two.

The table shows what satisfactory results can be obtained by paying careful attention to the instruction of new men. Even a comparatively small company can afford to have one man whose duty it shall be to break in new men and, when necessary, further instruct old men. Moreover, he should be held personally responsible for the men whom he instructs having the necessary knowledge and experience before they are allowed to operate a car by themselves. Needless to say, the handling of a car in such a way as to avoid accidents is one of the fundamentals taught the new men. Furthermore, all the men should be made to understand that the instructor is available for the old men as well as the new. One company has men who have been in the service ten years and more who have come in for additional instructions.

Many street railway superintendents fail to realize how much patience and perseverance is necessary in instructing the men to avoid accidents. After a new man has been turned over to the transportation department by the instructor, his further practical training must be largely in the hands of the inspectors. The proper training of inspectors is a matter in which there is considerable room for improvement. The issuing of orders and instructions by written bulletins will, of course, always be necessary in street railway operation; but these should be supplemented by constant, patient work on the part of the inspectors. To obtain a really good inspector requires much more time and effort on the part of the management than to obtain a satisfactory trainman. Where a trainman can be made to reach a reasonable degree of proficiency in one or two months, it often takes one or two years to turn out a really satisfactory inspector. The ideal inspector, who is friendly with the men under him, but who never allows familiarity to breed contempt for him, and who can watch and suggest to the trainmen practically hour by hour, can work wonders in the improvement of the way the cars are handled. The kind of inspector who hangs around the streets or rides the cars as if he were bored to death, rarely venturing a suggestion to the trainmen, is doing very little to improve the situation and often, by his example, hurting it. The proper training of inspectors should receive more attention. One method that has been successfully tried for getting better inspection results is to divide the system into inspection divisions, each in charge of one inspector, and then, by comparing results on the different divisions, obtain the stimulating effect of rivalry between the various inspectors. Further stimulus can be obtained by holding the inspector morally responsible for accidents which occur in his division in which the trainmen concerned should have known better or acted differently.

The claim department should have a large share in assisting in the reduction of accidents. To secure this there must necessarily be the closest co-operation between the claim and transportation departments. The claim department from its very nature is in constant touch with the accident situation more than anything else connected with the operation of the company, and its advice to the transportation department should therefore be in the nature of expert testimony. Assuming that the claim department gives to each trainman before he starts work the fullest possible instructions regarding accident prevention, a suggestion has recently been made for further co-operation between the claim and transportation departments. It has been suggested that a special inspector be designated, whose sole duty it shall be to investigate for the transportation department each accident that occurs in which any persons or property are injured. This special inspector would have a crew always available to substitute for the crew on any car which had an accident, who could then be taken off to discuss the matter while it was fresh in their minds. It would be the duty of this special inspector to decide from this immediate examination just how the accident happened, and just to what extent it was the fault of either one of the trainmen. This would give him the opportunity of impressing upon the trainmen wherein they were at fault, in a manner which would be remembered by them in the future. The question of whether or not the men should be discharged for the accident would, of course, rest entirely with the superintendent of transportation; but the recommendation of the special inspector would probably have considerable weight with him. This scheme is along the line of closer relations between the trainmen and the company and quicker action in enabling them to gain experience from the accidents which actually occur. The man of sense is not necessarily the one who never makes a mistake, but the one who does not make the same mistake twice; and the scheme in question is an attempt to help the men to learn by experience the dangers to be avoided.

Probably the most essential thing in accident prevention, in spite of all the care and forethought that may be used in instruction and inspection, is the loyalty of the trainmen to the company. The loyal man will be careful in operating his car

and will endeavor to follow carefully the company's rules; but until a man's loyalty is stimulated and built up he will be an indifferent car operator, no matter how much sense and even experience he may have had in car operation. All this, of course, requires that the man in charge of the discipline of the trainmen shall be absolutely fair and just and a good judge of human nature. He should have the degree of personal magnetism and natural leadership which will make the men working under him enthusiastic and loyal. In general, the companies which have the best accident record are those with the most loyal trainmen and the ones whose men stay with the company longest.

It would be very desirable to put into effect some plan by which the careful, loyal trainman would receive a bonus for his greater care and skill in handling his car, because the enlightened self-interest of the individual man, which would be thereby stimulated to greater and greater care, would help more than anything else to improve the quality of car operation. No one has yet been able to devise such a plan which would possess the two essential qualities of

(1) Being perfectly fair and impartial;

(2) Impressing every trainman with the fact that it was perfectly fair and impartial.

The nearest approach to such a scheme in connection with the accident situation is the suggestion of dividing equally between the company and the trainmen (pro rata, according to the wages received by each man) the amount of money by which the cost of damages for any one year fell below that for the preceding year. This plan has the strong point in its favor of tending to make the good men insist upon improvement on the part of the poor men because (the division being prorated to all the trainmen) the careless man would by his carelessness rob all the other trainmen of part of the expected bonus.

The objections to the scheme are:

(1) That the reward for increased efficiency will be a constantly decreasing one (due to the fact that the bonus is always a differential), while the effort required for a given increase in cost saved would be a constantly increasing one.

(2) That the trainmen could never be persuaded to share with the company any increase in damage cost over the preceding year.

Without the latter provision, however, the proposal would be unfair to the company, for the reason that the men could deliberately conspire to make a poor showing one year, so as to get the benefit of half of the improvement the next year.

The first objection could be largely removed by fixing after a few years an arbitrary amount (which past experience had indicated was a reasonable showing) and then offering to share each year with the trainmen the saving in damage cost made over this figure. This modification, however, would not eliminate the second objection above mentioned, and in addition it would introduce a third objection, namely the impossibility of persuading the men that the arbitrary amount chosen was fair. The solution of the problem of stimulating the personal ambition of the trainmen, without thereby introducing troubles into the situation, will be a great stride in accident prevention.

Statistics show that the American is the most reckless individual in the world. This feature of the accident situation is a difficult one because, in the first place, it involves educating all the people to greater care, and in the second place their carelessness arises principally from thoughtlessness, which prevents educational efforts on the part of the street railway companies from having a lasting effect. Some very encouraging beginnings have already been made in the way of lessening the public carelessness. Several of the Texas companies have published statements in the newspapers showing by illustrations and other means the kind of accidents which are likely to occur but which can be avoided by forethought on the part of the traveling public. Letters have been written to all employers of wagon drivers and owners of automobiles asking them to watch for street cars before crossing street car tracks. The school teachers have been persuaded to talk to their children

about the dangers of playing in the street and stealing rides on street cars, and other special interests have been appealed to. A number of companies have warning cards placed in their cars calling the public's attention to avoidable accidents, and the back of transfers has also been used for this purpose.

A very interesting movement has been started within the last few months, known as the "Public Safety League." These leagues have been started by the street railway companies in Seattle and Spokane, Wash., and in Portland, Ore. They began their operations by having a paid lecturer visit all the schools and talk to the school children about the care necessary in avoiding accidents. Each pupil was furnished with a badge, consisting of a small white pennant with the letters "P. S. L." on it. Inquiry from other persons as to what these badges meant served to pass the word along, and, of course, the children reported fully to their parents at home such an unusual occurrence as a lecture during school hours. The movement was later spread to the business men and other classes, so that in the city of Seattle alone 50,000 of these Public Safety League badges were distributed free to the general public. Great good has come from this scheme, due to its getting the people to thinking about their own safety. It has even reacted on the trainmen by making them realize that the public is familiar with what constitutes safe operation, and that as the people are becoming more careful, it devolves on the car operators also to become more careful.

INVESTIGATION AND CARE OF RETURN RAILWAY CIRCUITS*

BY G. G. NELSON, ELECTRICAL ENGINEER NORTHERN TEXAS TRACTION COMPANY, FT. WORTH, TEX.

Unless extreme care is taken with the return circuits the losses in these circuits will become enormous. Very often they are attributed to other causes, such as the waste of power by motormen.

The greatest trouble with all rail bonds is that not enough care and attention is used in their purchase and installation. The ideal place for installing bonds is underneath the angle-plates. In this location the bond can be made very short, usually not over 10 in., and it is protected from copper thieves. Some roads use two bonds on the same joint to insure good conductivity in case of failure of a single bond. Unless double bonding is required for conductivity this practice is not recommended. It is better to install a single bond of sufficient capacity and to maintain it.

For contact surfaces about 100 amp per square inch is good practice. A No. 0000 bond has a contact surface of about $1\frac{1}{2}$ in., so that about 150 amp may be allowed for each No. 0000 bond. The angle-plate, when well bolted up, will carry about 50 amp. Hence 400 amp is a load for two rails bonded with single No. 0000 bonds. Of course, such a track will carry considerably more current, but there will be heating at the joints and the life of the bond will be very much lessened in the same way that the life of any machine is lessened when it is overloaded. If more current has to be carried a larger bond should be used. If this is not possible, double bonding would have to be employed. Angle plates for electric railway joints should have a sufficiently large space between the plates and the web of the rail, so that the bonds will not be pinched.

In drilling the holes in the rail, oil under no circumstances should be used, because it is impossible to wipe all of this oil out of the hole. A thin film will be left which will cause a high resistance contact, which in turn will cause heating, and in a short time increase the resistance of the bond so much that electrically the bond is of no use whatsoever. The writer has not found any trouble in having holes drilled dry, but if some sort of a lubricant is demanded sal soda and water are to be

recommended. After such use, however, the hole, immediately after drilling, should be very carefully wiped out with a clean rag. Then the bond should be installed without any delay, so that the contact will not be damaged by rust. Before installing the bonds the bond contact terminals should be polished with emery cloth. When using a screw compressor a very small amount of flake graphite mixed with oil placed in the punch hole on the bond head will prevent the compressor plunger from cutting the bond, and will enable the compressor screw to be turned up much more readily. Care should be used, however, that none of this graphite and oil gets on the contact surface. The writer has found that the wrenches furnished by the makers for screw bond compressors do not have enough leverage power. It is his custom when a new screw compressor is received to have the length of the wrench increased to 5 ft. He also instructs the compressor man by all means, if possible, to break the compressor by turning up on the wrench when compressing bonds in the rails.

Care should be used in sharpening the drill bits used for boring bond holes, as a drill bit not properly ground will drill a hole considerably larger than it is supposed to. For this reason bonds expanded by means of driving a steel pin into the center of the bond head are in the writer's judgment very undesirable. These steel pins do not allow for various sizes of holes drilled with different bits. Men to work on the bonding gangs should be selected with great care. Only such men should be used as are able to realize the importance of bonding and are able to be taught how to do it. They should be conscientious enough to do the best they can whether or not the boss is watching them.

Immediately after a bond is installed and it is covered up by the fishplate it is impossible to tell whether a first-class or only a fair job has been done. Poor workmanship will show up in six months' or a year's time. Soldered, brazed and welded bonds have been used to a considerable extent, but it is very difficult to get them properly installed with the kind of labor usually available.

Railroad crossings and all track special work should be bonded by means of copper cable extending around them, unless the crossings and special work are of the solid-weld type. The carrying capacity of this cable should be the same as the rail itself, as on a bolted-up crossing or special work very little dependence can be placed upon the rails themselves carrying any current. If desired, old rails, well bonded into the tracks on each side of such special work, can be used to good advantage for special bonds. On all track attention should be paid to having the angle-plate bolts well tightened up, for if the joints are loose mechanically the bonds will soon be damaged so that they are of no practical use.

If there is much leakage of current from the rail to the ground the base of the rail will wear out, due to corrosion, much faster than the ball. Salts will increase this corrosive effect. It has been found that ties treated by the chloride of zinc process to prevent decay will, when used under rails carrying electric current of 100 amp to 200 amp, cause the base of the rail to be eaten away in three years' time, so that the rails are practically useless. This happened under the writer's observation on tracks that were both well and poorly bonded. The poorly bonded track became corroded much faster than the well bonded track.

A power house negative bus was connected some time ago by a 500,000 circ. mil cable to telephone lead-sheathed cables about 4000 ft. away from the power house. The output of the station at the time was 1500 amp, and of this amount 350 amp was being picked up on the telephone cables and returned through the 500,000 circ. mil ground wire.

Once a year all rail bonds should be tested by reliable men. All defective bonds should be repaired. It is desirable to use a tester which will show conclusively whether or not there is any current in the rail. A No. 0000 bond in a 70-lb. rail, if in first-class condition, should show a resistance of from 1 ft. to 2 ft. of rail. Poor bonding workmen will spoil the best bond ever made.

*Abstract of paper read at the annual meeting of the Southwestern Electrical & Gas Association, Houston, Tex., April 27-29.

BOILER ECONOMY AND THE APPLICATION OF FLUE-GAS ANALYSIS *

BY M. L. HIBBARD, ENGINEER SAN ANTONIO GAS & ELECTRIC COMPANY

The chief source of unnecessary waste in the operation of the average boiler plant is either too much air supplied to the furnaces or, probably in a few cases, too little air. With more air than is required for the combustion of the fuel the energy lost is greater than it should be by an amount proportioned to the weight of this excess air and its elevation in temperature from that of the boiler room to that of the stack. With insufficient air a certain amount of carbon monoxide is produced, and since 1 lb. of carbon burned to carbon dioxide (CO₂) represents the evolution of 14,600 heat units, as compared with 4450 heat units, when burned to carbon monoxide (CO), the difference, namely, 10,150 b.t.u., will be carried up the stack. With a throttling of the air supply and the production of CO, the operation of the furnace is carried on after the fashion of a producer gas generator. CO may also be produced by incomplete mixture of the furnace gases or the lack of a temperature sufficiently high to cause its combustion. The mean proportions of oxygen and nitrogen in air by volume are 20.96 per cent of oxygen and 79.04 per cent of nitrogen. The volume of CO₂ formed by the combination of carbon and oxygen is exactly equal to that of the oxygen so used. Hence, as a result of the combustion of 1 lb. of carbon furnished with exactly the right quantity of air, no more nor less, the gaseous products of combustion would have 20.96 per cent of their volume composed of CO₂ and the remaining 79.04 per cent of nitrogen. The volume of CO₂ is always a measure of the air supplied.

The following table is based on pure carbon with the theoretical quantity of air required for complete combustion taken as 1:

Per Cent of CO ₂ by Vol. in Products of Combustion.	Air Supplied.	Per Cent Excess Air.
20.96	1.00	0.0
19	1.10	10.3
18	1.16	16.4
17	1.23	23.3
16	1.31	31.0
15	1.39	39.7
14	1.49	49.7
13	1.61	61.2
12	1.74	74.6
11	1.90	90.5
10	2.09	109.6
9	2.32	132.8
8	2.62	162.0
7	2.99	199.4
6	3.49	249.3
5	4.19	319.2
4	5.24	424.0
3	6.98	598.6
2	10.48	948.0
1	20.96	1996.0

With the boiler furnace as constituted complete combustion with the theoretical quantity of air cannot be obtained and, therefore, the volume of CO₂ will not equal the theoretical value. In the case of a furnace using coal as fuel the varying thickness of the fire and varying resistance to the passage of the air through the fuel due to this and the presence of ash and clinker in the fuel bed will all tend to increased air supply. With good coal 40 per cent to 50 per cent excess air represents fair average operation. In the case of liquid fuel, such as petroleum, the air is brought more intimately in contact with it and a smaller amount of excess air is required.

An accompanying table shows the approximate quantity of heat carried up the stack with various quantities of air. The fuel is assumed to be 1 lb. of pure carbon, having a heating value of 14,600 b.t.u. The stack temperature is taken as 550 deg. Fahr., the temperature of the air supplied to the furnace as 70 deg. and the specific heat of the furnace gases as 0.24.

The apparatus required for making tests of the flue gases and the building up of boiler efficiencies should consist of a thermometer for taking stack temperatures, a draft gage, an analyzing apparatus, so constructed as to give the percentages

of CO₂, O and CO, a suitable form of hand exhaust pump and a small rubber gas bag, all of which can be bought for about \$50.

The apparatus listed above requires no particular skill for its successful and proper manipulation. Having made an analysis and from it determined the excess air, the draft can be cut down or increased. After making a number of these determinations for varying rates of steaming, etc., the

Per Cent CO ₂	Supply of Air in Per Cent of Theoretical.	Weight of Products of Combustion.	Heat Generated in B. t. u.	Heat Lost in B. t. u.	Heat Lost in Per Cent of Heat Generated.
20.96	100	12.56 lb.	14,600	1446	9.9
15.0	139.7	17.15 "	14,600	1975	13.5
12.0	174.6	21.18 "	14,600	2440	16.7
10.0	209.6	25.23 "	14,600	2906	19.9
5.0	419.2	49.45 "	14,600	5696	39.0

air supply can be regulated with considerable accuracy. The firemen can occasionally be checked up by making an analysis to see that the instructions regarding firing and draft regulation are being carried out.

There are a number of forms of CO₂ recorders on the market which automatically make analyses at intervals of two or three minutes, and record the percentage of CO₂ in the flue gases on a chart. The chart is graduated in hours so that the CO₂ at any particular time can be obtained from the chart. Some difficulty has been experienced in the past by engineers in keeping these instruments in operation. Considerable improvement has been made of late in their construction and better results obtained. The CO₂ recorder is doubtless better adapted to the maintenance of furnace efficiencies than it is to the building up of same.

In the matter of the saving effected by increased boiler economy as against increased operating expenses due to the cost of flue gas analysis, a concrete case may be of interest. Assume a plant having a monthly output of 1,000,000 kw-hours and an ordinary efficiency of 2000 watts per gallon of oil, costing 2½ cents, and that the efficiency is increased to 2600 watts. The saving would be \$2,884 a month. That this is not an unusual case is shown by the following record of a central station using crude oil as fuel over a period of several years:

WATTS PER GALLON OF OIL.					
Month	1906	1907	1908	1909	1911
Jan.	2132	2748	2408	2334	2722
Feb.	2225	2786	2611	2324	2559
March	2142	2909	2612	2413	2550
April	2303	2789	2455	2175	2526
May	2405	2777	2575	2408	2494
June	2410	2820	2159	2530	2269
July	2443	2931	2356	2792	2422
August	2321	2608	2216	2951	2547
Sept.	2629	2431	2292	2866	2440
Oct.	2556	3202	2332	2868	2435
Nov.	2498	2501	2353	2942	2550
Dec.	2682	2562	2428	2898	2682
Average for Period	2401	2658	2413	2650	2518
Kw-hours Generated	7,115,668	9,483,192	10,350,781	11,645,894	14,019,350
					3,925,037

During 1906 little or no work was done by the company in the analysis of flue gases. In 1907 considerable attention was given to the matter, with the result that the efficiency was increased 257 watts per gallon. In 1908, due to increased activity in other lines, the subject was dropped, and the efficiency dropped back almost to what it had been two years earlier. In May, 1909, the work was again taken up systematically, and has continued ever since. The marked decrease in efficiency during June, 1910, was due to a breakdown which required the operation of a large number of small machines. During the period covered by these figures little or no change has been made in either the engines or the boilers or in any other operating conditions, except in increased output. The maximum demand on the station having kept pace with the output, the load factor has remained practically the same. Hence, it may be assumed with tolerable certainty that the increased economy has in this particular instance been due almost entirely to the flue gas analysis.

The detail records of the economy attained during the period

*Abstract of paper read at annual meeting of Southwestern Electrical & Gas Association, Houston, Tex., April 27-30.

given show that the economy of the first shift, namely that from midnight to 8 a. m., was increased approximately 45 per cent, that of the second shift was increased 40 per cent, while the third shift, namely that from 4 p. m. to midnight, was only increased about 17 per cent. From this it would appear that during peak load conditions the air supply was regulated with some degree of accuracy, even though it was guesswork, but that during the periods of light load it took a systematic analysis of the flue gases and a proper application of the facts so obtained to bring about results that have saved a great deal of money.

SUB-COMMITTEE MEETING OF THE JOINT COMMITTEE ON ENGINEERING ACCOUNTING

A meeting of a sub-committee of the joint committee on engineering accounting of the Accountants' and Engineering Associations was held in New York at the headquarters of the American Electric Railway Association on Friday, April 28. Those present were the following: H. H. Adams, superintendent of rolling stock and shops Metropolitan Street Railway, New York; John W. Corning, electrical engineer Boston Elevated Railway Company, Boston; N. E. Stubbs, auditor United Railways & Electric Company of Baltimore, and Norman Litchfield, engineer car equipment Interborough Rapid Transit Company, New York, and secretary of the Engineering Association.

This sub-committee was appointed to review the 1910 report of the joint committee on shop accounting. The first order of business was a consideration of points which were brought up in the discussion of this report at the 1910 convention.

James D. Andrew, superintendent of power stations Boston Elevated Railway, in a letter dated Aug. 17, 1910, had suggested that the item "pumps" should be transferred from sub-account No. 3001, covering maintenance of prime movers, to sub-account No. 3004, covering maintenance of auxiliaries. Upon motion it was decided that this point be referred for consideration to Charles Hewitt, superintendent of motive power Philadelphia Rapid Transit Company, who drew up the original classification. Mr. Andrew also suggested a separate sub-account number for coal and ash handling machinery instead of including it in sub-account No. 3004. In this connection the sub-committee discussed a more detailed rearrangement of maintenance accounts as proposed on April 26, 1911, by A. Wolff, superintendent motive power United Railways & Electric Company of Baltimore. It was the sense of the sub-committee that Mr. Wolff's suggestion could be reconciled with Mr. Hewitt's classification by dividing the latter's sub-account No. 3005, "maintenance of electric plant," into subdivisions 3005-a, 3005-b, etc., to cover individual items like switchboards and transformers.

The sub-committee offered the following suggestion for subdivisions under main account No. 30: That No. 3001-a cover maintenance of engines; No. 3001-b, turbines; No. 3002-a, furnaces, including grates and grate supports, etc.; No. 3002-b, maintenance of stokers; No. 3002-c, boiler settings; No. 3002-d, miscellaneous boiler repairs; No. 3004-a, maintenance of pumps; No. 3004-b, economizers; No. 3004-c, condensers; No. 3004-d, heaters; No. 3004-e, ash and coal machinery; No. 3004-f, coal towers; No. 3004-g, miscellaneous auxiliary repairs; No. 3005-a, maintenance of d.c. generators; No. 3005-b, a.c. generators and compensators; No. 3005-c, exciters; No. 3005-d, rotary converters; No. 3005-e, transformers and cooling systems; No. 3005-f, switchboards, including busbars, oil switches and instruments; No. 3005-g, storage batteries and charging outfits; No. 3005-h, wiring; No. 3005-i, miscellaneous electric items; sub-account No. 3006-a, cranes, hoists, etc.; No. 3006-b, miscellaneous steam instruments, etc.; No. 3101, maintenance of sub-station equipment, divided into No. 3101-a, rotary converters; No. 3101-b, transformers and cooling systems; No. 3101-c, switchboards, including busbars, oil switches and instruments; No. 3101-d, storage batteries, including charging outfits; No.

3101-e, wiring; No. 3101-f, miscellaneous electric items; No. 3102-a, cranes and hoists; No. 3102-b, air compressors, vacuum cleaners and other non-electric devices; No. 3102-c, heating systems. Other sub-accounts might be divided in like manner according to local needs.

The next subject discussed was the 1910 report of John Lindall, superintendent of rolling stock and shops Boston Elevated Railway, on subdivision of operating expense account for car maintenance shops. The subdivisions were approved, except that the numbering was revised, so that the terminal figures for the same items in each group would be the same. Following this the sub-committee took up the suggestions of subdividing shop accounts as made at the quarterly meeting of the Street Railway Association of the State of New York held Dec. 6 and 7, 1910, and noted in the *ELECTRIC RAILWAY JOURNAL* for Dec. 10, 1910.

In connection with these suggestions the sub-committee recognized that the subdivisions of account No. 32, as submitted by the 1910 committee, were tentative. It was merely the intention of the committee to show how subdivisions could be applied to any particular system. The sub-committee believed that in any event if it should be desirable to make further subdivisions they could be carried out as follows: Repairs of trucks of different types under the same class of car bodies, account No. 3204-a; truck repairs, including brake rigging, type X; account No. 3204-b, truck repairs, including brake rigging, type Y; for No. 36, covering electrical equipment of cars, use No. 3601-a, control and electric equipment, exclusive of motors, type X, and No. 3601-b, control and electric equipment, exclusive of motors, type Y. Account No. 3207, air-brake equipment, could be divided as follows: No. 3207-a, air compressor, including motor; No. 3207-b, air piping, reservoirs, etc.; No. 3207-c, governors; No. 3207-d, engineer's, triple, electro-pneumatic and emergency valves, and other air-brake details. These subdivisions also applied to sub-accounts Nos. 3217, 3227 and 3247.

Under miscellaneous items, sub-account No. 3260 could be divided into No. 3260-a, for projecting fenders, and No. 3260-b, for wheel guards; sub-account No. 3261 could be divided into No. 3261-a, for car signs, type X, and No. 3261-b, for car signs, type Y.

In regard to subdividing sub-account No. 3611, motors, the sub-committee suggested the following: No. 3611-a, repairs to motors, type X; No. 3611-b, repairs to motors, type Y; No. 3611-c, repairs to motors, type Z, etc. In submitting this subdivision based on all repairs to a given motor, say, per 1000 car miles, rather than assembling the detailed costs of the armatures, fields, brushes, etc., of all motors, the sub-committee felt that for general use such a scheme would determine the important point of the relative cost of each motor as a whole. It was of the opinion that when necessary the individual companies could readily determine what particular part of a given motor was costing too much.

It was suggested that car heating sub-accounts be added as follows: Nos. 3208, 3218, 3228 and 3238 for each main group of car types; also new sub-accounts Nos. 3209, 3219, 3229, 3239, 3249 and 3259 to cover car repairs on account of accidents.

Mr. Stubbs was assigned to communicate with W. F. Ham, comptroller Washington Railway & Electric Company, relative to the method of estimating credits for scrap as mentioned by Mr. Ham at the 1910 convention.

The meeting was then adjourned.

The Massachusetts Institute of Technology has published a bulletin in regard to instruction during the months of June, July and August, supplementing the work of the regular school year. The requirements for admission and in general the work performed and the final examinations correspond with those of the regular school year. The summer courses are open also to persons not students in the institute who possess the necessary qualifications.

AMOUNT OF MAXIMUM TENDER

Two cases recently decided in Richmond throw considerable light upon what constitutes the maximum amount which a passenger can legally tender for fare in Virginia. The defendant company in each case was the Virginia Railway & Power Company, which has in force the Standard Code rule that conductors are not required to make change in excess of \$2 in payment of any fare.

In the first case, which was tried in the Circuit Court of the city of Richmond on Dec. 30, 1910, the plaintiff handed the conductor a five-dollar gold piece. The conductor asked the plaintiff if that was the smallest coin which she had and she replied in the affirmative. The conductor then took the coin and continued collecting fares from other passengers. He subsequently returned to the plaintiff and told her that he would get the change when he reached the next switch. As he was unable to do so, and as the passenger could not, or would not, tender a smaller amount, she was ejected. The court held that the action of the conductor, as described above, was a waiver of any right which he might otherwise have had due to the amount of the tender and instructed the jury to return a verdict for the plaintiff, to whom \$250 was awarded.

In the second case, which was tried April 10 and 11, 1911, in the Law and Equity Court of Virginia, a passenger tendered a five-dollar bill in payment of fare, and the conductor, who was unable to change it, declined to accept it. As the passenger refused to tender any smaller sum he was ejected, and as he resisted the ejection he was placed under arrest by the conductor for disorderly conduct. In this case the court instructed the jury to return a verdict for the defendant. The plaintiff made the following contentions, all of which were denied: (1) That the regulation of the company limiting to \$2 the amount for which change will be given was unreasonable; (2) that the reasonableness of the regulation was a matter for the jury and not for the court; (3) that the regulation should be brought to the knowledge of the passenger; (4) that refusal to submit to ejection was not disorderly conduct; (5) that under the statute the conductor was without authority to arrest.

The first case, which was decided against the company, was not appealed because the verdict was for only \$250, while the appellate jurisdiction of the Supreme Court of Appeals of Virginia is limited to judgments in excess of \$300. The other case, in which the Law and Equity Court practically directed a verdict for the defendant company, was not appealed by the plaintiff, nor is it thought likely a writ of error will be sought.

The following list of cases relating to the obligation of street railway companies to change bills or coins of large denomination at the request of passengers is from the brief of A. B. Guigon, attorney for the company in the second case described above.

"Burge v. Georgia Ry. & Elec. Co., 65 S. E., 879; 6 St. Ry. Rep., 447. Plaintiff tendered a five-dollar gold coin; conductor refused to change it and ejected the plaintiff. Held, whether such a rule is reasonable or not is a question of law for the court and that a rule of the company prescribing two dollars as the maximum amount which will be changed is a reasonable rule, and that where a five-dollar gold coin was tendered by a passenger and two companions for transportation conductor could refuse to change it and require the persons to leave the car. This is a good opinion. Wynn v. Ga. Ry. & Elec. Co., 6 Ga. App., 77; 64 S. E., 278; Barker v. Central Park, etc., Co., 151 N. Y., 237; 45 N. E., 550; 35 L. R. A., 489; 56 A. M. St. Rep., 626; Muldowney v. P. B. Traction Co., 8 Pa. Super. Ct., 335.

"Wynn v. Ga. Ry. & Elec. Co., 64 S. E., 278; 6 St. Ry. Rep., 592, holds that tender for a five-dollar bill is not a good tender of a fare where the rule is that the conductors will not make change exceeding two dollars. This is also a good case.

"See the note, 5 St. Railway Rep., 837, and the case of Knoxville Traction Co. v. Wilkinson, 117 Tenn., 482, which upholds the same principle. In this case ten dollars was tendered.

"10 Am. & Eng. Ann. Cas., 642, has a note citing practically the same cases as those referred to in the Street Railway Reports.

"The right of a carrier to make such reasonable rules and regulations as it may consider proper for the conduct of its business is admitted; full note to be found in 4 St. Ry. Rep., 434, 992, and 5 St. Rep., 33, in a note to Little Rock, etc., Co. v. Goerner, 80 Ark., 158. See also 6 Cyc., 545 and 547.

"In Barrett v. Market St. Ry. Co., 81 Cal., 296, held that while a tender must be reasonably approximate to the amount of the fare the carrier was under obligation to furnish change, and the tender of a five-dollar gold piece for a five-cent fare was reasonable. This case was, however, explained in Barker v. Central Park, etc., Co., 151 N. Y., 237, as being the result of the peculiar monetary conditions existing in California.

"It is also held that it is not necessary that the plaintiff know of the rule of the company. Knoxville Traction Co. v. Wilkinson, 117 Tenn., 482.

"Virginia and S. W. Ry. Co. v. Hill, 105 Va., 729, holds that where the ticket agent punches a ticket wrongfully and the conductor ejects the passenger before he reaches his destination to which he attempted to purchase a ticket the passenger's right of action against the carrier is not for the ejection, which is lawful, but for breach of contract.

"Ability of conductor to make change does not make it necessary for him to do so where the company has a rule that five dollars will not be accepted. Fundenburg v. Augusta & A. R. Co., 21 L. R. A. (N. S.), 868 (1908).

"I understand that a North Carolina case has just been decided the same way.

"Nor does the mere fact that the conductor at first accepts a tender of the ticket rate through mistake, but within a reasonable time demands the extra sum required of those who pay on the train, operate as a waiver of the rule or entitle the traveller to passage at the ticket rate. Elliott, 2d Ed., Vol. IV, Sec. 1603, p. 450.

"Memphis, etc., v. Chastine, 54 Miss., 503. Counterfeit money paid not a good ticket."

ALUMINUM WIRE FOR FIELD COILS

A report just issued by the International Street & Interurban Railway Association gives some interesting particulars of the use of aluminum wire in field coils of railway motors. This practice of European roads has been mentioned in previous issues of this paper, but the report mentioned, which is by M. A. Mariage, general manager of the General Omnibus Company of Paris, gives details which have not heretofore been published. Twenty-five electric railway companies in Europe are employing aluminum field coils in their motors. Of this number eight companies have had them in use less than six months, nine less than a year, and eight more than a year. Most of the companies have equipped only a few of their motors in this way, but the Hamburg Street Railway Company has equipped 120 motors, all of the GE-800 type, in this way, and the Elberfeld Railway has equipped all of its fifty-four motors.

The section of aluminum wire to provide the same amount of conductivity as copper must be 1.687 times as large at zero degrees C. or 1.645 times as large at 100 deg. C. The actual coil, however, is no larger, because it has been found possible to oxidize the surface of the aluminum wire so that no textile insulation is required. The weight of the coils is about 50 per cent to 55 per cent that of a corresponding copper coil. This weight amounts to about 250 lb. for a two-motor car. The cost is also lower, even including the value of the scrap, which is higher for copper than for aluminum.

Most companies use cambric, paper or other insulation between the different layers of the aluminum field coils, but none between wires composing the same layer.

Several methods are employed for oxidizing the wire in order to provide the non-conductive surface. One company,

while the coil is being wound, moistens the cambric insulation between the coils and also the wire itself with the brush. When the coil is finished and before the outer insulation is put on a current is passed through the coil sufficient to raise the temperature of the wire to about 100 deg. C. The insulation resistance of the surface of the wire then gradually attains its normal value. Another company anneals the aluminum wire by raising it to a temperature of 200 deg. to 300 deg. C. before the coil is wound. Water is applied as before, but the coil is baked in an oven and the process is repeated once or twice. The General Omnibus Company coats the wire and coil with a plastic material having a clay base which gives a mummified coil.

Mr. Mariage calls attention to the fact that in addition to the other advantages of the use of aluminum the maintenance of the coil is low because its lightness reduces the injurious effect of the jars to which these coils are subject. He says, however, that care must be taken in winding to avoid joints in the wire, because it is difficult to make satisfactory joints; also, that care should be taken, when soldering on the field coil terminals, to avoid the formation of oxide on the surface of the aluminum wire.

CHICAGO SUBWAY PLANS

Mayor Harrison of Chicago has announced that he favors the early construction of the first sections of a comprehensive system of subways as outlined in the report of Bion J. Arnold, which was abstracted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 11, 1911. A review of these plans was given by Mr. Arnold at the weekly luncheon of the Electric Club of Chicago on April 26.

The subway sections to be built at the start would include the existing tunnels under the Chicago River at Van Buren, Washington and La Salle Streets. The first subways would relieve the surface lines of a portion of their cars and provide for faster running through the business district. The subway route that it is proposed to build first is from Archer Avenue and Clark Street north on Clark to Madison, thence west on Madison to La Salle and north through the Chicago Railways tunnel to Chicago Avenue. Simultaneously, two loops about the business district should be built for the west side surface cars, using the Van Buren and Washington Streets tunnels. Mr. Arnold estimated that the north and south route would cost \$3,000,000 and the west side route \$4,000,000.

The city now has \$6,109,000 available for subway construction in its traction fund. This fund has been built up during the last three years by the division of profits of the surface lines with the city. The net receipts, after operating expenses and fixed charges have been met, are divided in the proportion of 45 per cent to the companies and 55 per cent to the city.

Mr. Arnold referred to four methods of financing the subways: (1) Granting an indeterminate franchise to a private corporation with the city retaining the right to purchase; (2) construction by the city but operation and maintenance by private contract, the city reserving the right to purchase equipment; (3) construction and equipment by city and operation by private contract; (4) assessment of property for construction in much the same method that a sewer or paving district is created.

The plans for the construction of the subways had required considerable study because of the limited space available between the street surface and the roof of the 60 miles of tunnel now operated by the Illinois Tunnel Company. It was proposed to drive the low-level east and west lines as tunnels and not disturb the surface. The north and south lines, closer to the surface, would be built by open construction. It was thought that if suitable arrangements could be made the work could be accelerated greatly by using the Illinois Tunnel Company's service for removing the excavated material. As the excavation was made the dirt could be dropped into cars of the present subway and hauled to the lake front, where it would be available for filling in Grant Park.

MEETING OF SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION

The seventh annual convention of the Southwestern Electrical & Gas Association was held at Houston, Tex., April 27-29. More than 600 delegates and guests registered. The meetings were held in the new municipal Auditorium, the first floor of the building being given over to an interesting and attractive electrical show.

The convention opened on Thursday morning with President W. B. Tuttle, of San Antonio, in the chair. In his presidential address he commented on the present favorable tendency toward publicity in corporation management. Heretofore, he said, the public had seen only the collection side of the corporation's business and had often neglected to consider the huge outlays for operation, maintenance and new construction. It failed to realize, for example, that a corporation often put back into a community more than its net earnings during the same year, while the coming of the company's service might greatly increase real-estate values and improve the healthful conditions of the homes it reached. Although all other commodities had steadily risen in price, central-station service alone had decreased in cost, and the ride purchased for a nickel has grown in value, satisfaction, speed and comfort from the horse car to the modern electric railway car. Public-corporation managers, concluded Mr. Tuttle, were conducting "a square business in a square way," and the people were displaying willingness that the company should have the income which it rightly earns.

BOILER ECONOMY AND FLUE-GAS ANALYSIS

At the afternoon session M. L. Hibbard, engineer for the San Antonio Gas & Electric Company, presented a paper on "Boiler Economy and the Application of Flue-Gas Analysis," which is printed in abstract elsewhere in this issue. In discussing the subject Prof. A. C. Scott, of the University of Texas, referred to comparative tests of a Dutch-oven and chain-grate stoker furnace, using in each both lignite and high-grade fuels. The Dutch oven showed superior results using lignite of 8000 units to 9000 units fuel value, and attained a flue-gas content of 8 per cent CO₂ with hand firing, while the modern grate is much below this with the same low-grade fuel. F. G. Frost, of Houston, told of the results obtained there with oil burners, attaining a boiler efficiency of from 12 per cent to 14 per cent, beyond which the magnitude of other losses decreases the net input into the heating surface. H. S. Cooper, of Galveston, said that the type of oil burner employed affected the results less than the character of the draft and the spraying action of the fuel to be obtained.

RAILWAY RETURN CURRENTS

E. E. Nelson, North Texas Traction Company, Ft. Worth, then read a paper on the "Investigation and Care of Return Railway Circuits," which is abstracted in another column.

In the discussion which followed M. L. Hibbard, of San Antonio, told of using a city arc circuit for conducting voltage-drop tests in a street railway system, the lamps being lowered from their brackets as for trimming, and contact made with their wires through test jumpers. At the station the two sides of the arc circuit were linked through a voltmeter. H. S. Cooper pointed out that the leakage from a return conductor to the surrounding earth was a function of its potential difference from the surrounding medium rather than inversely as its carrying capacity. W. L. Wood, of Texarkana, suggested the application of solder with a blow torch around bond terminals, sealing the contact against the entrance of moisture. Objections to this method were raised by Mr. Nelson, who pointed out the disadvantages of heating the bonded joint after completion.

LIGHT-WEIGHT CAR CONSTRUCTION

A paper on the construction and operation of light-weight cars in Houston by R. T. Sullivan, superintendent of the Houston Electric Company, was read by David Daly, general manager of the company, in Mr. Sullivan's absence. An abstract of this paper will be found elsewhere in this issue.

R. B. Stichter, general manager of the Texas Traction Com-

pany, called attention to the great significance of the saving effected by weight reduction in the case of interurban cars having long daily runs, where the energy saving would be expected to amount to 100 watts per ton mile, besides consequent reduction all along the line of investment, operation and maintenance.

THE CAUSE AND PREVENTION OF ACCIDENTS

On Friday morning C. W. Kellogg, Jr., manager of the Texas securities department of Stone & Webster, read a paper on "The Cause and Prevention of Accidents." This paper is abstracted elsewhere in this issue.

C. P. Brown, of San Antonio, thought that during the first six months of a new motorman's service the gong might well be dispensed with altogether, since it was often the cause of accidents because too much dependence was placed on it to "shoo" people off the tracks.

W. L. Wood, of Texarkana, cited an instance of a suit, however, where the motorman's failure to ring the gong, although meanwhile he was using every means to stop the car, resulted in an adverse verdict for \$10,000. During the trial of the case it was quite clearly shown that the car would have struck the man before he could possibly have got off the track even if warned, but the omission to ring the gong constituted a technical breach and the judge instructed the jury to bring in a verdict for the plaintiff. Mr. Wood also remarked that the installation of powerful arc headlights on his cars had resulted in the avoidance of all night accidents during the last three years. In Texarkana he had adopted the plan of having chronically careless passengers reported, and writing each one a personal letter advising him against continuing the practice. In two cases where careless passengers were injured later and sued the company, the production in court of these warning letters had resulted in a verdict for the company. Mr. Wood had all of his men who were off duty attend court cases in which the company was being sued for personal injury damages, and he found that the familiarity which this experience gave the men with accident cases set them thinking and was valuable when they were themselves called upon to handle accident cases.

C. W. Kellogg, Jr., told of a practice employed in Austin, Tex., which was effective in reducing accidents as far as the trainmen's own care was concerned. A graduated wage scale was in effect, a man's pay being subject to an increase after he had been in the company's service a certain period. When a trainman was thus eligible for increased pay, his record was examined by a committee, among whose members were two of the older trainmen in the company's employ. This committee investigated for evidences of accidents or display of carelessness, and if it did not recommend the increase the raise in pay was not granted. The representation of two of their own men on the committee was found to please and satisfy the trainmen with the committee's findings, even if unfavorable to their own members in some cases.

John I. Beggs, formerly president and general manager of the Milwaukee Electric Railway & Lighting Company, who was a visitor in Houston on Friday afternoon, was invited to address the convention. Mr. Beggs spoke appreciatively of the responsibilities of public-utility corporation management, expressing the warmest interest in the work of the Southwestern association and the properties represented by it.

ELECTION OF OFFICERS

On Saturday morning the following officers of the association were unanimously elected for the ensuing year:

President, J. E. Carroll, Beaumont; first vice-president, E. T. Moore, Dallas; second vice-president, D. G. Fisher; fourth vice-president, H. M. Moore, Austin. Dan G. Fisher, of Dallas, was re-elected secretary. The following were chosen members of the executive committee: W. B. Head, Stephenville; W. B. Tuttle, San Antonio; J. B. Carroll, Beaumont; A. E. Judge, Tyler; E. D. Kelly, Terrell; G. H. Clifford, Ft. Worth; E. T. Moore, Dallas; D. G. Fisher, Dallas; W. L. Wood, Texarkana, and J. E. Johnson, Stamford.

ENTERTAINMENT

The entertainment committee adopted the plan of arrang-

ing its recreation features following the principal sessions of the convention. A number of ladies visited Houston and were entertained on Thursday afternoon at the Country Club and in the evening at a reception at the Electrical Show. On Friday evening the Sons of Jove rejuvenation was held. On Saturday there was a boat trip down the Houston ship channel to the San Jacinto battleground, where a shore dinner was served. On Sunday the delegates visited Galveston over the line of the new interurban railway, inspecting the midway power house for the road and the great concrete causeway which will carry the cars across the waters of Galveston Bay. At Galveston automobiles were ready to take the party on a tour of the island.

METROPOLITAN STREET RAILWAY REORGANIZATION PLAN

Further testimony concerning the plans of the bondholders for reorganization of the Metropolitan Street Railway was given before the New York Public Service Commission, First District, on April 24. The witnesses were H. Hobart Porter, of Sanderson & Porter, and James C. Boyd, of Westinghouse, Church, Kerr & Company.

TESTIMONY OF H. HOBART PORTER

H. Hobart Porter, of Sanderson & Porter, testified that the allowance for incidentals in the exhibits submitted on behalf of the committee would prove in actual practice inadequate to cover the items set forth. In his own experience he would have been inclined in making up a similar estimate of work to be performed to take out some of the items included, and then, having in mind the conditions prevailing for this work, would have allowed at least 10 per cent to cover the remainder. He did not believe that any experienced contractor competent to handle a piece of work of this character could afford to handle it on the basis of the 10 per cent allowed. He knew that the 10 per cent would be used up in the contractor's expenses of administration. Five per cent would not pay the cost of the engineering in this particular case. Such items varied largely with the character of the work and the conditions surrounding it.

The total allowed for interest and taxes during construction was inadequate to cover that item. The item of land carried interest for only three years. In work of this magnitude it was necessary that general plans be in hand before the money could be raised. It would be necessary that the more important portions of the land be under option. In order to obtain the land at a proper value it must be bought; it could not be held under option for a long period. The interest therefore would run during the entire period, allowance being made, of course, for interest charged to operation, as portions were used in operation. On the average three years' interest would be inadequate. It was possible that the track paving, ducts and feeders could be built and placed in operation so that the interest period would be as short as that placed upon it in this estimate, but Mr. Porter should regard it as a remarkable performance.

A power plant such as was necessary could not be built in two years. General contractors asked to be paid from time to time as the work progressed, and their profit should carry a considerable amount of interest. From Mr. Porter's own experience in work of this character, if he were to estimate the working capital he would figure how many months the work would require. If the work was to divide up evenly he would assume that probably three months' average expenditure would be adequate, and it was possible that under some circumstances less would be necessary. Judging from the estimate of time required, he thought the amount of working capital stated would be found to be very inadequate.

Estimate of the time within which work of the kind could be done was one of the most hazardous problems ever submitted to an engineer, but Mr. Porter felt that if an estimate of five years were made and any capitalists advanced money on faith in that estimate there would be a great deal of disappointment before the day of completion arrived.

Mr. Porter considered that if a company was spending an-

nually and continuously sufficient money from operating expenses to maintain 100 per cent operating efficiency it was as valuable as though no physical deterioration existed. He had estimated that it would be necessary to expend annually for repairs, renewals and replacements of the Metropolitan system \$2,650,000. All going public service corporations with real value required large amounts of additional capital continuously because they must grow. The production of that capital by the use of a fund for renewals, etc., was the cheapest thing the corporation could do, because thereby it saved itself discount on bonds and secured capital at the very lowest rates.

Mr. Porter thought the road was in efficient operating condition. He would not say 100 per cent, but it was in a good deal better condition than the average. Giving a general expression of opinion, he would say that less than \$10,000,000 of the \$50,000,000 cost of construction would represent physical deterioration. That was a maximum amount reached in his mind from study of the physical property. Judging from general observation, he should think that the receivers had brought the property up to a condition where the depreciation would represent less than \$10,000,000.

It was Mr. Porter's experience that it was not economical as a rule to have companies build their own extensions, and in companies in which he had to do with the management he frequently found that it was far cheaper to let the extension work so as not to interfere with the proper conduct of the regular business of the company. If the regular staff was put upon construction work in a company that was caring for the public efficiently there was almost invariably a series of complaints about bad service.

A company acquired a value as a result of having been operated and having learned some things that could not have been known originally. This experience always cost money. A property that was in good operating condition was worth more money when it was "seasoned" than when new. This experience was apt to decrease the operating expenses, but would also sometimes increase the gross earnings. Every community had its own peculiarities, and it cost money to learn how to make the best of each place. That produced what Mr. Porter meant by going concern value. The determination of this value was a case of financial judgment with a certain limited amount of engineering skill out of which the basis was built. The going concern value of each property would have to be estimated separately and might vary from 5 per cent to 25 per cent or 30 per cent owing to the difficulties of the situation.

While a property had to be studied all the time it took a long period to get the machine into such good operating condition that that kind of study could take place and be effective immediately.

Under examination by Commissioner Maltbie, Mr. Porter stated that the amount of \$2,650,000 which he estimated the Metropolitan system should expend annually for maintenance, repairs, renewals, etc., included a certain allowance for replacement before absolute physical degeneration would compel such replacement. No allowances were made for changes in the art or inadequacy.

TESTIMONY OF JAMES C. BOYD

James C. Boyd, of Westinghouse, Church, Kerr & Company, testified that the allowance of 8.8 per cent for incidentals was altogether too small. He expressed the same opinion regarding the allowance of 10 per cent for general contractor's profit. Even under a more favorable contract the larger part of this would be used up, and on a lump bid a great deal more should be allowed for this item. The allowance of 5 per cent for engineering was also too small. It did not provide for contractor's engineering, and there would be some engineering expense in connection with land. The calculation for interest and taxes during construction was very conservative. To complete construction of the property would require a somewhat longer period than five years. Interest would accrue on contractors' profits. Going concern value offset the depreciation in a telephone property which had been appraised recently in which each of these items amounted to 20 per cent of the cost of construction.

INSTRUCTION ROOM FOR BERLIN MOTORMEN

The two accompanying illustrations show portions of the instruction room used by the Grosse Berliner Strassenbahn, Berlin, Germany, for the class instruction of motormen. In exercising its choice of candidates the Berlin company prefers men who have been honorably discharged from the army. Such men are considered very desirable on account of their military bearing, neatness and discipline. The instruction



Instruction Room of Berlin Street Railway

course of the company extends over a period of from 14 to 21 days, according to the ability of the student. The platform and schoolroom work is alternated throughout the day, two-thirds of the time being spent on the cars and the rest in the classroom. As shown in one of these views, part of the classroom instruction is given on a dummy platform which is equipped with a controller, brake handles, sander, trolley catcher, trailer coupling and even the "current-on" clock, which indicates the coasting ability of motormen. The instruction room also contains samples of overhead line installation, which are described to the students to enable them to prepare reports on line troubles. The room is also furnished with the speci-



Giving Instruction in Overhead Work and Car Operation

mens of roadway signs such as the one marked "H," which is an abbreviation of "Haltestelle," signifying stopping place. The general instructor also supplements the talks and black-board demonstrations by describing individual parts of both car equipment and line equipment. On completing the instruction course the student must pass an examination given by the car engineer and traffic inspector of the district where he is to be employed. He then receives charge of a car for about two weeks under the observation of the local roadmaster, who must report him as satisfactory before he is finally accepted.

PITTSBURGH MEETING OF COMMITTEE ON EQUIPMENT

A meeting of the committee on equipment of the American Electric Railway Engineering Association was held at the Fort Pitt Hotel, Pittsburgh, Pa., on Monday and Tuesday, May 1 and 2. The committee members present were: Chairman, Milan V. Ayres, electrical and mechanical engineer Boston & Worcester Street Railway; A. T. Clark, superintendent rolling stock and shops United Railways & Electric Company, Baltimore, Md.; F. R. Phillips, superintendent of equipment Pittsburgh Railways; F. G. Grimshaw, master mechanic West Jersey & Seashore Railroad; W. Thorn, division engineer cars Board of Supervising Engineers Chicago Traction, and H. L. Patterson, chief engineer Mahoning & Shenango Railway & Light Company. Others present were: I. H. Milliken, McConway & Torley Company; William Bloss and C. H. Tomlinson, Ohio Brass Company; J. L. Davis and M. B. Lambert, respectively of the engineering and sales departments Westinghouse Electric & Manufacturing Company, and J. B. Crawford, Mahoning & Shenango Railway & Light Company.

Mr. Ayres said that in accordance with arrangements made with the American Society for Testing Materials he had appointed the following gentlemen as a conference committee on wrought-iron specifications: A. T. Clark (member of the committee on equipment); Carl F. Woods, Arthur D. Little's Laboratory, Inc., Boston, and C. G. Young, consulting engineer, New York. Mr. Ayres also announced that he had appointed the following gentlemen as a conference committee on steel wheels: H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J. (member of the committee on equipment); E. W. Holst, superintendent equipment Boston & Northern Street Railway, and Henry J. Gulick, Gulick-Henderson Company, inspection engineers, Pittsburgh, Pa. Each of these joint conference committees will have one vote in the deliberations of the American Society for Testing Materials. In this connection, Mr. Ayres announced that a conference committee on specifications for steel axles had been appointed by the chairman of the committee on heavy electric traction.

DISCUSSION ON COUPLERS

Mr. Grimshaw reported on couplers. He had first looked up the *Proceedings* of the Master Car Builders' Association to see how that association had taken up the subject of automatic couplers for steam cars. After this he had called a meeting of his sub-committee in Pittsburgh. After conference it was decided that it would not be advisable to send out a data sheet asking questions on track and grade conditions, length of car overhang, etc., because the answers would be more or less perfunctory and the information itself would be of no great value in reaching a decision. It was decided that, as the Central Electric Railway Association had been studying this matter, it would be well to write to Secretary A. L. Neereamer asking him why that association had adopted a standard coupler, why it had decided on the M. C. B. type of contour and what traffic conditions made it necessary to use automatic couplers. This communication to Mr. Neereamer was answered by R. M. Hemming, chairman of the Central Electric Railway Association standardization committee. The sub-committee thereupon decided it would be interesting to visit several roads in the Central West to observe conditions. The Peoria lines of the Illinois Traction System were first examined. It was found that the passenger train service seemed to be limited to the operation of one train a day each way between Peoria and St. Louis. This train consisted of one motor and one trailer. There was also considerable freight service. J. M. Bosenbury, superintendent of motive power Illinois Traction System, was using an M. C. B. type coupler which had been modified to the extent of lengthening the guard arm by putting a bracket outside of the coupler head and by using a very deep knuckle 16 in. high. This knuckle was adopted because of special grade-crossing conditions which had existed at one time. The ordinary depth of knuckle had uncoupled vertically. From conversation with Mr. Bosenbury Mr. Grimshaw received the impression that this grade crossing had been so modified that it was no longer

absolutely necessary to make use of the extremely deep knuckle.

The sub-committee then visited several roads about Chicago and found that very few of them were running trains. The Chicago, Lake Shore & South Bend Railway was running trains out of Chicago, but did not have particularly severe grade conditions and there were sharp curves only near South Bend. This company was using a coupler of practically M. C. B. contour. It had never experienced trouble from buckling or uncoupling while pushing cars around sharp curves. The Michigan United Railways stated that it was planning to run a few trains soon consisting of one motor and one trailer or of two multiple-unit motor cars. The Chicago & Southern Railway, South Chicago, of which W. B. Tarkington is general superintendent, was using a coupler of M. C. B. type which was not interchangeable on account of its smaller size. This line has curves of 35-ft. radius and one grade of 9 per cent, with short-radius vertical curves at the top and bottom. The couplers operated satisfactorily under these conditions when pushing or pulling a motor car and trailer. The Aurora, Elgin & Chicago Electric Railway was using automatic couplers, but not of M. C. B. type.

After visiting Mr. Neereamer at Indianapolis the sub-committee went to the shops of the Terre Haute, Indianapolis & Eastern Railway, a company which had adopted the Central Electric Railway Association's standard type of coupler. A few of these couplers were found on the company's locomotives. The company seemed to be operating practically no trains except in freight service. The sub-committee also found no train service operated from the Indianapolis union station.

On going to the shops of the Indiana Union Traction Company, at Anderson, it was found that the coupler in use was similar to Mr. Tarkington's design but of standard M. C. B. size to permit coupling up with standard steam cars. This company used an extended guard-arm bracket on the side of the head and a shelf extension at the top. The Mahoning & Shenango Railway & Light Company was found to be using automatic couplers not of the M. C. B. type. They were operated under the most severe conditions, such as sudden breaks in grade of over 7 per cent. It was observed that a spring carrier was used which permitted lateral displacement of $1\frac{1}{2}$ in. on one side and 2 in. on the other side. The overhang of each car was 10 ft., which the speaker did not think severe.

Mr. Grimshaw said that, while he had formulated no definite conclusion, it seemed to him that the interurban train service now being operated was, to say the least, very intermittent and the requirements were not nearly as severe as he had expected to find them. For instance, the crossing situation on the Illinois Traction System had been so modified as to eliminate the necessity for the extra deep knuckle. He thought that when an electric railway reached the stage of regular train service it would find it best to modify its track and curves to approach steam railroad conditions. Thus very few special attachments would be required on the drawbars except that greater radial action would be necessary on account of more severe curve conditions. It would be well to confer with the coupler manufacturers, but he did not think that the situation was serious enough to demand hurried action. It appeared questionable to him whether a majority of the electric railways now operating trains had such unusual conditions as to require special attachments on their drawheads. The feature of the sub-committee's inspection trip which impressed him most was the lack of train service.

Mr. Bloss described the freight trailer service of the Indiana Union Traction Company and other lines in the Central West. The interchange of car-load lots made a standard coupler necessary for connecting lines even if some of the roads in the group did not require special interlocking attachments for their individual conditions. In reply to Mr. Ayres, Mr. Grimshaw said that the radial M. C. B. coupler could be operated in conjunction with steam railroad couplers in trains. Mr. Patterson said that the steam railroads objected to its use because of the danger of buckling and Mr. Bloss added that if used at all the cars so coupled were placed at the end of the train. It appeared

from the general discussion that when car builders ship cars on their own trucks they are often obliged to furnish steam railroad couplers for the trip to destination.

Mr. Ayres stated that the M. C. B. coupler question presented three conditions: Is it necessary to put on some attachment to prevent buckling when pushing, to prevent uncoupling on vertical grades, and to have something like a spring carrier? To this Mr. Grimshaw added a fourth condition, namely: Is a centering device necessary?

Mr. Tomlinson related how the need for a special form of M. C. B. coupler on electric roads came to exist. The original coupler had no vertical movement on itself. An emergency knuckle was designed, but it was found that when coupled to steam railroad cars it came out immediately on vertical grades. In discussing the depth of knuckles, he said that there was 22 in. space between the Peoria cars of the Illinois Traction System, as the long knuckle prevented getting the cars close together unless the platforms were of prohibitive height. An objection to a coupler with a projecting guard arm and a shelf extension at the top was its rigid connection on straight track to certain types of steam railroad couplers.

Mr. Grimshaw said that in any event a shackle bar would be required if a steam car had to be taken around a sharp curve. He said further that the Lake Shore Electric Railway had experienced no buckling in going around curves with couplers of standard M. C. B. contour even in pushing, whereas the Illinois Traction System had been obliged to apply means to prevent buckling.

Mr. Bloss said that the electric railways wanted a coupler to embody the following features: First, M. C. B. contour; second, coupler heads must be interlocking to avoid buckling and to avoid vertical movement, thus requiring rigidity at the coupler head itself; third, the coupler must have flexibility for the carrier. In general, the coupler should have maximum rigidity in the head as well as maximum flexibility in its other parts.

Mr. Patterson thought that too much effort was being made to get a coupler for every possible condition when much trouble could be eliminated by improving the physical conditions of the line to make them suitable for train operation. Mr. Bloss replied that in any event it would be necessary to care for a sudden rise in grade, as when the train passed over a steam railroad crossing.

Mr. Thorn pointed out one important difference in steam and electric coupler operation. On a steam train there is a condition of tension throughout the draft rigging, whereas on an electric train, with, say, two motor cars, a pushing action with tendency to buckle arose if the rear motor car accelerated faster than the front car. Mr. Ayres understood that Mr. Thorn's statement was borne out by the early experiences of the Boston Elevated Railway, which had suffered from the buckling of drawbars due to pushing strains on sharp curves.

Mr. Bloss considered coupler safety. He said that in M. C. B. couplers the wear of the tail of the knuckle was a vital matter and the cost of knuckle maintenance was very heavy. One of the points of the Central Electric Railway Association's standard coupler was the use of interlocking lugs in the head to prevent uncoupling of a train in case a knuckle broke.

Mr. Milliken held the opinion that more attention was given to the buckling question than its importance demanded. The Washington, Baltimore & Annapolis Electric Railroad, for instance, was using a plain M. C. B. coupler successfully, although it had curves of about 35-ft. radius and sudden changes in grade. He did not think it of great importance to have the platforms close together on interurban trains. He saw no objection to the movement of one knuckle on the other. The knuckles on the Washington couplers were 11 in. high and moved out about 4 in. under the worst conditions. Rigid carriers were used. It was not necessary to have much movement of the coupler at its outward point.

Mr. Patterson said that experiments made by him had failed to find any place on his interurban system where a standard

9-in. M. C. B. knuckle would disengage by reason of a break in grade.

Mr. Phillips objected strongly to the tendency to load up the car with all kinds of special devices to overcome deficiencies in the track.

Mr. Bloss pointed out that the sharp curves and abrupt changes in grade encountered by the interurban cars were in the streets of terminal cities where it was difficult, if not impossible, to change the conditions.

Mr. Ayres thought that a middle ground could be taken regarding improving the track conditions for interurban cars in city streets. The short radius curves, perhaps, could not be eliminated in many cases, so that radial drawbars would be necessary, but there was more possibility of so moderating the vertical breaks in grade as to avoid serious trouble. He did not think that it was the committee's province to prescribe a type of coupler which all electric railways should use. There were many interurban railways which had no interchange problems and such lines would not put in M. C. B. couplers until their conditions changed. The problem before the committee was how far could it go in recommending details of an M. C. B. coupler for roads which wanted that type. He did not believe that there was the slightest chance of getting the M. C. B. contour approved as a standard for all interurban railways.

Mr. Clark thought that the committee might lay down four or five general features which a satisfactory coupler should meet without referring to any specific designs.

Mr. Bloss suggested that the committee hold its next meeting in Indianapolis, where it would have the opportunity of seeing couplers operated under a great diversity of conditions. Mr. Tomlinson indorsed this suggestion and said that the coupler manufacturers would doubtless be willing to supply full-size tracings and models for the committee. It was tentatively decided that the next meeting of the committee should be held in July, beginning at Cleveland and ending at Indianapolis. This arrangement will permit the members to study the behavior of the different types of couplers in all kinds of service.

In connection with his report on couplers Mr. Grimshaw was to have included the subject of signal and control connections. He said that he had no definite report to make on this matter, but that many companies appeared to be using the standard M. C. B. air hose.

Mr. Lambert said that the Westinghouse Electric & Manufacturing Company had gone so far as to make its control interchangeable with the General Electric Company's type M system on seven or eight systems and he believed that the General Electric Company had done likewise.

J. L. Davis thought it would be difficult to standardize control circuits, as the speed characteristics of the connected motor cars ought to be identical.

Mr. Grimshaw stated that inasmuch as the committee on heavy electric traction was considering the standardization of the location of apparatus it would be well to communicate with that body before recommending any control circuit standards.

Mr. Patterson felt that improvements could be made in the multiple unit receptacles and plugs now generally used.

Mr. Ayres pointed out that a standard control coupler would have to contain the maximum number of contacts, even if all were not used. As a general rule, however, operating companies would soon find use for the extra contacts for signal circuits, etc.

The general subject of couplers and their signal and control connections was carried over to the next meeting for further report.

DESIGN OF CAR BODIES FOR LIGHT WEIGHT

Mr. Phillips presented a report on the design of car bodies for light weight. He said the most important thing to begin with was to have a universally acceptable unit of comparison. There were many types of cars and innumerable ways of proportioning the seating and standing areas. If it were desirable to compare cars on the basis of seating capacity there ought to be a set of standard or equivalent seat dimensions even in

the dimensions themselves were purely theoretical. The dimensions suggested by Mr. Phillips for this purpose were as follows: Width of seat at hip line, 17 in.; height of seat, 17 in.; height of back, 17 in.; width of back, 17 in.; distance between centers of transverse seats, 30 in.

He said that the four main divisions which make up the equipment in weight of a car might be divided as follows: Car bodies, trucks, motive-power equipment, power brakes. The car body should include the seats, lighting and heating arrangements, foundation brake rigging and hand brake, fare-collection equipment, headlights, fenders, pilots, signs, etc. The dividing line might logically be taken at the center plate, which is a part of the truck. A wheel guard could be considered as part of the truck. The motive-power equipment would include all wires and cables except the lighting and heating circuits. On air-brake cars the dividing line might be established by the pull-rods running from the end of the cylinder levers. The connecting rods and cylinder levers should be considered a part of the air-brake equipment and the pull-rods a part of the truck equipment. In general, it would be desirable to follow the standard accounting classification as closely as possible and also the common practice of truck and car builders in furnishing certain parts when special instructions are not given in the specifications. Thus, truck builders usually furnished the pull-rods, and hence that item should be considered a part of the truck weight.

Mr. Phillips said that he had obtained from the builders the names of all companies using steel cars. It was his intention to correspond with these companies and to assemble all data which he could get relative to the weight and operation of this class of rolling stock. He said that in designing the Pittsburgh cars stress diagrams had been made throughout for all members of the framing and shearing strains had been calculated for the rivets. The later steel cars would weigh 3600 lb. less than the original Pittsburgh design.

Mr. Phillips then discussed the Pittsburgh center-vestibule steel trailers, a description of which was published on page 1155 of the *ELECTRIC RAILWAY JOURNAL* for Dec. 10, 1910. These cars weigh, completely equipped, 22,300 lb., or 360 lb. per passenger. A feature is the use of trucks with 22-in. diameter wheels. These cars have already proved their durability by remaining practically uninjured in collisions which have badly damaged wooden cars. Mr. Phillips said that one of the hindrances of light car design was the prejudice against unusual outlines, such as flat arches, etc. Mr. Thorn submitted some blueprints showing the details and stress diagrams of the underframe of a proposed pay-as-you-enter car for the Chicago Railways Company.

There was a general discussion as to whether cars should be designed with an allowance for impact, but it was the consensus of opinion that this could not be done because the force of collisions could not be predetermined. There was then a general discussion on seat dimensions as a basis of comparison. Some members were of the opinion that cars could be compared to better advantage on the basis of floor area with or without platforms. A comparison on the basis of cubical contents was also suggested. Mr. Phillips proposed that the committee discuss at the next meeting the most desirable unit basis for comparison. Mr. Ayres suggested that Mr. Phillips draw up a report embodying the merits and demerits of the different methods of comparison so that the committee could make a final report merely by eliminating or modifying certain portions. The Monday session was then closed.

CAR HEATING AND VENTILATION

The Tuesday morning session was opened by Mr. Thorn, who presented a report on car heating and ventilation. He said that he had drawn up a rough draft covering the different methods of heating except by the old-fashioned coal stove and had laid down the cardinal points which should be considered in each. His final report would discuss the general ability of the heater to heat the car, the cost of operation and maintenance, the weight of the apparatus, the space occupied, the attention required, the effect on insurance rates, the relation of the heater

to cleanliness and its freedom from noxious gases and ventilation. He was planning to consider the application of a hot-air, hot-water and an electric heater system to typical single-truck and double-truck cars, assuming certain conditions of temperature, power cost, fuel cost, operating conditions, etc.

Referring to the fire risk, Mr. Thorn said that three years ago, when he made a report to the Board of Supervising Engineers Chicago Traction on car heating systems, the Chicago Board of Fire Underwriters had notified him that it would be necessary to charge an extra premium of 10 cents to 25 cents per \$100 insurance according to whether cars with hot-water heaters were stored in fireproof or non-fireproof buildings. Furthermore, the rate on the cars themselves would be increased 17½ cents per \$100 insurance if hot-water heaters were installed. The difference in cost between electric and hot-water heating under these conditions was so small that the former was adopted.

Mr. Thorn said that he had figured out the average energy consumption for the car heaters in Chicago, based on daily temperature reports from the United States government. He had found that the number of cold days during the winter is actually much less than is usually assumed. The cost of heating a car per day per annum, including the cost of hauling the equipment around, but not allowing for differences in insurance rate, was 30 cents for hot water and 30.4 cents for electricity.

It appeared from the general discussion that many railways have their maximum loads in the summer, so that it would be unfair to charge against electric heaters any other items than extra coal cost and attendance. Mr. Thorn pointed out that hot-water heaters do not always receive as much attention as they should, so that a low coal consumption is shown, whereas the tendency with electric heaters is to keep them at the highest notch a greater part of the time. Storm sash, he thought, could be used to advantage in any climate where the temperature dropped to zero. He found in one case that of two cars otherwise alike the one with storm sash had a temperature 9 deg. higher than the other.

Mr. Thorn pointed out that ventilation was an important function to consider in connection with car heating. He described the methods used in Chicago to determine whether the companies comply with the ordinance that 350 cu. ft. of air must be brought into the car per hour per passenger based on maximum standing and seating capacity. The rules of the Board of Health also state that no more than ten parts of carbon dioxide shall be permitted in 10,000 parts of air. He described the various systems of car ventilation now being tried in Chicago and mentioned that one of them was of the natural-draft type. The air inlets are located near the car floor. His observations at Chicago had convinced him that good heating and good ventilation were possible at the same time.

Mr. Phillips stated that the forced-draft heating and ventilating system used in the Pittsburgh steel cars was perfectly satisfactory. The motor is ⅓ hp and delivers 275 cu. ft. of air per minute. He thought that the forced-draft heaters gave more heat for a given amount of coal than the hot-water heaters. The Chicago method of drawing the air over the electric car heaters was an excellent one.

Mr. Davis calculated that 1 kw-minute would raise the temperature of 1800 cu. ft. of air 1 deg. Cent.

In concluding the discussion of car heating, Mr. Thorn mentioned that the Chicago cars average thirteen hours a day; usually eighteen hours are consumed in calculating the heater requirements for a day.

DESIGN OF TRUCKS WITH REFERENCE TO LIGHT WEIGHT

The subject of design of trucks with reference to light weight had been assigned to a sub-committee consisting of Messrs. Phillips, Clark and H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J. Mr. Benedict, chairman of this sub-committee, was absent, but wrote that he expected to have his report ready by June 1.

Mr. Phillips described the trucks used on the steel motor and trail cars in Pittsburgh and discussed the merits of pressed

steel construction for the framing. Mr. Thorne said that the tendency of the truck builders was to get away from the extra heavy designs which they had formerly considered necessary for electric railway conditions.

Mr. Davis referred to the use of light plate frames on European locomotives. The greater elasticity of this design permitted the stresses to be distributed instead of being concentrated at some one point to cause breakage. He thought that every joint in a truck ought either to be welded or riveted. Mr. Thorne believed that the day would come when a motor truck would not weigh more than 30 per cent of the maximum load on the center plate.

Mr. Davis pointed out that if inside-hung motors were used the trucks could be lighter and would have less tendency to get out of square than where there is a distorting effect due to hanging the motors outside. Mr. Thorne stated that an estimate submitted by a truck builder showed a saving of 200 lb. per truck if the motors were inside-hung.

Mr. Davis also said that another disadvantage of short wheel-base trucks, say, 4 ft. 6 in. long, was their tendency to pitch and nose when traveling at, say, 30 m.p.h.

Mr. Phillips found that in starting a car considerable weight was transferred from the front to the rear axle. In one test the weight on the rear axle increased 4000 lb. on the first control point. The temperature of the motors also differed on account of draft conditions. He thought that more uniform loading was obtained when the motors were inside-hung.

MOTOR AND GEAR-CASE DESIGN

There was a general discussion on the use of welded sheet-steel gear cases. Mr. Phillips said that this type was doing well in Pittsburgh, where it had been in service for the past year. Mr. Davis said that if the sheet-steel acetylene-welded gear cases continued to give as good service as hitherto the Westinghouse company would apply them on a much wider scale.

Referring to the possibility of reducing motor weights, Mr. Davis said that the prime object in saving weight was to reduce power consumption. The Westinghouse company was working along the lines of making a given motor do more work, especially by determining the proper gear ratio for the service. A change of gear ratio on one of the Pittsburgh lines had brought about a power saving of 12 per cent without affecting the schedule. At the same time the temperature rise was decreased 20 deg. C. The Pittsburgh armatures were now wound with asbestos-covered wire to take care of trailer operation. These coils, however, required the most rigid inspection against bare spots. The Westinghouse company was now developing special compounds for what it termed heatproof and fireproof armatures. The company was also gradually adopting strap instead of round wire for armatures. In general its object was to make the armature just as durable for a rise of 100 deg. as the present armatures are for a rise of 65 deg.

Mr. Davis said that the Westinghouse company was also developing a system of field control for d.c. motors similar to that so successfully used on the Pennsylvania Terminal electric locomotives. It was experimenting with a slow-speed motor which would be very economical in power consumption for congested districts where most of the running time was spent. On reaching the outlying district the controller would be moved to one high-speed point which would cut out part of the field winding. The idea was to get at least 20 per cent difference in speed. On the experimental line a 40-hp slow-speed motor is doing exactly the same work as a 65-hp motor operated by ordinary control. The saving in power is about 12 per cent. The temperatures of the smaller motor are a little higher, but not dangerously so. The 40-hp motor weighs 2700 lb. and the 65-hp motor 3450 lb.

Mr. Davis thought aluminum coils were too bulky for the fields. The most efficient conductor should be used, for the less crowded the space in the motor the less the heating would be. The aluminum coil had worked out very well, however, for the shunt coils of generators and small stationary motors in wire sizes ranging from, say, No. 32 to No. 40. The most

economical railway motor winding from the space-saving standpoint was a scrap-wound field with asbestos insulation between the turns.

The meeting then adjourned for a trip to one of the Pittsburgh Railways Company's shops and the works of the Westinghouse Electric & Manufacturing Company.

ATLANTIC CITY FOR THE 1911 CONVENTION

Secretary H. C. Donecker has just issued the following bulletin:

"TO THE MEMBERS OF THE

"AMERICAN ELECTRIC RAILWAY ASSOCIATION,

"AMERICAN ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION,

"AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION,

"AMERICAN ELECTRIC RAILWAY CLAIM AGENTS' ASSOCIATION,

"AMERICAN ELECTRIC RAILWAY TRANSPORTATION AND TRAFFIC ASSOCIATION.

"ANNOUNCEMENT OF THE 1911 CONVENTION CITY.

"PLACE OF MEETING.

"The annual convention of your association will be held at Atlantic City, N. J., on Monday, Tuesday, Wednesday, Thursday and Friday, Oct. 9, 10, 11, 12 and 13, 1911. Information as to the specific days upon which the various associations will hold their meetings will be given in later bulletins.

"Our members are familiar with the advantages enjoyed by Atlantic City as a convention place, and it is unnecessary, therefore, to call attention to the facilities offered in the way of hotels, meeting halls and exhibit space. However, it does appear to be desirable that the membership, as a whole, be acquainted with the events which have led to the selection of Atlantic City again this year in order that all may realize the difficulties which confront a committee in the selection of a convention city having proper hotel accommodations for from 3000 to 4000 delegates and guests, and exhibit space approximating as nearly as possible 100,000 sq. ft., and that they may also know the care the officers of the association have endeavored to exercise so to locate our annual meetings in various sections of the country as more or less to equalize between members the expense, distance traveled and time spent in attending same.

"With this last thought particularly in mind the executive committee at the January meeting, after having considered invitations from Rochester, N. Y.; Atlantic City, N. J.; Richmond, Va.; Toronto, Ont.; Niagara Falls, N. Y., and Minneapolis, Minn., resolved that the 1911 convention should be held in some city in the Middle West, provided proper facilities could be obtained, and thereupon appointed a committee on convention location to investigate fully the whole subject. This committee visited Chicago, Minneapolis, St. Louis, Kansas City and Rochester, and obtained information concerning Indianapolis, Detroit, Cleveland, Richmond and Toronto. After thoroughly analyzing the data obtained it was found that the city of Chicago was the only one of those in the Middle West which at this time has available a combination of hotel, meeting hall and exhibit space facilities which could be made to answer the demands of an annual convention of this association, even though the exhibit space is only about one-half that offered at Atlantic City. The committee decided, therefore, to hold the 1911 convention in the city of Chicago.

"For the purpose of making definite arrangements the committee again met in Chicago on Saturday, April 22, when it was learned that the Coliseum Building, which it had been proposed to use for exhibit purposes, had been contracted for by other associations for practically the entire period between Sept. 12 and Dec. 1, there being but two or three open days available during all that time. It was discovered, also, that some of these contracts had been made as far back as August, 1910, though the committee had been assured on the occasion of its first visit to Chicago that the building could be utilized during any part of the month of October for our convention purposes. There being no other space obtainable and the com-

mittee recognizing that the manufacturers' exhibits form an important feature of our convention, it became apparent that this condition eliminated Chicago from further consideration for this year's meeting.

"Inasmuch as the facilities in the other cities, including those of the Middle West, are inadequate at this time, the choice of the committee was necessarily limited to the city of Rochester or Atlantic City, and, feeling that the membership would be better satisfied to go to that city which could provide the best combination of facilities, the committee selected Atlantic City for your convention place. The committee also recommended that negotiations be immediately entered into looking toward an option on the Coliseum Building in Chicago for October of next year, in order that nothing might arise to prevent a Middle West convention in 1912.

"ADDITIONAL INFORMATION.

"Subsequent bulletins will deal with the matter of hotels, railroad facilities, convention halls, manufacturers' exhibits, programs and other features of our annual convention.

"Considering the total membership, the growing interest, the increased committee work and the well-defined subjects which have been laid out for discussion, our thirtieth convention should exceed in practical results the excellent ones held in previous years.

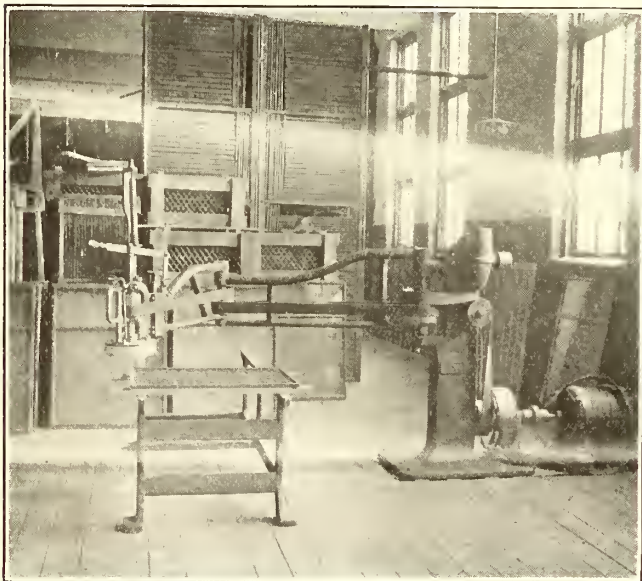
"Respectfully submitted.

"May 4, 1911.

"H. C. DONECKER, Secretary."

MOTOR-DRIVEN MACHINE FOR CLEANING SCREENS

An accompanying illustration shows a motor-driven Fay & Egan door sander, which has been installed in the sash and screen section of the new shops of the Chicago Railways Company for cleaning screens. Each spring about 26,000 storm sash have to be removed from the cars and be replaced with screens. The screens are cleaned and painted before they are sent out to the carhouses for installation. This process is facilitated



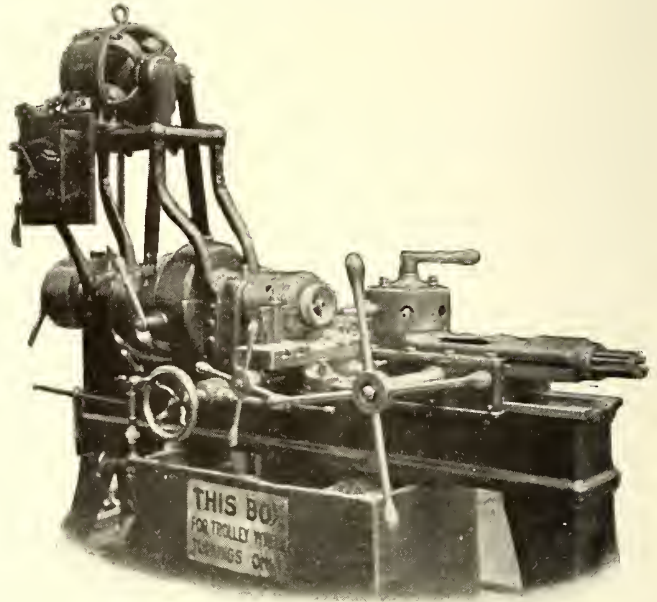
Motor-Driven Machine for Cleaning Screens

greatly by the use of a scrubbing brush which is attached to the revolving head of the motor-driven sander and is rapidly passed over the screen to clean the paint. This machine is driven by a 3½-hp motor.

The Louisville (Ky.) Railway has put in service a 2-ton truck to be used in repair work to take the place of the wagons drawn by mules. The truck was purchased second-hand and the commercial body which surmounted it was replaced by a tower built by the company.

RAPID FINISHING OF TROLLEY WHEELS

The Chicago Railways Company casts its own trolley wheels. These are made largely from scrap. Six wheels are cast in each block and after cooling they are taken to a band saw in the electrical shop and separated from the gates. Each wheel has a square extension about ½ in. long cast on the end of one hub. This square hub fits the grips of the air chuck on the turret lathe which is used for finishing the trolley wheels.



Turret Lathe with Air Chuck for Finishing Trolley Wheels

This lathe has an all-day capacity of about twenty wheels per hour. The lathe, which is of Warner & Swazey manufacture, is driven by a 3-hp motor installed by the shop forces. The air chuck, which makes possible the rapid finishing of trolley wheels without stopping the lathe during the finishing process or when a fresh casting is to be inserted, was designed and manufactured by the machine-shop force.

The process of finishing a trolley-wheel casting on this turret lathe is as follows: The air chuck is opened by turning its control valve. The square extension on the hub of a cast wheel is inserted while the lathe is running and the chuck is closed again by throwing the air valve. Then the cored opening through the trolley-wheel hub is bored out and the hub also is faced with one of the tools held in the lathe turret. Next a mandrel held in the turret is moved into the hole just bored in the wheel hub. This gives a firm support for the wheel while the groove is being finished. When the mandrel is in place a groove-forming tool which is mounted in the back tool post is drawn forward until the groove is completely finished. The mandrel is then withdrawn. Next a reaming tool is put through the hub. Then the finished wheel is cut off and the hub is faced by a cut-off tool mounted in the front tool post. The finished wheel and all of the turnings fall into a box beneath the lathe. This box is mounted on wheels and can easily be drawn away for sorting and emptying its contents.

ADDITIONAL SIGNALS FOR ILLINOIS TRACTION SYSTEM

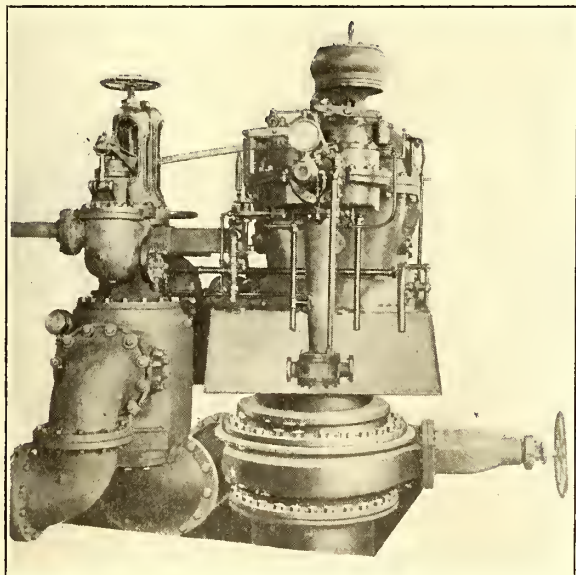
The Illinois Traction System has ordered from the Union Switch & Signal Company thirty-seven Style B electric signal mechanisms and all the necessary supplementary apparatus of the same type as it is now installing. Twelve of these signals will be put in for the protection of curves between Princeton and Ottawa on the Chicago, Ottawa & Peoria Railway and the remaining twenty-five will be used for continuous protection on the line between Edwardsville and Granite City, where the traffic entering and leaving St. Louis is very heavy.

PAPER ON LOW-PRESSURE TURBINES

A paper on "Various Phases of Low-Pressure Turbine Work" was delivered on March 11 before the Providence (R. I.) Association of Mechanical Engineers by E. D. Dreyfus, commercial engineer with the Westinghouse Machine Company. Mr. Dreyfus first discussed combined engine-turbine units where the low-pressure turbine and engine form either a compound or triple expansion unit with all governing cared for by one regulator on the engine. In this connection he described the most desirable engine modifications, such as valve setting, for securing the best results from combination equipments. In those plants where the addition of the low-pressure turbine doubles the possible output of the original equipment and the actual load is correspondingly increased it is desirable to have some factor of safety. This is ideally secured by the use of an auxiliary live-steam admission valve.

The speaker pointed out that the a.c. low-pressure turbine with condenser by-pass operation might prove profitable in existing direct-current railway plants where extension becomes necessary for outlying rotary converter substations. The service in the bordering and sparsely settled territory naturally is infrequent in comparison with important parts of the city. Consequently, the a.c. low-pressure turbine units operate on a comparatively variable load and the by-pass system will thus effect the most economical station results. This is analogous to the conditions surrounding the installation of two 600-kw low-pressure turbines at the Havana Railway's plant. The arrangement of the by-pass valve as connected to one of these turbines is shown in an accompanying shop view. The steam connections have not been completed, and part of the turbine auxiliaries, such as the pump and cooler, have been removed to simplify the illustration. The angle at which this view was taken does not clearly show that the governor valve by-pass connects with the turbine exhaust pipe.

It is not necessary in low-pressure turbines with by-pass governors that the turbine should be large enough to utilize all the exhaust of the engine at, say, atmospheric pressure. The most desirable intermediate pressure and the percentage



By-Pass Valve on Low-Pressure Turbine

of exhaust to pass through the turbine is elective to a great degree. Mr. Dreyfus also considered the application of the low-pressure turbine to intermittently operated and reversing engines; to installations where there is a periodic cessation of the exhaust steam supply; to plants which can utilize waste heat from gas engines, etc. In conclusion, he quoted some economy records and compared the efficiency range of the engine versus the turbine. Some sixty plants, eleven of them electric railways, are now using one make of low-pressure turbine.

10,000-KVA WATER-COOLED TRANSFORMERS

The Pennsylvania Water & Power Company generates power from the Susquehanna River at McCall's Ferry, where it will have an ultimate capacity estimated at 100,000 kw. At present the power generated is transmitted 40 miles to Baltimore. Transmission lines to other large cities are also contemplated.



10,000-kva Transformer Installed in a Baltimore Substation for Power from McCall's Ferry

The Baltimore substation is now equipped for 40,000 kva, but space is provided for additional transforming and switching apparatus. The present equipment consists of four 10,000-kva, three-phase Westinghouse transformers, which are of particular interest because they are the largest transformers ever built. They are of the water-cooled type and are used to step down the 25-cycle current from 70,000 volts to 13,200 volts. The transformer tank is elliptical, having an over-all length of 15 ft. 11 in. and an over-all width of 8 ft. 8 in. The height to the top of the terminal is over 16 ft. and the joint between the case and cover is 11½ ft. from the floor. The total weight of each transformer complete with oil is about 145,000 lb., or nearly 75 tons.

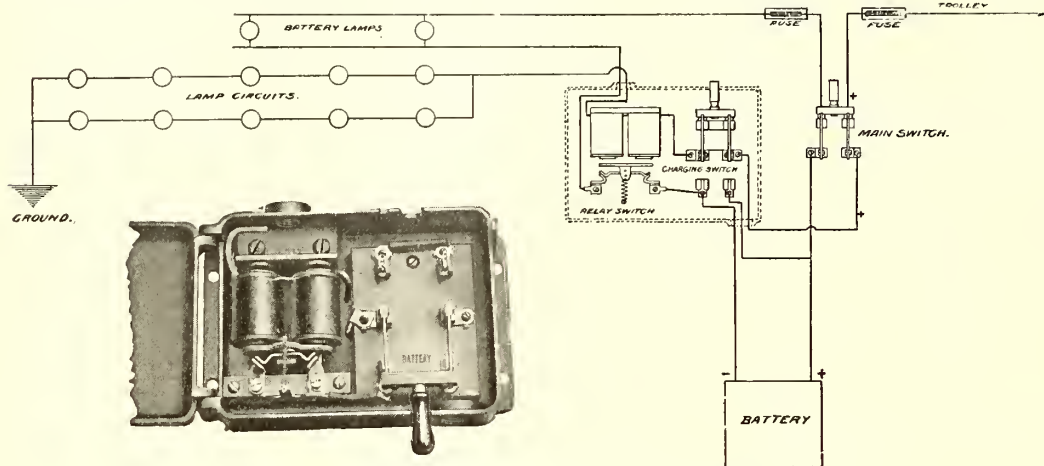
The transformers are of the core type, water-cooled. The cooling water is visible at its exit, so that any stoppage or inequality of flow in the parallel cooling coils can be detected easily. The tanks are of boiler iron with welded seams and crowned cover and bottom. The Westinghouse condenser type of terminal bushing is used, as the specifications called for bushings to withstand a test of 180,000 volts each for one minute. These bushings are made up of alternate layers of insulating and conducting material, which, by producing a uniform distribution of dielectric stress in the insulation, enable the use of a much smaller bushing.

On account of railroad clearances and the great weight of each unit, the core and coils, the tank, cover, base and details and the oil were received from the factory separately. At the Baltimore substation a railroad siding runs directly into the station. Paralleling the siding in the station are the transformer compartments, built of concrete. On receipt of the transformers in the substation it was necessary to assemble them, one at a time, on a truck running on a track having the same center line as the siding but of wider gage. After each transformer was assembled the truck was pushed along its track to the proper compartment and the transformer rolled in on its own wheels. The oil, received in tank cars, was pumped into the tanks after the transformers had been thoroughly dried out. Underneath each transformer is a pit con-

nected with a 10-in. main for draining the tanks in case of emergency. The top of each transformer is connected through a back pressure valve to an 8-in. main to relieve any possible rise of pressure in a tank. The arrangement is such that oil blown out of one transformer cannot enter another. The cooling system is arranged to preclude a shutdown from lack of cooling water.

AUTOMATIC SWITCH FOR EMERGENCY CAR LIGHTING

The Consolidated Car-Heating Company has recently put on the market a switch for automatically charging the auxiliary car-light batteries from the live trolley and for automatically cutting in a group of lamps for lighting the car in emergencies when current has been cut off from the trolley. The device is mounted in an iron box and cover and is provided with outlets for conduit, when the connecting wires are carried in conduits.



Emergency Car Lighting Circuit and Switch

By referring to the diagram of wiring for this switch, it will be seen that the current comes from the live trolley to the main switch and then to the charging switch. Flowing through the magnet coils, it attracts the relay plate away from the contacts and goes to the trolley lamps and then to the ground. In this position it will be noted that the storage bat-

how the relay switch automatically throws the storage battery lights into circuit when current is no longer on the trolley. Under these circumstances, there is no flow of current through the magnet coils and the relay plate falls down upon the contacts. The circuit is now as follows: Current flows from the positive terminal of the batteries to the main switch; then through the fuse to the battery lamps, to the relay plate to the negative terminal of the batteries. The system has been installed on the subway cars in New York. The lamps on the battery circuit are 8-volt, 15-watt, 12-cp tungsten lamps and four are used per car.

CAR WATT-HOUR METERS WITH MERCURY FLOTATION

An account was published in the issue of this paper for Feb. 25 of the Sangamo car watt-hour meter, in which the rotating element is floated on mercury. The growing use of car meters will make a short description of this feature of the Sangamo car meter of interest.

In the meter the armature floats in the mercury, a small solid non-metallic float being riveted to the center of the copper disk so as to give the necessary lifting effect for the entire moving system, including the immersed armature, the aluminum damping disk and the shaft above, as shown in Fig. 1. By properly proportioning the amount of buoyancy a very light pressure, about 3 grams, or 1/10 oz., is exerted on the jewel bearing at the top, thereby rendering the meters proof against the transmission of shock to the moving system or jewel bearing.

The variation in the amount of effective pressure upon the jewel between a temperature of 110 deg. above zero and 10 deg. below zero Fahrenheit, due to change of density of the mercury,

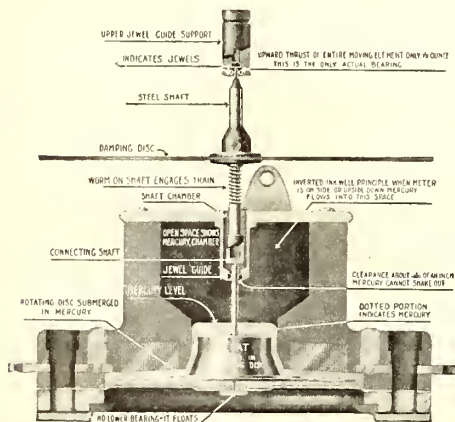


Fig. 1—Mercury Motor Element

teries are not in circuit. By throwing the battery switch to the lower position, as shown in the interior view, current comes from the trolley through the main switch to the storage batteries, then flows through the magnet coils to the trolley lamps and ground. This gives a 1-amp flow through the batteries. As the battery is designed for 8 volts, it can be connected in series with the car lamp circuit in this way without dimming the lamps materially. When the battery has been sufficiently charged the charging switch is of course thrown back to the upper position.

By referring to the wiring diagram again, it will be seen

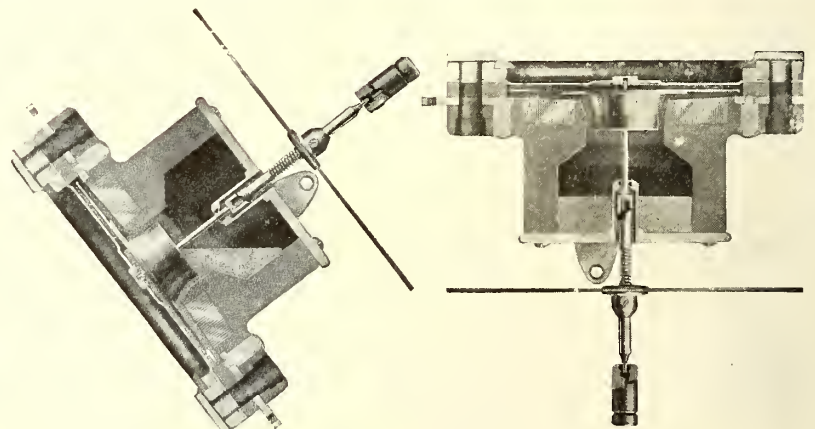


Fig. 2—Mercury Motor Element Half Inverted and Inverted

is not sufficient to show any appreciable difference in the buoyancy. The large ring jewel surrounding the inner spindle where it passes through from the mercury chamber and the small ring jewel at the top of the outer spindle, guiding it where it presses upward against the flat end jewel at the top, have so little friction upon them that the wear is inappreciable and it is said that breakage of these jewels is unknown.

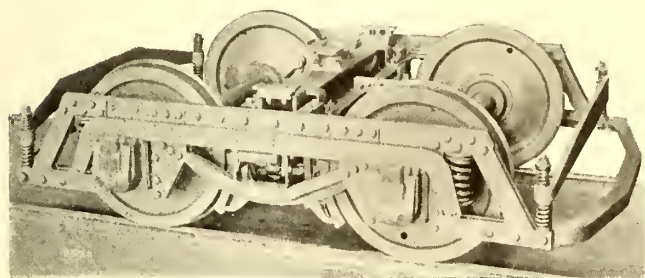
The mercury chamber element is designed somewhat like an invertible inkwell, so that it is impossible to spill mercury, no matter in what position the meter may be turned or placed in shipment, or at the time of installation.

The shaft of the meter is made in two parts. The lower one, which carries the armature, passes up through the sapphire guide ring in the long shell projecting down from the cover of the mercury chamber, while the upper and larger shaft, which carries the damping disk and the worm for driving the recording train, is keyed freely to the lower shaft and is thus properly driven from the armature. The ring jewel guide is very accurately gaged to give a clearance of about 0.001 in. to 0.002 in. on the armature shaft.

The manufacturers claim that the non-spillable feature of the mercury flotation meter, coupled with its ruggedness, renders it especially desirable for use in car service where a meter is inevitably subject to excessive shocks and jars when running over bad joints and special work.

MOTOR TRUCKS FOR WINNIPEG

The Winnipeg (Man.) Electric Railway has recently received from the Baldwin Locomotive Works sixty-four trucks for city service which are of exceptionally light weight. These trucks are designated by the builders as Class 54-18-E and are of the



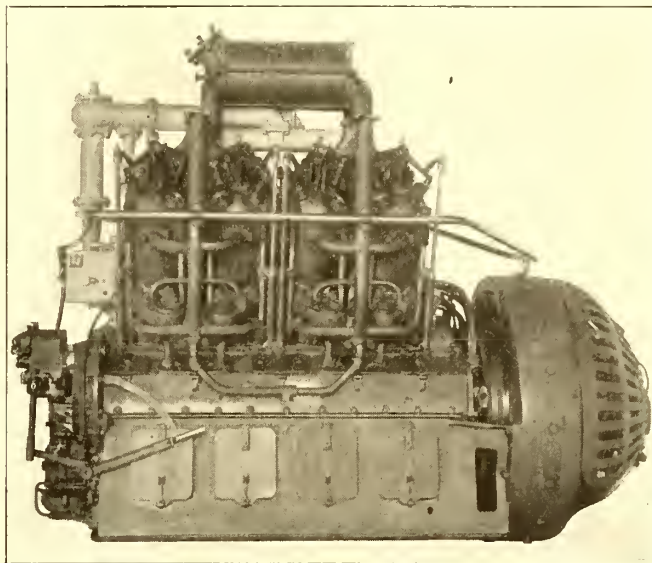
Truck for Winnipeg Electric Railway

pedestal type with double equalizing beams on each side. The equalizers support the side frames through coiled springs, each of which is placed $9\frac{1}{2}$ in. outside of the center of the adjacent journal, so that while the wheel base is only 54 in. the spring base is 73 in. The side frames are forged of wrought iron and are 4 in. deep by $1\frac{1}{2}$ in. thick. The pedestals are formed of

GAS-ELECTRIC CAR FOR B., R. & P. RAILWAY

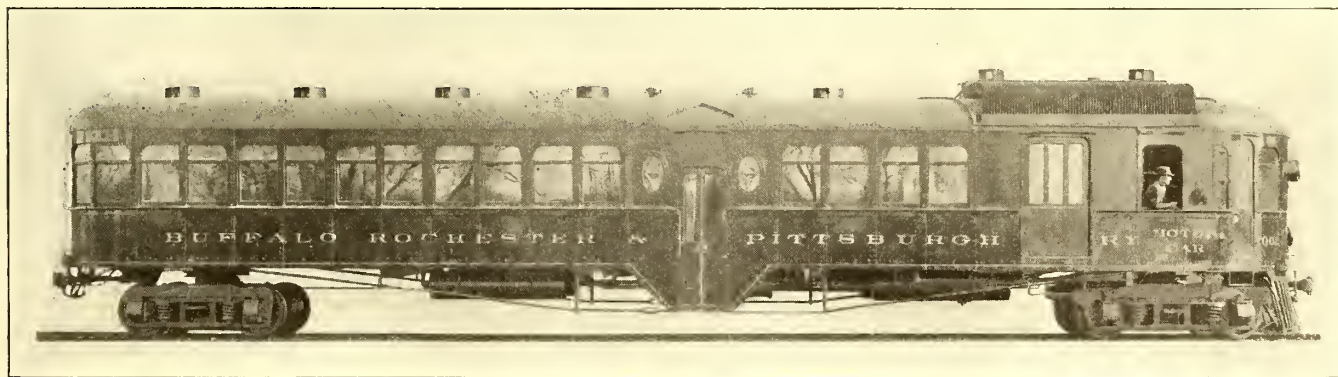
The General Electric Company has just delivered a gas-electric car to the Buffalo, Rochester & Pittsburg Railway. On April 18 the car proceeded to its destination over the lines of the New York Central Railroad & Hudson River Railroad, carrying a party of prominent railroad men. The car is 66 ft. long, 14 ft. 1 in. high and has a seating capacity of 49 in the passenger compartment and 20 in the smoking compartment, with two passengers per seat.

This car derives its power from a gasoline engine and



Gas-Electric Engine and Generator

transmits it to the wheels by means of an electric drive, thus avoiding any direct mechanical gearing or connection between the engine and the wheels. The engine is direct-coupled to an electric generator, forming a compact power plant located in the engine compartment. The electric power thus generated is applied to standard railway motors which are mounted upon



Side View of Gas-Electric Car

steel plates and are rigidly bolted to the side frames. They have malleable iron wear plates and binders. Steel angles are used for transoms and the bolster is cast steel. It is carried on full elliptic springs supported from the transoms with swing links. The brakes are inside-hung and are applied through a live lever located on the center line of the truck. Following the usual practice of the builders all bolts are tapered and driven in reamed holes and all metal surfaces in contact are accurately machined.

The weight of the truck complete without motors is 6950 lb. It is designed for mounting two G.E.-80-A motors outside hung and the maximum service speed is 25 m.p.h. The wheels and axles were manufactured and assembled by the Standard Steel Works Company.

the axles. The car is operated by means of a suitable controller like ordinary electric trolley cars. A 100 gal. storage tank supplies sufficient gasoline to carry the car over 200 miles. The car is provided with automatic and straight air brake equipments and auxiliary hand brake for use in case of emergencies. It is also equipped with standard automatic air signals.

All members of the party were greatly pleased with the performance of the car, which made the trip of 244 miles from Schenectady to Rochester via the Auburn division on time at every point and without delay of any kind. The smoothness of operation and ease of control were subjects of most favorable comment. The speed attained on the heavy grades of the Auburn road was highly satisfactory.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Kentucky.—Taxation—Foreign Holding Companies—Money Paid for Stock Therein.

A Kentucky railway company desiring to raise money to better its lines and equipment by means of an additional issue of stock, a foreign company was organized to hold the same, and it exchanged its own stock therefor and for money paid to it by holders of the common stock, to be turned over to the railway company to make the necessary betterments. Held, that the money thus paid to the railway company was in no sense a debt from it to the holding company, and so subject as such to assessment to the holding company, but was taxable to the railway company as money or betterments in the hands of its owner. (*Commonwealth v. Louisville Traction Co.*, 125 S. W., Rep., 711.)

Michigan.—Ordinance as to Fares—Extension of Corporate Limits—Effect.

An ordinance accepted by a street railway company providing that at certain hours during the day the company should charge certain fares over its lines within the city must be construed strictly against the company and therefore has equal effect in territory subsequently annexed to the city. (*People v. Detroit United Ry.*, 127 N. W. Rep., 748.)

New York.—Taxation—Statutory Provisions.

General Street Railroad Act, Sec. 8, as originally passed (Laws 1884, Ch. 252), provided that no percentage of gross earnings need be paid by a railroad in a municipality of less than 250,000 inhabitants, except when required by the local authorities as a condition to its construction, operation or extension, but that in a city of 250,000 inhabitants or over such a payment must be made whenever a line was constructed or extended after passage of the act. Held that where by annexation a city whose population is less than 250,000 becomes part of a city having a greater population a street railway therein becomes liable to pay a percentage of its gross receipts to the city. (*City of New York v. Pelham Park R. Co.*, 124 N. S. Sup., 958.)

New York.—Mortgages—Construction—Property Included—After-Acquired Property Clause.

A clause in a mortgage given by a street railroad company operating an extensive system acquired largely by leases from various other companies by which the mortgage is made to include all the railroads, contracts and leaseholds then owned by the mortgagor is sufficiently broad to cover an indebtedness due from a constituent company, or lessor, to the mortgagor arising under the terms of the lease for betterments made by the mortgagor on the leased property.

The after-acquired property clause of a street railroad mortgage construed with respect to the property subsequently coming within the mortgage thereunder. (*Farmers' Loan & Trust Co. v. Metropolitan St. Ry. Co. et al.*, 181 Fed. Rep., 575.)

New York.—Power of Revocation.

The franchise to operate a street railroad springs from the State and not from the city where its lines lie, though it is essential that the consent of the municipal authorities should be secured, and hence the right to revoke the franchise rests in the State, and the municipality cannot move to compel a removal of such a company's tracks on the ground that they constitute a nuisance, not from operation in a manner not authorized by the grant, but for mere non-usage. (*City of New York v. Montague et al.*, 124 N. Y. Sup., 959.)

Pennsylvania.—Regulation—Rate of Fare—Strip Ticket.

Where a street railway company contracted with a city that the existing rates of fare might be changed from time to time, but only with the consent of both parties to the contract, and at the date of the contract the company charged 5 cents for a continuous ride and sold tickets in strips at the rate of six for 25 cents and gave free transfers at certain intersections on either cash fares or tickets, the company does not violate the contract by discontinuing the sale of strip tickets without the city's consent.

"Rate of fare" ordinarily signifies the unit or basic price on which the total charge is based, and in the carrying of passengers by street railway companies the rate is fixed at a

certain price per ride, without reference to the distance traveled, and this price for a single ride is the rate of fare, as the term is ordinarily used, so that the total charge of 25 cents for six rides is not a rate of fare as used in the contract relating thereto. (*City of Philadelphia v. Philadelphia Rapid Transit Co.*, 77 Atl. Rep., 501.)

LIABILITY FOR NEGLIGENCE

Georgia.—Injury to Passenger—Pleading—Proximate Cause.

The petition alleged that the plaintiff, who was an old lady unacquainted with the streets or their condition in the City of Rome, where the defendant operates a line of street cars, took passage on one of the cars and made a contract with the conductor in consideration of the fare of 5 cents to convey her as a passenger from that point to Cherokee Street in South Rome, that the conductor failed to comply with his contract and did not carry her to Cherokee Street but put her off the car at East Third Street and gave her a transfer by which she was compelled to walk a quarter of a mile to another car, "that in going to said car petitioner fell, dislocated her hip and broke her hip," that if she had known that she could not have been carried to South Rome without having to walk this distance she, on account of her age, infirmity and defective eyesight, would have employed a hack or other means and would not have attempted to get on the car. No direct connection between the defendant and the fall is alleged. The plaintiff sues for the personal injury received through the fall. Held, that the defendant's wrong, if any, was not the proximate cause of the injury, that the petition does not state a cause of action and that it was properly dismissed on demurrer. (*Burnett v. Rome Ry. & Light Co.*, 66 S. E. Rep., 803.)

Illinois.—Injury to Passenger—Contributory Negligence—Standing on Footboard.

Where a street car is crowded and there are no vacant seats, standing on the footboard is not of itself negligence on the part of a passenger.

A street railroad accepting one as a passenger on the footboard of the car is bound to exercise toward him the high degree of care required of carriers of passengers. (*Math v. Chicago City Ry. Co.*, 90 N. E. Rep., 235.)

Indiana.—Master and Servant—Injuries to Servant—Latent Defects.

In an action for injuries to an employee of a trolley company engaged in braking a spool of wire held by a jack on a car by the jack falling on him, it was proper for the court to charge that if all spools of wire theretofore used by the foreman were free from staples attaching the wire to the spools, except those on the outside, and that down in the wire on this spool, concealed from view so that it could not be detected, the wire was fastened to the spool by a staple, which fact neither plaintiff nor defendant knew, and that this fastening was the proximate cause of the plaintiff's injury, he could not recover, where defendant was not negligent in connection with the preparation of the roll of wire on the spool. (*Dunlap v. Indiana Union Traction Co.*, No. 6879, 90 N. E. Rep., 904.)

Iowa.—Injuries to Travelers—Contributory Negligence.

Plaintiff, a farmer whose eyesight and hearing were both defective, started to drive his team across a street railroad track in the middle of a block when he was struck and injured by a car approaching from the rear. He had traveled on such street from 900 to 1000 ft. without looking or listening for a car approaching from the rear, and his only excuse for not doing so was that he thought there was but one car on the line and he saw this approaching from the opposite direction. It was not unusual, however, for defendant to operate two cars on the line, especially on Sundays and circus days, as was the day of the accident, and at the time plaintiff was struck the car which he saw approaching was about to take a switch directly in front of plaintiff, in order that the other car might pass. Held, that plaintiff was negligent as a matter of law. (*McCormick v. Ottumwa Ry. & Light Co.*, 124 N. W. Rep., 889.)

Massachusetts.—Regulation and Operation—Injuries—Contributory Negligence

A person driving a carriage across a street railway track, after the passage of a car going in one direction, has the

right to rely somewhat on the fact that he heard no gong from the car going in the opposite direction, where one of the rules required a gong to be sounded when passing another car, and to expect that cars will not be driven at so dangerously high a rate of speed without the usual warning signals as to involve danger of a collision. (*Murphy v. Boston Elevated Ry. Co.*; *Sortwell v. same*; 90 N. E. Rep., 398.)

Massachusetts.—Negligence of Passengers—Standing on Running Board.

Where a person riding on the running board of a street car was recognized as a passenger by collection of his fare, he was not, because of his position, as a matter of law, negligent if subsequently injured through the carrier's carelessness.

A passenger so situated has the right to assume that during transit the carrier will not expose him to the peril of injury from passing vehicles, if by the exercise of reasonable diligence the movements of the car can be so controlled as to avoid collision with them. (*Eldredge v. Boston Elevated Ry. Co.*, 89 N. E. Rep., 1041.)

Michigan.—Street Railroads—Collisions—Contributory Negligence.

That a driver of fire apparatus was familiar with the ordinance requiring street cars approaching an intersecting street occupied by tracks to come to a stop at least 20 ft. from the tracks, and knew of the custom of bringing the cars to a stop, and that he relied on the performance of such duty in approaching a crossing, were material as bearing on contributory negligence in driving in front of a car approaching a crossing.

Where the driver of fire apparatus of a city saw a car approach from 40 to 70 ft. away from the usual stopping place of cars, before proceeding to cross a street on which tracks were operated, the court could not say as a matter of law that he was not justified in attempting to cross in front of the car where his horses were under control, and in reliance on the motorman stopping his car as required by a city ordinance, but the question was for the jury. (*Theisen v. Detroit United Ry.*, 127 N. W. Rep., 708.)

Missouri.—Street Railroads—Operation—Contributory Negligence—Driver of Vehicles—Injuries—Proximate Cause.

If the driver knows that a horse is likely to become frightened at street cars, he drives on a street having a car line thereon at his own risk.

That plaintiff's horse was scary would not prevent him from recovering for injuries caused by its becoming frightened at a street car and running over a dirt pile in the street, if the negligence of defendant city and the street car company proximately caused the injury.

Cities must keep their streets in a reasonably safe condition for use by the traveling public, and are liable for injuries resulting from their failure to do so to travelers thereon who are themselves exercising due care. (*Turner v. Southwest Missouri R. Co. et al.*, 120 S. W. Rep., 128.)

New Jersey.—Children—Contributory Negligence.

Whether a schoolboy, six years and ten months old, is chargeable with contributory negligence is to be determined by the standard of care applicable to a boy of his age, considering his surroundings at the time of the accident. (*Ritscher v. Orange & P. V. Ry. Co.*, 75 Atl. Rep., 209.)

New Jersey.—Injury to Vehicle on Track—Contributory Negligence.

Where plaintiff had been driving for some distance along the right side of a street so close to the car track that a car could not pass him, he was not, as a matter of law, guilty of contributory negligence by failing to keep a lookout for a car behind him nor in attempting to cross the track to the left, but such negligence is a question for the jury. (*Knoll v. New Jersey St. Ry. Co.*, 75 Atl. Rep., 450.)

New Jersey.—Infant—Contributory Negligence—Damages.

Where a child is under seven years of age there is a presumption that it is not guilty of contributory negligence, and in the absence of proof to the contrary the judge is justified in taking this question from the jury.

A verdict of \$8,000 for the loss of the leg of a girl six years of age not allowed to stand under the circumstances of this case. (*Baker v. Public Service Ry. Co.*, 75 Atl. Rep., 441.)

Pennsylvania.—Injuries to Passenger—Negligence.

Where a passenger in boarding a car is injured as a result of the starting of the car on a signal by an unauthorized passenger, the railway company is not liable for injuries sustained. (*Cohen et al. v. Philadelphia Rapid Transit Co.*, 77 Atl. Rep., 500.)

Pennsylvania.—Master and Servant—Injuries to Servant—Reputation in a Particular Calling.

Where a servant's injuries were alleged to have been caused by the master's negligence in employing or retaining an incompetent servant, the burden of proof thereof was on plaintiff.

Where it was claimed that a motorman was so incompetent that the street railway company was negligent in employing him, evidence that his reputation for competency as a motorman, among the conductors and motormen who daily congregated to the number of 30 or 40 in the car barn, was bad was admissible. (*Pittsburgh Rys. Co. v. Thomas*, 174 Fed. Rep., 591.)

Texas.—Personal Injuries—Amount of Damages.

Evidence in an action for personal injuries to a young, healthy and strong woman held, in view of the showing as to permanency thereof and probability of resulting paralysis, to sustain a recovery of \$15,000. (*San Antonio Traction Co. v. Probandt*, 125 S. W. Rep., 931.)

Virginia.—Principal and Agent—Misconduct of Agent.

A principal, though liable to make compensation for injuries done by his agent within the scope of his employment, is not liable for exemplary or punitive damages merely by reason of wanton, oppressive or malicious intent on the part of the agent, nor unless such misconduct has been so ratified as to make the principal particeps criminis in the agent's act. (*Norfolk & P. Traction Co. v. Miller*, 174 Fed. Rep., 607.)

ASSAULTS—EJECTMENTS

Alabama.—Assault by Conductor—Liability.

Where a conductor attacked a passenger before he alighted from the car and continued the assault after the passenger had left the car, the carrier was liable not only for the initial assault but for the consequences following therefrom in natural sequence and as a part of one continuous transaction.

Where, in an action by a passenger for an assault by the conductor, the evidence showed that the assault followed a wrangle concerning the failure of the passenger and his companions to leave the car at their destination, it was proper to show the facts, whether their failure to leave the car was due to their carelessness or to the conductor's failure to announce the station, as shedding light on the contentions of the parties and mitigating the damages, though neither reason for failing to get off would be conclusive on the right to recover.

Where, in an action by a passenger for an assault by the conductor, the carrier sought to show that the assault was in necessary defense of the conductor's person, a charge that if the passenger first struck the conductor, and the conductor only struck the passenger to protect himself from assault, the jury should find for the carrier was proper. (*Alabama City, G. & A. Ry. Co. v. Sampley*, 53 So. Rep., 142-3.)

New York.—Passengers—Who Are—Transfer—Ejection of Passenger—Regulations—Time of Presenting.

If a transfer given to a street car passenger was valid, he was entitled to carriage on a car on the line to which he was transferred, and hence was a passenger thereon, though the conductor refused the transfer.

If a street car conductor was justified, under reasonable rules of the company, in refusing a transfer, the holder could not remain on the car after being requested to get off, so as to be entitled to recover for assault in putting him off, even if the original contract of carriage was valid.

Where a passenger waited only 10 or 15 minutes for a street car on a line to which he had a transfer, and no car passed which he could board until 10 minutes after the time limit of the transfer, the company not maintaining its regular schedule, the limitation in the transfer was illegal as to him, so that a rule of the company requiring the refusal of the transfer if the time limit had expired when the passenger boarded the car was unreasonable and illegal. (*Daniel v. Brooklyn Heights R. Co.*, 121 N. Y. Sup., 577.)

LONDON LETTER

(From Our Regular Correspondent)

Most of the trackless trolley schemes which are before Parliament have passed the first and second reading. The two most important cities at present interested in trackless trolley schemes are Bradford and Leeds, and the executive council of the County Councils Association has determined to present evidence to the joint committee of the Lords and Commons. It is contended that it should be in the power of a road authority to refuse its consent to the introduction of trackless trolleys over its roads, except under certain conditions. Among the conditions which might properly be required by a road authority are the following: (1) That where such powers are granted the promoters should be obliged to contribute toward the cost of maintenance of the roads; (2) that the road authority should have power to control the weight of the cars; (3) that strict regulations should be laid down as to dimensions and material of tires; (4) that the traffic should be subject to general regulations made by the road authority. Sir George Gibb, president of the road board, has invited the Council to send delegates to the meeting at the Institute of Civil Engineers to arrange to hold the International Road Congress in 1913 in London.

It will be remembered that Messrs. Griffiths and Bedell were recently awarded a verdict of £12,000 against Sir John Benn for alleged libelous statements made in regard to the G. B. surface contact system. This decision has now been reversed in the Appeal Court before the Master of the Rolls and Lords-Justices Fletcher-Moulton and Buckley, who held that while Sir John had attacked the G. B. system he had not cast any reflection upon Messrs. Griffiths and Bedell personally.

The tramway committee of Belfast has had before it a project to grant halfpenny fares for women. Mr. Nance, the general manager of the tramways, pointed out to the committee that the tramway system had been successfully worked upon penny fares for all adult passengers and that every halfpenny passenger was carried at a loss. The committee has resolved not to accede to the application.

The Wolverhampton Corporation Tramways have been so successful during the year that an amount equivalent to 1½d. rate has been allocated by the committee to the borough funds, after placing the usual amount to the renewal and reserve fund. The Lorain surface contact system has been in service in Wolverhampton since 1902 and has proved very satisfactory.

The returns of the tramways of Great Britain are very much better this year than for the last few years, due undoubtedly to the improved condition of trade in Great Britain. The British Electric Traction Company, which controls systems in various parts of the country, shows increased receipts and increased profits on nearly all of the systems, the increase in traffic for the current year amounting to more than £20,000. The Metropolitan Electric Tramway, which operates in the north of London, shows an increase during the year of 14,000,000 passengers and £67,400 in gross revenue. The dividend on the ordinary shares has been increased from 5 per cent to 5½ per cent and larger sums have been placed to the reserve and renewals account.

For some time the ratepayers of Dover have engaged in a controversy as to whether or not electric trams should be operated in that town on Sundays, and it appeared at one time as if Dover would have no Sunday trams. The Corporation at first used a prepaid postcard to canvass the people, but this did not work satisfactorily and a proper ballot was arranged. By a majority of 1164 out of nearly 5000 votes the ratepayers have now decided that cars shall be operated on Sunday.

Philip Dawson read a paper recently before the Institution of Civil Engineers entitled "The Electrification of a Portion of the Suburban System of the London, Brighton & South Coast Railway." During the last year of steam traction the number of bookings at Peckham Rye Station was more than 500,000, whereas during twelve months following electrification the number of bookings was more than 1,000,000. The London, Brighton & South Coast Railway was the first English railway of any magnitude to adopt the single-phase system.

The report in regard to the electrification of the Brighton Railway's lines extending over some 480 miles has been denied by Mr. Forbes, the general manager of the company. The company is, however, encouraged by the success of the electrified portion and is equipping an additional 15 miles of railway with electricity, including the City and West End routes to the Crystal Palace. The electrification of the Croydon route and the conversion of other sections of suburban routes will follow. The contractors for the electric line and the engineers are prepared to electrify the main line from Croydon to Brighton, but this will not come before the directors for about a year. At present, however, there is no intention to proceed with any general scheme of electrification.

Lynden Macassey, arbitrator, has fixed the price to be paid for the Cavehill & Whitewell Tramway by the Belfast Corporation at more than £56,000, plus all the expenses incident to arbitration, which will probably amount to £10,000.

Sir George Goldie, the new chairman of the finance committee of the London County Council, pointed out recently that the receipts per car mile were decreasing and that during the last two years the working expenses per car mile had increased owing to larger payments for rates on the permanent way, with the result that the surplus on working per car mile, which had hitherto stood at a fraction over 5d., was now expected to be only 4½d. He concluded that while the general financial position of the tramways was sound it was essential to proceed with caution in considering proposals for unremunerative extensions or to add to the working expenses of the undertaking, or offer further facilities to the traveling public which would result in reducing the receipts. The estimated financial results of the tramways for the yearly account show an anticipated surplus on working amounting to £900,885 (viz., electric traction surplus, £915,690; less horse traction deficiency, £14,805). Of this sum debt and other charges absorb £713,041, leaving a balance of £187,844, of which £138,270 has to be carried to the renewals fund under resolution of the Council of June, 1908, and £49,574 is available for the general reserve fund.

The Underground Electric Railways, which owns various electric tubes in London, is again making an effort to procure a physical connection between the Charing Cross, Euston & Hampstead line (the terminus of which is in the station yard of the Southeastern Railway Company at Charing Cross), the Trafalgar Square Station of the Bakerloo line and the Charing Cross Station of the Metropolitan District Railway. Last year a bill before Parliament for a somewhat similar scheme was abandoned on account of the serious opposition. This time it is hoped that the opposition will be overcome. By making a loop in the vicinity of all three stations traffic could be worked much more satisfactorily. The same company is also promoting a bill to extend the Bakerloo Railway from Edgeware Road half a mile to the Paddington Station of the Great Western Railway.

A special meeting of the tramways committee of the Glasgow Corporation was held on April 13 to consider the conditions of service in the department. The motormen and conductors have petitioned for a forty-eight hours' week instead of a fifty-four hours' week, and fourteen days' holiday instead of five days, with pay. In reply to a question, a member of the deputation stated that the motormen and conductors had not threatened to strike. The committee deferred its decision.

The annual congress of the Tramways & Light Railways Association will be held at Edinburgh on July 13 and 14, 1911. In the course of the competition between the Royal Automobile Club and the Imperial Automobile Club of Germany for the cup given by Prince Henry of Prussia, the competitors will stop at Edinburgh for two nights. It is proposed to hold a joint dinner of the representatives of these two clubs and of the association on the second evening, Friday, July 14. The Hon. Arthur Stanley, M. P., will be in the chair, and it is hoped that among the guests will be H. R. H. Prince Henry of Prussia and H. S. H. the Duke of Teck (president of the Royal Automobile Club). Papers will be read and discussed during the mornings of July 13 and 14.

A. C. S.

News of Electric Railways

Subway Negotiations in New York

Additional concessions concerning the Brooklyn Rapid Transit Company's subway offer were made on May 1, 1911, by Col. Timothy S. Williams and a committee of the directors of the Brooklyn Rapid Transit Company at a conference with the Public Service Commission and the committee of the Board of Estimate, of which Borough President McAneny is chairman. The points conceded on May 1 by the conferees were:

First—That the company will operate as original lines, at any time the city wants to build them, the following:

Jerome Avenue extension of the Triborough in the Bronx to Jerome Park Reservoir.

Southern Boulevard extension of the Triborough to the Bronx River.

Astoria and Corona lines in Queens Borough.

Nostrand Avenue extension in Brooklyn from the main line under Eastern Parkway to Flatbush Avenue.

Livonia Avenue extension from Eastern Parkway to New Lots Avenue.

Fourteenth Street extension from Union Square under the East River, and through the Eastern District of Brooklyn to East New York.

Second—That if the city chooses to build the original extensions of the Fourth Avenue Subway from Fortieth Street, Bay Ridge, to Fort Hamilton and Coney Island, respectively, the Brooklyn Rapid Transit Company will agree that \$12,000,000, which it proposed to put into the Broadway, Manhattan, line, may be transferred to such part of the subway system as will not interfere with the future ability of the city to acquire without supplemental cost the main stem lines in Manhattan. The city's conferees, it is known, have made up their minds to build the original Coney Island and Fort Hamilton extensions of the Fourth Avenue, Brooklyn, subway so as to get the benefit of the Brooklyn Rapid Transit Company's offer to contribute \$12,000,000 to subway construction elsewhere in the system.

The offer on the original lines, which included the main stem of the triborough, the Fourth Avenue with Coney Island extensions in Brooklyn; the Flatbush Avenue, with its Brighton Beach extension and its Eastern Parkway extension; the Nassau Street and Broadway-Fifty-ninth Street loop lines in Manhattan; the Queens Borough loop line, from the Queensboro Bridge to Woodside and back to Broadway, Williamsburg, and the whole of the Brooklyn Union elevated system in Brooklyn, was as follows:

The entire receipts to be taken together, and the charges attributable to operation, including taxes, paid; the company then to retain an amount equal to the net earnings on its elevated lines owned in the Brooklyn Union Elevated system and turned over to the new consolidated system for the year previous to that in which operation was begun; the company next to receive interest and amortization on the new capital it supplied; the city next to receive interest and amortization on its capital investment, and the net receipts to be divided equally between the city and the company.

After the conference on May 1 it was pointed out that with the \$80,000,000 of subway building credit which the city will have available on July 1 it would be possible to start all the construction embraced in the Brooklyn Rapid Transit's scheme of "original lines" without any delay about the acquirement of further borrowing capacity.

Col. Williams made it plain that his company would not consent to a parceling out of the transit territory, as suggested by Mayor Gaynor. Col. Williams said:

"The Mayor is reported as saying that the Brooklyn Rapid Transit Company should 'have the Centre Street loop in any case.' This is gracious, but I fear the Mayor has not been studying the transit question of late on his knees, as he is said to have done prior to a certain date. Now that Brooklyn passengers, under our offer, have the opportunity of being distributed over three-quarters of Manhattan, by through cars and with no additional fare, the Mayor could no more restrict them to the Centre Street loop, as a distribution line, than he could reconcile Brooklyn to the substitution of farthing candles in place of electric lights."

Samuel Rea, vice-president of the Pennsylvania Railroad, issued the following statement criticising the offer of the Brooklyn Rapid Transit Company:

"If what I have read contains the full proposition, then I can scarcely credit that it has been received with serious attention, or is worthy of it. I think it a specious proposition, absolutely selfish, and it makes Manhattan Borough and the Bronx a tail, or side issue.

"It specially ignores the lower west side of Manhattan, as well as the new civic development created by the Pennsylvania Railroad through its millions of expenditures in connecting Manhattan, Brooklyn and Queens by rail, not only with each other, but with the rest of the continent.

"If the city finally determines on a new system independent of its present subway, then why not adopt the plan recommended by the Chamber of Commerce for a Brooklyn, west side Manhattan and upper east side Lexington Avenue route, which would be unquestionably better for all interests than that now proposed, which takes the cream of Manhattan without properly serving it or the Bronx, and would require a double fare from the citizens in other boroughs who travel daily to and from these neglected sections?

"The Pennsylvania Railroad and the Long Island Railroad, which serve the boroughs of Manhattan, Brooklyn and Queens, and will eventually reach the Bronx, spent \$150,000,000, with the idea that the city would carry out promptly the construction of the necessary subways to accommodate the traffic to and from its station. It located its Seventh Avenue station advisedly.

"If the Brooklyn Rapid Transit Company's proposition is carried out, a through four-track west side subway for one fare, connecting Brooklyn, Manhattan and the Bronx, that would serve the new Pennsylvania center, must necessarily be postponed indefinitely."

Commenting on Mr. Rea's statement, Col. Williams had this to say:

"Evidently the humor of Mr. Rea's very serious interview is apparent to most people except to himself. He describes our proposal as 'absolutely selfish,' and then proceeds to denounce it because it, in his judgment, does not furnish sufficient access to the Pennsylvania Railroad Station. There may be another reason. Our plan calls for a 5-cent fare from the neighborhood of the Pennsylvania station to Jamaica, whereas the Pennsylvania Railroad Company charges 30 cents for this ride and even commuters have to pay 13 1-3 cents. Therefore, when we consider 'selfishness' we are quite ready to have our attitude compared with that of the Pennsylvania Railroad.

"Of course the public has already realized, even if Mr. Rea and his associates have not, that the location of the Pennsylvania Railroad Station is not along the heaviest currents of travel in Manhattan and never can be. It is desirable in the interests of people generally that adequate transportation to and from it should be furnished, but not at the sacrifice of the wants of forty or fifty times as many people, and we are willing to meet that demand if it can be done without injury to the great number of people we desire to serve.

"At present people in Brooklyn who want to go to the Pennsylvania Railroad Station without change of cars have to take a train from Flatbush station leaving every hour, going east as far as Woodhaven, then turning north and west to the Pennsylvania station in Manhattan, and the fare ranges from 10 to 35 cents, and the time consumed is thirty minutes. We propose to bring 1,000,000 people within one block of Mr. Rea's station by through cars in half the time and for one 5-cent fare."

Mr. Rea replied as follows:

"It is evident that the Brooklyn Rapid Transit Company, with which we have friendly relations, is not aware that the Pennsylvania Tunnel & Terminal Railroad is precluded by its franchise from engaging in local business, and further that the policy of the Pennsylvania Railroad and Long Island Railroad is not to compete with, and their expenditures were not made for the purpose of competing with, the rapid transit lines, but, among other features, to aid the latter lines in solving the transit problems of New York City. Our complaint, therefore, is not that rapid

transit facilities are to be furnished but because the present proposition does not furnish rapid transit to all parts of the city and in other respects is not fair to the city or the taxpayer.

"The Pennsylvania Railroad built its New York and Long Island tunnels without any help from the city, furnished all the capital required, and did not look for any guarantee thereon, but instead pays heavy franchise taxes and general city and State taxes. The company believes that the requirements of the city make it imperative for the Pennsylvania Railroad Station to have rapid transit distributing facilities to and from every borough of the city without omitting any section. If a broad proposition of that kind is offered it certainly would not be opposed by the Pennsylvania Railroad or the Long Island Railroad, or by the citizens using their lines."

Progress of Toledo Negotiations

Negotiations between the city of Toledo, Ohio, and the Toledo Railways & Light Company for a renewal of the grant were pursued uninterruptedly during the week which ended on April 29, 1911. The first examination of the Schreiber ordinance was completed on April 26, 1911, and the negotiators reached the point where appraisers are to be chosen to value the properties.

On April 25, 1911, the negotiators threshed out the question of selecting the third member of a board of arbitration in cases of labor troubles where the employees and the company fail to agree upon the third member. The company agreed that the city should select the third arbitrator. A. E. Lang, president of the company, objected to the clause which declares that the company shall, at the exclusive option of the Council, forfeit all rights, if it fails to abide by the decision of the arbitrators. He said the position of the company would be greatly weakened by so many forfeiture provisions. At the suggestion of Mayor Whitlock this point will be left until the general forfeiture provision is reached and all grounds of forfeiture will be included in one clause or section. The company is to pay the expenses of arbitrations.

On April 25, 1911, the negotiators settled the length of the workday for employes at 10 hours, or 70 hours per week, instead of 8 hours, as provided by the Schreiber draft. In discussing this matter, Mr. Lang urged that in shortening the workday the expense would be increased and that this might make impossible the rate of fare that the Mayor has in mind. Mayor Whitlock took the ground that the service demands men who are not worn out by long hours of work, and that the people must pay enough fare to insure satisfactory service. After discussing the arbitration of labor difficulties to some extent at this session, the Mayor agreed that the city and the company should be bound by the finding of the board, in order that there should be no further possibility of reopening the matter.

In talking over the provision under which the city is to be permitted to purchase the property when the State has conferred the right of municipal ownership. Mr. Lang suggested that intervals at which the city may avail itself of this privilege should be definitely stated, that the city should be bound by the award of a board of arbitration to take the property, and that the conditions of purchase should be such as to protect the capital invested.

The section giving the city the right to take charge of operation if the company fails to furnish the required service for one day was referred to the attorneys. Mayor Whitlock said he would favor the omission of this point, if, in redrafting the portion of the ordinance relating to arbitration, definite assurance was given that the operation of cars could not be tied up by a strike. This was the purpose of putting the provision in the ordinance.

Mr. Lang objected to the provision that the tracks should become the property of the city at the end of the grant or in case of forfeiture. He said that the company could not borrow money under the franchise unless investors were fully protected to the end of the period and that a sinking fund would be necessary to take care of the value of the tracks and other property at the end of the time, and that the rate of fare would have to be sufficient to cover the fund. It was finally agreed that the city

should designate a purchaser under the conditions mentioned and that the attorneys should work out a provision to protect fully both the city and the company. Such a purchaser must take the entire property and not merely the tracks, as provided in the draft. Attorneys will work out the details of the option to be given the city on the plant.

At a meeting of the Council committee of the whole on the evening of April 26, George W. Tonson, city engineer, was instructed to fix the value of the company's physical property. He was one of the State appraisers of railroads in Michigan in 1900 and 1903. He stated that men to do the detail work will have to be employed by the city. He and Mayor Whitlock will confer as to methods of procedure and the work will then be begun. Arrangements will be made with the company to have Mr. Tonson's representatives work jointly with the engineers of the company.

Mayor Whitlock was authorized by the Council to negotiate with engineers to fix the value of the intangible property. He submitted the names of H. E. Riggs, of Riggs & Sherman, Toledo; Frederick T. Barcroft, Detroit, and Professor Edward W. Bemis, Cleveland, as experts.

The monthly meeting of the board of directors of the Toledo Railways & Light Company was held on April 27, 1911. Mr. Lang said the directors felt that the franchise negotiations were taking too much time.

The engineers who work on the appraisal of the property will report their findings to the negotiators as they are completed and the figures will be considered in an effort to arrive at conclusions at as early a date as possible. A new ordinance will be drafted to include the subjects upon which an agreement has been reached and this draft in turn will be amended and corrected, so that only the valuation and rate of fare will be left for consideration until the last.

Contracts for Power from McCall's Ferry

The Pennsylvania Water & Power Company, which operates the McCall's Ferry power plant, has made public its first annual report. The following interesting reference is made by the company to the contracts which it has closed for the sale of power:

"A contract has been closed with the Consolidated Gas, Electric Light & Power Company. A contract has also been agreed upon and only awaits formal confirmation by the Susquehanna Railways, Light & Power Company, Lancaster, Pa. These two contracts call for the delivery of about 16,000 hp of current, and we expect that this amount will be added to by the contract with the United Railways & Electric Company, Baltimore, which contract will practically double the amount of power and put into action approximately 32,000 hp. The contracts so far negotiated have been confined to companies having available steam plants which can be utilized to cover the low stages of the river. We therefore expect to continue making contracts up to the total of 50,000 hp, available during the greater part of each year and for two-thirds of the time available the year round.

"There will be involved in carrying out the contract with the United Railways & Electric Company an expenditure for cables, etc., amounting to \$150,000, and in the case of the Lancaster contract an expenditure for transmission line amounting to \$150,000. The income from these contracts will amount to approximately \$700,000 per year, while the plant available should be able to care for additional contracts which would substantially increase this amount."

Joint Commission Recommends New Subway Plan for Boston

The Massachusetts Railroad Commission and the Boston Transit Commission, sitting as a joint board by order of the present Legislature, have issued a report recommending the construction of a subway under Boylston Street, Boston, in the Back Bay district, and the abandonment of the plans for building the so-called Riverbank subway authorized by Chapter 573 of the Acts of 1907. The joint board fixes the desirable route from the intersection of Commonwealth Avenue and Beacon Street under Commonwealth Avenue, the Fenway, Newbury Street, Hereford and Boylston Streets to Park Street, and recommends a double track line which will parallel the existing Tremont Street subway between Boylston and Park Streets. The estimated

cost of the subway, with stations at Massachusetts Avenue, Copley Square, Tremont Street and Park Street, is \$4,700,000. By the terms of the 1907 act the Riverbank subway is to be built from Park Street to the intersection of Commonwealth Avenue and Beacon Street via Beacon Hill and the south embankment of the Charles River Basin, at an estimated cost of \$3,700,000. The proposed Boylston Street subway would traverse the central business axis of the Back Bay, and would, in the opinion of the joint board, constitute a symmetrical development in the Boston transportation scheme. The board points out that a Boylston Street subway would serve a larger population than the Riverbank tube, citing the increasing development of both Boylston Street and Huntington Avenue, as well as the area in the vicinity of Tremont Street. It considers that the Legislature should enter into an arrangement with the Boston Elevated Railway in connection with the repeal of the Riverbank subway act and the desired passage of a Boylston Street subway act, so that the company may relinquish its rights in the former case and lease the new subway.

Proposed Changes in Cleveland Ordinance

D. E. Morgan, member of the street railway committee of the Cleveland City Council, who has been investigating the request of the Cleveland Railway for an increase in the operating allowance under the Tayler grant, has concluded that if this step is not taken the wages of motormen and conductors will have to be reduced. He took the matter up with Mayor Baehr on April 28, 1911, and both agreed that no reduction of wages should be made.

Officials of the company appeared before the street railway committee recently to urge an increase of 1 cent per mile in the operating expenses, which would make the allowance 12½ cents per car mile. An ordinance introduced some time ago provides for an increase of ½ cent, but the officials state that this is not sufficient to cover the cost of operation. Thomas Kilfoyle, auditor of the company, presented figures to show that the average operating expenses per car mile for the last seven months have been 12.42 cents, or 0.92 of a cent less than is provided for by the Tayler grant. The advance in wages which went into effect on June 15, 1910, resulted in an increase of 1 cent per car mile in the operating expenses. Street Railway Commissioner Dahl told the committee that the deficit in the operating expenses for the year ended March 1, 1911, aggregated \$124,315.47.

On April 24, 1911, Councilman Hanratty introduced an ordinance in the City Council to direct the company to connect the Superior and Detroit, the Payne and Bridge and the Denison and Central Avenue lines. This would be following to some extent the routing that existed under the old franchise and would make possible a trip between the extreme limits of the city without the necessity of transfers. Chairman Kramer introduced a resolution to approve the relaying of 70,032 ft. of track. The company will spend \$59,819 for this improvement.

The report of the special committee of the Chamber of Commerce will probably be submitted to the Chamber within a short time and will then be referred to the City Council, with such recommendations for changes in the Tayler grant as may be deemed desirable.

Southern Pacific Electrification

The first electric train was sent over the new Alameda electric loop of the Southern Pacific Company on April 13, 1911. The cars were run in trains at first and later were separated and individual car tests were made.

Industrial Agent F. W. Hoover, of the Southern Pacific Company, has announced that the Alameda electric service on the south side line will start on June 1, as announced some time ago. The north side of the loop will not be given an electric train service until the Oakland side of the present steam horseshoe route is made over into a part of the electric system.

That the Southern Pacific Company has determined to further extend its trolley system on the San Francisco peninsula is indicated by an application for a franchise made recently to the board of trustees of Redwood City by Judge

Edward F. F. Fitzpatrick, the legal representative of the railroad in San Mateo County. The application is for a fifty-year franchise for a double-track electric railway through Redwood City with extensions to the Woodside district. Since the purchase of the lines in San José the Southern Pacific Company is in control of the electric transportation from that city as far north on the peninsula as Palo Alto.

The first big construction plan for local electric railroads in San José under Southern Pacific ownership will be a loop line of 15 miles, connecting Alum Rock Park, Berryessa and San José. This was announced recently by F. E. Chapin, general manager of the local lines. The line will be double-track and standard gage, and will go into the park via the present narrow-gage route to the mouth of the canyon. The cost of the proposed new route is estimated at between \$500,000 and \$600,000.

Newark Subway Offer Withdrawn

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, Newark, N. J., has withdrawn the proposal which he made to Mayor Haussling of Newark for the construction of a subway in Newark to be used by the cars of the Public Service Railway. Mr. McCarter gave as his reason for withdrawing the offer the failure of the Legislature at the recent session to pass the necessary enabling act to permit the city to build the subway and lease it to the company for a term of years. In his letter Mr. McCarter said:

"As more than four months have elapsed since I wrote you on Dec. 20, 1910, bringing to your attention the imperative need of subway development in Newark to relieve congestion at the Four Corners, and as during the interval nothing has been done by the city authorities in considering or negotiating about this important subject, and as the Legislature has adjourned for the year without enacting any legislation that would permit of the carrying out of any plan, I herewith withdraw the proposition contained in that letter, as it is too important a proposition to remain in indefinite suspense. This will leave the whole subject open to future consideration when in the judgment of the city authorities the proper time has arrived. Meanwhile we will do the best we can to handle the constantly increasing traffic with our facilities."

In his reply to Mr. McCarter the Mayor said:

"I need scarcely point out to you that negotiations looking to the construction of subways would be futile without legislation, and that the failure of such legislation as was requested in this direction left the city with its hands tied."

Association Meetings

Arkansas Association of Public Utility Operators—Little Rock, Ark., May 3, 4 and 5.

Massachusetts Street Railway Association—Boston, Mass., May 10.

New England Street Railway Club—Boston, Mass., May 25.

Illinois Electric Railways Association—May 26.

Central Electric Accounting Conference—Springfield, Ill., June 10.

Central Electric Railway Association—St. Joseph, Mich., June 22.

Street Railway Association of the State of New York—Cooperstown, N. Y., June 27 and 28.

American Electric Railway Association—Atlantic City, N. J., Oct. 9 to 13.

New Jersey Commission Organizes.—At the meeting of the State Board of Public Utility Commissioners of New Jersey, in Trenton, on May 1, 1911, to organize in accordance with the new law, Winthrop M. Daniels, of Princeton University, was seated as a new member to succeed Frank H. Sommer, Newark, and Commissioner Robert Williams, Paterson, was elected president. Alfred N. Barber, Trenton, was continued as secretary, while Philander Betts and Charles D. McKeivey were retained as chief inspectors. Assistant Attorney-General Nelson B. Gaskill submitted an opinion that the new law does not bar State officers from using railroad passes.

National Railways of Hayti.—The National Railways of Hayti has been organized to build a steam railroad in Hayti to connect Port au Prince, Gonaives, St. Marc and Cape Haitien, and develop the northern part of Hayti. The company will take over about 30 miles of track in that section of the island and will build about 350 miles of new track. The contractor for the work is the Caribbean Construction Company, National City Bank Building, New York, N. Y. C. G. Young, 60 Wall Street, New York, N. Y., has been appointed consulting engineer in New York. The construction company sent fifty engineers to Hayti recently and is preparing specifications for the railroad material which will be required. Some electric railway construction in the towns served by the steam railroad may be done later, but the company has no immediate plans for such work.

Fire at Bangor, Maine.—The fire which swept Bangor, Maine, on the evening of April 30, 1911, destroyed the Graham Building, belonging to John R. Graham, president of the Bangor Railway & Electric Company, and crippled the local electric light and power and electric railway service. The General Electric Company shipped to the company before the fire was under control one 500-kw rotary converter, three 185-kw transformers and switchboard and three 100-kw lighting transformers to replace substation equipment which was destroyed. Nearly the entire business section and a large portion of the residential section of the city were wiped out, among the property burned being the general offices of the Bangor & Aroostook Railroad, the local offices of the Western Union Telegraph Company and the Postal Telegraph Company, the telephone exchange, the post office and other public buildings. The total loss is estimated at several million dollars.

Association Bulletins and Data Sheets.—The secretary of the Engineering Association is sending to all member companies and associate members a bulletin outlining the subjects which are being considered this year by each of the standing committees and such special committees as have been appointed. The committee on way matters of the Engineering Association has sent out data sheet No. 73, requesting information for the use of sub-committee No. 3, which will consider the subject of shop facilities and working equipment for the way department. The committee on passenger traffic of the Transportation & Traffic Association is devoting its attention this year to a study of the methods employed by member companies to create and maintain "every day" business. It has sent out a data sheet requesting information regarding civic organizations and the relations of the member companies with such organizations; advertising; activities of industrial and passenger agents, and commutation rates.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

Committee findings with respect to the future of the Boston Elevated Railway's relations with the West End Street Railway and with the transportation situation as a whole in eastern Massachusetts are anticipated with much interest, as are the forthcoming recommendations with respect to the electrification of steam railroads at Boston and the project to permit the New York, New Haven & Hartford Railroad to build a tunnel under Boston Harbor and install an initial electrified service between Readville and Beverly. The announcement of closer traffic and financial relations between the New Haven and the Boston & Albany division of the New York Central lines foreshadows a more favorable attitude toward terminal electrification in the future in case the New Haven plans are permitted to be carried out on the basis of a moderate initial electrification, with a natural extension of the system as its benefits and economies appear from experience under Boston conditions. An order has been sent to the Railroad Commission requiring the board to investigate and report by May 15, 1911, means to protect passengers from injury at the elevated stations of the Boston Elevated Railway. Hearings have been closed upon the bill to permit the New Haven interests to acquire the Boston, Revere Beach & Lynn Railroad. The attitude of the committee upon this bill will in large measure determine its action upon the bill which is designed

to require the Railroad Commission to issue a certificate of public convenience and necessity to the Boston & Eastern Electric Railroad.

The Attorney-General has issued a finding that the proposed law requiring street railways to carry mail carriers in uniform free of charge is unconstitutional. Particulars of the ruling are given on page 819, in this issue. A report has been published on the work of the Railroad Commission, prepared by Clinton H. Scovell, who was retained by Governor Foss. The report contended that the board failed to make sufficient inquiries in connection with security issues upon which it passes. The absence of detailed stenographic reports of hearings on this type of cases was also criticised. The general opinion is that the report will fall short of its purposes through its pointlessness, when examined in detail. It is admitted, however, that the practice of the Massachusetts Gas & Electric Light Commission in making stenographic reports of hearings might be followed with advantage by the Railroad Commission. As a result of the Scovell report, Governor Foss sent a special message to the Legislature again recommending the abolition of the commission and the transfer of its functions to a public utilities board.

OHIO

The Winters public utility bill passed by the House recently has been so amended by the Senate committee on railroads and telegraphs that its application to street and interurban railways is very limited. With water transportation, union depot, freight line and equipment, sleeping car and express companies, they would operate under the laws at present applicable to them. Interchange of service between steam, interurban and street railways would be required only where the lines are of the same grade and gage, the commission to decide whether such interchange is for the public convenience. The section relating to stock control would follow the provisions of the House bill. Rates would be determined upon the basis of the market value of stocks and bonds instead of the physical value as in the House bill. The State Railroad Commission would be succeeded by the Public Utilities Commission. The House committee has recommended for passage the Irvin bill to permit street and interurban railways to borrow money regardless of their capitalization and to mortgage both their real and personal property. The Donson bill to permit greater leeway in the construction of crossings over public highways was also recommended. This bill would permit piers or abutments to be located in the center of public roads outside of municipalities, provided sufficient clearance remained for travel. The idea is to make it more convenient to eliminate grade crossings. The Shaffer bill to give interurban railways the right to condemn trees along their rights of way has been acted upon favorably by the Senate. An amendment was inserted to give the companies the right to condemn private property within the limits of municipalities.

PENNSYLVANIA

The State Legislature has entered upon the last month of its present session with plenty of hard work unfinished, including the important Public Service Commission Bill, which is being so bitterly opposed. Both of the transportation classes have had their hearings before the House Judiciary Committee, and the committee gave its final hearing on May 3. It is stated that the bill will be amended to remove municipalities from its influence, but the Governor is firm in his desire to have the bill passed. It is even intimated that should the Legislature adjourn without passing the measure he will call an extra session for its further consideration. In the House Senator McNichol's bill to provide for the merger and consolidation of street railway and electric power companies, which had passed the Senate, was defeated on final passage through lack of a constitutional majority. Subsequently, however, the House adopted a resolution to reconsider its action and placed the bill on the postponed calendar. The House passed the bill to empower second-class cities to levy and collect taxes for general revenue purposes on street railways, telephone, telegraph, electric light or power, water, gas and heat companies. The House also passed the bill to empower municipal corporations to construct street railway tracks and lease them to companies or persons.

Financial and Corporate

New York Stock and Money Markets

May 2, 1911.

Active demand for bonds is the sustaining feature of the New York markets, the issues having a ready sale at slightly advanced prices, denoting a desire for investment of idle funds. The crop outlook is favorable, but steel orders are about one-third smaller in volume than for the preceding month, and most of the railroads are putting into effect important retrenchments. The stock market is irregular, with prices showing no changes of importance. Money is plentiful and rates easy. Quotations to-day were: Call, 2@23½ per cent; ninety days, 2½@23¼ per cent.

Other Markets

In Philadelphia trading has been irregular, with marked activity and advances in several of the local issues in the early part of the week. Philadelphia Rapid Transit rose to 18, while Union Traction has been fluctuating at 46.

Strength is evidenced on the Chicago Exchange, prices having advanced generally throughout the list. Northwestern Elevated 4s were the feature of the bond market, advancing to 99¼.

Transactions in Boston have been on a broad scale, prices having advanced, although to-day's quotations show a slight falling off from the gains of the week.

There has been a good demand for bonds on the Baltimore list and prices are firm with fractional gains.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 25.	May 2.
American Light & Traction Company (common).....	a288	292
American Light & Traction Company (preferred).....	a106	*106
American Railways Company.....	a44½	44
Aurora, Elgin & Chicago Railroad (common).....	a40	a44
Aurora, Elgin & Chicago Railroad (preferred).....	a86	a86
Boston Elevated Railway.....	127½	127
Boston Suburban Electric Companies (common).....	a15	a15
Boston Suburban Electric Companies (preferred).....	72	a75
Boston & Worcester Electric Companies (common).....	8	a10
Boston & Worcester Electric Companies (preferred).....	a47	44
Brooklyn Rapid Transit Company.....	77½	78¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84	84½
Capital Traction Company, Washington.....	a126½	a130
Chicago City Railway.....	a190	a190
Chicago & Oak Park Elevated Railroad (common).....	3	3
Chicago & Oak Park Elevated Railroad (preferred).....	6	6
Chicago Railways, optg., ctf. 1.....	a90	a85
Chicago Railways, optg., ctf. 2.....	a22½	a22
Chicago Railways, optg., ctf. 3.....	a5	a3¾
Chicago Railways, optg., ctf. 4.....	a5¾	a5
Cincinnati Street Railway.....	a131	*130
Cleveland Railway.....	a97	a96½
Columbus Railway (common).....	a96	*96
Columbus Railway (preferred).....	100	*100
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	100	100
Detroit United Railway.....	a71	71
General Electric Company.....	151¾	158
Georgia Railway & Electric Company (common).....	a132	a133
Georgia Railway & Electric Company (preferred).....	91	91
Interborough Metropolitan Company (common).....	18	18½
Interborough Metropolitan Company (preferred).....	49½	51½
Interborough Metropolitan Company (4½s).....	78½	79
Kansas City Railway & Light Company (common).....	a21	20½
Kansas City Railway & Light Company (preferred).....	a70	a68
Manhattan Railway.....	137	137½
Massachusetts Electric Companies (common).....	16½	a18½
Massachusetts Electric Companies (preferred).....	a87½	a88
Metropolitan West Side, Chicago (common).....	824	825
Metropolitan West Side, Chicago (preferred).....	a68	a68
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	70½	73½
Northern Ohio Light & Traction Company.....	a44	44
Northwestern Elevated Railroad (common).....	a21	a20½
Northwestern Elevated Railroad (preferred).....	65	a65
Philadelphia Company, Pittsburgh (common).....	a53¾	a52½
Philadelphia Company, Pittsburgh (preferred).....	a43	a43½
Philadelphia Rapid Transit Company.....	a17½	a18
Philadelphia Traction Company.....	83¾	82½
Public Service Corporation, 5% col. notes (1913).....	100½	100½
Public Service Corporation, cts.....	a106	a106
Seattle Electric Company (common).....	a107	a107
Seattle Electric Company (preferred).....	a98	a98
South Side Elevated Railroad (Chicago).....	*a71½	a72
Third Avenue Railroad, New York.....	10½	11½
Toledo Railways & Light Company.....	a8	a7½
Twin City Rapid Transit, Minneapolis (common).....	a108½	a109½
Union Traction Company, Philadelphia.....	a45½	46
United Rys. & Electric Company, Baltimore.....	a185½	185½
United Rys. Inv. Co. (common).....	a42	42
United Rys. Inv. Co. (preferred).....	a72	71½
Washington Ry. & Electric Company (common).....	a35½	a35½
Washington Ry. & Electric Company (preferred).....	a90	89¾
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	a103½	a103½
Westinghouse Elec. & Mfg. Co.....	a67	69½
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a117½	a118

a. Asked. *Last sale.

ANNUAL REPORTS

Hudson & Manhattan Railroad

The statement of income of the Hudson & Manhattan Railroad for the year ended March 31, 1911, compares with the preceding year as follows:

Year Ended March 31.	1911.	1910.
Gross revenue, all sources	\$4,165,492	\$3,051,486
Operating expenses and taxes on operated properties	1,850,440	1,464,222
Gross income applicable to fixed charges.....	\$2,315,052	\$1,587,264
Interest on total interest-bearing bonds outstanding.....	\$2,918,007	\$2,464,811
Less interest chargeable to construction.....	819,192	1,076,981
Balance, being interest on capital employed in operation and chargeable against income.....	\$2,098,815	\$1,387,830
Other charges.....	258,127	122,045
Total deductions from income.....	\$2,356,942	\$1,509,875
Net income after deduction of fixed charges applicable against that portion of the property employed in present operations.....	*\$41,890	\$77,389
Depreciation included above in operating expenses and set up in amortization reserves.....	\$127,713	\$194,599
Percentage of railroad operating expenses vs. railroad revenue	40.45	47.80
Percentage of railroad operating expenses, exclusive of depreciation reserves.....	37.20	40.56

*Deficit.

W. G. McAdoo, the president, says in his report in part:

"The physical condition of the property has been maintained at the highest standard of efficiency. In August, 1910, the new station at Henderson and Grove Streets, Jersey City, was opened for business, and in November the extension from Twenty-third Street and Sixth Avenue to Broadway and Thirty-third Street was completed and put into operation. The car storage yard and repair shops at Henderson Street and Railroad Avenue, Jersey City, were completed in the fall of 1910, and now provide a much needed facility for the proper care and repair of equipment.

"The opening of the Broadway and Thirty-third Street station in the heart of the business, shopping and theater districts of New York City has greatly improved your company's position. At this station facilities are provided for the handling of baggage, mail and express matter, as has been done at the Hudson terminal at Cortlandt and Church Streets, but these sources of revenue have not yet been tapped, and cannot well be until the connection with Newark (now under construction) is completed. The Erie Railroad and the Lehigh Valley Railroad have each established ticket offices on the concourse floor of the Thirty-third Street station, and provision has also been made for ticket offices of other trunk lines.

"The Hudson terminal has become the most important traffic, business and office center in the downtown district of New York. These buildings have maintained their popularity and there has been such a steady demand for space that on May 1, 1911, the buildings will be 99.3 per cent rented. The gross income from the buildings for the year ending May 1, 1912, will be \$1,566,318, as against \$1,509,628 for the year ending May 1, 1911. Rates have been maintained and the high character of the tenantry has been upheld. The amount payable for assumed leases for the year ending May 1, 1912, will be only \$16,647.

"Since the last report your company has purchased fifty additional steel passenger cars, with full motor equipment, under a purchase agreement with the Guaranty Trust Company of New York, which has issued car purchase certificates, 'Series B,' against this equipment. Orders for thirty-six more cars, this company's portion of the equipment to be used in the joint service to Newark, have been placed, and car purchase certificates covering these will also be issued, with the same provision for semi-annual payments on account of principal.

"Work on your company's portion of the joint high-speed line with the Pennsylvania Railroad to Newark has progressed satisfactorily, and it is expected that this service will be inaugurated during the summer of 1911. When the operation of this joint line begins it will provide an additional station of great importance to the company at or near the Boulevard, Jersey City Heights. With an efficient rapid transit service connecting it with uptown and downtown centers in New York, this part of Jersey City will build up

rapidly as a residential section. The Hudson terminal will then become the downtown terminal of the Pennsylvania system. Trains will be scheduled from the Hudson terminal to connect with the Pennsylvania trains at the Manhattan transfer just east of Newark, and it is intended that all Pennsylvania Railroad traffic to the downtown district of New York shall be handled by this company from the Manhattan transfer through the Hudson tunnels.

"A new local station in the heart of Newark will be an important feature of this joint rapid transit line, which will offer such advantages in the way of through and frequent service and quick time between Newark and its suburbs and New York that a large and continually increasing traffic may be confidently expected.

"Construction has not yet begun on the Forty-second Street Grand Central extension, for which a franchise has been granted to your company. The present uncertainty about the new subway lines in New York City presents a problem which makes it unwise to begin this work, or even satisfactorily prepare plans for it, until the city has reached a decision on the main subway question. In order to make it most useful and efficient for the purposes intended, this extension should dovetail with any new subways which may be built. The extension from Sixth Avenue to Fourth Avenue, under Ninth Street, is in somewhat the same category as the Grand Central extension. The Public Service Commission has extended the time for its construction until June 15, 1913, before which time a definite course can be decided upon.

"There has been a gratifying growth of traffic. For the year ended March 31, 1911, the total number of passengers carried was 50,926,980, as against 34,574,815 for the year ended March 31, 1910. This, however, is not a fair comparison, as the Cortlandt Street tunnels (downtown lines) were not put into operation until July 19, 1909. Traffic continues to show satisfactory increases over corresponding periods of the previous year in all cases in which the physical conditions were comparable. The number of passengers per mile of road operated for the year ended March 31, 1911, was 7,643,251, as against 6,799,373 for the preceding year, an increase of 12.4 per cent. This represents a real growth, but as the ratio is based upon an average of miles operated (increasing as new portions were put into operation), it is not truly indicative of the normal increase of traffic to be expected. During September and October of both 1909 and 1910 the road was operated on practically the same mileage, and the traffic of the latter period showed an increase of 24 per cent over that of the former.

"Satisfactory comparisons of the ratios of operating expenses to revenues cannot as yet be made. As from time to time new portions of your property have been put into operation, it has been the policy of the management to begin such operations with the maximum number of train crews, station and other employees as it was anticipated would be required. Such items, together with heavy expenses for preliminary testing and practice running, in order that the new services might begin smoothly and without interruption, have materially increased the operating expenses. Many reductions in the cost of operation have been made, however, and when the system is completed and the operation becomes more uniform the ratios of operating expenses should show further decreases.

"During the year covered by this report the company has operated an average of 1808 trains per day, making a total of 6,592,271 revenue car-miles in the year. Although these trains have been sent through the tunnels under a ninety-second headway during rush hours and under a two-and-a-half-minute headway during the rest of the day, the percentage of trains on time was 99.46 per cent.

"As important portions of the system are still under construction and the operated portion represents only a part of the total capital expenditure and capacity, interest charges on bonded debt have been apportioned between operation and construction. There is now being deducted from operating income interest on a total of \$50,000,000 of bonds, and there is being charged to construction the interest on \$14,500,000 of bonds. With the extension of service over those parts of the line now under construction the amount of interest deductible from income will be increased, and the amount charged to construction will be reduced, so that the charge of interest to construction will progressively disappear. It

is a universal practice to charge to construction the cost of money during the period of construction, and the division of this charge between operation and construction has been made on a basis which in the opinion of your management is sound and conservative.

"As required by the regulations of the Public Service Commission, this company has charged off and set up depreciation and amortization reserves, with the result that on March 31, 1911, in addition to actual expenditures in maintaining the property at the highest point of efficiency, we have absorbed into operating expenses and set up a reserve of \$385,081. A better showing of net earnings might have been made by less conservative methods of accounting, but we believe that future results will reflect the wisdom of the policy which has been adopted."

Traffic statistics for the two years compare as follows:

Year Ended March 31.	1911.	1910.
Average miles of road operated.....	6.663	5.085
Number of revenue car miles operated....	6,592,271	4,483,961
Passenger traffic:		
Number of passengers carried.....	50,926,980	34,574,815
Number of passengers carried per mile of road.....	7,643,251	6,799,373
Number of passengers per revenue car-mile	7.73	7.71
Revenues and operating expenses:		
Gross revenue per mile of road.....	\$382,162	\$339,968
Gross railroad operating revenue per mile of road.....	404,478	354,195
Operating expenses (excluding taxes) per mile of road.....	163,615	169,298
Net railroad operating revenue per mile of road.....	240,863	184,897
Passenger revenue per revenue car-mile...	\$0.3863	\$0.3855
Gross railroad operating revenue per revenue car-mile.....	0.4088	0.4017
Operating expenses (excluding taxes) per revenue car-mile.....	0.1653	0.1920
Net railroad operating revenue per revenue car-mile.....	0.2435	0.2097
Passenger revenue per passenger.....	\$0.05	\$0.05
Gross railroad operating revenue per passenger	0.0529	0.0521
Operating expenses (excluding taxes) per passenger	0.0214	0.0249
Net railroad operating revenue per passenger	0.0315	0.0272

Spokane & Inland Empire Railroad

The income account of the Spokane & Inland Empire Railroad for the year ended June 30, 1910, compares with the previous year as follows:

REVENUE FROM TRANSPORTATION.		
	1909.	1910.
Freight	\$325,020	\$472,918
Passenger	530,543	755,608
Street railway system.....	387,390	486,119
Other revenue.....	26,147	48,969
Total operating revenue.....	\$1,269,100	\$1,763,614
Per mile (average).....	6,345	8,519
OPERATING EXPENSES.		
Maintenance of way and structures.....	143,662	283,158
Maintenance of equipment.....	118,855	112,615
Traffic expenses.....	23,668	25,227
Transportation expenses.....	459,265	548,392
General expenses.....	98,901	112,775
Total	\$844,351	\$1,082,167
Per mile (average).....	4,221	5,227
Net operating revenue.....	424,749	681,447
Per mile (average).....	2,124	3,292
Taxes accrued.....	37,800	55,000
Per mile (average).....	189	205
Operating income.....	\$386,949	\$626,447
DEDUCT.		
Interest on funded debt.....	\$234,700	\$247,450
Other interest.....	.....	43,429
Hire of equipment.....	5,716	15,456
Accident, Gibbs, Idaho.....	.....	295,073
Miscellaneous	1,035	147
Total	\$241,451	\$601,555
Net	\$145,498	\$24,892
Ratio of operating expenses to total operating revenue	66.54	61.37
Ratio of taxes to total operating revenue.....	2.98	3.12

Jay P. Graves, the president, says in part in his statement to shareholders:

"The interurban passenger revenue was \$755,608, an increase of \$225,065, or 42.42 per cent, over the previous year.

"The freight revenue was \$472,918, an increase of \$147,898, or 45.50 per cent, over the previous year.

"The revenue from the operation of the street railway system was \$486,119, an increase of \$98,729, or 25.48 per cent, over the previous year.

"The total operating revenue was \$1,763,614, an increase of \$494,514, or 38.97 per cent, over the previous year.

"The charges for maintenance of way and structures were \$283,158, an increase of \$139,497. This increase was caused by the unprecedented high water in February and March throughout the 'Inland Empire,' and especially the floods along the Palouse River, destroying on the Colfax branch six span bridges and 6 miles of track. The line was closed into Colfax for 60 days. On the Moscow branch the deep cuts slid in and the line was closed into Moscow for 30 days. On the street railway system 1.46 miles of paving between the rails were laid and new steel installed, as required in our franchises from the city of Spokane.

"The charges for maintenance of equipment were \$112,615, a decrease of \$6,240 from the previous year.

"The charges for transportation expenses were \$548,392, an increase of \$89,127, caused by the increased passenger train service on the different divisions of the system and the increase in the number of tons of revenue freight carried, which was 51.73 per cent over the previous year.

"On the Cœur d'Alene division the summer schedule was increased from 50 to 60 trains per day to carry the heavy traffic to Liberty Lake, Hayden Lake and other resorts.

"The new lines and extensions of the city traction system required the regular operation of 15 additional cars over the previous year.

"During the past fiscal year the salaries of the traction trainmen were raised 10 per cent.

"The capacity of the power plant at Nine Mile, on the Spokane River, has been increased during the past fiscal year to 20,000 hp, and is furnishing for the operation of the Inland division from 4000 hp to 5500 hp. Our power contract with the Washington Water Power Company, entered into when our lines were first constructed, has yet five years to run. We are using, under our contract, 3800 hp, the minimum amount permitted by the contract. This power is used to operate the Cœur d'Alene and Traction divisions. We will, however, during the ensuing year, require 2000 hp in addition for the operation of the Traction division, which will be furnished by our plant at Nine Mile. We have contracts for the sale of 2800 hp for commercial and irrigation purposes, for which we are receiving approximately \$4 per horse-power per month. We have also about 1000 hp additional business in view for the ensuing year. In addition to this we expect to furnish power for several large industrial plants to be located in Spokane.

"A second high-tension power line has been constructed from Nine Mile to Spokane during the past year, which, together with the first line, is capable of carrying the entire output of the plant, and also insures continuous service in case of damage or accident to one of the lines.

"We have now in operation 66 miles of 60,000-volt, high-tension power lines capable of supplying the present and prospective business of the company for a number of years.

"Total charges to capital account during the year were \$794,100.

"The physical condition of the property is excellent. The roadbeds have been kept in first-class condition, tie renewals have been made when necessary, and our lines are all fully ballasted and compare favorably with the very best railway lines in this country. It has been the policy of the company, in order to build up industries along its lines, to put in spurs and sidings whenever business promises. There were 38 different industrial tracks completed during the past year, aggregating in length about 2.92 miles. This policy not only helps to build up the country through which the road runs but will add materially in time to the earning power of the system.

"The management expected to resume the payment of dividends on the preferred rights during the year of 1910, as the earnings of the company warrant. The Gibb's accident, however, and the disastrous floods at Colfax and along the Palouse River, referred to, have, as shown by the income account statement, eaten up our earnings, and, much as we regret it, the payment of dividends will be postponed. Next year the dividends on the preferred rights will accumulate, commencing Jan. 15. The total operating revenue of the company, showing an increase of 40 per cent over the revenue of the previous year, is a very substantial increase, and would have more than paid the dividends on our preferred rights if not for the extraordinary demands upon our resources above mentioned.

"The country along our lines is rapidly developing, and

we anticipate an increase in earnings for the ensuing year."

Traffic statistics for the last two fiscal years are as follows:

PASSENGER (RAILROAD DIVISION), YEAR ENDING JUNE 30.			
	1909.	1910.	
Number revenue passengers carried.....	1,088,682.00	1,518,582.00	
Number revenue passengers carried one mile.....	24,608,962.00	33,741,821.00	
Number revenue passengers carried one mile per mile of road.....	149,145.00	195,039.00	
Average distance carried miles.....	22.6	22.2	
Total passenger revenue.....	\$501,982.28	\$712,054.73	
Average amount paid by each passenger (cents).....	46.11	46.90	
Average rate per passenger per mile (cents).....	2.04	2.11	
Total passenger earnings, including mail, baggage and express.....	\$530,542.84	\$755,607.82	
Mileage of passenger cars.....	1,555,078.00	1,678,957.00	
Mileage of passenger trains.....	707,874.00	781,012.00	
Passenger earnings per train mile (cents).....	74.95	96.7	
Passenger earnings per average mile of road operated.....	\$3,215.41	\$4,367.68	
FREIGHT (RAILROAD DIVISION), YEAR ENDING JUNE 30.			
Revenue tons carried.....	379,136.00	575,276.00	
Revenue tons carried one mile.....	15,099,677.00	22,597,855.00	
Average distance hauled—one ton mile.....	39.8	39.3	
Total freight revenue.....	325,020.18	472,918.28	
Average amount received per ton freight (cents).....	85.73	82.21	
Average receipts per ton per mile (cents).....	2.15	2.09	
Mileage of loaded cars.....	797,841.00	1,151,316.00	
Mileage of empty cars.....	539,615.00	730,437.00	
Total mileage.....	1,337,456.00	1,881,753.00	
Mileage of freight trains.....	194,407.00	237,014.00	
Freight revenue per train mile.....	\$1.67	\$1.00	
Freight revenue per average mile of road operated.....	1,969.82	2,733.63	
CITY TRACTION SYSTEM.			
Revenue passengers carried.....	7,821,526.00	9,825,707.00	
Passenger car mileage.....	1,602,323.00	2,126,481.00	
Passenger earnings.....	\$384,933.55	\$482,966.15	
Passenger earnings per car mile (cents).....	24.02	22.71	
RAILROAD DIVISION.			
Gross earnings per average mile of road operated.....	\$5,343.70	\$7,211.90	
Operating expenses per average mile of road operated.....	3,544.91	4,283.04	
Net earnings per average mile of road operated.....	1,798.79	2,928.86	
CITY TRACTION SYSTEM.			
Gross earnings per average mile of road operated.....	\$12,913.00	\$14,297.61	
Operating expenses per average mile of road operated.....	8,648.07	10,035.33	
Net earnings per average mile of road operated.....	4,264.93	4,262.28	

Athol & Orange Street Railway, Athol, Mass.—Control of the Athol & Orange Street Railway has passed to interests identified with the Connecticut Valley Street Railway and F. E. Pierce, president of the latter company, has been elected president of the Athol & Orange Street Railway to succeed G. D. Bates, and D. P. Abercrombie, Jr., secretary and treasurer of the Connecticut Valley Street Railway, has been elected treasurer to succeed A. N. Ellis. New directors have been elected as follows for the Athol & Orange Street Railway: E. C. Crosby, F. E. Pierce, J. A. Taggart and D. P. Abercrombie, Jr. It is stated that the Millers River Street Railway will be incorporated to take over the Athol & Orange Street Railway and build an extension to connect the lines of the Athol & Orange Street Railway and the Connecticut Valley Street Railway.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—Redmond & Company, New York, N. Y., offer for subscription at 94 and accrued interest, paying about 5.5 per cent, the unsold portion of \$2,400,000 of 5 per cent sinking fund gold bonds of the Augusta-Aiken Railway & Electric Corporation dated Nov. 15, 1910, and due Dec. 1, 1935. The bonds are secured by a direct first mortgage on the entire railway and lighting property, subject only to an issue now limited to \$967,000 which is being reduced annually.

City Railway, Dayton, Ohio.—The City Railway has paid a special dividend of \$9.09 1-11 per share on the common stock. This dividend will be applicable at the option of common stockholders on or before June 1, 1911, to purchase from the company, at par, additional common stock which will bring the total outstanding from \$2,195,900 up to practically \$2,400,000.

Galveston-Houston Electric Company, Galveston, Tex.—The Galveston-Houston Electric Company has filed at Augusta, Maine, a notice of the increase of the capital stock of the company from \$6,000,000 to \$7,000,000 by the addition of \$1,000,000 to the common stock. Previous to the increase in stock there was \$3,000,000 of preferred stock and \$3,000,000 of common stock.

Indianapolis, Newcastle & Toledo Electric Railway, Newcastle, Ind.—The property of the Indianapolis, Newcastle & Toledo Electric Railway was sold under foreclosure at Indianapolis, Ind., on April 22, 1911, for \$22,511.39 to David M. Parry, Indianapolis, Ind., president of the company, and William E. Stevenson, Indianapolis, Ind., secretary, who represent the bondholders.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company has sold \$10,000,000 of one-year 4½ per cent notes to J. P. Morgan & Company, New York, N. Y. Part of the proceeds will be used to redeem \$4,584,000 of 5½ per cent notes, which were issued three years ago and matured on May 1, 1911, and the balance will be used to finance miscellaneous undertakings of the company.

Jacksonville (Fla.) Traction Company.—The Jacksonville Traction Company, which has succeeded the Jacksonville Electric Company, has taken over the Ortega Railroad, which extends from the terminus of the tracks of the Jacksonville Electric Company on St. John's Avenue to Ortega, a distance of 3¼ miles.

Martha's Vineyard Street Railway, Cottage City, Mass.—The Martha's Vineyard Street Railway has petitioned the Railroad Commissioners for approval of the lease of the Oak Bluffs Street Railway for a term of five years and eight months. The Martha's Vineyard Street Railway is to pay the Oak Bluffs Street Railway the sum of \$440 for the eight months ended Dec. 31, 1911, \$460 for the year 1912 and \$480 for each and every year thereafter until the expiration of the term of the lease.

New York, New Haven & Hartford Railroad, New Haven, Conn.—Theodore N. Vail has been elected a director of the New York, New Haven & Hartford Railroad to succeed Nathaniel Thayer, deceased.

Ottawa (Ont.) Electric Railway.—E. N. Soper and T. F. Ahearn have been elected directors of the Ottawa Electric Railway to fill vacancies on the board.

Pennsylvania Tunnel & Terminal Railroad, New York, N. Y.—Terms of a renewal agreement between the Pennsylvania Railroad and the Pennsylvania Tunnel & Terminal Railroad for the operation of the Pennsylvania Railroad terminal in New York by the Pennsylvania Railroad have been approved by the Public Service Commission of the First District of New York. The renewal agreement grants extensions of time for temporary operations of the terminal by Pennsylvania Railroad from June 1, 1911, for eleven months, or until May 1, 1912, prior to the making of a long lease for operation of the terminal by the Pennsylvania Railroad. W. Heyward Myers has been elected a director of the Pennsylvania Tunnel & Terminal Railroad to succeed Charles E. Pugh.

Public Service Railway, Newark, N. J.—The petition of the New Jersey & Hudson River Railway & Ferry Company, which is controlled by the Public Service Railway, for approval of proposed issuance, sale and delivery of its 4 per cent mortgage bonds to the amount of \$100,000 has been approved.

Springfield (Mass.) Street Railway.—The House has refused to admit a petition of the president of the Springfield Board of Trade and the Selectmen of eight Massachusetts towns for legislation to authorize the Berkshire Street Railway to purchase property and franchises of the Springfield Street Railway. The matter will go over until the next Legislature meets.

Third Avenue Railroad, New York, N. Y.—A motion was made before Judge Lacombe in the United States Circuit Court by counsel for the Central Trust Company, on April 28, 1911, for an order sustaining the reports of the special master relative to the compensation of the receivers of the Third Avenue Railroad. The bondholders' committee made no opposition to the presentation of the report and Judge Lacombe reserved his decision.

Toledo & Chicago Interurban Railway, Kendallville, Ind.—The Toledo & Chicago Interurban Railway has secured an order from Judge Carl Yapple, of the Superior Court at Ft. Wayne, Ind., extending \$82,000 of the receiver's certificates for one year. Of this amount \$65,000 was due on

April 22 and \$17,000 on May 8. At present there is \$100,000 of certificates outstanding.

Union Utilities Company, Morgantown, W. Va.—The Union Utilities Company has declared an initial quarterly dividend of one-half of 1 per cent on its \$800,000 of common stock.

Watsonville (Cal.) Transportation Company.—The Watsonville Railway & Navigation Company has been incorporated with a capital stock of \$200,000 by F. E. Snowden, C. H. Fisher, C. A. Shuey, G. W. Bell and E. M. Heaney, presumably to succeed the Watsonville Transportation Company, the property of which, consisting of rolling stock, power plant and four miles of track, was sold under foreclosure as noted in the ELECTRIC RAILWAY JOURNAL of March 25, 1911, page 536.

Wisconsin Electric Railway, Oshkosh, Wis.—The Railroad Commission of Wisconsin has authorized the Wisconsin Electric Railway to issue \$83,000 par value of 5 per cent, twenty-year first-mortgage gold bonds, in denominations of \$1,000 each. The issue is to be secured under a mortgage executed to the Wisconsin Trust Company, Milwaukee, Wis. The bonds are to be sold for cash and for not less than 85 per cent of their par value for the purchase of electric railway property and equipment, and to defray the cost of extensions and additions to the property of the company.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland, receiver of the Yonkers Railroad, to issue receiver's certificates to the amount of \$100,000 payable on or before two years from date, to bear interest not to exceed 6 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

		ATLANTIC SHORE RAILWAY.				
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	Mar. '11	\$20,700	\$20,250	\$450	\$8,121	\$7,671
1 "	" '10	24,407	15,590	8,816	12,576	3,763
3 "	" '11	54,969	52,857	2,112	23,819	21,707
3 "	" '10	62,086	47,746	14,340	37,687	23,348
AURORA, ELGIN & CHICAGO RAILROAD.						
1m.,	Mar. '11	\$122,679	\$74,913	\$47,766	\$35,948	\$11,818
1 "	" '10	118,709	69,443	49,266	32,263	17,002
9 "	" '11	1,290,629	744,151	546,478	308,693	237,785
9 "	" '10	1,181,898	655,610	526,289	273,955	252,333
CLEVELAND, PAINESVILLE & EASTERN RAILROAD.						
1m.,	Mar. '11	\$24,075	\$13,887	\$10,188	\$8,172	\$2,016
1 "	" '10	25,070	13,284	11,785	7,839	3,947
3 "	" '11	68,242	40,453	27,789	24,519	3,269
3 "	" '10	64,856	37,423	27,433	23,747	3,686
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.						
1m.,	Mar. '11	\$84,315	\$50,285	\$34,031	\$30,164	\$3,866
1 "	" '10	80,827	48,194	32,633	29,794	2,839
3 "	" '11	240,383	144,279	96,104	90,058	6,045
3 "	" '10	216,119	141,470	74,649	89,382	14,733
LAKE SHORE ELECTRIC RAILWAY SYSTEM.						
1m.,	Mar. '11	\$86,528	\$49,821	\$36,707	\$34,790	\$1,917
1 "	" '10	85,984	49,142	36,842	34,803	2,039
3 "	" '11	247,356	147,310	100,046	104,200	4,155
3 "	" '10	235,855	144,975	90,898	103,921	13,023
MONTREAL STREET RAILWAY.						
1m.,	Mar. '11	\$371,992	\$234,484	\$137,508	\$46,423	\$91,085
1 "	" '10	336,197	220,790	115,407	40,675	74,731
6 "	" '11	2,202,915	1,370,473	832,442	229,205	603,237
6 "	" '10	1,992,236	1,216,984	775,252	212,586	562,666
NORTHERN OHIO TRACTION & LIGHT COMPANY.						
1m.,	Mar. '11	\$190,186	\$110,850	\$79,336	\$44,329	\$35,007
1 "	" '10	173,425	99,159	74,266	43,292	30,974
1 "	" '11	548,871	322,623	226,248	133,115	93,133
3 "	" '10	484,575	286,173	198,403	129,875	68,528
SEATTLE ELECTRIC COMPANY.						
1m.,	Feb. '11	\$428,557	\$246,177	\$182,381	\$107,170	\$75,210
1 "	" '10	431,075	262,799	168,276	111,643	56,633
12 "	" '11	5,596,701	3,162,447	2,434,254	1,307,613	1,126,641
12 "	" '10	5,970,447	3,487,395	2,483,052	1,265,205	1,217,847
TAMPA ELECTRIC COMPANY.						
1m.,	Feb. '11	\$57,335	\$28,330	\$29,004	\$6,283	\$22,722
1 "	" '10	56,284	27,256	29,028	4,566	24,462
12 "	" '11	593,878	327,404	266,473	67,870	198,604
12 "	" '10	601,509	343,867	257,643	55,949	201,694
TWIN CITY RAPID TRANSIT COMPANY.						
1m.,	Mar. '11	\$625,164	\$328,252	\$296,912	\$140,079	\$156,833
1 "	" '10	598,403	304,774	293,628	140,229	153,399
3 "	" '11	1,821,039	970,531	850,508	420,238	430,270
3 "	" '10	1,719,320	889,024	830,296	420,688	409,608
WHATCOM COUNTY RAILWAY & LIGHT COMPANY.						
1m.,	Feb. '11	\$31,350	\$17,480	\$13,870	\$10,655	\$3,215
1 "	" '10	32,816	21,249	11,567	9,326	2,243
12 "	" '11	406,930	226,240	180,690	112,376	68,314
12 "	" '10	411,792	233,099	178,693	100,471	78,222

Traffic and Transportation

Retiring Manager Commends and Advises Employees

W. F. Kelly, whose resignation as general manager of the San Francisco, Oakland & San José Consolidated Railway and the Oakland Traction Company, Oakland, Cal., is noted elsewhere in this issue, addressed the following statement to the employees of the company under date of April 22, 1911:

"Looking back over a quarter of a century of active railroad service the one fact in my whole career that is most gratifying and appeals to me most strongly is the feeling that you are my friends—friends who have shared with me the troubles, discouragements and difficulties of the past and whose faithful and efficient service has contributed in a large degree to whatever success has been mine. In laying aside the cares and responsibilities of railway service I wish to convey to you a few words of counsel and appreciation. It has been my pleasure as well as my constant effort to secure for you the most favorable conditions, the fairest consideration of all grievances and the best wages which the business will permit. If you have a higher regard for the dignity and responsibility of your employment, a clearer conception of your duties to your employers and the public, a better appreciation of the value of courtesy and fair dealing toward all whom you meet and a proper pride and regard for yourselves as citizens, then shall I feel well repaid for my term of service with you. Upon your conduct depend in a large degree the peace, good order and good name of this community. See to it that this trust be not thrown lightly aside. Lend not a willing ear to him who would sow the seeds of dissension and discord within your ranks. Think for yourselves, weigh calmly all matters affecting your welfare, stand strongly for justice and fair dealing. Whoever may be my successor I trust that he may be worthy of your confidence and measure up to the full stature of a man. I trust that he will find in all his dealings with you that you will meet him in a fair, frank and manly way. Do this and your conduct will meet with the approval of a clear conscience and the respect and approval of your friends and fellow citizens. I wish for you all an increasing measure of success in your employment, good health and happiness to you and your families and an honored name among your friends and neighbors."

Free Transportation of Letter Carriers Declared Unconstitutional by Attorney-General of Massachusetts

In accordance with an order adopted by the House of Representatives of Massachusetts, on March 24, 1911, directing the Attorney-General to inform the House whether, in his opinion, a statute requiring street railways to carry free United States letter carriers would be constitutional and valid, James M. Swift, Attorney-General, has rendered the following opinion:

"Under date of April 10, 1901, Attorney-General Knowlton advised the honorable Senate that a bill requiring transportation of letter carriers at a rate less than that collected from ordinary passengers was in his opinion unconstitutional so far as it concerned the Boston Elevated Railway, on the ground that such bill, if enacted, would impair the obligation of the contract contained in the charter of that company. (II Op. Atty-Gen., 261.) This opinion was undoubtedly correct, and is applicable with equal or greater force to a statute such as is described in the order above set forth.

"I am, however, of opinion that such a statute would be unconstitutional as applied to street railways generally. The right of the Legislature to regulate fares charged by street railways is undoubted, but it cannot 'under pretence of regulating fares and freights,' require a street railway 'to carry persons or property without reward.' See *Stone v. Farmers' Loan & Trust Company*, 116 U. S. 307, 331. The rate fixed must be reasonable. Obviously, a requirement that any class of persons (here 'United States letter carriers in uniform') be carried free is not a reasonable or proper exercise of the distinctively rate-making power.

"If the statute is to be justified at all it must be justified under the police power in its broader sense, i. e., the power

to legislate 'for the safety, health or proper convenience of the public.' (*Lake Shore & Michigan Southern Railway v. Smith*, 173 U. S. 684, 698-9.) Legislation for these purposes is not necessarily bad because it imposes an incidental pecuniary loss upon the carrier. (*Atlantic Coast Line Railroad v. North Carolina Corporation Commission*, 206 U. S. 1, 24, 25. *Interstate Railway v. Massachusetts*, 207 U. S. 79, 87.) It cannot, of course, be assumed that any class of persons can be carried free by a street railway without some, though perhaps slight, pecuniary loss to the company. A requirement of such free transportation cannot be sustained under the police power unless such requirement is reasonably adapted to promote 'the safety, health or proper convenience of the public.' The free transportation of United States letter carriers as a class, even though limited to carriers who are in uniform, does not tend to promote the public safety, the public health or the public convenience. It does not benefit the public generally, but is 'an arbitrary enactment in favor of the persons spoken of' (i. e., United States letter carriers in uniform). See *Lake Shore & Michigan Southern Railway v. Smith*, supra, p. 699. No reason appears which justifies the discrimination between United States letter carriers in uniform, as a class, and all other persons. See *Lake Shore & Michigan Southern Railway v. Smith*, supra, pp. 694-5. *Interstate Railway v. Massachusetts*, supra.

"For these reasons I am of opinion that a statute 'requiring street railways to carry free on their passenger cars United States letter carriers in uniform, in the city or town in which they are employed,' would not be constitutional and valid."

Accidents in New York City in February

The following comparative summary of accidents for February, 1911, February, 1910, and February, 1909, on the street railways and the subway and elevated lines in Greater New York, which come under the jurisdiction of the Public Service Commission of the First District of New York, was submitted by the secretary of the commission at the regular meeting of that body on April 18, 1911:

	February, 1909.	February, 1910.	February, 1911.
Car collisions.....	101	108	98
Persons and vehicles struck by cars.....	837	905	1371
Boarding	504	549	599
Alighting	412	546	424
Contact electricity.....	14	24	18
Other accidents.....	1489	1506	1704
Total	3357	3638	4214
INJURIES.			
Passengers	1349	1501	1553
Not passengers.....	390	378	385
Employees	245	267	282
Totals	1984	2146	2220
SERIOUS (INCLUDED IN ABOVE).			
Killed	16	15	15
Fractured skulls.....	7	0	3
Amputated limbs.....	1	0	1
Broken limbs.....	14	22	20
Other serious.....	116	68	69
Totals	154	105	108
Number of revenue passengers.....	105,726,614	113,659,016	*118,400,000
Revenue car miles operated.....	20,519,675	21,437,207	*22,900,000

*Estimated as to small portion (about 1 per cent) of traffic.

Lanterns as Premiums.—The Illinois Traction System, Peoria, Ill., will this year present silver lanterns to employees with perfect records for use on the road instead of the \$10 that has been previously given.

Property at Park Damaged by Fire.—The buildings and other property at Rothschild's Park, which is owned by the Wausau (Wis.) Street Railroad, were damaged by fire recently. The loss is placed at \$17,000, with insurance to the extent of \$12,000.

Lehigh Valley Transit Company's Freight Service.—The Lehigh Valley Transit Company, Allentown, Pa., has arranged to handle freight and freight cars on the lines of the Slate Belt Street Railway into and through Bangor, Pen Argyl, Wind Gap and Belfast.

Night Service in Vancouver.—The British Columbia Electric Railway, Vancouver, B. C., inaugurated a half-hourly night service on April 17, 1911. The schedule covers all the city lines, and service is continued until 2 a. m. Double fare is charged after midnight.

Service Agreement Renewed in Salt Lake City.—The agreement between the Utah Light & Railway Company, Salt Lake City, Utah, and its employees in regard to wages and terms of service, which expired on May 1, 1911, has been amended and renewed for a period of two years.

Full Uniforms for Employees of Maine Road.—The platform employees of the Lewiston, Augusta & Waterville Electric Railway, Lewiston, Maine, are to wear full uniforms. Formerly the uniform has consisted of cap and coat, and on portions of the line only the cap was used by the motormen.

Suggestions from Men in Regard to Uniforms.—The Pacific Electric Railway, Los Angeles, Cal., has in contemplation a change in the uniforms of its employees, and conductors and motormen in the employ of the company have been requested to communicate to the company any suggestions which they have to make in this connection.

Illinois Traction System Advertisement.—The Illinois Traction System, Peoria, Ill., is carrying in 300 newspapers an advertisement 4½ in. wide by 5 in. high headed "Summer Time Is Travel Time," in which it calls attention to the exceptional opportunity for summer travel, both for business and pleasure, which is afforded by the Illinois Traction System.

Court Decision in Regard to Transfers on Staten Island.—The Court of Appeals has rendered a decision which requires the Staten Island Midland Railway and the Richmond Light & Railroad Company, Staten Island, N. Y., to exchange transfers as ordered by the Public Service Commission of the First District of New York. It is stated that the companies will carry the case on appeal to the Supreme Court.

Rerouting Proposed in Milwaukee.—James D. Mortimer, vice-president, secretary and general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has submitted to the city administration a plan to help relieve the congestion of street railway traffic in downtown Milwaukee by rerouting cars. The company desires a franchise on Seventh Street, from State Street to Clybourn Street, so as to route the Eighth Street-Muskego Avenue cars over the Sixteenth Street viaduct.

New Car Signs in Boston.—The Boston Elevated Railway has been making a study of destination signs for surface cars and has made a tentative decision to adopt as standard a type of hood sign which will display the name of the destination of the car in large letters and also a number the first figure of which will denote the division and the second and third the route over which the car runs. For some time the company has been displaying on the cars a large disk on which was painted the number of the division over which the car was operated.

Wheel Guards in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company is experimenting with wheel guards with a view to adopting them for general use on its cars. Ford, Bacon & Davis, New York, N. Y., who were employed by the State Railroad Commission to investigate street railway conditions in Philadelphia, have sent to the commission a copy of a letter from Director of Public Safety Henry Clay, of Philadelphia, requesting the names of cities in which the automatic wheel guards, referred to in their report, are used. Director Clay was informed that these wheel guards are used in Manhattan and Brooklyn boroughs, New York City, and Chicago.

Passes Discontinued in New Jersey.—The Public Service Railway, Newark, N. J., has issued a statement in regard to the discontinuance of passes after May 1, 1911, in accordance with the provisions of the new public utility law. The statement is concluded as follows: "The company has been advised by counsel that it would be a violation of subdivisions 'd' and 'g' of the eighteenth section of the act to continue to carry without compensation policemen, firemen or other persons not covered by the exception, subdivision 'g' and Section 41, and in compliance with the mandate of the law free transportation heretofore afforded to the classes referred to will be withdrawn beginning May 1, 1911. Any disobedience of the provisions of the act is made a criminal offense, and Sections 34, 35 and 36 provide for the punishment of offenders by fine or imprisonment or both, violations of the law being made misdemeanors."

Personal Mention

Mr. F. M. Lott has been appointed master mechanic of the Ocean City (N. J.) Electric Railroad.

Mr. D. J. Stewart has resigned as manager of the Lulu Island branch of the British Columbia Electric Railway, Vancouver, B. C., after thirteen years of service.

Mr. F. E. Pierce, president of the Connecticut Valley Street Railway, Greenfield, Mass., has been elected president of the Athol & Orange Street Railway, Athol, Mass., to succeed Mr. G. D. Bates.

Mr. D. P. Abercrombie, Jr., secretary and treasurer of the Connecticut Valley Street Railway, Greenfield, Mass., has been elected treasurer of the Athol & Orange Street Railway, Athol, Mass., to succeed Mr. A. N. Ellis.

Mr. Edward M. Boggs, civil engineer of the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway, has been appointed chief engineer of the construction and maintenance of way departments of the companies.

Mr. W. E. Salber, formerly electrical engineer of the Toledo Railway & Light Company, Toledo, Ohio, has been appointed superintendent of motive power of the Canton division of the Northern Ohio Traction & Light Company, Akron, Ohio, to succeed Mr. W. H. Tucker, resigned.

Mr. Lester A. Harrington, who has been acting as chief dispatcher and assistant to Mr. M. McIntyre, general superintendent of the San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal., has been appointed general freight and passenger agent of the company to succeed Mr. H. C. Guiteau, resigned.

Mr. J. P. Potter, who has been connected with the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway for many years as superintendent, has been appointed general superintendent of the marine and railway transportation departments of the companies.

Mr. O. E. Robinson has resigned as assistant superintendent of the Danville lines of the Illinois Traction System. Mr. Robinson has been with the Danville street Railway & Light Company and the Illinois Traction System for the last ten years. It is understood that Mr. Robinson will go into the same line of work in the Southwest.

Mr. F. L. Sheppard, general superintendent of the New Jersey division of the Pennsylvania Railroad, has been appointed general superintendent of the West Jersey & Seashore Railroad, Camden, N. J., and general superintendent of the Philadelphia & Camden Ferry Company, in connection with his duties as general superintendent of the New Jersey division.

Mr. J. Q. Brown, assistant general manager of the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway, has been appointed chief engineer of the mechanical and electrical departments of the companies with the additional office of purchasing agent. Mr. Brown has superintended the engineering work of the companies for the last twelve years.

Mr. R. W. Watson, of New York, who was recently elected vice-president of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., to succeed Mr. J. Levering Jones, will, for the time being at least, be the active head of the company, taking over the duties relinquished by Mr. C. D. Emmons, whose resignation as general manager of the company is noted elsewhere in this column.

Mr. J. T. Wallis, superintendent of motive power of the Erie division of the Pennsylvania Railroad and the Northern Central Railway, Williamsport, has been promoted to the position of superintendent of the West Jersey & Seashore Railroad, Camden, N. J., and superintendent of the Philadelphia & Camden Ferry Company, to succeed Mr. D. H. Lovell, who has been granted extended leave of absence.

Mr. C. H. Stocum has been appointed superintendent of the Pittsburgh, McKeesport & Westmoreland Railway, Mc-

Keesport, Pa. Mr. Stocum began his railway career with the Brooklyn (N. Y.) Heights Railroad in 1893 as a helper in the shops and remained with the company and the Brooklyn Rapid Transit Company until 1904, advancing to the position of foreman of car wiring and testing. Since leaving Brooklyn Mr. Stocum has been employed by the New York Central & Hudson River Railroad in its operating department as inspector; with the Hudson & Manhattan Railroad, operating under the Hudson River, as foreman of inspection barns, and with the Pennsylvania Railroad at the works of the Westinghouse Electric & Manufacturing Company at East Pittsburgh as locomotive inspector.

Mr. W. R. Alberger, vice-president of the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway, has been appointed to have general supervision over the affairs of both companies, the positions of general manager and assistant general manager having been abolished following the resignation of Mr. W. F. Kelly. Mr. Alberger is also vice-president of the United Properties Company.

Mr. Charles A. Hobein has been appointed superintendent of power stations of the United Railways, St. Louis, Mo., to succeed Mr. E. D. Smith, who, as announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 7, 1911, has become chief engineer of the Board of Education of St. Louis. Mr. Hobein has been connected with the company for eight years and has recently been assistant superintendent of power stations of the company.

Mr. Charles J. Jones, chief engineer of maintenance of way of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., since the road was constructed, has been appointed superintendent of transportation of the company to succeed Mr. J. W. Brown, whose appointment as assistant superintendent of transportation of the Public Service Railway, Newark, N. J., was announced in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911.

Mr. A. N. Manahan has been appointed special resort agent of the Pacific Electric Railway, Los Angeles, Cal., in charge of Alpine Tavern, Casa Verdugo, the parks in Riverside, Redlands and San Bernardino and other resort properties owned by the company. Mr. Manahan was manager of the bureau of admissions at the World's Fair in St. Louis, and of the same bureau and of the department of concessions at the Alaska-Yukon Exposition in Seattle.

Mr. William J. Wilgus has received from the Institution of Civil Engineers of Great Britain the award of the Telford gold medal in recognition of the meritorious paper read by him at the last session of the Institution. Mr. Wilgus was formerly fifth vice-president and chief engineer of the New York Central & Hudson River Railroad and was in charge of the electrification work of that company in and around New York City. At the present time he is engaged in consulting engineering work in New York City.

Prof. Winthrop More Daniels, who has been appointed a member of the Board of Public Utility Commissioners of New Jersey to succeed Mr. Frank H. Sommer, was born in Dayton, Ohio, forty-three years ago and was graduated from Princeton University in the class of 1888. After graduation he taught for two years in a preparatory school at Princeton. He then went to Leipzig University for a year's study in history and economics. In 1891 he was appointed instructor in economics in Wesleyan University, Middletown, Conn., but in 1892 he was called to Princeton. In 1895 he was made professor of political economy at Princeton, a position which he still holds. Professor Daniels has served at various times, chiefly in the summer vacations, in an editorial capacity with the *Evening Post*, of New York. From 1906 until 1909 he was secretary and treasurer of the American Economic Association and is a member of the executive committee of that association. Contributions by Professor Daniels have appeared at various times in the *Atlantic Monthly* and in scientific economic journals. Besides this he has published "Elements of Public Finance" and has several times revised and brought down to date "Johnston's History of American Politics."

Mr. Carl A. Sylvester has resigned as general manager of the Boston (Mass.) Suburban Electric Companies to become assistant to the general manager of the Rio de Janeiro

Tramway, Light & Power Company, Rio de Janeiro, Brazil. Mr. Sylvester will succeed Mr. Walter Pearson at Rio de Janeiro and will leave Boston about June 1, 1911, to enter upon his new duties. Mr. Sylvester was born in Newton Center, Mass., and was educated in the public schools there and was graduated from Harvard in 1902. He immediately entered the employ of the Newton system of street railways and worked in the shops and in the operating and construction departments. He also served for a time with the power department. In 1903 he was appointed assistant general superintendent of the Boston Suburban Electric Companies and later entered the general offices of the company in connection with the purchasing of supplies and as acting paymaster. Subsequently he became clerk to the president and in 1904 was made assistant to the general manager. He was given the title of assistant general manager in 1906. In September, 1909, Mr. Sylvester was appointed general manager of the Boston Suburban Electric Companies to succeed Mr. Matthew C. Brush, resigned.

Mr. George A. Damon, managing engineer for the Arnold Company, Chicago, Ill., has been appointed dean of the School of Engineering of Throop Polytechnic Institute, Pasadena, Cal. Mr. Damon was born in Chesaning, Mich., on April 7, 1871. He was educated in the grammar school at Detroit and the high school at Ypsilanti, and was graduated from the latter in the class of 1889. Meanwhile Mr. Damon gained experience as a freight clerk with the Michigan Central Railroad at Ypsilanti. Subsequently he entered the University of Michigan, but his work at the university was interrupted in 1893 when he took charge of the educational exhibit of the university at the World's Fair in Chicago. Shortly thereafter Mr. Damon became connected with the Fisher Electric Company, which he served in the drafting room and shop. In the fall of 1894 he returned to the University of Michigan and completed his course. In September, 1895, Mr. Damon became connected with Mr. Bion J. Arnold, who had recently opened an office in Chicago as a consulting engineer, and he has been connected with Mr. Arnold continuously since that time. At first Mr. Damon's work with Mr. Arnold was along consulting engineering lines, but when the Arnold Electric Power Station Company was organized Mr. Damon became prominently affiliated with the work which it carried out in different parts of the country. In 1908 and 1909 Mr. Damon served as first assistant to Mr. Arnold in the work which he carried out as consulting engineer to the Public Service Commission of the First District of New York. In 1910 Mr. Damon directed the investigation by Mr. Arnold of transportation facilities in the Pittsburgh district for the Mayor in connection with the plans for a greater Pittsburgh. Since January, 1911, he has been in Los Angeles, Cal., in charge of the appraisal of the property of the Southern California Edison Company and has recently taken up the preliminary studies for Mr. Arnold of the transit problems of Los Angeles. His work at Throop Institute will not interfere with his duties in connection with the Arnold Company. Mr. Damon is an associate of the American Institute of Electrical Engineers and a member of the Western Society of Engineers and the Western Railway Club.

Mr. W. F. Kelly, general manager of the Oakland Traction Company, Oakland, Cal., and of the San Francisco, Oakland & San José Consolidated Railway, has resigned from those companies for the reasons set forth in a letter which was addressed by him on April 6, 1911, to the board of directors of these two companies, made public April 21. The letter follows: "Observing that most men retire from the active cares of business only when they have failed, or are incapacitated for active duty, I promised myself on entering the street railway service that, whatever the result of my efforts, in no event would I remain in active duty for a longer period than twenty-five years. That time has now elapsed and I deem it my duty to redeem that promise. Some esteem it a glory to 'die in the harness,' but for myself I prefer the freedom and larger leisure which come from laying it aside. While yet there is joy in living I desire the opportunity to direct my time and efforts as fancy may dictate. To this end I present herewith my resignation as general manager of both the Key Route and Oakland Traction companies, effective May 1. During the month of May my services, if desired, are at your com-

mand in an advisory capacity upon any of the work now in contemplation or under way. More than half of my street railway experience has been in the service of your company and I wish to express my hearty appreciation of your cordial support and co-operation in whatever measure of success has attended my efforts. Time, patience and unceasing effort have solved many of the difficulties of the past and your properties are now in an excellent condition with a corps of operatives honest, efficient, trustworthy and loyal to the highest degree. I would especially commend to your most favorable consideration the various heads of departments and trust that opportunity may speedily afford a substantial recognition of their well merited and efficient service. It is most gratifying that our business and personal relations have been most cordial and harmonious throughout the entire period of our association and I trust they may so continue. Your various enterprises are now entering upon a period rich in great possibilities and I bespeak for them the fullest success." Mr. Kelly also issued a letter to the employees of the company expressing his appreciation of their loyalty during his administration. Mr. Kelly was formerly general manager of the Columbus Street Railway, Columbus, Ohio, but has been connected with the Oakland properties for about thirteen years. He was a member of the executive committee of the American Street Railway Association in 1895-1896.

Mr. C. D. Emmons has resigned as general manager of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., which succeeded the Fort Wayne & Wabash Valley Traction Company recently, to become general manager of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind. Mr. Emmons was born in Lafayette, Ind. in 1871. He lived eighteen years in Pittsburgh and was graduated from the Western University of Pennsylvania with the degree of civil engineer. After graduation he entered the service of the Pennsylvania Railroad as a rodman, and was advanced to the position of supervisor of signals for the territory around Philadelphia. In 1900 he was appointed general superintendent of the Lafayette (Ind.) City Railway, and in July, 1903, he was appointed general superintendent of the Fort Wayne & Wabash Valley Traction Company and superintendent of construction of the Ohio & Indiana Construction Company, which was then building the Fort Wayne, Van Wert & Lima Railway. In April, 1905, he was appointed general manager of the Fort Wayne & Wabash Valley Traction Company, which now operates 212 miles of line. Under Mr. Emmons' direction there have been constructed two new lines—the Fort Wayne, Van Wert & Lima Railway and the link between Fort Wayne and Bluffton, which connects with the Indiana Union Traction Company's system. Mr. Emmons also directed the reconstruction of the remaining interurban property of the company as well as the city lines of Fort Wayne and Logansport. A new power house has been erected and almost an entire new equipment of city cars has been furnished to the Fort Wayne city lines under his direction. Mr. Emmons has taken an active interest in the affairs of the American Electric Railway Transportation & Traffic Association and the Central Electric Railway Association and was chairman of the committee on interurban rules of the Transportation & Traffic Association in 1909-1910. At present he is co-chairman of the joint committee of that association and the American Electric Railway Engineering Association on block signaling for electric railways. In commenting on his resignation the *Fort Wayne News* said: "It is sincerely to be hoped that the policy to which he so carefully adhered will be followed by the administration that shall succeed his, for it is highly desirable that the relations between the company and the community should be upon a basis of fairness and amiability. Mr. Emmons has built up a magnificent organization, has established friendly working conditions, and leaves the property in excellent shape. The departure of Mr. Emmons is a distinct loss not only to the traction company but to Fort Wayne."

OBITUARY

Alexander E. Brown, president of the Brown Hoisting Machinery Company, Cleveland, Ohio, and inventor of several devices for handling coal and ore, is dead.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Watsonville Railway & Navigation Company, Watsonville, Cal.**—Incorporated in California to build an electric railway in Watsonville, and presumably to take over the Watsonville Transportation Company. Capital stock, \$200,000. Officers: F. E. Snowden, C. H. Fisher, C. A. Shirey, C. W. Bell and E. M. Heaney.

***East St. Louis & St. Louis Traction Company, East St. Louis, Ill.**—Incorporated in Illinois as a subsidiary of the East St. Louis & Suburban Railway, to build a line in East St. Louis from the East St. Louis relay passenger station south on Missouri Avenue to Tenth Street and west on Tenth Street to the east approach of the Free Bridge at Tenth Street and Piggott Street.

***Richmond & Cincinnati Traction Company, Richmond, Ind.**—Application for a charter will be made by this company in Indiana to build an electric railway to connect Richmond, Ind., and Cincinnati, Ohio, and later to extend it to Union City. Capital stock, \$50,000. [E. R. J., April 1, '11.]

***Miller's River Street Railway, Miller's Falls, Mass.**—Application for a charter will be made in Massachusetts by this company to build a 14-mile electric railway to connect Miller's Falls, Montague, Erving, Wendall and Orange. Capital stock, \$70,000. Incorporators: Daniel P. Abercrombie, Jr., Montague; Charles W. Clapp, Greenfield; Marcus A. Coolidge, Fitchburg; Edward C. Crosby, Brattleboro, and Frederick E. Pierce, Greenfield.

***Syracuse, Watertown & St. Lawrence River Railroad, Syracuse, N. Y.**—Chartered in New York to build a 7-mile electric railway to connect Syracuse, Watertown, Cicero and Brewerton. The line will connect with the Syracuse & South Bay Electric Railroad in Cicero and extend to Brewerton. Capital stock, \$1,250,000. Incorporators: J. S. Moore, W. W. Foster and M. H. Knapp.

***Sioux Falls & Southern Minnesota Traction Company, Pierre, S. D.**—Application for a charter has been made by this company in South Dakota to build an electric railway between Sioux Falls, S. D., and Albert Lea, Minn., via Worthington, Sheppard, Spring Valley, Drésden, Loon Lake, Petersburg, Dwinell, Ceylon, Silver Lake, East Chain and Pilot Grove, Minn. Capital stock, \$300,000. Incorporators: L. B. Wyckoff, Syracuse, N. Y.; J. J. Davenport, H. W. Knight and Charles S. Sollas, Chicago, Ill., and G. P. Peterson, Pierre.

FRANCHISES

Fresno, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has received a franchise from the Board of Supervisors to build its line through Fresno County.

Glendale, Cal.—The Pacific Electric Railway has asked the Council for a franchise to build its tracks between Glendale and Burbank. The right-of-way will be wide enough for two tracks, and will be graded for a double track, but only one track will be rushed to completion.

Redwood, Cal.—The Southern Pacific Railroad has asked the Board of Trustees for a fifty-year franchise to build a double-track line through Redwood City.

Sacramento, Cal.—The Sacramento Electric, Gas & Railway Company will ask the Board of Trustees for a franchise to build a crosstown railway in Sacramento.

Santa Barbara, Cal.—The Santa Barbara Consolidated Railway has asked the City Council for a franchise to rebuild and extend some of its lines in Santa Barbara.

Algiers, La.—The Algiers Railway & Light Company has received a franchise from the City Council to extend its tracks over certain streets in Algiers.

Donaldsonville, La.—The Lafourche Valley & Gulf Railway, Donaldsonville, has received a franchise from the Town Council to build its tracks in Donaldsonville. This 90-mile electric railway will connect Donaldsonville and Leesville, on the west bank of the Bayou Lafourche. F. M. Welch, Donaldsonville, president. [E. R. J., Jan. 21, '11.]

New Iberia, La.—The Southwestern Traction & Power Company, New Orleans, has asked the City Council for a franchise to build its tracks in New Iberia. This 75-mile railway will connect New Iberia and Lafayette. F. W. Crosby, New Orleans, president. [E. R. J., Feb. 25, '11.]

Shreveport, La.—The Shreveport Traction Company has asked the City Council for a franchise to extend its tracks in Shreveport.

Detroit, Mich.—The Detroit United Railway has asked the Common Council for a franchise to extend its Greenwood Avenue line out Hamilton Boulevard and to double-track some of its lines in Detroit.

Watertown, N. Y.—The Black River Traction Company has received a franchise from the Common Council to extend its tracks on Washington Street in Watertown.

Memphis, Tenn.—The Memphis Street Railway has asked the City Commissioners for a franchise to extend its tracks over certain streets in Memphis.

***Bremerton, Wash.**—L. H. Gray, Seattle, representing the Puget Sound Southern Railroad, has asked the Council for a franchise to build an electric railway in Bremerton. This is part of a plan to connect Puget Sound with the Grays Harbor country.

***Ellensburg, Wash.**—Paul L. Richards, Ellensburg, has asked the County Commissioners for a franchise to build an electric railway through Kittitas County.

Wheeling, W. Va.—The Pan-Handle Traction Company, Wheeling, has asked the Board of Commissioners of Ohio County for a franchise to build a third-rail on River Road, at the northern boundary of the city limits of Wheeling, northward to Third Street, in Glennova, and westward to the site of a proposed car house.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has asked the Council for a franchise to extend its tracks on Seventh Street from State Street to Clybourn Street, in Milwaukee.

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company will soon begin to construct two extensions, one to Ingleside and Scottsdale, and the other, a south side line on Central Avenue across the new bridge and through Tempe to Mesa.

Glendale & Eagle Rock Railway, Los Angeles, Cal.—This company is securing right-of-way for an electric railway which will connect its lines and the Glassell and Workman ranches. The company will also extend its tracks over certain streets in Glendale.

Monterey & Pacific Grove Railway, Monterey, Cal.—This company has begun the broad gaging and reconstruction of its tracks in Monterey.

Ontario & San Antonio Heights Railroad, Ontario, Cal.—The construction work on the Pomona-Clairemont branch and the reconstruction of the Euclid Avenue line of this company are now completed and the lines placed in operation. Through cars between Ontario and Pomona are running on regular schedule.

***San Francisco, Cal.**—Law Brothers, San Francisco, are said to be negotiating for a right-of-way to build an electric railway through Marin County. It is planned to operate a ferry service between Belvedere and Harbor View.

Tidewater & Southern Railroad, Stockton, Cal.—This company, which is now building an electric railway from Stockton to Modesto, via Atlanta, French Camp and Turlock, will extend its line 25 miles to Merced. K. C. Brueck, Stockton, president. [E. R. J., April 22, '11.]

Sacramento Valley West Side Electric Railway, Willows, Cal.—This company has been organized to build a 50-mile electric railway from Woodland north to Kennett, via Red Bluff, Redding, Colusa and Willows. C. L. Donohue, Willows, and E. L. Sisson are interested. [E. R. J., April 15, '11.]

Citrus Southern Electric Railway, Sanford, Fla.—All preliminary arrangements have been completed by this company and the laying of rails will begin Sept. 1 for building this 45-mile railway between Kissimmee, Sanford and Orlando. J. J. Brophy, Winter Park, general manager. [E. R. J., April 8, '11.]

***West Point, Ga.**—Plans are being considered for building an electric railway to connect West Point, Hamilton, Talbotton, Culloden, Forsyth, Juliette and Monticello.

Aurora, Elgin & Chicago Railway, Elgin, Ill.—Work has been begun by this company on the double tracking of its line through Montgomery.

Cincinnati, Louisville, Lexington & Maysville Traction Company, Dry Ridge, Ky.—The citizens of Independence have raised the necessary \$50,000 to secure the extension through Independence. W. T. S. Blackburn, Dry Ridge, resident. [E. R. J., March 25, '11.]

Lexington & Interurban Railways, Lexington, Ky.—Plans are being made by this company for building a 22-mile extension between Lexington and Nicholasville.

Louisville & Interurban Railway, Louisville, Ky.—This company is negotiating with the municipal authorities of Shelbyville for extending its railway through Shelbyville.

Nortonville (Ky.) Traction Company.—This company advises that it will begin construction of its electric railway in Nortonville within the next month. It will locate its power station in Nortonville and will furnish power for lighting purposes. Capital stock, \$100,000. Officers: Frank E. Mohr, Nortonville, president; T. F. Callard, vice-president, and Frank G. Hoge, Nortonville, secretary and treasurer. [E. R. J., April 8, '11.]

Berkshire Street Railway, Pittsfield, Mass.—This company has begun work in Otis and will begin construction within a week on the western extremity of its line between East Lee and Huntington.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—A contract has been awarded to Bean & Jones by this company for building its railway from Benton Harbor to Sister Lakes, Dowagiac and Cassopolis.

Lansing & Northeastern Electric Railway, Detroit, Mich.—The extension of this company's third rail system from Lansing to Owosso has been surveyed from Owosso to Saginaw. Construction will begin this summer.

Duluth (Minn.) Street Railway.—The work of laying heavy rails on the South End, Billings Park and other lines of this company in Superior has been completed. The company will extend its tracks over the West Fourth Street bridge when it is completed.

Granite City Railway, St. Cloud, Minn.—This company will soon begin the construction of a 7-mile extension to its Waite Park line at St. Cloud. The franchise for the extension has been secured.

West Missouri Electric Railway, Kansas City, Mo.—This company has awarded the contract to the Spitaufsky-Wagner Construction Company for building its proposed 34-mile electric railway to connect Kansas City and Harrisonville via Grandview, Belton and Roymore. Three bridges will be required of 200 ft., 100 ft. and 60 ft., respectively, and of steel girder and concrete. W. N. Nagle, chief engineer.

Virginia City, Mont.—L. H. Leber and R. J. Watson have secured right-of-way and completed surveys for an electric railway between Alder and Virginia City.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—The Public Service Commission has granted the application of this company to sell \$500,000 of notes. About \$355,000 will be spent for improving 5 miles of line on Coney Island Avenue.

Nassau Electric Railroad, Brooklyn, N. Y.—This company, by order of the Public Service Commission, has been granted permission to construct its proposed extension between Liberty and Georgia Avenues extending along Georgia Avenue to Atlantic Avenue and connecting with the existing track of the Brooklyn, Queens County & Suburban Railroad in Georgia Avenue.

Little Falls & Johnstown Railroad, Little Falls, N. Y.—Frederick D. Hone, New York, is making surveys for this 28-mile electric railway between Little Falls and Johnstown via St. Johnsville. [E. R. J., April 22, '11.]

Piedmont & Northern Railway, Charlotte, N. C.—Irwin, Hart & Company, Knoxville, Tenn., are reported to have been given a subcontract for 4 miles of grading of this railway near Pelzer, S. C. A. V. Miller and T. L. Nelson, Lenoir, N. C., will have a sub-contract near Gastonia, N. C.,

and Hoffman & Sudderth, Gastonia, will do some of the concrete work. J. R. Ervin, Lenoir, is reported to have a sub-contract on the line in South Carolina. This company will let contracts for bridges over the main Catawba River and the South Fork of the Catawba, in North Carolina, and over the Reedy and Saluda Rivers in South Carolina. This electric railway, which is to connect Charlotte, N. C., and Greenwood, S. C., was chartered in South Carolina as the Greenville, Spartanburg & Anderson Railway, and in North Carolina as the Piedmont Traction Company. A recent charter has been obtained in South Carolina, in which these two companies will be merged at some future time as the Piedmont & Northern Railway. The officers of both companies are: J. B. Duke, president; W. S. Lee, Charlotte, vice-president; Thomas B. Lee, chief engineer. Headquarters, Charlotte, N. C. [E. R. J., March 25, '11.]

***Hendersonville, N. C.**—C. F. White is making plans to organize a company to build a 2-mile electric railway from the depot in Hendersonville to Osceola Lake via Columbia Park. About \$10,000 has been subscribed. It is expected to extend this line in the near future, making a belt line through that vicinity.

***Cincinnati Short Belt Railroad & Traction Company, Cincinnati, Ohio.**—This company proposes to build an electric railway through Duck Creek Valley, Madisonville, Oakley, Norwood, Bond Hill and the Mill Creek Valley, from Red Bank to Chester Park. Later on the line may be extended to the Ohio River line and will connect all railroads in the Cincinnati zone and facilitate switching traffic. Peter Eichels, Cincinnati, Ohio, is interested.

***Cleveland, Ohio.**—It is said that a company will shortly be incorporated to build a railway between the southern city limits of Cleveland and the race track at Randall, a distance of 7 miles. Men interested in racing matters are at the head of the project. The Cleveland Railway will probably be asked to furnish the power to operate it.

***Fostoria & Fremont Electric Railway, Fostoria, Ohio.**—This company has completed its 20-mile electric railway between Fremont and Fostoria. All right-of-way has been secured and work will begin at once on an 18-mile extension between Fremont and Port Clinton. J. D. McDonald, secretary.

***Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.**—Plans are being considered by this company for building extensions to Blenheim and Sarnia. The Blenheim extension will be begun this summer.

***Hamilton, Ont.**—It is reported that a syndicate of Toronto capitalists is prepared to build an electric line connecting Hamilton, Galt and Guelph, providing satisfactory arrangements can be made with the municipalities along the line. The Toronto people are said to be ready to proceed at once.

***Canby Canal Company, Oregon City, Ore.**—This company is considering plans for building an electric railway from Canby to Molalla, with branches to Beaver Creek, Meadowbrook, Colton, Needy and Macksburg. It is expected that this line will eventually be extended across the Willamette River and connect with the Oregon Electric Railway, Portland, near Wilsonville.

***Philadelphia (Pa.) Rapid Transit Company.**—This company contemplates the construction of a branch line extending from its present Short Line, at its new bridge spanning Ridley River, to Fourth Street and Highland Avenue, in the extreme western section of Chester. It is understood that the company will bear the expense of a bridge over Chester River, which is the dividing line between the eastern and western sections of Chester, providing City Councils extend it the necessary franchises on Fourth Street.

***Philadelphia & Western Railway, Philadelphia, Pa.**—This company has awarded the contract to the Stone & Webster Engineering Company, Boston, for building its extension from Villa Nova to Norristown. Work has begun.

***Woodlawn & Southern Street Railway, Woodlawn, Pa.**—J. G. McGuire & Contracting Company, New Brighton, Pa., has been awarded the contract by this company for building its three-mile electric railway from Woodlawn to Aliquippa, with a branch on Franklin Avenue, Woodlawn,

extending to New Sheffield. It is stated that construction will be begun at once. J. I. Moore is interested. [E. R.-J., March 4, '11.]

***Abbeville, S. C.**—Messrs. Cothran & Cothran have been awarded the contract for surveying for a proposed 12-mile electric railway between Abbeville and Antreville.

***Camden, S. C.**—R. E. Sharpe, Rembert, is said to be making plans to build an electric railway to connect Camden and Sumter.

***Columbia & Augusta Electric Railway, Columbia, S. C.**—This company, which is considering plans for building an electric railway between Columbia and Augusta, has secured permission from the Secretary of State to change the name of the company to the Augusta-Aiken Electric Corporation. L. C. Maynie, president, and M. H. Mendee, secretary and treasurer.

***Greenville, Spartanburg & Anderson Railway, Greenville, S. C.**—This company has applied to the Secretary of State for permission to increase its capitalization from \$300,000 to \$4,000,000 and to construct a line from Gelton to Greenwood.

***Beaumont (Tex.) Traction Company.**—An order has been placed by this company for \$10,000 worth of rails for special work on its tracks. Pearl Street and several other streets in the business section of Beaumont will be double tracked.

***Denton (Tex.) Traction Company.**—This company has awarded the contract for building an extension to the northern part of Denton and to the College of Industrial Arts. Work will begin within a few weeks.

***Gainesville, Tex.**—M. A. Hindman, Fort Worth, and associates are making plans to build an electric railway to connect Gainesville, Tioga and McKinney. Another plan is considered by a company to build an electric railway from Gainesville to Sherman via Whitesboro.

***Bay Shore Rapid Transit Company, La Porte, Tex.**—Contracts have been awarded by this company to the W. E. Ule Construction Company for building its projected 25-mile line between Houston, La Porte and Sylvan Beach. Work will begin before June 1 and the original route, via South Houston, will be abandoned.

***Marshall (Tex.) Traction Company.**—Plans are being made by this company to build a 2-mile extension in Marshall to the East End suburb.

***San Antonio & San José Interurban Railway, San Antonio, Tex.**—This company is in the market for 150 tons of 50 or 60 lb. relaying rails to complete its line from San Antonio to San José, Tex. A. P. Powers, San José, general manager. [E. R. J., March 18, '11.]

***Citizens' Railway, Waco, Tex.**—This company is negotiating to finance further extensions and improvements of its lines. J. H. Boughton, president.

***Norfolk Railway & Light Company, Norfolk, Va.**—It is reported that this company will extend its line to Richmond and Washington.

***Norfolk & Portsmouth Traction Company, Norfolk, Va.**—Work has been begun by this company on the extension of its Edgewater line. The track is being extended from Forty-third Street with a double track to Bowling Alley and a single track to Tanner's Creek.

***Seattle, Wash.**—L. G. Gray, Seattle, and associates are securing right-of-way for an electric railway to connect Bremerton, Charleston, Port Orchard, Union City, Shelton, Clifton and Gray's Harbor.

***Spokane & Inland Empire Railroad, Spokane, Wash.**—This company is said to be considering plans for building an extension down the Spokane River to the Columbia and will let contracts as soon as it has completed the financing of the project.

***Pacific Light & Power Company, Walla Walla, Wash.**—This company is securing a right-of-way from the mouth of the White Salmon River to Trout Lake, a distance of 30 miles, for an extension. Much property along the proposed route has been taken over by the company. It is reported that the company intends to extend its line from its present terminus at Uniontown to and around Smith's Point and probably as far east as the county bridge across Young's Bay.

***La Crosse & Black River Falls Railway, Black River Falls, Wis.**—Interest has again been revived in building this proposed electric railway to connect La Crosse and Black River Falls. Black River Falls has the water power necessary to operate an electric and freight line. It is stated that the company will soon organize.

SHOPS AND BUILDINGS

Central California Traction Company, San Francisco, Cal.—Work has been begun by this company on the construction of three passenger depots to be erected at Morada, Campton and Florin Road. Samuel B. McLenegan, Stockton, general manager.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is considering plans for building a new passenger station in Fort Wayne.

Northern Indiana Railway, South Bend Ind.—This company expects to have its new passenger and freight station at Elkhart ready for occupancy by May 15. The second floor will be used for offices and rooms for the employees.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company has begun work on a building to be constructed on Nicollet Avenue and Blaisdell Avenue, between Thirty-first Street and Thirty-second Street, in Minneapolis. The principal building will be 30 ft. x 303 ft., and will be used for offices and for the trainmen. The remainder, or working part of the building, will be 1-story structure 100 ft. x 303 ft.

Long Island Railroad Company, New York, N. Y.—This company will build a new depot at Woodside. The cost is estimated to be about \$100,000.

Ohio Electric Railway, Cincinnati, Ohio.—This company will build a new freight depot at Hamilton in the near future.

Spokane & Inland Empire Railroad, Spokane, Wash.—This company will build new car houses near Recreation Park in Spokane during this year. C. L. Bankson, Spokane, purchasing agent.

POWER HOUSES AND SUBSTATIONS

San Bernardino Valley Traction Company, San Bernardino, Cal.—This company's substation at the mouth of Waterman canyon on the Arrowhead-Hot Springs branch was destroyed by fire on April 27. The loss is estimated to be about \$7,000.

Pacific Gas & Electric Company, San Francisco, Cal.—It is reported that this company will build a new substation at McNear's Point.

Connecticut Company, New Haven, Conn.—It is reported that this company is preparing to abolish its Seaview Avenue power house in Bridgeport and install in its place a substation in which the power from the power station at Cos Cob will be distributed to operate its lines in Bridgeport.

Keokuk Electric Railway & Power Company, Keokuk, Ia.—This company wants for immediate delivery one 800-hp cross-compound Corliss engine and condenser, for 140 lb. steam; one 300-kw, 133-cycle, s.p., 1100-2200-volt, three-bearing, composite-wound Westinghouse generator, with exciter and switchboard panel; one 400-kw, 550-volt railway generator with switchboard panel, for its power house in Keokuk. A. D. Ayres, Keokuk, general manager.

Marquette County Gas & Electric Company, Ishpeming, Mich.—This company has just purchased one 400-hp Babcock & Wilcox water tube boiler for its power house in Ishpeming.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—A contract has been awarded to B. J. Jobst by this company to build a transformer station on Fifth Street and Jones Street, in Omaha. The structure will be 60 ft. x 40 ft., one story high and of brick and steel construction. The cost is estimated to be about \$100,000.

Hudson & Manhattan Railroad, New York, N. Y.—This company has ordered a 1500-kw rotary converter from the General Electric Company.

Twin City Light & Traction Company, Centralia, Wash.—This company has begun work on its new power station on Coal Creek in Chehalis.

Manufactures & Supplies

ROLLING STOCK

Washington & Virginia Railway, Washington, D. C., has purchased four 27 E-1 trucks from The J. G. Brill Company.

Union Electric Company, Dubuque, Ia., expects to purchase several new cars, but has not yet decided upon the details.

Northern Texas Traction Company, Ft. Worth, Tex., has ordered four interurban motor cars from the St. Louis Car Company.

Houston (Tex.) Electric Company has ordered ten single-end trailer and five single-end motor cars from the St. Louis Car Company.

Texarkana Gas & Electric Company, Texarkana, Ark., is reported to be considering the purchase of two pay-as-you-enter cars.

Boston (Mass.) Elevated Railway has ordered forty 70-ft. all-steel cars from the Standard Steel Car Company, for use in the Cambridge subway.

New York & Stamford Railway, Port Chester, N. Y., has ordered ten pairs of Standard O-50 trucks from the Standard Motor Truck Company.

Lancaster & York Furnace Street Railway, Lancaster, Pa., has ordered one 38-ft. flat motor car body and two 27 G-1 trucks from The J. G. Brill Company.

West Missouri Electric Railway, Kansas City, Mo., is considering the purchase of several new cars; also an electric locomotive. H. D. Pattee, president.

Du Bois Electric & Traction Company, Du Bois, Pa., has purchased one 25-ft. 4-in. motor car body and two Brill 39-E trucks with rolled-steel wheels, from the G. C. Kuhlman Car Company.

Walla Walla Valley Railway, Walla Walla, Wash., has ordered one 36-ft. combination passenger and smoking motor car body and two 25-ft. 4-in. vestibuled motor car bodies from the Danville Car Company.

Wilkes-Barre (Pa.) Railway has purchased twenty new cars from The J. G. Brill Company. They are 48 ft. 1 in. over all, with flat arched roof, and are equipped with MCB-27 trucks. Fourteen of these cars are for city service, and are equipped with four Westinghouse 101 B-2 motors, and H. L. control. Six of them are for interurban service, and are equipped with Westinghouse 305 motors, H. L. control and General Electric air brakes.

TRADE NOTES

A. O. Schoonmaker Company, New York, N. Y., has moved its office from 221 Fulton Street to 66 Park Place, New York.

Perry Ventilator Corporation, New Bedford, Mass., has received the contract for ventilators for the fifty cars for the Pittsburgh (Pa.) Railways, which are being built by the Pressed Steel Car Company.

American Bureau of Inspection & Tests, Chicago, Ill., has appointed George W. Greene as inspecting engineer to succeed Morgan T. Jones, retired. E. C. McMillan has been appointed to succeed Mr. Greene.

Kirby Equipment Company, Chicago, Ill., has moved its offices and the Chicago office of the Globe Seamless Steel Tubes Company, Milwaukee, Wis., from the Railway Exchange to the People's Gas Building.

Automatic Ventilator Company, New York, N. Y., has received an order to install its ventilators on the four interurban cars for the Utica & Mohawk Valley Electric Railway, being built by the G. C. Kuhlman Car Company.

Kilby Frog & Switch Company, Birmingham, Ala., has appointed H. G. Barclay traveling sales agent. Mr. Barclay, previous to his present appointment, was connected with the Lorain Steel Company, Johnstown, Pa., for twenty years.

John G. Kipp, heretofore sales manager of the Electric Railway Equipment Company, Cincinnati, Ohio, has just been appointed general eastern agent of the company with offices at 90 West Street, New York, where he will handle his company's entire line of products.

C-A-Wood-Preserver Company, St. Louis, Mo., which early this year removed its general offices from Austin, Tex., to St. Louis, Mo., reports that its record of business so far this year exceeds in large degree that of any similar period in the history of the company.

Henry R. Cobleigh has resigned as mechanical editor of *The Iron Age*, which position he has held for the last seven years, to take charge of the advertising and publicity of the International Steam Pump Company, New York, N. Y. He entered upon his new duties on May 1.

Walter L. Vaughn, formerly superintendent of the Van Brunt Street & Erie Basin Railroad, Brooklyn, N. Y., for more than nine years, and previously for several years with the Coney Island & Brooklyn Railroad, has become associated with E. L. Post & Company, manufacturers of bab-bitt metal, New York, N. Y., as traveling salesman in the East.

Kerite Insulated Wire & Cable Company, New York, N. Y., which has acquired the interests of its Western representative, the Watson Insulated Wire Company, has established a Western office in the People's Gas Building, Chicago, Ill. B. L. Winchell, Jr., formerly vice-president of the Watson Insulated Wire Company, has been appointed Western sales manager.

St. Louis Car Company, St. Louis, Mo., reports the receipt of orders through Stone & Webster, Boston, Mass., for ten single and trailer and five single-end motor cars for the Houston (Tex.) Electric Company, and four large inter-urban motor cars for the Northern Texas Electric Company, Ft. Worth, Tex. The company has also received an order from the Southern Railway, Washington, D. C., for fifteen 65-ft. all-steel combination passenger and baggage cars complete.

Union Switch & Signal Company, Swissvale, Pa., has appointed George A. Blackmore Eastern manager with general charge of the affairs of the company in the eastern district, effective May 15, 1911. Aaron Dean has been appointed Western manager with general charge in the western district. Mr. Dean's appointment will be effective on or before June 1. Both Mr. Blackmore and Mr. Dean will report to S. G. Johnson, general sales manager, in all matters pertaining to sales.

Foote Engineering & Construction Company, Kansas City, Mo., has recently been incorporated by H. B. Foote, Roy B. Pearce and C. G. Spencer. The company will engage in the design, construction and operation of complete railway plants and systems. Its officers and engineering staff have had considerable experience in the design and construction of power plants, transmission lines, rolling stock and general equipment. H. B. Foote, president, has been engaged in the electrical contracting business for several years as a partner in the firm of Denton, Foote & Company, of Kansas City.

Hodenpyl, Walbridge & Company, New York, N. Y., bankers, have dissolved, and Anton G. Hodenpyl, George E. Hardy, Bernard C. Cobb, John C. Weadock and William H. Barthold have formed a co-partnership under the firm name of Hodenpyl, Hardy & Company, with offices at 7 Wall Street. The firm will operate and acquire public utility properties and deal in bonds, stocks and other securities. Henry D. Walbridge, James K. Andrews, Hiram S. Brown and Francis E. Hoag have formed a company, under the name of H. D. Walbridge & Company, to acquire, finance and operate railway, gas and electric properties, and deal in securities at the same address.

International Pay-as-You-Enter Car Corporation, London.—Active negotiations are in progress for the disposal of the European patents of the Pay-as-You-Enter Car Corporation to a group of tramway operators in London on terms which were approved by the stockholders at a special meeting held in Wilmington, Del., on April 26. Out of a total of \$3,261,900 of stock entitled to vote there was represented personally or by proxy \$2,840,800. All of these votes were unanimously in favor of the proposals. It is understood that the controlling interests in the International Pay-as-You-Enter Car Corporation, as the company will probably be entitled, intend to install the cars immediately on a line in London which is eminently suited to test the pay-as-you-enter system, as the traffic is congested, there is a universal fare and no double-deck cars are used.

Universal Vanadium Company, Pittsburgh, Pa., was incorporated in Delaware recently to act as selling agent for the American Vanadium Company, and in a selling capacity in conjunction with the Vanadium Sales Company of America, both companies thus taking charge of the entire product of the American Vanadium Company. The Universal Vanadium Company has the following officers and directors: Edward M. McIlvain, president, 30 Church Street, New York; Millard Hunsiker, vice-president, Paris, France; James C. Gray, secretary and treasurer, Frick Building, Pittsburgh, Pa.; Joseph W. De Wyckoff, European representative, 64 Victoria Street, Westminster, London, Eng.; E. Marshall Fox, Wetley Rocks, Staffordshire, Eng.; Sylvester D. Townsend, Jr., Wilmington, Del.; William McIlvain, Reading, Pa. Since the formation of the American Vanadium Company the entire product of vanadium alloys produced by this company has been marketed by the Vanadium Sales Company of America. The offices of both companies have been in the Frick Building, Pittsburgh, Pa.

United States Steel Corporation, New York, N. Y., called the annual meeting of its stockholders for April 17, 1911. At the meeting President Gary presented his annual report, and referred in part as follows to the prospects of the company: "We believe we have at present a better organization throughout our companies than we ever had before. We think we are well equipped at the present time to manage our affairs economically and promptly, and yet we have no disposition to remain passive, inactive or contented. We are well satisfied with the amount of business we have done and profits we have realized during the last fifteen months. When the steel corporation was organized the total capacity of finishing mills was about 23,000 or 24,000 tons a day. Now the producing capacity is nearly double that amount. Therefore, although mills are not running to more than about 70 to 74 per cent of their capacity, this is much more than the total capacity at the time the corporation was organized. We started out with about 60 per cent of the total business of the country and at present we have about 55 per cent on the average. Our new business during January, February and March averaged 35,000 to 40,000 tons a day, or 75 to 85 per cent of our capacity. If my figures are correct, the profits on our products in the last ten years have been about the same per ton." G. M. Lane, of Lee Higginson & Company, New York, N. Y., has been elected a director of the corporation to succeed the late Nathaniel Thayer. In addition to Mr. Lane the following directors have been re-elected for a three-year term: George F. Baker, W. E. Corey, J. F. Dryden, C. A. Griscom, Samuel Mather, D. G. Reid and Henry Walters. John Reis, for several years the supervisor of new construction for the corporation, has been made vice-president. Mr. Reis was formerly connected with the National Steel Company, New Castle, Pa., absorbed by the Carnegie Steel Company before the merger. Ward B. Berley has been made assistant to the president, James A. Farrell. Mr. Berley was assistant to W. B. Dickson, who recently resigned as a vice-president.

ADVERTISING LITERATURE

General Vehicle Company, Long Island City, N. Y., has published *Elec-Tricks* for April, which contains reports from several companies showing the performance of its electric vehicles.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued a booklet entitled "Westinghouse Static Protective Apparatus," which covers the line of static protective apparatus manufactured by the company.

Joseph Dixon Crucible Company, Jersey City, N. J., is distributing a folder entitled "Maintenance Painting for Electric Railways," which explains the special adaptability of Dixon paints for street railway uses. It contains illustrations of street railway viaducts, power plant stacks and car trucks painted with Dixon's silica-graphite paint.

Transportation Utilities Company, New York, N. Y., which was recently organized to represent directly the Acme Supply Company and the General Railway Supply Company, is mailing an announcement to this effect and calling attention to the devices and materials which it will handle. The company is also distributing a catalog which describes and illustrates its "Tucco" friction curtain roller and fixture and "Tucco" ratchet fixtures.

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CONTENTS.

New York Rapid Transit Plans.....	827
Transportation of Letter Carriers and Policemen.....	827
The New York Reorganization	828
Object Lessons for the Motormen.....	828
Hourly Schedules on Interurban Roads.....	828
Standardizing Motormen	829
The Platform Instruction System of the Philadelphia Rapid Transit Company	830
Broadway Station of Illinois Traction System at St. Louis.....	837
Tabulation of Car Defects on the Brooklyn Rapid Transit System....	838
Timber from Replaced Bridge of Cleveland, Painesville & Eastern Railroad	839
Convention of Arkansas Association of Public Utility Operations.....	839
Conference on Signals in Indiana.....	840
Hearing to Require Electrification of West Side Freight Line in New York	840
Baltimore Bulletin on Care of Special Work.....	841
Concrete Pole Construction in Oklahoma.....	841
General Accounting of Public Utility Corporations.....	842
Roadbed Construction at Little Rock.....	843
Improved Line Construction Tools.....	844
More Electric Emergency Trucks for Third Avenue Railroad, New York	844
News of Electric Railways.....	845
Financial and Corporate	851
Traffic and Transportation	855
Personal Mention	857
Construction News	858
Manufactures and Supplies.....	861

New York Rapid Transit Plans.

The citizens of New York cannot now complain that the proposals submitted by the Interborough Rapid Transit Company and by the Brooklyn Rapid Transit Company do not offer the opportunity for rapid transit facilities for which they have long waited. The proposal of the former company, made public May 10, comprises not only very extensive additions to the rapid transit system in Manhattan and Bronx Boroughs, but also an important subway and elevated system in Brooklyn and Queens Boroughs, reaching even to Coney Island, and also a subway to Richmond. The question now squarely before the city is to decide between the two proposals submitted, or else to effect some arrangement by which both companies will receive franchises under which they will materially extend their lines. A year ago, or even six months ago, offers such as have recently been made seemed impossible. But the more favorable terms for the advancement of the city's credit to which the city seems now to be at least tacitly committed have allowed the companies a much freer hand in their proposals. New York seems at last to have waked up to a realization of the importance of rapid transit, and we hope that a decision will soon be reached and then that construction work will not be long delayed.

Transportation of Letter Carriers and Policemen

By decision of the Attorney-General of Massachusetts a proposed act requiring the street railway companies of that State to carry or transport letter carriers free would be unconstitutional, and under the new public utilities commission law in New Jersey the transportation by the companies without compensation of policemen or firemen in that State is now illegal. These decisions put in concrete form a matter on which the practice of electric railway companies has differed. In the majority of cases, probably, the companies have given free transportation to policemen in uniform when they have not exceeded a certain number, say two, per car. A smaller number of companies have accorded the same courtesy to firemen, and a few only have made no charge to letter carriers. The theory which has lain at the bottom of this practice has undoubtedly been that these public servants would reciprocate for this transportation by rendering prompt service when needed. There has been the added reason, in the case of policemen, that the presence on a car of these officers of the law is often of assistance to the employees in suppressing disorderly conduct on the car. The letter carriers, of course, deserve the least consideration because a street railway company has no grant and obtains no favors from the national government. But the present trend of public service legislation seems to be in the direction of cutting off all free transportation except to bona-fide employees of the company. On the whole, this is a desirable step, because when once an exception is made for one class of municipal officers it is difficult to draw the line.

The New York Reorganization

The plans for reorganization of the Metropolitan Street Railway of New York, which are now before the Public Service Commission of the First District, were formed by a joint committee representing holders of the two principal issues of bonds of the company. This committee assumes direct control over the showing upon which the commission is asked to approve the issue of new securities in order that reorganization may be effected. It had a valuation made covering the physical property together with various elements of intangible value which it considers proper to capitalize, and upon this appraisal the case is based. So far the testimony has consisted of direct evidence regarding the valuation by those who were engaged in it and by supplemental evidence by engineers in reference to various elements of value, principally of a non-physical nature. Such evidence presumably constitutes substantially the case of the committee. The commission, on its part, has cross-examined witnesses and has checked the inventory and analyzed the appraisal. Since the value sought is the cost of reproduction of the property the appraisal shows the estimated expense of creating a system where none existed before. Although the joint committee represents directly the holders of \$29,100,000 bonds, the total amount of securities outstanding and of special items for which provision is to be made, including cash requirements, is \$135,900,000, while the aggregate of new and undisturbed securities proposed under the plan is \$96,300,000. The importance of an early completion of the reorganization is so obvious and the time which has elapsed since the appointment of receivers for this company in September, 1907, is so long that it is greatly to be hoped that no material delay will intervene between the final hearing and the adoption of a satisfactory plan.

Object Lessons for the Motormen

Modern pedagogics lays great stress upon the principle of the object lesson, namely, the concrete presentation of the thing which is talked or written about. This principle has always been applied in the training of student motormen and conductors, but there is a tendency to overlook its value as a supplement to the standard rules for preventing the thoughtless handling of equipment. Motormen may read or may be told any number of times that they should not run on resistance notches, but they will never fully realize the meaning of this order until they actually see a set of burned-out grids; or the negligence of the individual may be effectively used as an object lesson, as in Toronto, where photographs of damaged armatures and other equipment are shown to the motormen and brief explanations are given as to how the trouble was caused and how it could have been avoided. The United Railways & Electric Company of Baltimore recently has gone even further in educating its men by pointing out the great damage which may be done in time by the cumulative effect of the carelessness of many individuals. As described elsewhere in this issue, the Baltimore management has accomplished this object by distributing a bulletin which contains a series of illustrations of new and worn-out special work. The principal reason for the premature removal of this costly material was rapid running over crossings, switches and curves. This appeal to the men was based on the fair assumption that the unskillfulness of motormen is due to ignorance more often than to carelessness or a desire to injure their employer's property. The men can easily appreciate the significance of a defect which has been caused directly by one

person, but it is much more difficult to make them understand that track work, which is apparently so massive, can be quickly battered into uselessness. In the demonstration of such facts either the ruined object itself or a good illustration thereof is worth any number of abstract injunctions.

HOURLY SCHEDULES ON INTERURBAN ROADS

An examination of the timetables of a large number of interurban railways in different parts of the country shows that it is the general practice to operate cars in both directions at intervals of even hours, making the leaving time from one or both terminals on the hour. This practice, undoubtedly, is the outgrowth of the development and extension of interurban lines from suburban and city lines. No one will deny that the convenience to the public which an hourly schedule affords has been a large factor in building up interurban traffic in competition with the irregular schedules of parallel steam roads. It is coming to be a question for careful consideration, however, whether regularity of schedules, because it is a traffic-producing asset, is not being maintained at the expense of excessive lay-over time and other objectionable operating practices such as trains running late and the uneven loading of trains.

The 1910 report of the committee on construction of schedules and timetables showed that the lay-over time of a large number of city systems represented on an average 12.5 per cent of the total service time. The percentage is much higher on many interurban roads. One road in New York State, for example, runs from terminal to terminal in 1 hour and 28 minutes, with 6 minutes lay-over at one end and 57 minutes at the other end. The ratio of lay-over time to total time for a round trip is therefore 26 per cent. It seems reasonable to suppose that if only 6 minutes lay-over is necessary at one terminal a large reduction could be made at the other terminal provided an irregular schedule was adopted.

This raises the question as to what is the minimum lay-over time necessary for an interurban car crew on a run of, say, 40 miles. The crew must report to the dispatcher, the conductor must make out his trip report, and the car should be swept out and superficially inspected. Some allowance for delay inbound must also be made, so that a car coming in late can go out on time. Fifteen minutes would seem to be a reasonably fair time for lay-over at each terminal on such a run requiring, say, two hours. This would give a ratio of lay-over time to total time for a round trip of 11 per cent. A shorter time than 15 minutes is allowed by many roads at one, and sometimes at both, terminals, but unless the running time is made considerably slower than the capacity of the car equipment warrants, so that the time lost may be made up on the road, too short a lay-over often results in cars leaving the terminals late and eventually demoralizing the schedule.

From the psychological point of view it is desirable to allow the motorman of a high-speed car some time in which to relax and rest from the nervous strain under which he performs his duties. The length of time which should be allowed for this reason is an open question. Some superintendents claim that an interurban motorman is under less nervous and physical strain while operating his car at 50 m. p. h. or 60 m. p. h. than the motorman on a city car who runs through crowded streets, and that the interurban motorman, therefore, requires no more time, if as much, to relax than the city motorman. Other railway men take an opposite view.

Regular hourly schedules have an important advantage from an operating standpoint, which should not be lost sight of. With uniform headway in both directions on single track the meeting points of all cars are the same at all hours of the day, and certain sidings become known as regular meeting points. There is less danger of running by a siding which is a regular meeting point for all trains than where the meets of each train are at different points. The work of the train dispatcher is lessened and some slightly greater degree of safety is secured.

It will be worth while for the manager of every interurban to give this complex subject of schedules careful study with the view of effecting possible economies in operation. One method, of course, would be that of disregarding the hourly or half-hourly plan of operation and of operating cars every 43 minutes, or every 70 minutes, or with whatever interval would best suit the length of the run. This would mean, of course, that the patrons of the road would have to depend upon a printed timetable for their knowledge of the times of departure of the cars. In some cases such a plan might be the best to adopt, especially on lines where there is much of a morning and evening rush, when it would be desirable for traffic conditions to shorten the headway between cars. For the ordinary interurban railway, however, we believe that most managers would be loath to adopt such a plan except to avoid an extremely long lay-over. Another alternative is to extend the run of the car so as to utilize the wasted time; another is to shorten the time of run by shortening the route, or by omitting a few stops, or by changing the gear ratio. Each case will have to be decided upon its own merits. The principles to be followed are for the company to strike the best balance possible between the various conflicting factors.

STANDARDIZING MOTORMEN

It is practically the universal rule that the introduction on cars of almost any kind of checking instrument will disclose great differences in the operating characteristics of the motormen. Part of these differences are due to variations in the natural ability of the men, but a larger portion of them undoubtedly are caused by poor training. The work of a motorman is so largely a matter of physical routine that one may well consider the possibility of standardizing his movements. There can be but one best way to manipulate the equipment. That way is the one which should be drilled into the men. Such uniformity is not possible if one follows the present practice of placing the recruits with "experienced" motormen before they have received any theoretical instruction. Motorman instructors are usually chosen for their good transportation records and not for their skill in manipulating the controller and brake. Nevertheless the transportation department is, or should be, as much interested in the economy of power and in the reduction of the cost of maintaining the equipment as any other department in the company. For example, there is no doubt that a great many motormen who are careful to follow the instructions in the standard code of operating rules governing their performance on the road are careless about dragging the brakeshoes, wasting air and doing other things which cause no great immediate damage to the equipment but do prove costly in the end. An engineer who has visited a number of roads and whose work has brought to his attention the subject of brakeshoe adjustment recently said that he be-

lieved many motormen wasted as high as a $\frac{1}{2}$ kw hour per car mile by operating with brakes which were too tight. The blame for this condition may be due to the inspectors quite as much as to the motormen, but the latter, at least, are on the car constantly and should be able to tell by the "feel" whether the brakeshoes are dragging. Carelessness in this respect, as well as in other phases of car operation, is not only harmful in itself, but if not guarded against it is likely eventually to become widespread.

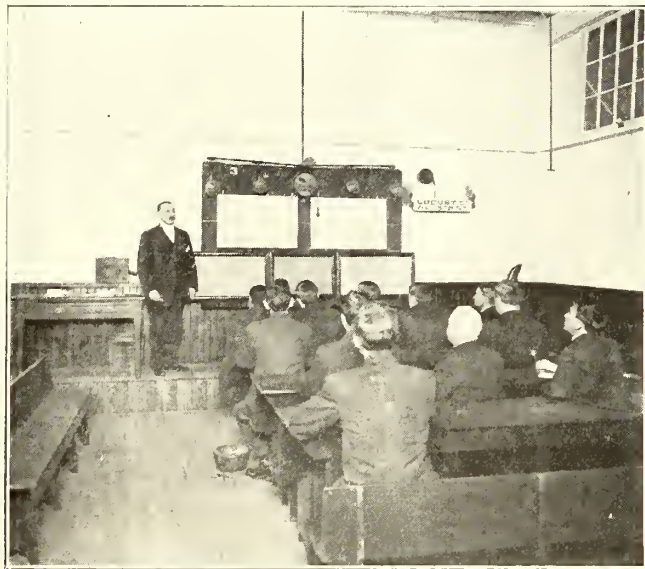
These conditions emphasize the importance of uniformity in the method of breaking in new men, or rather in the method of teaching them the proper way to handle the equipment. Otherwise, even if the motorman instructor has no wasteful habits in car operation, he will probably have his own pet ideas to exploit. The graduates from such a school are very discouraging material for the school-room instructor, to whom they are turned over for final approval. He can perhaps instil into them a few general notions about the nature of electricity, but he cannot even attempt to undo the false training which they have absorbed in the actual running of a car.

The experience of a number of those railways which have given much thought to thorough methods of instruction is that much better results are obtainable when the new men are taught by one scientifically trained teacher in a well-equipped instruction room before they go on the platform. This is the method now followed by the Philadelphia Rapid Transit Company, whose old and new practices are described elsewhere in this issue. On the Philadelphia system a single instructor can take care of as many as a dozen men at a time, showing them how to make in the proper way every possible combination of controller, braking, sanding and signal movements.

Such a teacher can explain the meaning of every step and have the men go through a simultaneous drill so often and so thoroughly that they will do the right thing automatically when they are placed on the car. Under this system all that is left for the motorman instructor is to see that the new man is capable of dealing diplomatically with passengers and drivers of obstructing vehicles, of making out reports and of doing other things which cannot be taken up in the classroom. After this period of probation, the general instructor can give the candidate his seal of approval, after determining that the novice can discover troubles and correct them by carrying out such emergency operations as replacing a fuse, cutting out a defective motor, etc. It must not be forgotten, however, that even if the new men really do know how to handle the car properly there will always be a tendency for them to fall into more or less slipshod ways. This is all the more likely because some transportation departments give little thought as to how a man treats the apparatus so long as he makes his schedule and has no accidents. To avoid this tendency it would be well to have an inspector report on the operating methods of different motormen so that delinquents could be ordered to instruction headquarters for further training. However, such inspection alone will not fulfil the desired end unless it goes in hand with a system of rewarding those who do handle their cars in the most economical manner. A logical reward would be to make motorman instructors of these men and pay them a bonus whether they have a student in charge or not. A reward of this kind would be a real incentive, whereas under present conditions they are all paid without regard to their operating efficiency.

THE PLATFORM INSTRUCTION SYSTEM OF THE PHILADELPHIA RAPID TRANSIT COMPANY

During the past year the Philadelphia Rapid Transit Company has inaugurated a system of instruction for motormen and conductors of which the fundamental feature is a thorough schooling under a general classroom instructor before any work is done on the platform. The prime object is to teach the men how to perform their duties in a really efficient manner, according to a single standard, instead of placing entire dependence upon a variety of platform instructors to complete the edu-



Philadelphia Instruction System—Enlarged Conductor's Way Bill, Timetables, etc., on Demonstration Board

cation of entirely untrained men. In striving to obtain the desirable end of uniformity in method, it has been found well to have the training system flexible enough to apply to both new and old men, either by sending them to the headquarters school or visiting their carhouses in an instruction car.

ARRANGEMENT OF INSTRUCTION CLASSES

In view of the fact that the instruction course is not confined to new men, it was found desirable to arrange the classes so that all men sent to the schoolroom at a certain hour would receive the kind of instruction which would best apply to their particular case. According to the schedule now in force, the recruits who are selected by the employment department on Monday, Wednesday and Friday, the three employing days, must report to the schoolroom on either Tuesday, Thursday or Saturday at 8:30 a. m. Student motormen and conductors who return for examination and final instruction must report to schoolroom either Monday, Tuesday, Wednesday, Thursday, Friday at 1:30 p. m. or 12 noon on Saturday. Experienced motormen and conductors who are to be appointed platform instructors or who are considered in need of special instruction because of improper performance of their duties must report at 8:30 a. m. Monday, Wednesday or Friday. Motormen sent for at this time are usually required to operate the instruction car and are passed on by the chief instructor. The joint instruction of motormen and conductors is given when they are returned for examination and consists of a lecture on prevention and handling of accidents and an explanation of the operating mechanism of the pay-within car door. For the latter purpose a full size pay-within door and step, together with the operating mechanism, have been provided.

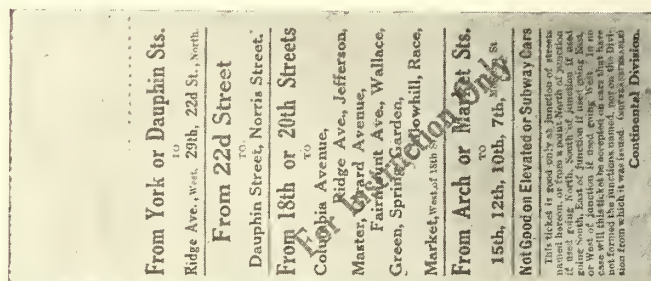
Neither student motormen nor conductors receive pay during the schooling period.

INSTRUCTION FOR CONDUCTORS

As shown in the accompanying illustration, student conductors are seated at desks each of which will accommodate five men. At one end of the room is a board, on or near which are

mounted a standard fare register, trolley catcher, destination sign board and framed schedules of various types, time-point tables, etc. The board also carries under spring clips two sheets of thin paper printed as the front and back of a conductor's standard way bill enlarged to 22 in. x 34 in. so that all seated in the room may easily see the different items of the way bill as they are described by the instructor.

The first step in the instruction of student conductors is a brief talk regarding the duties of the position and an explanation of the student conductor's catechism, after which the instructor explains how, when a run number is assigned, the leaving time and block numbers may be obtained from the schedule. He then assumes a run number, finds the leaving time and block numbers from a schedule in front of him and makes the necessary notations on the large way bill, instructing the men to do the same on the standard size way bill with which they are supplied. He next sets the register to "out" and starts ringing fares and tearing off properly punched transfers and exchanges, at the same time explaining why he should issue and receive certain kinds and colors of transfers, exchanges and tickets. He then assumes they are at the end of the line and explains how to find the leaving time from there and why register, transfer and exchange ticket statements should be entered on the way bill. After this he turns the destination sign, shifts the register to "in" and starts on the return trip. This is carried out for four complete trips. After the first trip the instructor shifts the responsibility for each step, by asking questions of the men. After the fourth trip is completed the way bills are balanced as they must be before being turned over to a receiver. This course of instruction, which occupies from three to three and one-half hours, is compulsory for all inexperienced men, but it is optional with ex-conductors to remain for it or not. The student is then sent to the depot to which he is assigned, after being given a conductor's cate-



Philadelphia Instruction System—Back of a Sample Transfer



Philadelphia Instruction System—Front of a Sample Transfer

chism with instructions to memorize the answers to the questions, of which there are twenty-five, as follows:

STUDENT CONDUCTOR'S CATECHISM

1. Q.—Upon being assigned to a run by clerk, what material is necessary for you to have before starting to work?

A.—Way bill, tickets, punch and \$2 in change.

2. Q.—How should you find the starting time of each trip and the block numbers your car is to carry?

A.—The clerk will assign the run number; the starting time and block numbers should then be read from the schedule of the division on which this run is located.

3. Q.—How will you find the car which is assigned to your run?

A.—By searching in the carhouse for a car on which the proper block number is posted.

4. Q.—After finding car what information should be given to register clerk?

A.—The car number, the register number and the statement shown on register dial.

5. Q.—What should be entered on way bill before leaving carhouse?

A.—Run number, block number, car number, register number, conductor's name and badge number, motorman's name and badge number, and the statement shown on the register dial, together with a statement of the number of each kind of tickets delivered to conductor by clerk.

6. Q.—What inspection of car should be made before leaving carhouse?

A.—See that register is in place, that trip dial of register is at zero, that car lights will burn properly, block and badge numbers are in place and that destination signs are properly set.

7. Q.—Who is responsible for the starting of car from terminal on schedule time?

A.—Both conductor and motorman.

8. Q.—Explain bell signals?

A.—Signals to motorman: one bell to stop, two bells to start, three bells to stop at once. Signals to conductor: three bells, pull down pole; four bells, set rear brakes.

9. Q.—What does one bell from motorman on pay-within car mean?

A.—Person wishes to board car.

10. Q.—What signal is used by motormen to inform conductor of passengers boarding car by way of front door?

A.—Motorman gives bell for each passenger who boards car by way of front door.

11. Q.—What is the rate of fare?

A.—No.

16. Q.—What tickets are not registered?

A.—Transfer tickets.

17. Q.—How should transfers be issued?

A.—When passenger asks for same at time of payment of fare and on cash fare or 5-cent ticket only.

18. Q.—In issuing exchange and transfer tickets, what punch mark is necessary?

A.—The hour only.

19. Q.—In receiving exchange tickets and transfer tickets, what observations should a conductor make?

Conductor		Motorman		Division	
1st Block No.	2d Block No.	1st Block No.	2d Block No.	Run No.	Date
CAR No.	TRIP	TIME	5 ct. Fares	Exchanges Sold	TOTAL CASH
	1 OUT				
	IN				
	2 OUT				
	IN				
	3 OUT				
	IN				
	4 OUT				
	IN				
	5 OUT				
	IN				
	6 OUT				
	IN				
	7 OUT				
	IN				
	8 OUT				
	IN				
Totals					

Philadelphia Instruction System—Back of Conductor's Way Bill

A.—Note if good on your division and offered at right place, also that date is correct and that same is within time limit of punch mark.

20. Q.—In case of your register becoming disabled whom would you notify and what record would you keep of fares collected?

A.—Would notify the office, street superintendent or dispatcher at end of line, and until same was repaired or replaced

would punch each fare collected on back of pad of tickets and afterwards register them on the new or repaired register in the presence of person replacing same and make a report of it.

21. Q.—Which is the out trip as shown on the way bill?

A.—The starting time on the schedule is the out trip.

22. Q.—How often is entry made to way bill from register on each trip?

A.—Twice, once at each terminal.

23. Q.—How and where should the register be set?

A.—By turning the key in the register until trip dial stands at zero. It should be set at the end of each half trip.

24. Q.—When and how should receipts be turned in?

A.—At the finish of day's work, to receiver, after being sure that way bill balances correctly and shows the proper amount that has been collected, together with all tickets received and those remaining unissued, together with punch.

25. Q.—What method is used in being relieved on the street?

A.—When being relieved on the street by another conductor fill out O. K. or receipt card, showing conductor's name, run number, register number, commencing and ending statement of same, and have conductor who is making relief sign his name and run number to same and turn this card into office, as this is your receipt showing the statement of register to be correct at that time.

REGISTER STATEMENTS.		Referring to Rule No. 40 in "Book of Rules."	
Register No. _____	Ending _____	IN CASE OF EMERGENCY, CALL	
Commencing _____	Total _____	Bell Phone "MARKET 4407" Keystone Phone "MAIN 051"	
Register No. _____	Ending _____	In making up this Way-Bill all totals must balance correctly.	
Commencing _____	Total _____	STATEMENT OF PASSENGERS.	
Register No. _____	Ending _____	Passengers	5 Cts.
Commencing _____	Total _____	Sct. Fares	
Register No. _____	Ending _____	Sct. Exchanges Sold	
Commencing _____	Total _____	Sct. Exchanges Received	
Register No. _____	Ending _____	Sct. Tickets Received	
Commencing _____	Total _____	Package Tickets Received	
Register No. _____	Ending _____	Free Tickets Received	
Commencing _____	Total _____	Grand Totals	
Total Registrations _____		Each trip must show the car number used.	
STATEMENT OF EXCHANGE TICKETS		In all cases the starting time on the schedule is the OUT trip; the return is the IN trip.	
Ending _____	Total Sold _____	When on time, put down the schedule time leaving each end, when not on time, put down the actual time.	
Commencing _____	Total Issued _____	In no case add passengers of one trip, or part of trip, to those of any other trip. Each trip, or part of trip, must show the fare.	
STATEMENT OF TRANSFER TICKETS.			
RED Ending _____	WHITE Ending _____		
Commencing _____	Commencing _____		
Total Issued _____	Total Issued _____		

Philadelphia Instruction System—Front of Conductor's Way Bill

A.—Five cents.

12. Q.—How many kinds of tickets are in use?

A.—Five.

13. Q.—Name each.

A.—Exchange tickets; 5-cent tickets; package tickets; free tickets, and transfer tickets.

14. Q.—What tickets are sold by conductor, at what rate and under what restrictions?

A.—Exchange tickets, at the rate of 8 cents each, and only at time of collection of fare from passenger.

15. Q.—Are all tickets received registered?

The minimum training period for inexperienced conductors is five days, and the maximum any number until given up as hopeless. Ex-employees of the company may be turned in after having made one trip over each line operated from their depot and passing the examination at the instruction room. This examination is given to all students after completing their training on the cars and consists of properly completing and balancing a partly filled way bill and answering questions from the catechism and book of rules. Men who fail to pass this examination may take time to study the catechism and way bill and return at a later date for another examination.

INSTRUCTION OF MOTORMEN

The instruction room formerly contained a skeleton car, on which all wiring was exposed. It was found, however, that a knowledge of this wiring was of little value to the motormen of a city car, where the delay necessary to apply any but simple remedies was costly. It was decided therefore to replace this car by enough controller and brake stands to make it possible for one instructor to train ten men at the same time in the

Over the instructor's stand are suspended a gong, circuit breaker and hood switch, a fan which represents No. 1 motor and a lamp which represents No. 2 motor. On the floor in front of the controller are placed two frames of standard grid resistance on which lamps are mounted, to show the cutting out of sections of resistance at various points of the controller. The current is brought into and through the equipment as it is on a car. The effect of fast feeding, defective motors, etc., may be demonstrated by pressing a grounding switch in the floor, thus causing the circuit breaker to blow, while the effect of opening a motor cut-out switch may be shown on the fan and resistance lamps.

PRELIMINARY INSTRUCTION OF MOTORMEN

All newly employed men whether experienced or not are sent from the employment department to the schoolroom.

The instructor first delivers a brief lecture regarding the duties of their position and the vital necessity of caution. He then explains the operation of a controller, demonstrating this explanation by means of a board on which lamps take the



Philadelphia Instruction System—Teaching a Group of Motormen Recruits to Manipulate Controller and Brake Handles

operation of controller, hand and air brakes. There are eleven of these stands, ten of which are on a platform built around the wall on three sides of the room. The eleventh stand, which is intended for the instructor, is in the center of the room at one end, so that he may watch the students to the best advantage. The training controllers are all nine-point, fitted with automotoneers, reverse cylinders and cut-out switches. Each hand brake operates against a spring beneath the floor, while the engineer's valve on ten of the stands has reduced openings and feeds directly into pressure gages which are placed in front of the supporting rail. One of these stands is supplied with a standard sander and another with a vertical wheel brake. A complete air brake outfit is placed on the floor of the room and the engineer's valve on the instructor's stands feeds to the brake cylinder. A pressure gage is piped from the end of the brake cylinder and located in plain view of all the students, a helical spring being connected between brake levers to the return piston to release position when the air is released.

place of motors and resistance, clearly explaining the difference between resistance and running points. He also explains the path of current from the trolley to the rail, demonstrating by means of chalk and blackboard. The motor cut-out switches are then touched on but not in detail, as it is not considered good policy to overburden the new man with information at this time. The instructor then gives each man a student motor man's catechism which contains twenty-seven questions and answers as follows:

STUDENT MOTORMEN'S CATECHISM

The points on a controller top are arranged in two groups, namely: Series and multiple.

1. Q.—What are series points on a controller?

A.—All points in the first group.

2. Q.—What are multiple points on a controller?

A.—All points in the second group.

3. Q.—How does current feed to motors when control handle is on series points?

A.—Flows through No. 1 motor before reaching No. 2 motor.

4. Q.—How does current feed to motors when control handle is on multiple points?

A.—Flows into No. 1 and No. 2 motors simultaneously.

5. Q.—What is resistance?

A.—Metal strips through which current is passed when it is desired to check full current from entering the motors.

6. Q.—What are resistance points on a controller?

A.—Points on which the control handle is placed when current passes through resistance, thus preventing full current from entering the motors.

7. Q.—What are safe or running points?

A.—Points on which the control handle is placed when current enters the motors without passing through resistance.

8. Q.—What would be the result of allowing the control handle to rest on resistance points for any considerable length of time?

A.—The resistance would become overheated and might set fire to the car.

9. Q.—How may "safe" or running points be known?

A.—The last point in the series group and the last point to which the control handle may be fed are running points.

10. Q.—What is the duty of an automatic circuit breaker?

A.—To act as a safety-valve and protect controllers and motors from a heavier flow of current than they can carry safely.

11. Q.—What are some causes for a heavy flow of current?

A.—Defective motors, power and brakes on at the same time, and fast feeding of controllers.

12. Q.—Should an automatic circuit breaker be prevented from blowing by holding or fastening?

A.—No; it would be dangerous.

13. Q.—If impossible to throw controller off when desiring to stop car, what action should be taken?

A.—Open hood switch.

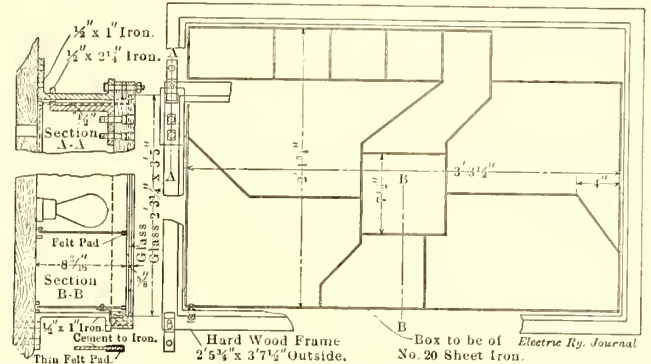
hand brake and open the drain cock under the reservoir, open the overhead switch and place the headlight and handles in their proper place.

18. Q.—Explain bell signals.

A.—Signals to motormen: one bell, stop; two bells, start; three bells, stop at once. Signals to conductor: three bells, pull down pole; four bells, set rear brake.

19. Q.—What does one bell from motorman on "pay-within" car mean?

A.—Person wishes to board car.



Philadelphia Instruction System—Instruction Board Detail of Lamp Box Frame and Support

20. Q.—What signal is used by motormen to inform conductor of passengers boarding car by way of front door?

A.—Motorman gives bell for each passenger who boards car by way of front door.

21. Q.—If car will not start on first, second or third point, but controller flashes or automatic circuit breaker blows, what action should be taken?

A.—Throw controller to off position, see that brakes are released and reverse on rear controller in center; if so, cut out one motor; if this does not help, replace the cut-out switch and try the other. If car continues to give trouble, let it be pushed by follower.

22. Q.—If car seems dead when controller is fed to first, second and third points, what action should be taken?

A.—Throw controller to off position, see that pole is against trolley wire and turn on car lights. If these do not burn, wait for power to return on line, which will be shown when lights burn.

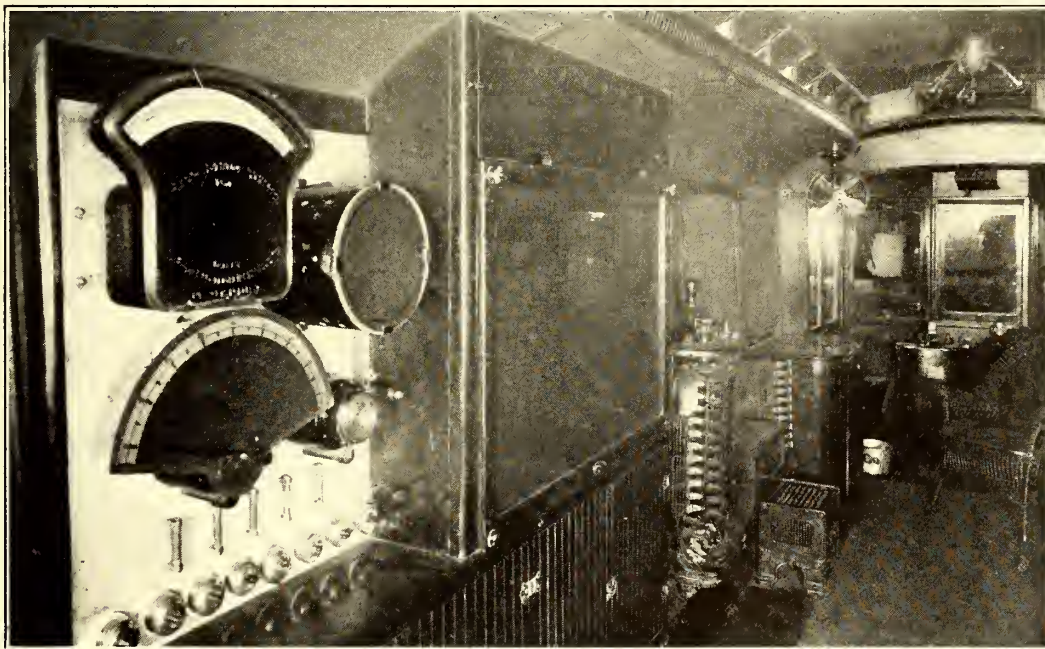
23. Q.—If car seems dead when controller is fed to first, second and third points and car lights burn brightly when

turned on what action should be taken?

A.—See if overhead and automatic switches are on. If so, cut out one motor. If this does no good, replace the cut-out switch and try the other. If car still refuses to move, be pushed by follower.

24. Q.—If the automatic circuit breaker blows three times consecutively while the controller is being fed slowly, what action should be taken?

A.—If brakes are fully released and car not ascending a heavy grade, open the controller and cut out a motor. If the



Philadelphia Instruction System—School Car, Showing Extra-Size Pressure Indicator and Ammeter at the Left

14. Q.—How should controller be thrown off?

A.—Rapidly.

15. Q.—Is it safe to throw controller partly off?

A.—No; it must be always thrown completely off.

16. Q.—Should brakes and power be on at the same time?

A.—No; they perform opposite duties and will not work together, without danger of injury to the equipment.

17. Q.—What should be done to a car when placing out of service in depot?

A.—Turn off power from air pump, release air brake, apply

controller was on a series point when automatic blew, try No. 1 motor switch first. If controller was on a multiple point when automatic blew, try No. 2 motor switch first. But in either case if the first switch tried does not prove right replace it and try the other. If automatic still continues to blow, be pushed by follower.

25. Q.—What is the maximum speed at which a car should cross special work?

A.—That which the second point on a controller would give a car on a level rail.

26. Q.—When may a reverse be used?

A.—Only when necessary to avoid an accident.

27. Q.—If necessary to operate a car through water, how should it be done?

A.—Slowly, drifting without power if possible.

The instructor explains to the men that they must study and be prepared to answer any of the foregoing questions when they are returned to the instruction room for examination. The experienced men are then sent to the depot to which they are assigned, there to make at least one trip over each line, or until the instructing motormen with whom they are placed are satisfied to pass them. Upon this they return to the instruction room for examination and final instructions.

After the old men leave the room the inexperienced men are placed at the controllers, where they are first drilled in feeding up and throwing off. They next take up the hand brake, being taught how to wind up and release, after which they take up both controllers and hand brakes, operating in response to bell signals which are given by the instructor. This training is continued until they are able instinctively to do the right thing at the right time with both controllers and brakes. The instructor then starts the air compressor, explaining how this is done on a car and how the pump is controlled by the governor. He then explains the different positions of the engineer valve, demonstrating by means of the gage on the brake cylinder and the motion of the brake levers how brakes are applied, held and released. Following this, he turns air to the engineer's valve in front of the students and drills them in applying, holding and releasing to such pressure as he may ask for. He explains in the meantime that the gage in front of them corresponds to the gage on the brake cylinder and that the motions they make are the same as will be made when they are stopping an air-brake car. This training is continued until the men can locate application, lap and release positions without watching their hands; in fact, they are kept at both controller and brakes until able to operate them with head up and eyes looking forward.

The students are next taken to the instruction car and shown the location of the various parts of the equipment which have been explained to them; also how to prepare a car for service and what to do when putting it away. This completes their preliminary training. They then go to the depot to which they have been assigned. There they are trained on the cars until satisfactory to the various instructing motormen with whom they are placed. After this they must return to the instruction room for examination and final instruction. All inexperienced

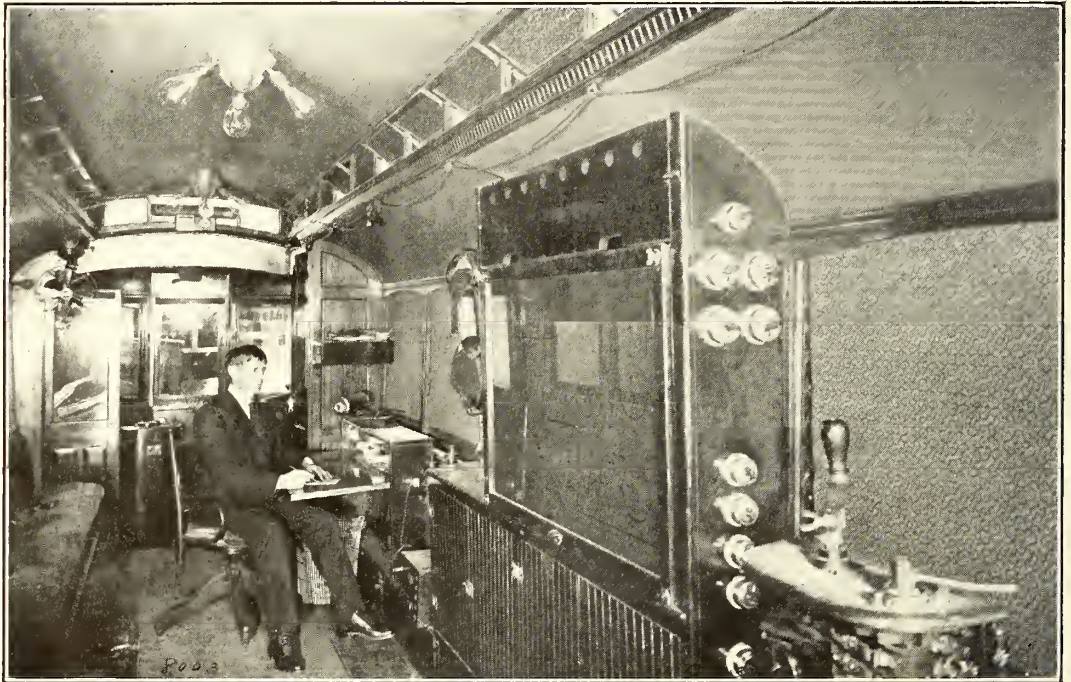
motormen must remain under instruction for a minimum period of eight days.

JOINT INSTRUCTION OF MOTORMEN AND CONDUCTORS

After completing their training period on the cars, the motormen and conductors return to the instruction room at the same hour. There they are all seated in one room to receive instructions in such duties as may be common to both positions. After this the motormen are seated in the other room and the examination commences.

EXAMINATION AND FINAL INSTRUCTION OF MOTORMEN

The examination is made up of questions from the catechism and questions regarding the application of certain rules. The examiner checks opposite the name of each man the question asked and whether it was answered correctly or not; if not, the question passes to the next man. After the correct answer has been given, the instructor explains in detail the reason for that answer. If it pertains to controllers or motors he demonstrates the explanation on the different types of controllers which are erected in the corner of this room and connected to lamps representing resistance and motors. A thorough explanation of resistance and resistance points is given at this time, the men being shown how resistance will heat more rapidly with the controller on multiple than on series resistance points. It



Philadelphia Instruction System—School Car with Illuminated Circuit Board in the Foreground at the Right

is also shown that with motors cut out the resistance will heat more rapidly on series points than with all motors in. How motors are cut out on different types of controllers is covered in detail, while the warning indications that cut-out switches should be used are carefully explained.

The men then have the proper operation of the air brakes explained and demonstrated on the brake system in the room. Every effort is made to discourage the waste of air and the fanning of the air-brake handle, a common fault of motormen, by explaining how the motorman with good judgment can make most service stops with one application and one or two releases. Men who fail to satisfy the instructor as to their competency are not allowed to go to work, but have an opportunity to ask questions and, after additional study of the catechism and book of rules, may return at a later date for another examination. Before leaving the employment department each motorman and conductor is furnished with a printed form on which a record of his instruction is kept. Each instructor who passes him signs his name, badge number, date of instruction, number of trips and, if motorman, whether an air or hand brake car was used. After the student has passed the examination at

the schoolroom the chief inspector signs this paper. The man then receives a badge number and is placed on the books as an employee. A card index is kept in the instruction room on which the dates of instruction of each man and any other information cared for are noted.

INSTRUCTION CAR

The instruction car was equipped in order to instruct classes of men without subjecting them to the loss of time necessary for a trip to the headquarters school from carhouses which were, perhaps, many miles away. It has a body of the standard pay-within type with folding vestibule doors and steps. The end bulkheads are absent as in the pay-within car so that men seated in the car may have an unobstructed view of the motor-man. The interior has a longitudinal seat along one side, while on the opposite side are placed the various demonstrating devices and special furnishings. The car may be warmed by electric heaters under the seats and on the platforms or cooled by two electric fans. A cabinet containing a water cooler and wash basin is at one end of the car, water for the wash basin being raised by air pressure from a reservoir on the floor. Next to this cabinet is mounted a six-point controller, which was installed in order to show a method of cutting out motors which differs from that of any other controller on the system. On the floor in front of this controller is a frame of unconnected grid resistance, next to which is a glass-incased compressor governor which is a part of the air-brake circuit. Next in line is the standard K-12 controller which is connected to lamps used to illuminate a chart, on which is shown by lines of light the path of current through resistance and motors on each point of the controller for both four-motor and two-motor equipments. The construction and wiring of this device are shown on pages 833 and 835. The surface of this chart consists of a framed sheet of plate glass 2 ft. 3¼ in. high and 3 ft.

the increased danger of multiple over series resistance points, why series resistance points become more dangerous with motors cut out, the changes of current path with motors cut out and the effect of pulling a brush from one motor on a four-motor equipment, whereby one of the others receives double current while the controller is on series points.

The snap switches at the side of the chart are for the purpose of changing from a two-motor to a four-motor equipment. The controller is also used to show the injurious effects of throw-

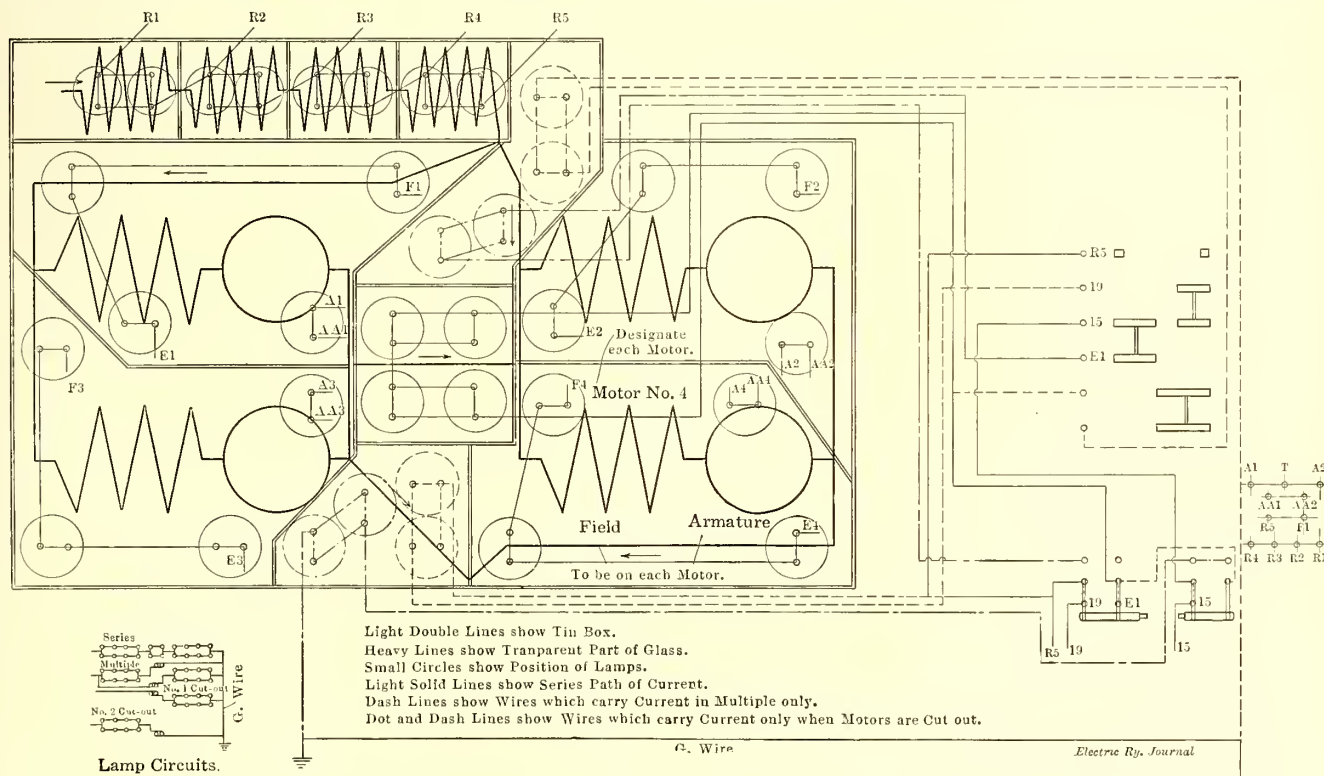
REPORT FROM INSPECTOR OF MOTORMEN

Depot,		Date,									
NAME	Badge No.	AIR BRAKES				CONTROLLER				Run Number	Month and Day
		Average No. of Applications	Releases when not necessary	Applies full car standing	Stops with jerk	Feeds fast	Throws off slow	On and off 1 pt. uselessly	Uses power and brakes together			Uses power over spec. work

Philadelphia Instruction System—Report Blank on Motor-man's Treatment of the Equipment

ing off slowly or pinching on and off one point. This is demonstrated by a 2½-amp current, which produces an arc heavy enough to short-circuit from trolley finger to R₁ resistance finger. All concealed lamps necessary for this equipment are placed in the cabinet under the chart.

On the left side of the chart is a board on which are mounted instruments, as shown on page 833. The one at the top on the right side is cylindrical in form and is part of a device to show whether the car wheels are revolving or sliding. This



Philadelphia Instruction System—Wiring of the Instruction Board in the School Car

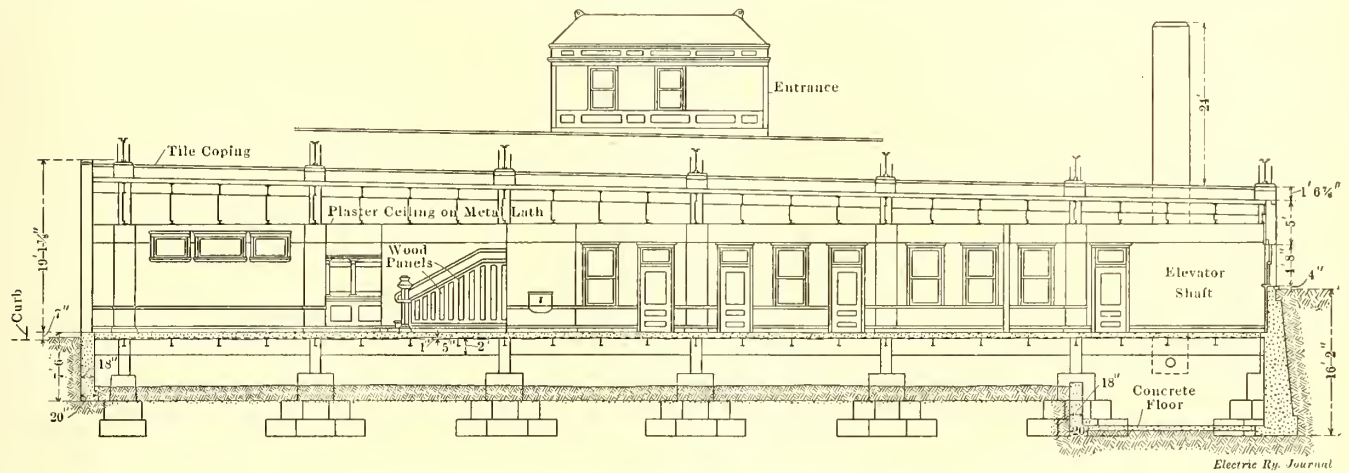
5 in. long. This glass is painted black with resistance and motor circuits, arrows indicating the direction of current flow, motor numbers, etc., shown by transparent lines which are illuminated by 16-cp lamps placed in variously shaped compartments 8 3/16 in. deep. Each compartment has a sheet of ground glass of the same shape fastened in it between the lamps and the plate glass in order to diffuse the rays of light. Each movement of the controller lights or darkens the proper lamps to show on the chart the changes in the path of current. The chart shows

cylinder is made of sheet iron with a glass front which is painted black except for a ring of clear glass near the circumference. Inside of the cylinder are eight compartments, in each of which is an 8-cp lamp, separate wires leading from each lamp to contact fingers as shown on page 836. The contact fingers are fastened to a stationary fiber disk which surrounds the axle as illustrated. As the axle turns a contact plate fastened thereto grounds one finger circuit just before opening another, thus producing little arcing at the contact and lighting

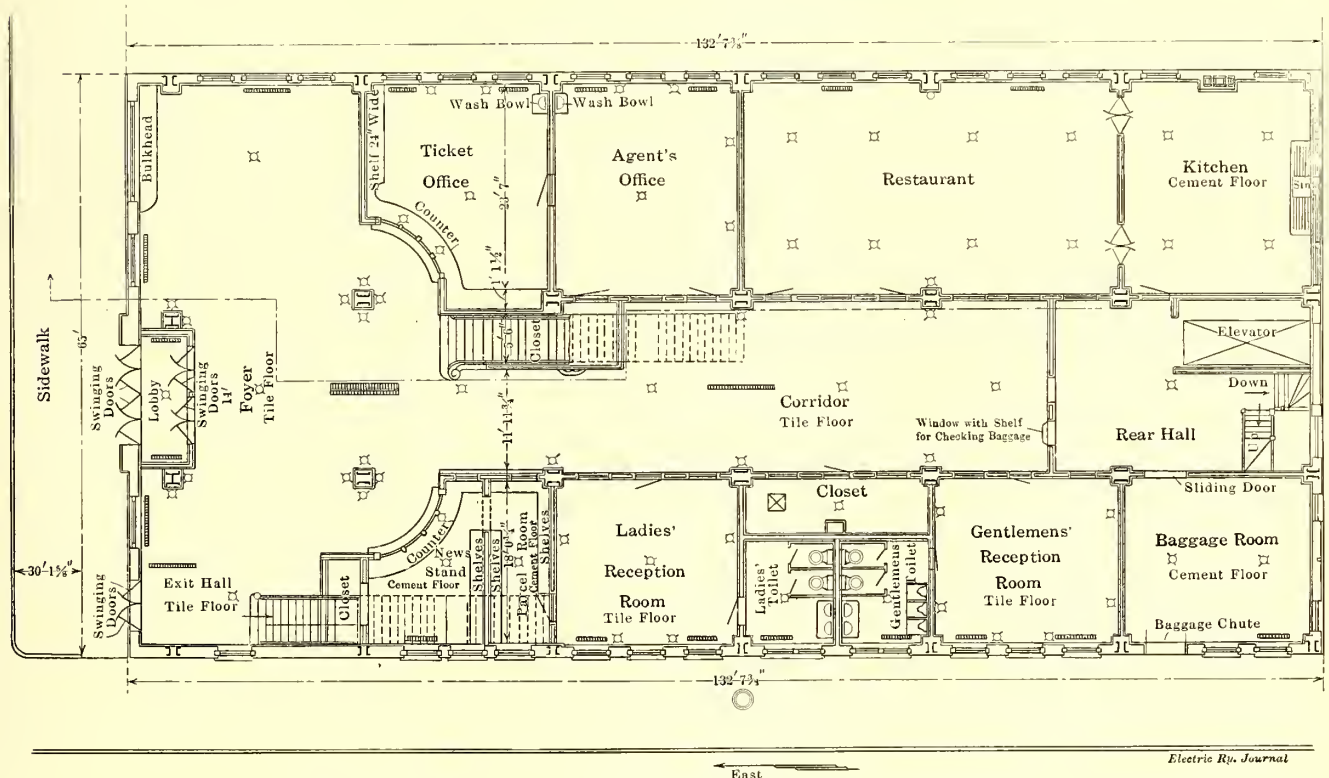
BROADWAY STATION OF ILLINOIS TRACTION SYSTEM AT ST. LOUIS

The Illinois Traction System recently completed a very fine passenger station located at the St. Louis end of the viaduct leading to its new McKinley bridge. This station is for the accommodation of city and interurban passengers using the Illinois Traction bridge-service cars and the through interurbans to Illinois. It is located at Salisbury Street, fronting on the Broadway double-track line of the United Railways of St. Louis. Plans for the station were drawn by Francis Bacon,

ground floor underneath a paved deck, on which are the two interurban and city tracks with their loading platforms and shelters. Complete facilities are afforded for handling local and through passengers. The station has a frontage of 65 ft. on Broadway and is 132 ft. 7 in. long. Its interior is subdivided as shown on the accompanying floor plan. The subdivisions include a large foyer from which broad stairways, as shown in the halftone engraving, lead to and from the tracks above the roof of the station. Other subdivisions of the station include a restaurant, retiring rooms, parcel room, news-stand and a baggage room. An elevator with a platform 5 ft.



Illinois Traction Passenger Station—Longitudinal Section



Illinois Traction Passenger Station—General Plan of Ground Floor

architect, Chicago, and the steel work, which includes supports for the double-track approach to the bridge, was designed by Ralph Modjeski, consulting engineer, Chicago. The construction work was handled by the department of bridges and buildings of the Illinois Traction System under the supervision of E. M. Haas, superintendent, the work being done very largely by company forces at an approximate cost of \$27,000.

BUILDING ARRANGEMENT

The Broadway station is built beneath the viaduct approach to the McKinley bridge at the point where the approach joins the street level. The station facilities are all located on the

x 14 ft. provides for carrying loaded baggage trucks between the ground level and the level of the station platforms above the building.

The building structure has a frame of structural steel inclosed in brick walls trimmed with cut stone. The interior steel work is incased in brick for providing protection from fire, and interior partitions are made of Mackolite 4 in. thick, bonded and laid in concrete mortar. The roof is made of reinforced concrete having a granitoid sidewalk finish covered with composition to protect it against water.

The interior finish of the station corridor and rooms is plain

oak with a white paste filler and three coats of varnish, the last coat being rubbed dull. The accompanying engraving shows the appearance of the wall finish with its white tile wainscot and the mosaic floor with the monogram of the railroad company inserted opposite the main entrance to the station. The walls have three coats of plaster placed on No. 19 wire cloth. They are tinted in conformity with the light tone of the wains-

TABULATION OF CAR DEFECTS ON THE BROOKLYN RAPID TRANSIT SYSTEM

The mechanical department of the Brooklyn Rapid Transit System follows the practice of summarizing on a monthly blueprint the run-in statistics of every car depot on the system. This blueprint is distributed regularly to all interested parties.

The comparisons thus made are not considered absolute because the equipments used on some lines are older than on others aside from wide variations in operating conditions. Nevertheless, these summaries arouse the spirit of emulation, as each foreman is spurred on to improve upon his previous records. On the other hand, the superintendent of equipment can detect the weak spots at a glance and can plan for betterments accordingly.

As the parallel figures for the separate divisions would not be of general interest, it has been deemed desirable to assemble the totalized run-in records of the surface and elevated systems for the half year from Oct. 1, 1910, to March 31, 1911, thereby including all of the winter months. This assembly is given in the accompanying table, which shows that these run-in statistics are kept under three general heads, as follows: "Number of Cars Run In and Result of Examinations," "Mileage Basis" and "Percentage Basis."

The first head has ten subdivisions, among the most interesting being those which give the average daily mileage per car, the number of cars found O. K. upon examination,

and run-ins not due to defects of equipment. It will be noted that the surface cars averaged from 75 miles to 83 miles a day, which is remarkably close to the range of 89 miles to 96 miles made by the elevated or high-speed equipment. The item



Illinois Traction Passenger Station—Foyer Ticket Office

cot, floor and woodwork. The building is heated from a boiler plant located in a basement under the baggage room. The wash basins in the toilet room are piped for hot and cold water, a 30-gal. upright tank having been installed in the base-

CAR RUN-IN RECORD OF BROOKLYN RAPID TRANSIT SYSTEM FROM OCT. 1, 1910, TO MARCH 3, 1911, INCLUSIVE.

Definition of the term "Run-In"—When it becomes necessary for any reason to replace any car in service, the car replaced shall be considered a "Run-In."									
Number of cars run in and result of examination—									
Average number of cars maintained a day.....	{ Surface	Oct.	Nov.	Dec.	Jan.	Feb.	March.		
	{ Elevated	1,680	1,650	1,568	1,557	1,561	1,583		
Total number of cars maintained per month.....	{ Surface	925	928	928	928	928	928		
	{ Elevated	52,080	49,560	48,608	48,267	43,708	49,073		
Average number of cars operated a day.....	{ Surface	28,675	27,840	28,768	27,840	25,984	28,768		
	{ Elevated	1,407	1,395	1,409	1,402	1,413	1,461		
Total number of cars operated per month.....	{ Surface	781	758	805	788	794	821		
	{ Elevated	43,615	41,840	43,699	43,444	39,560	45,305		
Revenue mileage for month.....	{ Surface	24,207	22,737	24,972	24,441	22,230	25,456		
	{ Elevated	3,931,489	3,800,419	3,841,834	3,945,048	3,554,679	4,082,414		
Average mileage per car a day of cars maintained.....	{ Surface	2,574,940	2,483,363	2,699,351	2,664,347	2,401,765	2,706,202		
	{ Elevated	75	77	79	82	81	83		
Found defective mechanically or electrically.....	{ Surface	90	89	93	96	92	94		
	{ Elevated	473	396	542	688	593	602		
Found O. K. on examination.....	{ Surface	203	173	240	154	105	66		
	{ Elevated	251	236	403	480	491	440		
Due to causes not attributable to condition of equipment.....	{ Surface	19	27	32	26	10	19		
	{ Elevated	200	181	323	283	262	265		
Total of all causes.....	{ Surface	6	2	2	6	8	7		
	{ Elevated	924	813	1,268	1,451	1,346	1,307		
Mileage basis—total number of revenue miles made per car run in—	{ Surface	228	202	274	186	123	92		
	{ Elevated								
Found defective mechanically or electrically.....	{ Surface	8,312	9,597	7,088	5,734	5,994	6,781		
	{ Elevated	12,684	14,355	11,247	17,301	22,874	41,003		
Found O. K. on examination.....	{ Surface	15,667	16,104	9,533	8,219	7,240	9,278		
	{ Elevated	135,523	91,976	84,354	102,475	240,177	142,432		
Due to causes not attributable to condition of equipment.....	{ Surface	19,657	20,998	11,894	13,930	13,567	15,405		
	{ Elevated	429,157	1,241,682	1,349,675	444,058	300,221	386,600		
Total of all causes.....	{ Surface	4,255	4,675	3,029	2,712	2,641	3,123		
	{ Elevated	11,294	12,294	9,851	14,324	19,525	29,415		
Percentage basis—number of cars run in. Defective mechanically or electrically, compared with—	{ Surface								
Total cars maintained.....	{ Elevated	0.9	0.8	1.0	1.4	1.4	1.2		
	{ Surface	0.7	0.6	0.8	0.6	0.4	0.2		
Total cars operated.....	{ Surface	1.1	0.9	1.2	1.6	1.5	1.3		
	{ Elevated	0.8	0.8	1.0	0.6	0.5	0.3		

ment. This tank is heated by a coil placed in the firepot of the steam-heating boiler. A drinking fountain has been placed in the main corridor.

The St. Louis, Springfield & Peoria Railway has been approved for membership in the American Railway Association.

entitled "Due to Causes not Attributable to Condition of Equipment" shows a startling difference in favor of the elevated cars, but this is readily explained by the fact that many surface car run-ins are due to outside causes, such as collisions, side-wipes and the like. The real test of the reliability of the car equipment as a whole is given in the last item, which shows

the percentage of operated run-in cars which were found mechanically or electrically defective. These figures are very low, ranging from 0.9 per cent to 1.6 per cent on the surface division and from 0.3 per cent to 0.8 per cent on the elevated division.

It should be stated that the greatest care is taken to insure complete run-in records. Formerly the platform men were supplied by the transportation department with report blanks which were not numbered serially when they were turned in by the motormen. Hence the shop foreman had no means of knowing whether or not all defect reports had been submitted to him. The adoption of serial numbers has eliminated this source of error, since a missing report can be detected at once. The original copy of the defect report is given directly to the shop foreman, who afterward compares it with the like-numbered duplicate which is forwarded to him by the transportation superintendent.

TIMBER FROM REPLACED BRIDGE OF CLEVELAND, PAINESVILLE & EASTERN RAILROAD

The steel bridge of the Cleveland, Painesville & Eastern Railroad at Willoughby, Ohio, was constructed in the spring of 1910 to replace a wooden structure. In the destruction of the wooden bridge the timber was saved carefully and it has been possible to make use of most of it. The timber bridge was constructed in 1897 of long-leaf yellow pine and its original cost was about \$12,000. A saw was purchased second-hand at a small outlay and used to cut the timber. Although all of



Delegates at Convention of Arkansas Association of Public Utility Operators

the timber has not yet been utilized enough has been cut to build the following: An addition to the shop at Willoughby, 60 ft. x 60 ft., two stories high; an addition to the dance hall at Willoughby Beach Park, 16 ft. x 50 ft.; a two-story station for the Electric Package Agency, 40 ft. x 20 ft., at Willoughby; the guard rail which was placed on the steel bridge; boards and braces for 3500 ft. of snow fence. Some of the timber has also been used in the work of rebuilding cars. This information has been received through the courtesy of E. L. Schmock, assistant secretary and purchasing agent of the company.

The total revenue of the Liverpool Corporation Tramways in 1910 amounted to £614,815. The operating costs, including rental of leased lines, were £405,561, leaving a balance of £209,253. This sum was applied as follows: Interest, £50,344; sinking fund and repayment of loans, £60,643; reserve, renewal and depreciation account, £65,511; contribution in aid of the general rate, £32,755.

CONVENTION OF ARKANSAS ASSOCIATION OF PUBLIC UTILITY OPERATORS

The fourth annual convention of the Arkansas Association of Public Utility Operators was held at Little Rock, May 3, 4 and 5. There was a large attendance of members from Arkansas as well as from Tennessee, Oklahoma, northern Texas and southern Missouri.

The meeting was called to order Wednesday morning, May 3, at 10 o'clock, when it was found that 178 delegates were registered.

The first morning session began with the roll call and applications for membership. The latter showed an increase of 50 per cent since the last meeting, a gratifying sign of the prosperity of the association.

The report of the executive committee was then presented. It gave an epitome of the activity of the association during the past year and stated that great interest had been taken by the members of the association in everything connected with the welfare of the public service corporations of the State and in the improvement of the services rendered by them. It also stated that public sentiment was growing more favorable to public service corporations. The report of the legislative committee showed that during the meetings of the Legislature now in session several bills had been introduced which, if enacted, would have been very inimical to the public service corporations of the State and of no benefit to the public. The committee, through the presentation of the facts in the matter to the members of the legislative committee before which these bills were brought and to members of the Legislature as a body, was

able to prove the injustice of these bills. Hence they failed to pass.

The report of the secretary and treasurer was also read at this session. The association was in a prosperous condition and had a balance in the treasury and no debts outstanding.

President Fowles, Pine Bluff, then delivered an address. He first referred to the plan to form a twin-State or a tri-State association with the public utility companies of Mississippi and Tennessee. The companies in these States accepted the suggestion courteously but did not generally favor such an organization. The president then complimented the members on the satisfactory condition of their organization and dwelt upon the advantages of association work, especially to the representatives of small companies, who receive the benefit of the experience of the operators of the larger properties. This benefit comes not only at conventions, but during the year, because whenever any member desires special information the question can be taken up through the president of the association. President Fowles also referred to the anti-corporation

bills presented in the Legislature of the State during the past year. In his opinion, however, there was now beginning to be a reaction in the Southwest in favor of corporations, because a great many States had come to realize that anti-corporation legislation discourages the investment of Eastern capital in those States. In conclusion, the speaker expressed his appreciation of the support which he had received from members of the association during his two terms of office.

At the afternoon session the following papers were read: "Effect of Natural Gas Upon Municipalities," by W. L. Wood, Jr., general manager Texarkana Gas & Electric Company; "The Rate Question," by J. M. Hewitt, manager Mariana Light & Power Company, and "Water," by W. C. McGuire, manager Arkadelphia Electric Lighting Company.

In the afternoon the ladies in attendance at the convention enjoyed an automobile ride around the city and to Fort Logan H. Roots. In the evening there was a theater party at the Majestic Theater. The performers got off many skits on different delegates in the audience.

THURSDAY'S SESSION

The session on May 4 began at 10 a. m. and the following papers were read and discussed: "New Business," by M. Q. Woodward, new-business manager Pine Bluff Corporation; "Road-Bed Construction," by D. A. Hegarty, vice-president and general manager Little Rock Railway & Electric Company.

At the afternoon session the following papers were read: "Relation Between Contractors and Central Stations," by E. C. Bragg, manager Electric Construction Company, Little Rock; "Municipal Plants of Arkansas," by W. H. Walkup, superintendent Batesville Water & Light Company.

In the afternoon the ladies were entertained with a trolley ride to Forest Park, where an informal entertainment was held for them. They also participated in an auto ride around the city.

In the evening an informal banquet was given at the New Capitol Hotel by the Class B members of the supply men. Different members of the Legislature, then in session, attended and made speeches, and 255 members and guests were present. D. A. Hegarty acted as toastmaster and introduced each speaker with appropriate remarks. The following representatives of operating companies, members of the association, spoke: B. C. Fowles, Pine Bluff; S. A. Stearns, Little Rock; J. M. Hewitt, Mariana; E. T. Hardin, Hot Springs; C. J. Griffith, Little Rock; W. C. McGuire, Arkadelphia; J. W. McClendon, Fayetteville; W. L. Wood, Jr., Texarkana; W. M. Kavanaugh, Little Rock. Speeches on behalf of the supply men were made by Lewis Hunt, Commercial Electric Company, St. Louis; Clifford R. Croninger, General Electric Company, St. Louis; George Leak, Westinghouse Electric & Manufacturing Company, Memphis, and Walter Kleinschmidt, Electric Supply Company, Memphis. The toastmaster also called upon Hon. Kemp Toney, president of the Arkansas Senate, and Hon. Arthur Turner, State Senator from Jonesboro. The speeches referred to legislative matters and brought forth great enthusiasm. They stated in effect that, among the States which have great undeveloped resources, those which had shown the greatest growth are the ones which have invited corporations and capital to develop their resources; that corporations which treated the public fairly should receive every encouragement, and as the corporations of Arkansas were of that nature they should have fair treatment.

On the same evening the ladies were entertained at a banquet at the Marion Hotel. The entertainment committee in charge consisted of Mmes. D. A. Hegarty, E. C. Beach, S. A. Stearns, W. J. Tharp, C. E. Rose and C. J. Griffith.

FRIDAY'S SESSION

At the morning session on Friday a paper on "General Accounting of Public Utility Corporations" was read by W. J. Tharp, auditor Little Rock Railway & Electric Company. After the discussion of this paper an executive session was held at which new business was discussed. The election of officers for the ensuing year resulted as follows: President, J. M. Hewitt, manager Mariana Light & Power Company; first vice-

president, W. L. Wood, Jr., manager Texarkana Gas & Electric Company; second vice-president, J. W. McClendon, superintendent Fayetteville Light & Power Company; third vice-president, W. C. McGuire, manager Arkadelphia Electric Company; secretary, W. J. Tharp, auditor Little Rock Railway & Electric Company; treasurer, E. T. Hardin, superintendent Hot Springs Railway Company.

The following executive committee was elected: D. A. Hegarty, chairman, Little Rock; S. A. Stearns, Little Rock; A. E. Main, Hot Springs; W. H. Walkup, Batesville; W. C. McGuire, Arkadelphia; B. C. Fowles, Pine Bluff; J. W. McClendon, Fayetteville; Mrs. LaSalle Stoops, Stuttgart. The legislative committee is the same as the executive committee, but is a flexible committee, and can be increased in size at any time if necessary.

Mrs. LaSalle Stoops, manager of the Stuttgart Water & Light Company, is said to be the only lady successfully managing a light and water company in the country. She is a very active member of the association. The papers presented at the convention by Messrs. Hegarty and Tharp were the only ones of railway interest, and are published in abstract in this issue.

The place of the next convention of the association will be selected by the executive committee at its meeting in February, 1912.

CONFERENCE ON SIGNALS IN INDIANA

The Indiana Railroad Commission called a conference for May 4, 1911, of the special committee which is investigating block signal systems for installation on the interurban railways of the State. On that day the committee and members of the commission inspected the Kinsman block signal system installed on the Plainfield division of the Terre Haute, Indianapolis & Eastern Traction Company's line between Plainfield and Cartersburg. The special committee asked for further time in which to present its final report. The commission acceded to this request, and fixed June 1 as the date on which the final report is to be submitted.

Since the last conference of the committee with the commission the members of the committee have studied the exhibit of railway appliances and signal systems in connection with the meeting of the American Railway Engineering & Maintenance of Way Association and of the Railway Signal Association in Chicago. The committee has also inspected the installation of Nachod signals on the Chicago & Milwaukee Electric Railway near Racine, Wis.

HEARING TO REQUIRE ELECTRIFICATION OF WEST SIDE FREIGHT LINE IN NEW YORK

A hearing was held before Commissioner Eustis of the Public Service Commission of the First District of New York on May 5, 1911, to determine whether or not an order should be issued to require the New York Central & Hudson River Railroad to change its motive power from steam to electricity on its West Side tracks from Spuyten Duyvil south. After several witnesses had been called Mr. Eustis adjourned the hearing for two weeks, suggesting to Counsel Lyman of the New York Central & Hudson River Railroad that the company's engineers should take up the question of electrifying the West Side tracks.

The *Tramway and Railway World* in its issue of March 25, 1911, commented editorially on the campaign to prevent accident which is being carried out by the Portland Railway, Light & Power Company, Portland, Ore., and suggested that notices embodying the cautions to passengers mentioned by the Portland Railway, Light & Power Company in its campaign might well be posted in shelters on tramways in England where passengers sometimes have to wait for trains and cars and where they might be induced to study instructive literature designed to promote their safety and to prolong their life.

BALTIMORE BULLETIN ON CARE OF SPECIAL WORK

The United Railways & Electric Company of Baltimore has recently issued to its motormen the following common-sense bulletin on the conservation of special work:

"In the rear of the Carroll Park shops there is a lot upon which is stored special work—frogs, mates, switches and crossings—out of shape and out of service because it has become cracked, chipped and broken. Anyone not familiar with the operation of a street railway system might suppose that this discarded special work had lived its natural life and served as long as could be expected. But while it is true that the life of special work must necessarily have a limit, it is also true that its life is dependent largely upon the manner in which cars are operated over it. Whenever a motorman runs his car carelessly through a switch or over a crossing or too rapidly around a curve he helps to send some special work to the Carroll Park scrap heap. Special work is made of finer steel and is of higher grade than straight rails, and, being of special design, must be made to order. The high-grade steel and special workmanship make it far more expensive than ordinary track. In addition

quickly than it should; and, as its life of usefulness is shortened, the cost of maintenance is correspondingly increased. A motorman can do much to prolong the life of special work. If whenever a motorman approaches special work he will think of that Carroll Park scrap heap and what it means, the special work will soon give a much greater amount of service. Run slow through switches, curves and over crossings."

The bulletin contained illustrations of new and discarded special work, together with a note on the cost of renewals. The views of the old special work are reproduced in the accompanying cuts. The management finds that the men appear to have been impressed with the bulletin and its illustrations from the fact that a noticeable improvement in running over special work is apparent all over the system.

CONCRETE POLE CONSTRUCTION IN OKLAHOMA

The accompanying illustration shows one of the interurban lines of the Oklahoma Railway as equipped with reinforced concrete center poles with semi-ornamental pipe brackets. This



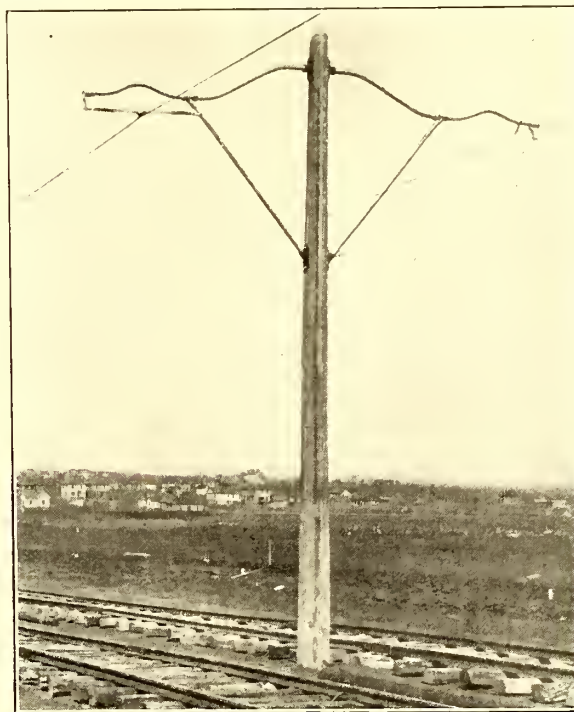
Views of Damaged Special Work Used as Object Lessons

tion there is the expense of laying it. The old work has to be removed and the new installed, requiring a gang of workmen; the streets must be torn up and repaved; it causes wear on other parts of the track by removing a vital part of the line; and it interferes with traffic on the street.

"To keep a piece of special work in its place, in active service, does not cost much—just a little thoughtfulness and care on the part of motormen.

"Special work is expected to bear a greater strain than the rest of the track, and for this reason it is made of harder steel, in order that it may live as long as straight rails; and it will do so if subjected only to ordinary wear. If a car is carefully operated, the special work will not be damaged. But when a motorman runs his car rapidly, bumping the heavy trucks of his car over special work, he puts the track to a test no steel can long stand. If one could beat with great force upon the most costly steel with a huge 20-ton or 30-ton sledge hammer, that steel would be broken to pieces. This is exactly the effect produced on special work by a motorman who runs his car rapidly through switches, curves and over crossings.

"This company buys the very best of special work, and, with care, it should last for a considerable time. But if proper care is not exercised in operating cars over it, it wears out more



Reinforced Concrete Center-Pole Construction

is an experimental equipment of twenty poles installed late in 1910. These poles are of the hexagonal type 30 ft. high with 7-in. tops and with reinforced walls $3\frac{3}{4}$ in. thick. The manufacturing cost per pole was \$8.50.

BUSHING ARMATURE HEADS

A new method of bushing armature heads has just been put into use at the Chicago Railways shops. When an armature head or its seat becomes so worn that the frame does not clamp it tightly and the position of the armature cannot be easily maintained between the pole pieces the heads are bushed. A V-shaped groove about $\frac{5}{32}$ in. deep is cut in the edge of the armature head. A ring of cold-rolled steel is sprung into this groove. The stock from which the rings are made is beveled on one side to fit the seat turned in the armature head. The bushings as applied restore the original diameter of a rigid surface for holding the heads tightly in the frames. The electrical department has gages with tool-steel points so fixed as to show the correct diameter to which the V-shaped groove must be turned in order that the armature head with its new bushing in place shall have its original diameter.

GENERAL ACCOUNTING OF PUBLIC UTILITY CORPORATIONS*

BY W. J. THARP, AUDITOR LITTLE ROCK RAILWAY & ELECTRIC COMPANY

Since the passage of the Hepburn bill, placing public service corporations under governmental control, and the formation of the Interstate Commerce Commission and many public service state commissions, much more time and careful thought are being given to the accounting system, and this is rightly so, for after all it is the books of the company which reflect the net results achieved.

The backbone of the accounting system is the general ledger, cash book, bank book and journal.

No. 1. Construction and Betterment Accounts.—The first step to be taken after a franchise is secured is to construct the system. The construction register shows in detail the cost of your property account. I believe that the form almost universally used is a bound book, providing, first, the voucher number; second, total charge; third, a succession of blank unit columns making possible any division of distribution desired.

No charges should be made to construction account without written approval from the proper officials. A very convenient form for keeping in touch with the construction expenditure is a loose-leaf sheet, showing the actual cost of construction for the current month and an estimate of the construction expenditures for the three following months. The form in detail is as follows: Job number; date issued; estimated date of completion; description, original estimate; estimate at date of report; amount expended for current month; amount expended in current year; total expended; needed to complete; four blank unit columns, the first three being the estimated construction expenditures for ninety days, and the last column the amount necessary to complete the job. By taking the totals of the estimated construction expenditures and combining the figures with a short and concise report of the net cash receipts and operating expenses for ninety days, a most excellent record for the manager is obtainable, as it gives him time to make whatever financial arrangements are necessary.

No. 2. Income.—First I will take up the books and records most generally used by a street railway system. A convenient form for the railway earnings register is a bound book, giving the date, trips, car hours, transfers, deadheads, tickets, cash fares, policemen and firemen, a blank column for any extra occasion, and total passengers registered, earnings per car mile and car hour and weather. At the bottom of the page are three total columns, the first showing the total receipts for the month, the second the amount brought forward from the previous month and the third the total for the year to date. From this record a daily statement of the railway earnings is made up. This statement accumulates for the month to date and the year to date. The temperature and the weather are also shown on the report. Mention is also made of any special occasion.

The starter gives each conductor, upon taking his run, a trip sheet, transfer envelope and time sheet. The trip sheet provides for the trip number, time, register reading, necessary columns for the different classes of fares and money, a place for the names of the crew running the car, and also space for the relief crew to sign the register reading at the time the car is turned over to the relief crew, thereby preventing any dispute between the two crews.

When the run is completed, the conductor totals up his trip sheet and turns in his money and tickets to the receiver, who, after verifying the correctness of the returns, issues a receipt, which is in duplicate form, the amount of money and conductor's badge number being shown by numbers, which are cut out by a punch. The duplicate is sent to the office with the trip sheet.

After the returns are all in, the money counted and the bal-

ance obtained, the money is put away in a safe, and the first thing next morning is taken to the bank. An arrangement is made with the bank to have the money counted immediately, and, as the bank has a Johnson coin-counting machine, it takes but a short while.

The item "chartered cars" represents the amount received for the use of special cars.

The item "advertising in cars" represents the amount received for the advertising space in the cars, the exclusive privilege with most companies being covered by one contract.

The item "miscellaneous income" represents sums received from other sources, such as power furnished from the railway circuit.

The income from electric, gas and water companies is, in most instances, obtained by an abstract of the consumers' ledger. In regard to the form to be used, where the electric, gas and water companies are under one management the three combined together in one book is preferable to separate books for each department. I also prefer one bill, showing, of course, the amount for gas, water and electricity, to three separate bills, as it is much more economical and is more convenient to the customer.

The receipts from lighting customers are deposited in the bank daily, and all payments made by the cashier for petty cash purposes are made from a petty cash fund.

No. 3. Expense.—Practically all items of expense are recorded in the accounts payable book where the voucher system is used. The accounts payable book provides for the voucher number, name, amount and any number of unit columns required; the totals only of each column being posted in the general ledger.

The system of the Little Rock Railway & Electric Company provides thirty-seven accounts for the expenses of the railway department and thirty-one for the lighting department. The specific headings for the railway department are as follows: Maintenance, consisting of nine accounts; transportation, consisting of fifteen accounts; general expense, consisting of thirteen accounts.

The specific headings for the lighting department are as follows: Total manufacture, consisting of nine accounts; total distribution, operation and maintenance, consisting of ten accounts; general expense, consisting of twelve accounts.

In order that a company may know what it has really earned each month it should exert every effort to voucher all expenses incurred during the month. In case large sums are expended, which cover several months or a year, the amount should be charged to suspense account and the proper amount charged into expense each month by a journal entry.

In the accounts payable book are provided a column for the expenses of the railway department and a column for the lighting department. For the details of the expenses of each department there are two separate books, which provide for the voucher number, total charge and a separate column for each item of expense. Another item which should be provided for each month in expenses is the damage account. You should charge into expenses each month enough to maintain always a good damage reserve account.

No. 4. Deductions from Income.—Under this heading are found interest on funded debt, interest on current liabilities, taxes—real and personal taxes—privilege and any other deductions required or desired, such as sinking fund, reserve and emergency fund or depreciation fund.

The above items should be deducted monthly in order that your surplus or deficit may represent, as nearly as possible, the true result accomplished for the month. It is very desirable where the earnings of the company are such as to justify you to set aside a certain amount each month for depreciation, for it is certainly taking place daily.

No. 5. Surplus or Deficit.—This item should represent the net earnings of the company. It should be the amount over and above all operating expenses, taxes, interest on bonds, notes, reserves for slow and bad accounts, depreciation, etc. It should represent the amount available for dividends.

*Abstract of paper read at the annual meeting of the Arkansas Association of Public Utility Operators, Little Rock, May 3, 4 and 5, 1911.

There is just one other book to which I should like to call attention, and that is a bond coupon filing book. At the top of the page is the serial number of the bond, and, as each coupon is numbered consecutively, spaces the actual width and length of the coupon are ruled on the sheet, and as soon as the coupons are paid and canceled they can be pasted in this book.

Other items which must not be lost sight of are mechanical machines, slide rules and wage tables. The posting to the customer's ledger, including both debits and credits, is proved daily by the use of a fifteen-bank Burroughs adding machine. The expenses per car mile, per car hour and per cent of increase and decrease, on the daily railway earnings statement, are obtained by the use of a Thatcher cylindrical slide rule. The payrolls of all the employees of the company are very quickly and readily calculated by the use of a daily and hourly wage-computing table. The monthly trial balance of the consumer's ledger is also obtained by the use of the adding machine, it being necessary to go through the ledger only twice in order to secure a complete trial balance. In the lighting department quite a saving is made by the use of a modern addressograph, which is electrically operated. The addressograph mentioned is a machine which has just been installed. Its main feature is that the address plate is held in the holder, consisting of three parts, the upper plate being for the name, the lower plate for the address and the other plate for the account number. This makes the operation of the addressograph very easy, as when a customer moves and a successor goes in, it is only necessary to take out the nameplate and insert the name of the new customer. This plate is made of cheap metal, which costs only \$1.25 per 1000. The system just mentioned costs practically one-third as much as the old rubber-type system to operate.

Another item, which I am mentioning practically last, but by no means least, is the monthly operating report. The Little Rock Railway & Electric Company makes up monthly a statement consisting of fourteen pages which gives on the front page the gross income for the month, the operating expenses and taxes, the deductions from income and net surplus. It also shows the per cent of operating expenses and taxes to gross income, the earnings on both preferred and common stock, the car miles, car hours, kw-hours, passengers carried, gross income per car mile, per car hour and per kw-hour. On this page the increase or decrease, as compared with the same month a year ago, is shown, and also on the same page are shown the items above accumulated for the year to date and compared with the same period for the previous year. On the following pages the income and expenses by departments are given in detail. On the last page is shown the trial balance for the current month, also the trial balance for the preceding month, together with the increase or decrease between the two months.

In addition to this report the company gets out monthly a payroll and statistical report which gives in detail the number of employees, rate, occupation, the number of accidents, specifying whether caused at street crossings, or while boarding or alighting from the car, or by collision, etc. It also furnishes a vast number of data, such as meters repaired, cars repaired and painted, kilowatt output of the power house, oil and waste used, the number of cars on hand and type, the number of boilers, horse-power and make, number of generators, kilowatt capacity and type, and, in fact, almost all data pertaining to the company's payroll and physical property.

In regard to apportioning expenses where water, electric railway and gas companies are combined several methods are used, some being arrived at by the per cent of the earnings of each department of the total earnings; some on the basis of the cost of investment of each department, and some on the output of the power house.

The Galt, Preston & Hespeler Street Railway, Ltd., Galt, Ont., and the Berlin & Waterloo Street Railway, Berlin, Ont., are being operated with power from Niagara Falls supplied by the Hydroelectric Commission.

ROADBED CONSTRUCTION AT LITTLE ROCK

At the annual meeting of the Arkansas Association of Public Utility Operators, held in Little Rock, May 3, 4 and 5, D. A. Hegarty, general manager of the Little Rock Railway & Electric Company, read a paper on roadbed construction in city streets. He described the method of installing T-rail track in Little Rock substantially as noted in the *ELECTRIC RAILWAY JOURNAL* for Nov. 20, 1909, on page 1061. The Little Rock company uses a 72-lb. T-rail laid on 6-in. x 8-in. x 8-ft. creosoted ties and ballasted with 8 in. of broken stone. Soft places in the sub-grade are filled with coal cinders. The rails are connected with six-bolt Continuous rail joints suspended between the ties. After the track is tamped and surfaced, concrete is poured in up to the top of the ties and covered by a 1-in. sand cushion for the brick paving. The rails are bonded with two No. 0000 soldered and compressed terminal bonds placed under the angle plates. The track is cross-bonded every 300 ft. with two No. 0000 tinned copper conductors and is also connected every 300 ft. to a 1,000,000 circ. mil tinned copper wire ground return. Mr. Hegarty said that whenever possible the ground return cable should be laid in concrete to protect it from contact with the ground, where it would soon deteriorate. Large ground return plates should be buried at the ends of all terminals and placed in water, if possible—if not they should be put in a space lined with charcoal and cinders. These plates should be buried at least 8 ft. or 9 ft. below the ground and distant from any service pipes.

The rails should be spiked to the ties with standard 5½ in. x-9/16 in. spikes with a chisel point in order to keep the ties from being crushed when the spike is being driven. Mr. Hegarty recommended a concrete mixture of the following proportions: One part Portland cement, two parts clean sharp sand and four parts crushed stone. The mixture should be used as wet as possible. If brick or block paving is laid the space on each side of the web of the rail should have pure cement, so as to give a smooth surface of the same width as the rail head for placing the block, except on the inside of the gage line of the track where the rail is high enough to allow the block to be set under the head of the rail. The block should be laid on a 1-in. sand cushion and rolled with a roller weighing not less than 10 tons. It should then be thoroughly grouted with cement grout, paving pitch or asphaltum tar. After the grouting has set the paving should receive a final rolling. Instead of using grooved block on the gage side of the rail the Little Rock company finds it better to use the ordinary block. This is placed under the head of the rail where there is sufficient space, and crowned toward the center. This construction avoids the undue wear to which grooved block is subjected from vehicles turning in and out of the track.

Mr. Hegarty said that he was opposed to putting asphalt on any part of the roadbed. He found that the T-girder or shanghai rail holds its alignment perfectly, as its vibration is so slight that the pavement does not break away from it as it does with other rails. Mr. Hegarty concluded with a reference to special work, which he said should always be made with large leads. Where possible the tongue of the switch should be placed on the side where it will get the least running wear. All rail tongues, frog points and the surfaces of the special work which receive the wear should be of hard material.

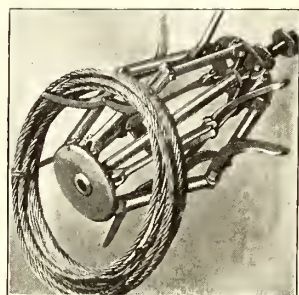
The report of the Brisbane (Australia) tramways shows that the receipts for 1910 amounted to £222,637, an increase of £23,302 over the year 1909, while the expenses had increased by £10,740, showing an increased net profit of £12,562. The total number of passengers carried was 32,419,276, an increase of 2,686,938, equivalent to carrying the whole population of Brisbane about 230 times during the year. The increase in car miles was 202,233, or 6.09 per cent. The increase in working expenses amounted to 10.18 per cent due to the increased mileage and to the increased cost of materials due to the general rise in wages consequent upon labor legislation.

IMPROVED LINE CONSTRUCTION TOOLS

There is an old saying that "no workman should be the servant of his tools, and this saying aptly fits those men engaged in the work of railroad construction. If, for example, a lineman, or any other workman, for that matter, regularly uses some tool or instrument that is not fully suited to his needs, he must either exert additional muscular effort or give some mental attention to the use of that tool. Thus the quality of the construction tools used by railroad linemen and trackmen and their adaptability to the service for which they are intended has a great deal to do with the efficiency of the work performed by them. In pursuance of this policy the Oshkosh Logging Tool Company, Oshkosh, Wis., is making a set of linemen's tools designed by men actually engaged in different kinds



Pole Climber



Collapsible Reel

of railroad construction. These tools include digging tools for pole and post-holes, carrying hooks and canthooks, timber and pole dollies, wire-stringing tools, such as reels, come-alongs and climbers, and hand tools, such as pliers, connectors, splicing

the Roberts pole-climber. One important claim made for this climber is safety, because each climber is forged complete with its spur from a single piece of crucible steel; thus the possibility of loose spurs is avoided. In the proportioning of the parts the spur and stirrup are arranged so that climbing is easy, yet the user can walk over rough ground without dulling the point. Another feature is the arrangement of the straps, which join at the bottom in a three-way ring on the outside of the foot. In this way they conserve the comfort of the wearer, because they lie smoothly around the ankle.

MORE ELECTRIC EMERGENCY TRUCKS FOR THIRD AVENUE RAILROAD, NEW YORK

The Third Avenue Railroad, New York, has just purchased from the General Vehicle Company, Long Island City, N. Y., three 2-ton emergency wagons of the storage battery type. These wagons will replace an equal number of four-horse vehicles which cost the company a total of about \$3,500 a year for the maintenance of the horses alone. The decision in favor of the electric truck was also influenced by the company's experience with its first auto-truck, which has not cost a cent for straight maintenance during its first year. The electric trucks, which weigh 3 tons each, have a range of 35 miles to 40 miles on a single charge. The motive equipment of each truck consists of a battery of forty-four cells, one GE-1022, 85-volt, 40-amp, 1200-r.p.m. motor which gives a speed of 15 m.p.h. to 16 m.p.h. on level roadways and 8 m.p.h. on a 5 per cent grade; a Morse chain for the motor drive to the jack shaft and roller chains from the jack shaft to the wheels; also regular and emergency brakes. Each truck is also supplied with an ambulance foot gong, alarm horn, headlights, sidelights, tail-lights, etc., in accordance with standard automobile regulations. Towing hooks are attached to the underframes. The wagons are painted the Third Avenue Railroad Company's standard red with black and silver striping with silver letters and numbers. Polished



Three Electric Emergency Wagons for Third Avenue Railroad, New York

clamps, etc. An accompanying illustration shows one of the latest designs of these line construction tools—a folding take-up reel. Another shows a pole climber.

The Oshkosh folding take-up reel is designed to facilitate wire stringing by lessening the time required for putting wire on and taking it off the reel. When a coil has been wound on the reel the mere removal of a pin permits the reel to collapse so that the coil can be removed easily, as shown in the illustration. The reel-stand folds compactly, as does the wheel, and thus requires little room in a line car or on an emergency wagon.

Another popular device manufactured by the company is

brass handles are installed on each side. The electrical equipment includes Sangamo amp-hour meters.

The report of the Birmingham (England) tramways for the year ended Dec. 31, 1910, shows that after providing £12,000 for interest on debentures and £10,000 for dividends on preferred stock—the common stock earned 10 per cent—there was a surplus of £44,327. The traffic receipts show an increase of £3,766, while the receipts from advertising and interest on investments show an improvement of £4,156. The number of passengers carried by the tramways during the year was 37,051,126, against 35,700,193 in the year 1909.

News of Electric Railways

Report of Cleveland Chamber of Commerce Committee Submitted

The special committee of the Cleveland Chamber of Commerce appointed to investigate the needs of the Cleveland (Ohio) Railway reported to the board of directors of the chamber on May 3, 1911, and its finding was unanimously approved. The effort of the committee was simply to bring about conditions that would enable the company to carry out the plans of Judge Tayler in formulating the grant, since he did not live to suggest such changes as experience had shown were necessary. The committee found no necessity for an increase in the maximum rate of fare, but opposed an arrangement that would extend the present rate of 3 cents to the suburbs as they are annexed to the city. It was suggested that the increase in the length of the haul would necessarily have to be limited to prevent an increase in cost of operation that would make it impossible to maintain the present rate. In order to carry out the purpose of the grant the committee believes that the city should control renewals and replacements and should have the power to propose extensions and betterments to be made with funds raised by the sale of stock or bonds or by increasing the floating debt. If the company should advance the plea that money cannot be secured the matter is to be referred to arbitrators. An amendment is suggested that would require the company to agree to spend at once not less than \$2,500,000 in extensions, betterments and permanent improvements designated by the city. To protect the investment the committee believes that the grant should be so amended as to require the city to pay the capital value for the property if taken over at the expiration of the franchise, the same to hold good in case the city nominates a purchaser. In order that deficits may not occur in the operating funds during the period of the year when operating cost is greatest, it is suggested that the surplus arising from operation be transferred to the interest fund annually instead of every six months, as provided in the original Tayler grant. The interest fund should be invested in non-taxable securities instead of being maintained as a savings fund in the banks. The report follows:

"Your committee appointed to consider what, if any, amendments in the interests of the city should be made in the franchise granted to the Cleveland Railway and whether the present is an opportune time to present such amendments submits the following report. The essential features of the Tayler grant, as we understand it, contemplate:

"1. Securing to the public the largest powers of regulation in the interest of public service.

"2. Securing the best transportation at cost.

"3. Giving to capital the certainty of a fixed income and no more.

"4. Securing so far as practicable certainty of return of investment at expiration of grant.

"In considering what amendments ought to be made your committee has been guided by the resolution appointing it. All recommendations made are in the interests of the city. None jeopardizes the present operating rate of fare; none weakens or impairs the city's right to control or its right of purchase. Certain of the amendments suggested will aid in relieving against the threatened impairment of capital and facilitate the obtaining of money for needed improvements. No amendments are recommended except such as should be made at the present time. The experience of the past year has developed two difficulties:

"1. Lack of power in the city to secure needed additions and betterments, including additional cars and power.

"2. Inadequacy of the provisions for the return of capital at the expiration of the franchise.

"To a certain extent the company could have procured funds to make extensions and betterments by the sale of bonds, but deemed it inadvisable to do so because of fear that it would not only impair the value of outstanding stock but affect its ability to sell additional stock. The present grant authorizes the purchase at expiration, at appraised value of physical property, no allowance to be made for the

franchise and pavement value included in Judge Tayler's valuation, both of which are now represented by issued securities. The grant further provides that from such appraised value all surplus earnings accruing during the last fifteen years of the franchise shall be deducted.

"Future extensions and improvements will necessarily depreciate, but the franchise makes no provision for maintaining the property beyond 70 per cent of its reproduction value. Should the price of labor and material entering into the cost of the property remain the same and the appraisement at the end of the grant be correctly made, a loss of capital would inevitably result in an amount equal to the franchise and pavement value and the unprotected depreciation. This is so serious a defect that we believe it must have been incorporated through inadvertency.

"Your committee recommends the following changes, some of which will increase the city's power of control and give to it the right to compel the making of extensions and betterments—others will relieve against the threatened impairment of capital at the expiration of the franchise, without impairing any right secured to the city or jeopardizing the present rate of fare:

"1. Section 21 should be amended so as to provide that no renewals or replacements shall be made without the consent of the city or of the city street railway commissioner if authorized by the city to act; the difference, if any, as to the propriety or necessity of making such renewals or replacement to be arbitrated in accordance with the general arbitration provisions of the ordinance; a detailed report of such expenditures to be filed with the city every month.

"2. Section 28 should be amended so as to confer on the city the right to propose extensions, betterments or permanent improvements. The propriety or necessity of making the same to be subject to arbitration in accordance with the general arbitration provisions of the ordinance. In event the city and company agree with respect thereto, or if there should be a disagreement, and the award be favorable to the city, such improvements shall be made, if the company, acting in good faith, can procure the necessary money therefor by the sale of stocks or bonds, or by an increase of its floating indebtedness; and if the company assigns its inability to procure the necessary money as a reason for not making such improvements, the question of its ability to procure the same by any means open to it under the ordinance shall be subject to arbitration. This right of the city to propose and compel the making of such extensions, betterments and permanent improvements shall continue until the franchise has less duration than five years.

"3. Section 28 should be amended so as to require the railway company, before the amended or renewal ordinance shall become operative, to agree to make immediately such extensions, betterments and permanent improvements as may be designated by the city, costing not to exceed \$2,500,000, and to furnish satisfactory assurances to the city that it has or will have available as needed the above amount.

"All parties who appeared before your committee agree that changes are necessary to protect capital investment at the expiration of the franchise against the hazards above referred to. Various amendments were proposed, among them that a sinking fund be created to amortize the items included in the Tayler valuation not represented by physical property and the depreciation on new property; that right of purchase at expiration of franchise be changed from appraised value to capital value and that an increase be made in the maximum rate of fare.

"The basis of purchase at the expiration of the grant should be changed from appraised value to capital value. This can be effected by repealing Section 36 and amending Sections 32, 35 and 40. Section 36 provides for a physical valuation in case of purchase after expiration of franchise. If the basis of purchase be changed to capital value, this section should be repealed. Section 32. This section prescribes the terms of purchase during the life of the fran-

chise. It should be amended to make clear that it applies to purchase during the entire term of the grant and, further, a provision should be inserted giving the city the right to compel the application of assets in the sinking fund to a reduction of the purchase price.

"Section 35. The existing section provides for purchase of the property within the city limits after the expiration of the franchise. The section should be amended so as to provide for purchase by the city at capital value under the terms of Section 32, except that 10 per cent shall not be added. The section should preserve to the city the right to purchase the whole system or the portion within the city limits and give the city the right to nominate a purchaser for the portion of the system lying outside the city limits should the city be by law unable to acquire such outlying portion, or should it deem the purchase of such outlying portion undesirable.

"Section 40. The last two paragraphs of the existing section are not aptly expressed nor are they in harmony with the plan proposed to change the basis of purchase after expiration of the franchise to capital value, nor do they clearly define how the assets in the sinking fund are to be applied in case of purchase during the fifteen-year period or in event of a renewal. This section should be amended by redrafting the last two paragraphs. No reference should be made to options of purchase; this should be fully covered by Sections 32, 33 and 35. The new paragraph should relate solely to the question of renewal of the grant within the last fifteen years of its life and make definite provision for the application of assets in the sinking fund either to a reduction of capital value or to paying for additions and betterments without addition being made therefor to capital value.

"Section 16 should be amended as follows:

"(1) So as to provide that there may be paid out of the interest fund that rate per cent upon refunded bonded indebtedness which the refunding bonds may bear and such rate as may be necessary to amortize the discount if bonds issued for that purpose are sold at a discount; the total rate, however, not to exceed 6 per cent on par.

"(2) So as to permit the company to issue bonds for other purposes on a basis which, together with the amount necessary to amortize discount, if sold at a discount, will not exceed a rate of 6 per cent on par.

"(3) So as to provide that if bonds are sold at a premium the premium shall be used for extensions, betterments and permanent improvements, or for refunding the then existing indebtedness of the company without additions to capital value.

"(4) By striking out in line 3 in the second paragraph of Sub-section 'c' and words 'provided that.'

"Section 19 should be amended as follows:

"(1) So as to permit the interest fund to be invested in such readily marketable, non-taxable, interest-bearing securities as may be approved by the city and railway company.

"(2) So as to provide that the surplus referred to in said section remaining unexpended for operating expenses shall be transferred annually instead of every six months to the credit of the interest fund.

"Section 29 should be amended by striking out the first line, as follows: 'The company may alone propose extensions, betterments or permanent improvements.'

"Section 31 should be amended by inserting in line 18, after the words 'or any wastefulness in the purchase,' the words 'or use.'

"Section 37 should be amended by striking out the following words in the last line: 'Sections 35 and 36 hereof,' and adding in lieu thereof the following: 'Section 35 hereof.'

"Section 44 should be amended as follows:

"(1) By inserting in the thirteenth line before the words 'value thereof' the word 'physical.'

"(2) By striking out in lines 13 and 14 the following words: 'determined as provided in Section 36 hereof plus 10 per cent.'

"(3) By inserting in the eighteenth line after the words 'with regard thereto' the following: 'and in the event that the city and the company disagree as to the physical value of the St. Clair Avenue line, the same shall be determined by arbitration in the manner provided in Section 11 hereof.'

"Section 45 should be amended so as to require the com-

pany to surrender all rights held by it under the present grant in event a renewal ordinance is enacted. In that event proper changes in Section 44 with respect to dates of expiration should be made.

"(1) The suggestion that Section 30 be amended so as to provide that if suburbs are annexed the City Council shall have the right to compel operation over lines in the annexed territory at the prevailing city rates of fare until the franchise is of less duration than fifteen years is not recommended.

"A request was also made that Section 30 be amended so as to permit the extension of the city rate of fare over that portion of the company's lines which is located in the former village of Collinwood.

"The adoption of either suggestion, if acted upon by the Council, would increase the cost of operation, which would have to be borne by car riders residing nearer the center of the city and tend to imperil the continuance of operation at the then rate of fare. If the present rate of fare is to be continued, and we believe under favorable conditions it can be, some limit must be placed upon the length of haul. There is no sufficient reason for reopening at this time a question to the solution of which so much consideration was given at the time the ordinance was drafted.

"(2) A sliding scale of return on capital invested was suggested and considered as a means of securing greater economy and efficiency in management and operation. We are of the opinion that any scheme of rewards and penalties would necessitate fundamental changes in the plan proposed by Judge Tayler.

"(3) A suggestion was made that a sinking fund be created to amortize the franchise and pavement values included in the Tayler valuation but not represented by physical property, also to care for depreciation on new property.

"Provision for such a sinking fund might impose such a burden on operating cost as to endanger, if not make impossible, a continuance of the present rate of fare, and for that reason is not recommended.

"(4) Further to protect capital investment, it was suggested that the maximum rate of fare be increased. Entertaining the opinion as we do that the present maximum rate will provide ample security if the amendments recommended are enacted, we think no change should be made.

"We briefly summarize the evidence upon which we have relied in reaching this conclusion.

"If the maximum rate of fare were charged at this time the surplus earnings would amount to nearly \$1,000,000 a year. Assuming no increase in traffic and the same ratio of operating expense and interest charges, there would be a surplus of \$15,000,000 earned during the last fifteen years of the grant without any additions for interest. If interest were added at the rate of 5 per cent per annum, compounded annually, the surplus would amount to about \$21,000,000.

"J. T. Ross, employed by the city street railway commissioner as traction expert, estimates that the surplus earnings, plus interest, during the last fifteen years, conservatively estimated, will amount at least to \$25,000,000.

"H. J. Davies, secretary of the Cleveland Railway, stated that the average rate of interest in traffic between 1902 and 1910 was 8 per cent compounded annually; that the increase in operating cost during the same period was about 8 per cent compounded annually; that the interest charges for capital required to care for the increased traffic were slightly less than 5 per cent compounded annually. He further stated that, based on the assumption that the increase in traffic during the last fifteen years would be only 4 per cent compounded annually, or one-half the amount of the increase during previous years, and that the operating cost and interest charges would increase 4 per cent compounded annually, which would be considerably in excess of the rate of increase during previous years, the surplus earnings would amount during the last fifteen years to more than \$25,000,000 without computing interest on the annual surplus. Adding interest on this at the rate of 6 per cent compounded, the surplus would amount to about \$40,000,000. Computing interest, however, at the rate of 5 per cent, compounded annually, which we deem the fairer rate, in view of the fact that the company is required to use its surplus earnings for the retirement of bonded and floating debt, the surplus would amount to over \$35,000,000.

"If the increase in traffic, in operating expenses and in interest charges should continue during the last fifteen years at the rates obtaining during the period from 1902 to 1910, the surplus earnings would amount to over \$75,000,000, as estimated by Prof. E. W. Bemis. While we think this is more than can be reasonably expected, we are satisfied that the factors of safety will remain the same; that earnings will increase relatively as fast as, if not faster than, the increase of operating and interest charges.

"If the estimate submitted by Mr. Davies is conservative, and we believe it is, more than \$25,000,000 would be available at the expiration of the grant after providing for the items in the Tayler valuation not representing physical property, as well as depreciation on new property, to provide for depreciation in the value of property at the expiration of the grant, if the franchise is not renewed.

"The ordinance contains some obsolete provisions, notably in Sections 16 and 46, having to do with matters now completely settled and adjusted. It would make for brevity and simplicity if these were eliminated. We recommend that this be done and that a renewal ordinance be enacted.

"We believe that the suggested changes should not be made without the fullest understanding and approval of the voters; to that end we recommend that careful public explanation of any amendments adopted be given by the city solicitor and street railway commissioner, so that the voters may be fully advised of the meaning and purpose of all changes and thus be better able to exercise the right of referendum if desired.

"Your committee is greatly indebted and desires to express its grateful appreciation to the city solicitor, the street railway commissioner, the Cleveland Railway Company and its counsel for the many courtesies shown and the assistance rendered by them to the committee.

"F. H. GOFF,
"CHARLES E. ADAMS,
"JAMES R. GARFIELD,
"H. H. MCKEEHAN,
"G. B. SIDDALL,
"HENRY W. STECHER,
"WARREN S. STONE.

"I believe that the City Council should have the power to extend the city rate of fare to Collinwood and to other suburbs as they are admitted. With this exception I concur in the report.

"W. S. HAYDEN.

"I concur in all the conclusions and recommendations of the report, except as to referendum on the proposed amendments. These amendments are vital and important. I, therefore, deem it unwise to set a precedent at this time of amending the Tayler ordinance without the amendments being submitted to and approved by a vote of the people. Accordingly I urge that the amendments, if any are adopted by the Council, should become effective only after acceptance by the company and approval by the people at a referendum vote thereon.

"D. C. WESTENHAVER."

At the regular meeting of the City Council on the evening of May 1, 1911, a resolution was adopted increasing the operating allowance 1 cent per car mile for the period which ends on Jan. 1, 1912. The proposed connection of east and west lines to make them through lines was discussed at a meeting of the street railway committee of the City Council recently. Mayor Baehr and Commissioner Dahl opposed the plan. The author of the resolution, Mr. Haserodt, maintained that the lines would yield more income when connected than they do operated separately. Mr. Dahl believed that the loss of transfers would be more than offset by the increased patronage. Mayor Baehr feared that such an arrangement would increase congestion at the Public Square.

Philadelphia Rapid Transit Loan Before Councils

The loan bill of the Philadelphia (Pa.) Rapid Transit Company to enable the company to raise \$10,000,000 for rehabilitation came before the Councils on May 5, 1911. The Common Council alone acted on the measure, the introduction of the bill in the Select Council being forestalled by a motion to adjourn, which was put in the Select Council as soon as the result of the vote in the Common Council had been announced. The Common Council, before it

passed the measure, adopted the following amendment:

"Whereas, The Philadelphia Rapid Transit Company, through its president and general manager, Charles O. Kruger, in a written communication, dated April 25, 1911, addressed to J. R. C. McAllister, chairman of the finance committee of Councils, concerning the \$10,000,000 bond issue which Councils are asked to approve, has outlined the policy and purpose of the company to be to use the proceeds of the bonds in such manner as to give Philadelphia the best possible transportation facilities, and to undertake and push to completion the extensions mentioned in Thomas E. Mitten's letter to Edward T. Stotesbury, and stating further that the company accepts as fixed the present system of fares, exchanges and transfers, and that it will not make any change in the number of transfer points, or its present exchange system and basic fare charges, without the formal consent of Councils as required by city contract; therefore,

"Be it ordained by the Select and Common Councils of the city of Philadelphia that the consent of the city of Philadelphia is hereby given to the Philadelphia Rapid Transit Company to increase its indebtedness by an issue of \$10,000,000 of 5 per cent gold bonds secured by mortgage or deed of trust containing such provisions, conditions and stipulations as may be approved by the board of directors of the Philadelphia Rapid Transit Company."

No changes were made, however, in the sections of the bill which cite the character of the securities to be pledged by the company for the payment of the projected loan.

The executive committee which represents the employees of the Philadelphia Rapid Transit Company who seek an increase in wages met on April 25, 1911, to consider the matter and announced after the meeting that "the motormen and conductors are determined to have their demands complied with." The statement which was issued after the meeting follows:

"The correspondence in the matter of the wage increase with the Philadelphia Rapid Transit Company was discussed by the local executive board of the carmen's union, Division 477, and the sentiment of the members was that the demand for the increase in wages will be insisted upon more strongly.

"Every depot was reported to be in a healthily organized condition, and the motormen and conductors are determined to have their demands complied with.

"Every carman is earnestly awaiting the general meeting to be held Thursday night to definitely consider the situation."

At a meeting of the employees on April 28, 1911, at which upward of 1500 men are said to have been present, the following resolution was adopted:

"Resolved, That we instruct the officers and executive board members to inform the company that we insist upon a wage increase to 28 cents an hour. If refused, that they proceed with our international officers in accordance with the laws of our association, and that we instruct our committee if its demands for a peaceable solution of the situation along constitutional lines be refused, it shall immediately call a special general meeting of the division to take final action in the matter."

The sentiment expressed in this resolution was communicated to the company, and under date of April 3, 1911, Charles O. Kruger, president of the company, replied as follows:

"Your communications of April 20 and 28 received. The company's position in the matter of wages was clearly set forth in my letter of April 19, 1911. The agreement provides for an increase in wages effective July 1 next. This advance will increase the payroll to an amount exceeding \$100,000 during the year following, with similar increases each of the next three years.

"From the company's side it may be stated positively that the present financial condition of the company does not justify any further increase in wages than those already promised. From the side of the men it may be stated with equal positiveness that the supply of labor is much greater and the cost of living materially less than when, a year ago, the men returned to work under terms which fixed the scale of wages for a period of five years. Any further or faster increase in wages must follow greater earnings on the part of the company.

"I quote the expression contained in your last communication that it is not your desire or sentiment to further embarrass the company in carrying out the many propositions and solving the problems in which it is involved."

"It must be apparent to all that to attempt to enforce the demands which you have made, or even to agitate the question of increased wages at a time when new interests are about to take charge of this property in the hope of making it successful, is doing the exact opposite from this protestation on your part."

"The company must therefore refuse your demands and decline to keep alive the agitation by discussing them further."

Amended Subway Proposal from Interborough Rapid Transit Company

The Interborough Rapid Transit Company, New York, N. Y., submitted on May 9, 1911, an amended subway and elevated extension offer. The principal features of the amended offer follow:

First—The expenditure of \$67,559,000 of its own money in construction of new lines, and \$31,965,000 of its own money in equipment, raising the city's contribution from the \$53,000,000 contemplated in the company's offer of Dec. 5, 1910, to \$67,559,000, and the company's contribution from \$75,000,000 contemplated in that offer to \$99,524,000. Thus a total proposed cost of new construction of \$135,780,000, and a total cost construction and equipment of \$167,745,000 is involved in the proposition.

Second—Construction of a two-track subway from a junction with the Lafayette Avenue line in Brooklyn, through the Eastern District of Brooklyn, and under the East River to Broadway in Manhattan; thence under Broadway to Fifty-ninth Street, and under Fifty-ninth Street to the Queensboro Bridge.

Third—Construction of two-track elevated extensions in Queens, one running from the Long Island City end of the Steinway Tunnel to the Queensboro Bridge Plaza, and thence to Woodside; the other from the Queensboro Bridge Plaza north to Astoria.

Fourth—Construction of the proposed Bronx elevated extensions, to become a part of the subway, and not extensions respectively of the Ninth and Third Avenue elevated lines, as laid down by the company in its offer of Dec. 5.

Fifth—The company's profits on the extensions, after all operating expenses are paid and the interest and sinking fund on both the company's and the city's investment provided for in that order of preference, to be restricted to 3 per cent additional on its investment, until such time as the city may have made up any deficit on extensions to be built in future, or on lines operated under a guarantee to the company, like the Fourth Avenue (Brooklyn) line; the city, however, to apply any profits which it might realize from the original extensions operated as a part of the main system to the deficits on the possible new extensions, or on its guarantees to the company against loss on the Fourth Avenue (Brooklyn) line.

Sixth—The city to have the right to retake after ten years either the present subway south of Forty-second Street or the present subway in Broadway north of Forty-second Street, upon payment of the difference in value, this to be adjusted by agreement between the company and the city, or to be settled by arbitration.

Seventh—Provided the city reacquires half of the present subway as above described, the city to have the right, at the end of thirty-five years from the commencement of operation, to acquire the rest of the present subway upon tendering to the company a sum equivalent to the estimated net profits for the remainder of the lease, this estimate to be based upon the average annual net profits for five years preceding the date of such acquisition.

Eighth—Construction to be begun in all boroughs at once; the elevated extensions in the Bronx and Queens to be put in operation in two years from the beginning of construction, as well as a shuttle subway line between Times Square and the Pennsylvania Station at Seventh Avenue and Thirty-first Street.

Ninth—If the public authorities prefer an offer upon the basis of the terms recently proposed to the city by the Brooklyn Rapid Transit Company, the Interborough Rapid

Transit Company, upon those terms, will undertake to build any road in any of the five boroughs that the public authorities may designate, including one or more through lines to Coney Island and Staten Island, and operate them all in connection with its present subway system for a single 5-cent fare.

The amended offer says that the company will not accede to the suggestion of the city's transit conferees that an arrangement be made for sharing profits on the elevated third tracks with the city. No concession is made from the request for 999-year franchises for the third tracks on the elevated structures.

Further than this the offer does not modify the demand of the Interborough in its first proposal that the city guarantee it against loss on the operation of the Fourth Avenue (Brooklyn) subway, under a separate contract from the rest of the system, and that such a guarantee be given on any future extensions, including those to Coney Island and Fort Hamilton.

Progress of Negotiations in Toledo

At a meeting of the Council committee of the whole at Toledo on the evening of May 1, 1911, Mayor Brand Whitlock suggested that his original idea of having a committee of experts appraise the property of the Toledo Railways & Light Company should be followed. The Council had, however, already designated City Engineer Tonson to value the physical property, but Albion E. Lang, president of the company, objected to this. Mayor Whitlock had agreed to an appraisal by Mr. Tonson in the interest of economy. It was decided finally to have E. W. Bemis talk matters over with Council. He named as terms for services as an expert the remuneration which he had received from other cities, ranging from \$40 to \$75 per day. H. E. Riggs, of Riggs & Sherman, Toledo, agreed to serve on the committee for \$35 per day. The Council will also confer with him. If it is thought best to have experts do the work the city will announce its selection and after the company has named its engineer the two will select the third member.

When the negotiators met on the morning of May 1, 1911, Mr. Lang contended that the proper way to make an appraisal was to employ experts. He proposed that the city employ an engineer and that the city's engineer and the company's engineer select a third member, their report to be binding only after its acceptance by the city and the company. Mayor Whitlock stated that the city would refuse to delegate authority to an individual, but that the Council probably did not understand Mr. Lang's proposal when first made to it, since no power would be delegated if the committee simply made the appraisal and submitted a report to guide the city and company in a final decision.

Mr. Lang suggested that the third man should be paid by both the city and the company. He desired to arrive at conclusions that will be mutually advantageous to the city and the company, but he wanted to profit by the experience of Cleveland and Detroit.

On April 29, 1911, City Solicitor Schreiber and Attorney Rathbun Fuller, acting for the company, reported that they had failed to agree upon the demand that the interurban railway should give up their contracts with the local company and make new agreements satisfactory to the city administration before the proposed new franchise becomes operative. They decided to send the question back to the negotiators when they met on May 1. Mr. Fuller insisted that the section be omitted and Mr. Schreiber refused to accede to this request.

In a general way the forfeiture clause agreed upon by the attorneys is the same as the original Schreiber draft. It provides that if the company fails to comply with all the terms of the franchise or with any general ordinance of the city the Council shall have the right to declare the franchise forfeited. This opinion of Council, it is stipulated, shall not prejudice the right of the City Solicitor to bring a forfeiture action in court. If any portion of the ordinance is declared invalid or inoperative by a court at the instance of the company the whole ordinance shall become invalid at the option of the Council. In that case the company shall not have any further rights under the new franchise nor can it revert to any of the rights under its unexpired franchises, but must still bear its obligations to the city. The clause pro-

viding that the tracks shall become the property of the city at the expiration of the franchise was stricken out, and it was agreed that the company should remove its tracks by paying the city an amount that will put the streets in good condition, unless the railway property passes to the possession of the city in the meantime.

The attorneys will report on a number of other questions at a later date.

Annual Convention and Annual Meeting of American Institute of Electrical Engineers

The annual convention of the American Institute of Electrical Engineers will be held in Chicago, Ill., June 26 to 30, 1911. The headquarters will be at the new Hotel Sherman. The committee on meetings and papers has arranged an attractive program of technical papers on a wide variety of subjects. Dugald C. Jackson, president of the Institute, has appointed the following convention committee, which will have charge of the local arrangements: Louis A. Ferguson, chairman; W. L. Abbot, B. J. Arnold, H. M. Byllesby, W. L. Campbell, T. P. Gaylord, W. B. Jackson, J. W. Johnson, John D. Nies, W. P. Sidley, B. E. Sunny, Fay Woodmansee, P. B. Woodworth and J. G. Wray. Three papers on railway subjects are announced as follows: "Electrification Analyzed and Its Application to Trunk Line Roads," by W. S. Murray (this is an abstract of a paper presented before the Institute meeting at Toronto on April 7 and already published in this paper); "The Costs of Railway Electrification," by B. F. Wood; "Induction Motor for Single-Phase Traction," by E. F. W. Alexanderson.

The annual meeting of the Institute will be held in the auditorium of the Engineers Building, New York, N. Y., on May 16, 1911, at 8:15 p. m. The board of directors will present its report for the fiscal year ended April 30, 1911, and the result of the vote for the offices to be filled for the ensuing administrative year will be announced. The feature of the evening will be the presentation ceremonies in connection with the award of the Edison medal to Frank J. Sprague. The program includes the presentation of the medal and certificate of award by Prof. D. C. Jackson, president of the Institute. Addresses will be made as follows: W. B. Potter, of the General Electric Company, "The Development of the Electric Railway"; F. H. Giddings, professor of sociology at Columbia University, "Social Results of the Introduction of the Electric Railway"; George F. Swain, professor of civil engineering at Harvard University, "The Relation of Governmental Control to the Development of Electric Railways and the Electrification of Steam Lines"; Commander S. S. Robison, of the Bureau of Steam Engineering, Navy Department, Washington, "The Results of the Use of Electricity in the Navy."

Subway Plans to Be Taken Up in Chicago.—On May 9, 1911, Mayor Carter Harrison of Chicago ordered Alderman Peter Reinberg, chairman of the local transportation committee, to appoint a sub-committee of three to take up at once plans for a subway in Chicago and report recommendations for starting work. Plans prepared by City Engineer John Ericson, Bion J. Arnold and others for subway construction will be considered. The city has a fund of \$6,000,000 available for subway construction.

Progress of Southern Pacific Electrification.—Julius Kruttschnitt, vice-president and director of maintenance of the Southern Pacific Company, who is now in the East, referred recently as follows to the electrification work of the company: "Electrification around San Francisco is progressing favorably. The power house has been finished and orders have been placed for equipment for some 120 coaches and trailers. Outside of that no equipment has or will be ordered this year. Some 10,000 freight cars and a couple of hundred passenger cars ordered some time ago are now being delivered."

Annual Report of Indiana Railroad Commission.—The annual report of the Indiana Railroad Commission shows that eleven interurban roads out of the thirty-six operating in the State declared dividends during the fiscal year ended June 30, 1910. The authorized capital stock of these companies was \$137,116,000, of which \$109,181,585 was outstanding. The authorized funded debt was \$115,689,000, of which

\$70,695,500 was outstanding. The total operating revenues amounted to \$14,010,798. The operating expenses amounted to \$7,598,578. The passenger car mileage was 41,883,408 miles, and the freight car mileage 2,601,035. The total number of passengers carried during the year was 115,626,481. The operating expenses per car mile were \$0.1996.

Convention Bulletin by Manufacturers' Association.—George Keegan, secretary of the American Electric Railway Manufacturers' Association, has issued a circular to the members in regard to the Atlantic City convention. He states the Manufacturers' Association has again secured the use of Young's Million-Dollar Pier, that satisfactory hotel accommodations are assured and that the usual guarantee has been secured against any advance in the regular hotel rates. Accompanying this letter is a copy of the circular issued by H. C. Donecker, secretary of the American Electric Railway Association, published in the *ELECTRIC RAILWAY JOURNAL* of May 6, 1911, page 803, and a pamphlet on the Manufacturers' Association which gives a short history of the association, a list of the officers and members, a copy of the constitution and by-laws and a copy of the report of the treasurer for last year.

New Hampshire Public Service Commission.—The measure to create a public service commission in New Hampshire, urged by Governor Robert P. Bass, has been passed. The commission is to have authority over all public utilities, including electric railways, railroads, electric light and power companies, gas companies, etc. It is to be composed of three members to be appointed by the Governor. The members are to be a chairman at a salary of \$3,500 a year, a clerk at \$3,200 a year and a third member at \$3,000. The terms of the first members are to terminate in 1913, 1915 and 1917 respectively. Thereafter appointments are to be made for a term of six years. The commission is authorized to expend \$4,000 annually and with the approval of the Governor and Council such further sums as may be necessary. The law provides that the commission must investigate complaints if made by city councils, mayors or selectmen, or upon the complaint in writing of 100 or more customers or subscribers in cities of 20,000, or not less than twenty-five in all other cities or towns.

Proposed Lines in Toronto.—Some time ago the city of Toronto, Ont., submitted preliminary construction plans to the Ontario Railway and Municipal Board for new street railway lines, but the board does not seem disposed to approve the plans until the details are given, including estimates of the cost of operation. The city cannot do this at present. While \$1,157,293 was voted in January, 1911, to build the lines, it has not been settled whether they are to be operated by the city or by the Toronto Railway. Negotiations are under way to have the Toronto Railway operate the lines in connection with its system, but the company has not yet signified the terms upon which it would agree to do this. It was stated that if the Toronto Railway should refuse to operate the lines proposed by the city their construction would be deferred and probably abandoned. It is regarded as almost certain that the Ontario Railway and Municipal Board will refuse to approve the plans of the city unless satisfactory evidence is forthcoming that the lines can be operated economically.

Ruling by Supreme Court on Portland Fender Ordinance.—The Supreme Court of Oregon has supported the lower court in the case of Edward Plinkiewisch, administrator of the estate of Otto Brandes, against the Portland Railway, Light & Power Company and the verdict for the defendant company is sustained, but the court has upheld the right of the Mayor and City Council to prescribe the type of fender that shall be used in the city. Judge McBride, who wrote the opinion, said in regard to the act in general: "It is not disputed that the fender actually in use on the car in question was of the design and character prescribed by this resolution, but it is contended that the proviso in the act is unconstitutional in that it gives the Mayor and Council the right arbitrarily to set aside the State law. We do not take this view of the act. The intent of the act is purely to prescribe in general terms what shall constitute a sufficient fender until each distinct locality shall have seen fit to legislate for itself on that subject. This court has upheld local option in regard to the sale of liquor and we see no reason why Portland or any other municipality may

not be permitted to exercise the same right in regard to fenders. The principle is the same; the regulation of each is the exercise of the police power for the benefit of the public."

Arguments Against Tax Assessments in Indiana.—Representatives of a number of interurban electric railways in Indiana appeared before the Indiana Tax Board recently to protest against the assessments fixed by the board. According to J. M. Barrett, general counsel of the Ft. Wayne & Northern Indiana Traction Company, the financial and industrial depression in the communities through which the interurban railway operates had tended to reduce the income and the assessment levied by municipal corporations for paving between tracks had cost the company which he represented \$150,000 during the last year. The 3-mile gravel road law had likewise cost the interurban railways of the State a large sum in special taxation, many towns having taken advantage of the law to pave streets occupied in part by street railways and interurban lines. Ferdinand Winter, who appeared for the Terre Haute, Indianapolis & Eastern Traction Company, declared that changes in the grades of public highways now partially occupied by tracks and the arbitrary orders of the County Commissioners had affected the securities of the electric railways. He cited one case where the Terre Haute, Indianapolis & Eastern Traction Company had been ordered to move its tracks off the highway for a distance of 23 miles. C. L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company, said the new employers' liability law would double the expense of the damage account and that the block signal and other requirements of the Indiana Railroad Commission would affect the interurban railways by increasing their expenditures materially.

LEGISLATION AFFECTING ELECTRIC RAILWAYS ILLINOIS

A bill which will permit the consolidation of the elevated railways of Chicago has been favorably acted upon by the committee of the House on corporations. The bill exempts railroads and other public service corporations from the provisions of the law covering corporate consolidations. The House has gone on record in favor of electing the State Board of Railroad & Warehouse Commissioners.

MASSACHUSETTS

The committee on street railways has voted leave to withdraw House Bill 1369, providing for the State and city ownership of street railways, and the House has refused to discharge the report from the orders of the day. The committee on railroads and street railways, sitting jointly, have voted adversely on House Bill 1360, accompanying the petition of William B. Lawrence, Medford, to determine the value of shares of stock of consolidated railroads and street railways. The committee on street railways has sent in an adverse report on House Bill 1365, for legislation to create a commission to investigate the affairs of the Boston Elevated Railway. The committee believes that the company's policy of publicity and its complete returns to the Railroad Commissioners leave concealed nothing which is of the slightest public interest. The report of the Boston Transit Commission and Massachusetts Railroad Commission, sitting as a joint board upon the Riverbank subway investigation, has been referred to the committee on metropolitan affairs. The report favored a subway under Boylston Street and the repeal of the Riverbank subway act of 1907. The Senate and House have accepted in concurrence the adverse report of the railroad and street railway committees on House Bill 1350, which provides for free transportation of United States letter carriers by railroads and street railways. The committees on street railways and labor have reported adversely on House Bill 524, which provides that conductors and motormen employed by street railways shall have one day off in fifteen. The Senate has accepted the adverse report of the committee on street railways on the bill to require companies to provide special service for workingmen and workingwomen between 5 a. m. and 8 a. m., and 5 p. m. and 7 p. m.

NEW YORK

The Assembly Committee on Railroads has reported favorably on two resolutions directing the Public Service

Commission of the First District to furnish information to the Assembly in reference to the transfer situation in New York. One of the resolutions asks the commission to report the result of its investigation relative to the restoration of the transfer system in the boroughs of Manhattan and the Bronx, and the other asks that the commission report as to its action on the application for a certificate of public convenience and necessity for railroads across the Queensboro Bridge.

The Senate has passed the bill for the removal of the tracks of the New York Central & Hudson River Railroad on Eleventh Avenue in New York City. The measure would compel the company to remove its tracks within six months unless the company in the meantime should reach an agreement with the city for some plan which would effect the required change after the proposed law goes into effect. The bill to require the Long Island Railroad to establish a 5-cent fare over its Atlantic Avenue division between Flatbush Avenue and Railroad Avenue has passed both branches of the Legislature. The fourth and final report of the employers' liability commission was made to the Senate on May 3, 1911, by Senator Wainwright, chairman of the commission. It recommends the adoption of a constitutional amendment that will meet the objections which caused the liability law passed at last year's session to be pronounced unconstitutional by the Court of Appeals.

OHIO

It is claimed that the Edwards subway bill was formulated by W. R. Hopkins, of the Cleveland Underground Rapid Transit Company; that its enactment into a law would give that company exclusive control of the streets under the surface and that it would also guarantee to the company the franchise it now holds, whether any construction work was done or not. Mayor Baehr, of Cleveland, objects to the bill, and the daily papers have reported quite fully the arguments and discussions. On the evening of April 1, 1911, the City Council of Cleveland adopted a resolution asking the House to delay action on the bill until an investigation could be made. At a meeting in Mayor Baehr's office on May 3, 1911, Mr. Hopkins accused the Cleveland Electric Illuminating Company of trying to block the passage of the bill. Samuel Scovil, vice-president of this company, who was at Columbus, said that he considered the bill iniquitous. Mr. Hopkins said that the bill was merely to legalize the agreements in the franchise and to remove all doubt of the right of city councils to grant franchises for underground roads. He offered to eliminate the portion which it was thought took away city control of the streets and to insert an amendment giving the right to lease space for wires and pipes. Another meeting was held on May 5, 1911. Mr. Hopkins and Mr. Scovil attended but nothing was agreed upon. Mr. Hopkins asserted that he was asking nothing in the bill that the city had not granted in the franchise.

PENNSYLVANIA

After being amended in committee in over one hundred instances, chiefly typographical corrections, the administration public service commission bill has been reported favorably to the House and will be made a special order so as to have it reach the Senate not later than May 15. The amendments of importance remove storage warehouses from the classes of public service business coming under the jurisdiction of the commission and provide that authority shall be exercised over municipal corporations only in so far as they are engaged in supplying gas or electricity, water or the means of sewage disposal. Reasonable service is defined as what the commission may require of corporations. The commission would be given authority to require interchange of business by telephone lines, the provision that it should extend only to non-competing lines being stricken out. All securities issued or provided under agreements or mortgages made prior to the act are to be exempted from its provisions and the families of railroad men are placed upon the list of those who may receive railroad passes. The terms of the commissioners are to begin June 1, 1911, instead of a month later, and the commission is given authority to dispose of costs. The Senate bill to allow street railways to construct and operate tracks in boroughs without consent of Council was defeated in the House, but was later reconsidered.

Financial and Corporate

New York Stock and Money Markets

May 9, 1911.

While trading in the bond market has been brisk during the greater part of the week, trading to-day has been marked by a decreased demand for long-term issues and an increased interest in short-term securities. Public interest in the stock market will be slight until the tariff legislation is more clearly defined and publication is made of the decisions of the Supreme Court in the trust cases. The trading in bonds has not caused any marked change in rates. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{1}{2}$ per cent; 90 days, $2\frac{1}{2}$ @ $2\frac{3}{4}$ per cent.

Other Markets

In Philadelphia, Philadelphia Rapid Transit and Union Traction declined slightly early in the week, owing to the failure to put through the loan ordinance.

In Chicago, Northwestern Elevated common advanced a point early in the week on advices that the Northwestern Elevated first mortgage 4 per cents would be refunded.

Trading in the Boston market has been light since the last report and transactions have been of a professional character. To-day's market has a strong undertone, however, and the trading was well distributed with prices higher.

Transactions in Baltimore have been devoid of feature and sales have been in small lots. With an increase of $\frac{5}{8}$, Fairmount & Clarksburg Traction 5s reached $100\frac{1}{2}$, making a new level for the year.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 2.	May 9.
American Light & Traction Company (common).....	292	a288
American Light & Traction Company (preferred).....	106	a106
American Railways Company.....	44	a44
Aurora, Elgin & Chicago Railroad (common).....	a44	a44
Aurora, Elgin & Chicago Railroad (preferred).....	a86	a86
Boston Elevated Railway.....	127	a127 $\frac{5}{8}$
Boston Suburban Electric Companies (common).....	a15	a15
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a10	a10
Boston & Worcester Electric Companies (preferred).....	44	a48
Brooklyn Rapid Transit Company.....	78 $\frac{3}{4}$	78 $\frac{3}{4}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84 $\frac{1}{2}$	85
Capital Traction Company, Washington.....	a130	130
Chicago City Railway.....	a190	a195
Chicago & Oak Park Elevated Railroad (common).....	3	3
Chicago & Oak Park Elevated Railroad (preferred).....	6	7
Chicago Railways, ptcptg., ctf. 1.....	a85	a85
Chicago Railways, ptcptg., ctf. 2.....	a22	a22
Chicago Railways, ptcptg., ctf. 3.....	a8 $\frac{3}{4}$	a8 $\frac{3}{4}$
Chicago Railways, ptcptg., ctf. 4.....	a5	a5
Cincinnati Street Railway.....	*131	*131
Cleveland Railway.....	a96 $\frac{7}{8}$	a97
Columbus Railway (common).....	*96	*96
Columbus Railway (preferred).....	*100	*100
Consolidated Traction of New Jersey.....	a76	a75
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	100	a100
Detroit United Railway.....	71	71
General Electric Company.....	158	156
Georgia Railway & Electric Company (common).....	a133	134
Georgia Railway & Electric Company (preferred).....	91	a93
Interborough Metropolitan Company (common).....	18 $\frac{1}{4}$	19 $\frac{1}{8}$
Interborough Metropolitan Company (preferred).....	51 $\frac{1}{4}$	53 $\frac{1}{2}$
Interborough Metropolitan Company (4 $\frac{1}{2}$ s).....	79	79 $\frac{7}{8}$
Kansas City Railway & Light Company (common).....	20 $\frac{1}{2}$	a21
Kansas City Railway & Light Company (preferred).....	a68	a67 $\frac{1}{4}$
Manhattan Railway.....	137 $\frac{1}{2}$	139
Massachusetts Electric Companies (common).....	a18 $\frac{1}{4}$	a18 $\frac{1}{2}$
Massachusetts Electric Companies (preferred).....	a88	a88
Metropolitan West Side, Chicago (common).....	a25	a24
Metropolitan West Side, Chicago (preferred).....	a68	a68
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	73 $\frac{1}{2}$	73..
Northern Ohio Light & Traction Company.....	44	*44
Northwestern Elevated Railroad (common).....	a20 $\frac{1}{2}$	a21 $\frac{1}{2}$
Northwestern Elevated Railroad (preferred).....	a65	a63
Philadelphia Company, Pittsburgh (common).....	a52 $\frac{7}{8}$	a53
Philadelphia Company, Pittsburgh (preferred).....	a43	a42 $\frac{3}{4}$
Philadelphia Rapid Transit Company.....	a18	a17 $\frac{3}{4}$
Philadelphia Traction Company.....	82 $\frac{1}{2}$	a83 $\frac{1}{2}$
Public Service Corporation, 5% col. notes (1913).....	100 $\frac{1}{2}$	a100 $\frac{5}{8}$
Public Service Corporation, cts.....	a106	a106 $\frac{1}{2}$
Seattle Electric Company (common).....	a107	a109 $\frac{1}{2}$
Seattle Electric Company (preferred).....	a98	100
South Side Elevated Railroad (Chicago).....	a72	a72
Third Avenue Railroad, New York.....	11 $\frac{1}{2}$	11 $\frac{7}{8}$
Toledo Railways & Light Company.....	a7 $\frac{1}{2}$	a8
Twin City Rapid Transit, Minneapolis (common).....	a109 $\frac{5}{8}$	a108 $\frac{1}{2}$
Union Traction Company, Philadelphia.....	46	a46
United Rys. & Electric Company, Baltimore.....	18 $\frac{5}{8}$	a18 $\frac{1}{4}$
United Rys. Inv. Co. (common).....	42	42
United Rys. Inv. Co. (preferred).....	71 $\frac{1}{4}$	71..
Washington Ry. & Electric Company (common).....	a35 $\frac{1}{2}$	35 $\frac{1}{2}$
Washington Ry. & Electric Company (preferred).....	89 $\frac{3}{4}$	89 $\frac{3}{4}$
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	a103 $\frac{1}{2}$	a103 $\frac{1}{2}$
Westinghouse Elec. & Mfg. Co.....	69 $\frac{1}{2}$	68 $\frac{1}{2}$
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a118	a117

a Asked. *Last sale.

ANNUAL REPORTS

United Railways & Electric Company of Baltimore

The income account of the United Railways & Electric Company of Baltimore for the year ended Dec. 31, 1910, was as follows:

Gross earnings.....	\$7,687,894
OPERATING EXPENSES:	
Conducting transportation.....	\$1,553,579
Motive power.....	588,174
Maintenance of way.....	287,033
Maintenance of cars.....	413,725
General expenses.....	759,385
Total operating expenses.....	\$3,601,896
Net earnings.....	\$4,085,998
Income from other sources.....	2,490
Total net income.....	\$4,088,488
FIXED CHARGES, ETC.:	
Interest on bonds.....	\$2,043,839
Park and other taxes.....	705,292
Ground rents and other rentals.....	7,567
Interest on car trust certificates, Series "A".....	8,313
Interest on car trust certificates, Series "B".....	24,437
Interest on car trust certificates, Series "C".....	12,187
Total fixed charges, etc.....	\$2,801,635
Balance.....	\$1,286,853
Deduction from income—rental account—1 $\frac{1}{2}$ per cent sinking fund, Maryland Electric Railways 5 per cent. bonds.....	60,000
	\$1,226,853
Amount written off for extraordinary expenditures, subject, however, to final distribution by the board of directors.....	864,048
Balance to the credit of profit and loss account.....	\$362,805

W. A. House, the president, says in his report in part:

"Comparing 1910 results with those of 1909, we have the following: Increase in gross earnings, \$477,910, or 6.63 per cent; increase in operating expenses, \$240,024, or 7.14 per cent; increase in fixed charges, \$82,447, or 3.03 per cent; increase in amount carried to credit of profit and loss for the year, \$259,803, after deducting \$60,000, representing $\frac{1}{2}$ per cent, sinking fund on the \$4,000,000 Maryland Electric Railways 5 per cent bonds for the year.

"The percentage of operating expenses to gross earnings was 46.85 per cent, as compared with 46.63 in 1909.

"The average earnings per car mile were 27.54 cents, an increase of 0.95 cent (due to increased efficiency resulting from large expenditures upon the property), and the cost of service 12.9 cents (exclusive of taxes and rehabilitation charges), an increase of 0.51 cent.

"The number of car miles run was 27,911,573, an increase of 787,917 miles. The total number of revenue passengers carried was 154,928,785, an increase of 9,326,795. The number of transfers used was 60,789,807, an increase of 3,759,251.

"In submitting this report it is proper to note the substantial consummation of the plans for the rehabilitation of the property.

"The great fire of February, 1904, which destroyed very valuable property of the company and interfered greatly with the traffic receipts, instead of proving a discouragement to the management stimulated its determination to pursue plans then under consideration for bringing the property up to the highest standard of efficiency.

"The company stopped paying interest on its income bonds and began applying all of its surplus over and above the interest on the first consolidated and underlying bonds to the plans of rehabilitation. In July, 1906, a financial plan was adopted whereby your company was enabled to provide funds for special capital expenditures through a leasing agreement with the Maryland Electric Railways Company and at the same time to fund the income bondholders' coupons from June, 1904, up to and including December, 1910, in the 5 per cent funding bonds of your company.

"The company thereafter continued to expend its surplus income upon the property, but as this income became available only as earned the management incurred a floating debt in anticipation of the earnings. This floating debt has now been paid.

"Of the 401.164 miles now operated by the company 234.075 miles are city lines; 180.613 miles are now laid with 9-in. girder rails, substantially all of which is within the city; 142.155 miles have been cast or electric welded. The

167.089 miles of suburban lines are, with few exceptions, in excellent condition.

"The company's generating capacity is 45,105 kw, as compared with about 12,000 kw at the time of the consolidation. Its present Pratt Street power house is a thoroughly equipped up-to-date plant, which will be further reinforced by electric energy to be furnished by the Pennsylvania Water & Power Company under contract concluded with that company Feb. 8, 1911. There are also five modern fireproof substations with a capacity of 28,000 kw. The company has erected under the arrangement with the Maryland Electric Railways six new fireproof carhouses of reinforced concrete or brick construction. It has also completely remodeled two of the older carhouses. In the last few years the company has placed in service 440 double-truck semi-convertible cars and 150 single-truck cars equipped with the most modern appliances, or more than the average number of cars operated at the time of the consolidation.

"As illustrating the heavy cost of street railway improvements it may be stated that the amount expended upon the property since the date of consolidation has been nearly \$18,000,000. It will be noted that interest on this expenditure at 5 per cent would equal about \$900,000, compared with the total fixed interest charges of the company paid in 1910, amounting to \$2,043,838.84.

"The property as a result of these expenditures is in excellent physical condition, probably on the whole better than that of any street railway in the country.

"The financial plan of 1906 is consummated. The company itself has a clean balance sheet and has no bills payable or accounts payable except current monthly accounts. This result has been accomplished in the face of the great industrial depression of 1908, when the company suffered a loss in gross revenue estimated to have amounted to over \$525,000.

"The total amount of taxes and public charges, including park tax, cost of paving streets, track changes necessitated by regrading of streets and highways, sewerage commission work, widening of streets, etc., was \$812,673 (an increase of \$77,606, or 10.56 per cent), or more than 10½ per cent of the gross revenue of your company, and about 20 per cent of the net receipts after paying the costs of operation. In other words, the total amount of taxes and other public charges paid by your company represents the gross earnings of about one in every ten cars operated, and the total net earnings (after paying costs of operation only) of about one car in every five.

"The park tax for the year was \$495,960, as against \$469,379 in 1909, an increase of \$26,580. The federal excise tax, imposed under an act of Congress, amounted to \$6,070 for the year. The easement tax controversy over 14,157 miles of private rights-of-way of your company has been settled.

"There were sold during the year thirty-five old cars to net \$10,426. Since the substitution of the semi-convertible air-brake cars for the smaller cars 170 of the latter have been sold to net \$77,404.

"After exhaustive examinations made of the working of the pay-as-you-enter type of car operated in several of the larger cities it was deemed advisable to equip one of your lines with cars of this type. Accordingly a contract was concluded covering the use by your company of this type of car and thirty-two of the large semi-convertible cars were remodeled at your company's shops by lengthening the platforms, changing means of entrance, exit, etc., and placed in operation Jan. 1 on the Pennsylvania Avenue line.

"On account of the growth of traffic on the Gilmor Street and Guilford Avenue line an order was placed in September for sixty double-truck semi-convertible cars of the pay-as-you-enter type. These cars were acquired under the arrangement with the Maryland Electric Railways Company, leased to your company and assigned to service on the line named.

"The prepayment method of collecting fares was introduced in the United States several years ago and its advantages have led to its adoption in a number of cities. In 1910, out of a total of 3571 cars ordered for electric railway service in the various cities of the United States 1878 were of the prepayment type.

"With this in view, your company entered into a contract with the Pay-As-You-Enter Car Corporation whereby that company licenses your company to build, rebuild, alter, or

equip its cars for pay-as-you-enter service when deemed desirable.

"At the last session of the Legislature an act was passed creating and establishing a Public Service Commission for the State, and providing for the regulation and control of public service corporations, public utilities, etc. Since its organization there have been filed with the commission a number of complaints affecting your company, notably the petitions requesting the commission to reduce the rates of fare from 15 cents to 10 cents on the Ellicott City and Sparrows Point lines, both of which have since been refused after hearings by the commission on the ground that the fares charged were reasonable for the service rendered.

"With a view to reducing the fire hazard to a minimum, contract was awarded in March covering the installation of complete automatic sprinkler systems of the latest design in the following carhouses: North Avenue and Gay Street, York Road and Arlington Avenue, Lombard and Seventh Streets, Electric Park. The total cost of this work was \$67,084, and was paid for out of proceeds from sale of Maryland Electric Railways Company's bonds. The Park terminal and Edmondson Avenue carhouses were equipped with sprinkler systems at the time of their erection. As a result of these improvements your company has been able to obtain a very material reduction in its insurance rate."

American Cities Railway & Light Company

The income account of the American Cities Railway & Light Company for the year ended Dec. 31, 1910, shows dividends received of \$878,446, interest on loans to local companies of \$12,157, and interest on bank balances of \$2,582, a total of \$893,185. Expenses and taxes were \$40,967, leaving net earnings of \$852,218. Dividends on the preferred stock were \$414,366, and dividends on the common stock \$430,444, leaving \$7,408 surplus. The previous surplus was \$556,925, and there was added \$100,000 "special income from earnings of previous years," making a final surplus on Dec. 31, 1910, of \$664,333.

A condensed income statement of the local companies for two years is as follows:

	Year Ended December 31, 1910.	1909.
Gross earnings.....	\$6,503,113	\$5,801,237
Operating expenses and taxes.....	3,721,468	3,360,944
Net earnings.....	\$2,781,645	\$2,440,293
Interest charges.....	1,289,192	1,251,542
Sinking funds.....	51,642	25,500
Surplus over fixed charges.....	\$1,440,811	\$1,163,251
Dividends paid.....	997,477	799,433
Surplus over dividends.....	\$443,334	\$363,818

J. K. Newman, the president, says in part: "If the proportionate interest of your company in the undivided surplus earnings of the local companies were added the results for the years 1910 and 1909 would be as follows:

	1910.	1909.
Net earnings of the American Cities Railway & Light Company.....	\$852,217	\$686,162
American Cities Railway & Light Company's proportionate share of the undivided surplus earnings over dividends.....	403,779	328,015
Total.....	\$1,255,998	\$1,014,177
Preferred stock dividends (5 per cent.).....	414,366	414,366
Surplus above preferred dividends, divided and undivided.....	\$841,632	\$599,811

"The total surplus, divided and undivided, after providing for the preferred stock dividends, was equivalent in 1910 to 7.82 per cent upon the outstanding common stock, as compared with 5.58 per cent in 1909 and 3.38 per cent in 1908.

"Out of the undivided surplus earnings shown above the local companies set aside as reserve funds for renewals, betterments and contingencies \$132,791 in 1910, as compared with \$170,740 in 1909.

"Your company now owns in the aggregate 84.1 per cent of the preferred stock and 89.5 per cent of the common stock of the following companies: Birmingham Railway, Light & Power Company, the Memphis Street Railway Company, Little Rock Railway & Electric Company, Knoxville Railway & Light Company, and the Houston Lighting & Power Company, 1905.

"The improvement shown for 1909 in the operation of the several companies was continued throughout 1910. The

gross earnings show an increase of over \$700,000, or 12.10 per cent, as compared with an increase of \$360,524 in operating expenses and taxes, thus making an increase of \$341,351 in net earnings.

"The reserve equipment and facilities acquired by the properties in previous years in anticipation of future requirements enabled them to take care of the large increase in business without as great expenditure for additions as would otherwise have been required. In consequence, the interest charges for the year exceeded the corresponding sum for 1909 by only \$37,650, or 3.01 per cent.

"A sinking fund of \$25,000 per annum in the Memphis company, coming into operation in 1910, accounts for most of the change from the previous year in the sinking fund deductions. These sinking fund payments are annually reducing the indebtedness ahead of the stock, and thus increasing the equity represented by the stock.

"The reduction in platform accidents resulting from the installation of gates on the cars in Birmingham has made a marked saving in the amounts paid by the Birmingham Railway, Light & Power Company for damages. Late in the year similar gates were installed upon the cars of the Memphis Street Railway, where the damage claims have also been heavy, and a material reduction in these expenses is expected in consequence of this step.

"During the year the Supreme Court of Tennessee rendered a decision favorable to this company in the suit instituted by some minority stockholders of the Memphis Street Railway, attacking the organization of this company and the legality of its acquisition of the stock of the Memphis Street Railway. The decision sustained this company in all its contentions.

"Notwithstanding the fact that the reserve equipment of the various properties enabled them to care for the large increase in business during the past year without all the expenditure that would otherwise have been required, the various companies spent about \$1,400,000 for new equipment, extensions, etc., to take care, not only of the business now being done, but the increased business expected in the immediate future. Of this \$1,400,000 construction expenditure about \$900,000 was provided by sale of bonds and nearly \$500,000 came from surplus earnings.

"Your company has had no occasion to borrow either to finance its own requirements or to assist the local companies. The latter have been able to sell bonds for a considerable part of their construction requirements, and to care for the balance thereof out of their undivided surplus earnings, except in the case of the Houston company, where \$500,000 new common stock has been sold for cash during the last two years and purchased by the American Cities Railway & Light Company.

"As a result the properties are free from floating indebtedness, except for some small temporary loans carried, pending sale of construction bonds. Your company is itself carrying the larger part of these temporary loans."

A combined statement of the five properties shows that in the seven years from 1903 to 1910 gross earnings increased from \$2,993,864 to \$6,503,113, or 117.2 per cent. Operating expenses and taxes increased from \$1,676,864 to \$3,721,468, or 121.8 per cent. Net earnings increased from \$1,317,000 to \$2,781,645, or 111.2 per cent. Interest rose from \$700,604 to \$1,289,192, or 84 per cent. The surplus increased from \$616,396 to \$1,492,453, or 125.8 per cent. Sinking fund requirements increased from nothing to \$51,642, and the final surplus from \$616,396 to \$1,440,811, or 133.7 per cent.

Angola Railway & Power Company, Angola, Ind.—Judge Yapple, in the Superior Court at Ft. Wayne, has appointed Fred S. Hunting, Ft. Wayne, receiver of the Angola Railway & Power Company, on the application of Sol A. Wood, a stockholder of the company.

Berkshire Street Railway, Pittsfield, Mass.—The following statement was made public on May 3, 1911, in regard to the affairs of the Berkshire Street Railway: "At a meeting to-day of the directors of the Berkshire Street Railway the stock of which was acquired by the New York, New Haven & Hartford Railroad by legislative authority last June, the organization in the interest of the New York, New Haven & Hartford Railroad was completed, and the directors and officers are now as follows: Directors: Wil-

liam L. Adams, Pittsfield; Charles F. Brooker, Ansonia, Conn.; Timothy E. Byrnes, Boston; Frank Curtiss, Sheffield; William Skinner, Holyoke; Charles S. Mellen, Stockbridge; Robb de P. Tytus, Tyringham. Officers: President, Charles S. Mellen; vice-president and clerk, C. Q. Richmond, Pittsfield; treasurer, Augustus S. May, New Haven; controller, H. M. Kochersperger, New Haven; assistant clerk, Arthur E. Clark, New Haven.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—The coupons due on Nov. 1, 1910, on the \$1,000,000 of first mortgage 5 per cent bonds of the Columbus, Delaware & Marion Railway were paid on May 1, 1911, the six months' limit under the mortgage. It is expected that the interest on the \$920,000 of first refunding 5 per cent. bonds of the Columbus, Delaware & Marion Railway which was due on Feb. 1, 1911, will be paid on Aug. 1, 1911.

Hudson Companies, New York, N. Y.—Harvey Fisk & Sons, New York, N. Y., are offering for subscription at 98½ and interest \$1,000,000 of the Hudson Companies' 6 per cent secured convertible gold coupon notes due on Feb. 1, 1913, but redeemable at 100 per cent on any interest date on thirty days' notice. The notes are part of the original issue of \$10,136,000 sold by the company in 1910, and are specifically secured by the pledge of 150 per cent in first-mortgage 4½ per cent bonds on the Hudson & Manhattan Railroad, due in 1957.

Indianapolis & Louisville Traction Company, Scottsburg, Ind.—A plan has been formulated for the reorganization of the Indianapolis & Louisville Traction Company. The company has outstanding at present \$1,250,000 of first-mortgage bonds: \$100,000 of preferred stock and \$2,500,000 of common stock. It is proposed to issue new securities as follows: \$1,500,000 of 5 per cent thirty-year first-mortgage bonds dated Jan. 1, 1911; \$600,000 of 6 per cent cumulative preferred stock and \$600,000 of common stock.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—Judge Killits, of the Federal Court at Toledo, Ohio, appointed Albert E. Royce and B. C. Harding, Bowling Green, receivers of the Lake Erie, Bowling Green & Napoleon Railway, on May 2, 1911, on a petition filed by Edmund C. Ebert, Detroit, Mich., who owns a judgment for \$325, secured against the company in January, 1910. Mr. Ebert claims that the company is insolvent, and that it has defaulted in the payment of interest on its bond issue of \$400,000, of which the Union Trust Company, Detroit, Mich., is trustee.

Lynchburg Traction & Light Company, Lynchburg, Va.—The Lynchburg Traction & Light Company has called for redemption at 103 and interest on June 1, 1911, at the office of the Logan Trust Company, Philadelphia, Pa., its \$250,000 of 6 per cent general mortgage convertible ten-year gold bonds of 1907.

Manistee Light & Traction Company, Manistee, Mich.—The property of the Manistee Light & Traction Company was sold under foreclosure on May 6, 1911, by order of the United States District Court, and was purchased in the interest of the bondholders.

Northern Texas Electric Company, Ft. Worth, Tex.—An issue of \$1,000,000 of three-year 5 per cent coupon notes has been sold by the Northern Texas Electric Company to Estabrook & Company and Parkinson & Burr, Boston, Mass., jointly. The notes are the direct obligation of the Northern Texas Company, and are to be secured by a first mortgage upon the property of the Ft. Worth Southern Traction Company, practically all of the stock of which will be owned by the former company. The Ft. Worth Southern Traction Company is to be organized under laws of Texas and is to own and operate an interurban electric railway of standard construction between Fort Worth and Cleburne, Tex., a distance of about 30 miles.

Philadelphia (Pa.) Rapid Transit Company.—Stern & Silverman, Philadelphia, Pa., have announced the terms of reorganization of the Philadelphia & Chester Railway. The Philadelphia Rapid Transit Company has received 51 per cent of the stock, or a controlling interest, in the new company to be called the Chester & Philadelphia Railway. The Philadelphia Rapid Transit Company is to keep 65 per cent of the gross income, maintain the property and assume all responsibility for operation.

Scranton & Binghamton Railroad, Scranton, Pa.—Fredrick Cohen & Company, Philadelphia, Pa., offer at par and interest the unsold portion of \$3,800,000 of first-mortgage, fifty-year, 6 per cent gold bonds of the Scranton & Binghamton Railroad, dated June 1, 1910, and due June 1, 1960, but redeemable at any interest period after five years at 105 per cent and interest. The Anthracite Savings Bank, Wilkes-Barre, Pa., is trustee of the mortgage.

Seattle (Wash.) Electric Company.—Lee, Higginson & Company, New York, Boston and Chicago, and Higginson & Company, London, Eng., recently offered for subscription on a 5.15 per cent basis \$1,500,000 of the first mortgage 5 per cent gold bonds of the Seattle Electric Company, dated 1909 and due March 1, 1939, but callable at 105 and interest on or after March 1, 1914. The trustee of the issue is the City Trust Company, Boston. The authorized issue is \$5,000,000, but there is outstanding, including this issue, \$3,100,000.

Springfield Railway & Light Company, Springfield, Mo.—The Federal Light & Traction Company, New York, N. Y., has taken over the Springfield Railway & Light Company, which controls the Springfield Traction Company and the Springfield Gas & Electric Company.

United Railways Investment Company, San Francisco, Cal.—Emil Loeb and Eben Richards have been elected directors of the United Railways Investment Company to fill vacancies caused by the resignation of M. Kubierschky and C. S. Shepard.

Valley Traction Company, Harrisburg, Pa.—The Valley Traction Company has filed with the Secretary of State a certificate certifying to an increase in the authorized capital stock of the company from \$1,000,000 to \$2,000,000 by raising the amount of the common stock from \$500,000 to \$1,500,000.

Virginia Railway & Power Company, Richmond, Va.—N. W. Halsey & Company, New York, N. Y., are offering for subscription at 97½ and interest the unsold portion of \$1,786,000 of 5 per cent gold bonds of the Virginia Railway & Power Company, dated July 1, 1909, and due July 1, 1934; interest payable Jan. 1 and July 1 at the office of the Equitable Trust Company, New York, N. Y., trustee. The bonds are in the denomination of \$1,000, and are callable at 105 on any interest date, and are being issued to retire the entire underlying debt of the company, with the exception of \$80,000 of prior lien bonds secured on a part of the property by a closed mortgage. The total authorized issue of these bonds is \$15,000,000, of which amount \$4,778,000 is reserved for additions and extensions to the property.

West Penn Traction Company, Pittsburgh, Pa.—The West Penn Traction Company has issued its report for the year ended March 31, 1911. The gross earnings for the year ended March 31, 1911, were \$2,059,227, as compared with \$1,828,391 for the previous year, an increase of \$230,835. The net earnings for the year ended March 31, 1911, were \$1,056,700, as compared with \$872,530 for the previous year, an increase of \$184,170. The statement for the year ended March 31, 1911, follows: Gross receipts, \$2,059,227; operating expenses and taxes, \$1,002,527; net earnings, \$1,056,700; fixed charges, \$475,821; surplus, \$580,879.

Worcester (Mass.) Consolidated Street Railway.—The Massachusetts Railroad Commission has approved the application of the Worcester Consolidated Street Railway to acquire the Worcester & Southbridge Street Railway, the Worcester & Blackstone Valley Street Railway, the Marlborough & Westborough Street Railway and the Worcester & Holden Street Railway, and to issue \$1,562,000 of stock share for share for the stock of the several companies. This will increase the stock of the Worcester Consolidated Street Railway to \$5,212,000.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland, receiver of the Yonkers Railroad, to issue \$1,000,000 of receivers' certificates payable in not more than two years from date, to bear interest not to exceed 6 per cent.

Dividends Declared

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, \$1 a share.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, ½ of 1 per cent, common.

Tampa (Fla.) Electric Company, quarterly, \$2.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS.

BANGOR RAILWAY & ELECTRIC COMPANY.					
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.
1m., Mar. '11		\$43,146	*\$24,718	\$18,428	\$12,498
1 " " '10		42,229	20,800	21,429	11,712
9 " " '11		440,553	*203,448	237,105	109,084
9 " " '10		425,651	*193,842	231,809	105,616
CHATTANOOGA RAILWAY & LIGHT COMPANY.					
1m., Mar. '11		\$72,395	*\$42,545	\$29,850	\$19,400
1 " " '10		67,580	*42,374	25,206	18,161
3 " " '11		215,193	*124,802	90,391	57,824
3 " " '10		194,649	*119,942	74,707	53,956
COMMONWEALTH POWER RAILWAY & LIGHT COMPANY.					
1m., Mar. '11		\$455,032	*\$261,327	\$193,705	\$105,303
1 " " '10		413,866	*239,210	174,656	104,339
3 " " '11		1,351,837	*754,375	597,462	303,133
3 " " '10		1,221,158	*692,386	528,772	305,955
DETROIT UNITED RAILWAY.					
1m., Mar. '11		\$788,328	\$490,269	\$298,058	\$177,567
1 " " '10		737,307	470,407	266,900	161,871
3 " " '11		2,225,592	1,403,433	822,159	527,571
3 " " '10		2,029,041	1,294,590	734,451	479,669
EAST ST. LOUIS & SUBURBAN COMPANY.					
1m., Mar. '11		\$176,892	*\$104,914	\$71,978	\$45,850
1 " " '10		200,254	106,317	93,937	45,526
3 " " '11		534,296	*307,265	227,031	136,289
3 " " '10		563,681	*308,841	254,840	135,561
GRAND RAPIDS RAILWAY.					
1m., Mar. '11		\$89,706	*\$51,683	\$38,023	\$15,066
1 " " '10		86,211	*47,200	39,011	14,979
3 " " '11		263,609	*151,406	112,203	45,288
3 " " '10		251,031	*141,116	109,915	46,102
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.					
1m., Mar. '11		\$37,046	*\$26,763	\$10,283	\$13,292
1 " " '10		37,609	*23,390	14,219	15,060
9 " " '11		396,278	*251,550	144,728	118,326
9 " " '10		395,669	*232,680	162,989	131,114
NORFOLK & PORTSMOUTH TRACTION COMPANY.					
9m., Mar. '11		\$1,561,877	\$887,316	\$674,561	\$562,396
9 " " '10		1,438,188	816,048	622,140	578,429
PENSACOLA ELECTRIC COMPANY.					
1m., Feb. '11		\$22,320	\$13,383	\$8,937	\$5,813
1 " " '10		19,812	11,725	8,086	4,825
12 " " '11		277,372	162,348	115,024	62,902
12 " " '10		248,219	143,507	104,712	53,467
PORTLAND RAILWAY, LIGHT & POWER COMPANY.					
1m., Mar. '11		\$515,753	*\$239,916	\$275,837	\$122,050
1 " " '10		435,652	*211,896	223,756	114,223
3 " " '11		1,505,640	*751,971	753,669	370,275
3 " " '10		1,259,739	*604,098	655,641	334,455
PUGET SOUND ELECTRIC RAILWAY.					
1m., Feb. '10		\$132,135	\$102,749	\$29,386	\$53,004
1 " " '10		131,219	96,883	34,337	50,220
12 " " '11		1,914,088	1,271,411	642,676	608,941
12 " " '10		1,896,408	1,263,789	632,620	582,137
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.					
1m., Mar. '11		\$87,728	*\$54,524	\$33,204	\$19,381
1 " " '10		82,459	*50,200	32,259	18,142
3 " " '11		261,842	*154,385	107,457	57,950
3 " " '10		251,038	*148,725	102,313	54,026
SAVANNAH ELECTRIC COMPANY.					
1m., Feb. '11		\$51,301	\$32,942	\$18,359	\$18,351
1 " " '10		45,130	27,365	17,765	17,752
12 " " '11		643,431	425,783	217,648	216,548
12 " " '10		602,000	390,293	211,707	210,341
UNION RAILWAY, GAS & ELECTRIC COMPANY.					
1m., Mar. '11		\$253,439	*\$147,294	\$106,145	\$59,782
1 " " '10		246,120	*142,534	103,586	57,924
3 " " '11		781,506	*458,439	323,067	178,601
3 " " '10		752,605	*452,152	300,453	174,222

J. J. Sullivan, president of the American Railways, Philadelphia, Pa., says of the business situation: "That the railroads of the country shall keep up to the highest state of efficiency and at the same time keep their rates down to the very lowest point, when all the costs of equipment and operation are constantly increasing, is what the public and the State and the United States government officials seem to require. Instead of enforcing the laws on the statute books we are constantly making new laws further to complicate the situation, and by the addition of many expenses, including an army of clerks to compile reports which are seldom read, are helping to eat up the revenue produced from increased taxation. The business interests are of the opinion that we have too much meddling."

Traffic and Transportation

Fare Complaint Against Washington (D. C.) Roads

Charles S. Moore, attorney for residents of Somerset, Drummond and Friendship, Md., filed a complaint with the Interstate Commerce Commission at Washington, D. C., on May 4, 1911, in which it is alleged that the Washington Railway & Electric Company, the Georgetown & Tenleytown Railway, the Washington & Rockville Railway and its receiver, George Weems Williams, are violating the act to regulate commerce passed by Congress in 1887 and its amendments. The attorney for the petitioners claims that as an inducement to persons locating in the sections named the railways about twelve years ago extended the one-fare zone from the District line to Somerset, taking passengers at the rate of a 5-cent cash fare or a car ticket sold at the rate of six for a quarter from these points to points in the District of Columbia, and that on June 1, 1910, the companies did away with this rate and made it a cash fare of 5 cents or a monthly commutation rate of \$1.73 from Somerset and Friendship Heights to the District line, and from there on the additional fare as charged in the District of Columbia. The restoration of the old rate is asked.

In the petition the alleged grievance is set forth as follows:

"That the defendants, about twelve years ago, on solicitation of the owners of subdivisions of land at Somerset, and for the purpose of encouraging development near their lines, extended the one-fare zone from the District line to Somerset, charging a fare of 5 cents or one car ticket at the rate of six tickets for 25 cents in either direction between Somerset and points in the District of Columbia. With the understanding that this rate of fare was to be permanent, and was to the mutual advantage of the residents of Somerset and said defendants, the entire community has been developed, and at the present time there are about 500 persons residing in the subdivisions of Somerset, Drummond and Friendship Heights.

"That said defendants maintained said rate of fare between Somerset and Friendship Heights and points in the District of Columbia for twelve years without any change of rate, and by so doing have represented to these citizens and the public that said rate of fare was a reasonable one.

"That July 1, 1910, said defendants increased the rate of fare between said points to a cash fare of 5 cents, or a monthly commutation rate of \$1.73, from Somerset and Friendship Heights to the District line, and from there on to points in the District a fare of 5 cents, or tickets at the rate of six for 25 cents, with like fares in the opposite direction.

"That the rate of fare now charged between said points is unreasonable, excessive and unjust, for the service performed, and in violation of Section 1 of said act to regulate commerce.

"Wherefore the complainants pray that the defendants may be required to answer the charges herein, and after due hearing and investigation an order be made commanding the defendants to cease and desist from said violations of the act to regulate commerce; that the former rate of fare of 5 cents or one car ticket at the rate of six for 25 cents be prescribed between said points of Somerset and Friendship Heights and points in the District of Columbia, and for such other relief and further order as the commission may deem necessary in the premises."

Rules Prescribed by Indiana Commission for Change of Crews

Under date of May 3, 1911, the Railroad Commission of Indiana addressed the following circular to all interurban railways:

"The interurban railways whose lines extend from Indianapolis, Ind., to Louisville, Ky., have petitioned the Railroad Commission of Indiana to approve the following rule, to take the place of the existing rule on this subject. The commission after full consideration has granted the petition of said companies, and now recommends to all interurban railways in this State the adoption of the same rule, as follows:

"In case it becomes necessary either from an emergency or when provided for in the assignment of crews, or by permission from proper authority, for crews or any member of the crew to change off between the initial and terminal points, the persons being relieved must deliver to the ones relieving them all unfulfilled orders affecting the movement of their train. One member of the crew receiving the unfulfilled order must call the dispatcher at the nearest telephone and repeat same to him, initialing and timing the order in the same manner as when taking an original, and have the same read to him and signed by the other member of the crew. The dispatcher will O. K. order and note same on his order book, giving the time and name of the member of the crew repeating.

"In the event of the telephone line being down and the crew being unable to reach the dispatcher in a reasonable time they may proceed on the order delivered to them by the crew they relieved, who must know that the relieving crew thoroughly understands same. In the event of their proceeding without having reached the dispatcher they must endeavor so to do at each succeeding siding."

"Please advise that you will accept and act in accordance with this rule."

Annual Meeting of the Stone & Webster Club of the Northwest

The first annual meeting of the Stone & Webster Club of the Pacific Northwest was held recently in the Viking room of the Tacoma Hotel, Tacoma, Wash. About 200 officials and employees of Stone & Webster attended. Officers were elected as follows: Hugh A. Tait, attorney for Stone & Webster for the Northwestern district, Seattle, president; J. M. Wilmot, Seattle, claim agent of the Seattle Electric Company, secretary; A. W. V. Ford, Tacoma, auditor of the Tacoma Railway & Power Company, treasurer. Vice-presidents—E. H. O'Dell, claim agent of the Tacoma Railway & Power Company; C. W. Howard, attorney of the Whatcom County Railway, Light & Power Company; A. M. Chitty, sales manager of the Everett Railway, Light & Power Company; W. R. Locke, engineer of the Stone & Webster Engineering Corporation. Trustees—F. Dabney, comptroller of the Stone & Webster Corporation of the Northwest; K. C. Schluss, superintendent of power and equipment of the Tacoma Railway & Power Company; E. C. Allen, engineer of the Stone & Webster Engineering Corporation, and K. K. Carrick, general traffic agent of the Seattle-Everett Traction Company. Among the prominent Stone & Webster officials who were present as guests of the evening were A. S. Michner of Boston, comptroller of the Stone & Webster Corporation; Judge John A. Shackelford, president of the Tacoma Railway & Power Company; Judge H. S. Elliott, Seattle, attorney for the Stone & Webster Corporation, and H. A. Tait, the new president of the club. The retiring president, A. L. Kempster, superintendent of transportation of the Seattle Electric Company, presided as toastmaster.

Service Resumed in Bangor.—The Bangor Railway & Electric Company, Bangor, Maine, on May 6, 1911, partially resumed service which had been suspended since the fire of April 30, 1911.

Through Service Between Cleveland and Marion, Ohio.—The Cleveland, Southwestern & Columbus Railway has arranged to operate its cars over the Columbus, Marion & Bucyrus Railway between Marion and Bucyrus. Service to Bucyrus was established some time ago.

Uniforms for Assistant Division Superintendents.—The Detroit (Mich.) United Railway has decided to require the assistant superintendents of its various divisions to wear uniforms hereafter. This will lead to their ready identification by citizens and by public officials, and it is thought will aid them materially in such work as directing the employees in blockades and in handling extraordinarily heavy traffic.

Increase in Wages in Norfolk.—The Norfolk & Portsmouth Traction Company, Norfolk, Va., has announced that on July 1, 1911, it will increase the wages of motor-men and conductors who have been in its employ more than four years from 20 cents to 21 cents an hour. On May 1, 1911, the company presented a new uniform to

every motorman and conductor who had been in its employ more than four years.

Accidents in Pennsylvania in 1910.—The report of the Pennsylvania Railroad Commission for the year 1910 contains the following summary of persons killed and persons injured on the street railways of the State: Employees killed, 16; employees injured, 232; passengers killed, 18; trespassers killed, 27; others killed, 126; total, 187; employees injured, 232; passengers injured, 2,151; trespassers injured, 148; others injured, 1,585; total, 4,116.

Service Agreement in Shreveport, La.—An agreement has been entered into between the Shreveport (La.) Traction Company and its employees by which the men will be paid 21 cents per hour for the first six months, 22 cents for the second six months, 23 cents the second year, 24 cents the third year, 25 cents the fourth year and 26 cents thereafter. No run is to be less than nine hours and none more than ten hours. The agreement went into effect on May 1, 1911.

Willow Grove Park.—The summer season at Willow Grove Park, which is operated by the Philadelphia (Pa.) Rapid Transit Company, opens on May 27, 1911. The company has announced the following band and orchestra engagements for the season: Ohlmeyer and his Coronado Band, May 27 to June 10; the Theodore Thomas Orchestra, Frederick Stock, conductor, June 11 to July 1; Stewart's Boston Concert Band, July 2 to July 15; Russian Symphony Orchestra of New York, July 16 to Aug. 5; Leps and his orchestra, Aug. 6 to Aug. 19; Creatore and his band, Aug. 20 to Sept. 10.

To Divert Freight at Portland.—The Oregon Electric Railway and the United Railways, Portland, Ore., plan to route all eastbound freight originating in the Willamette Valley and in the territory between Portland and Tillamook Bay over the new Willamette River bridge without going through Portland and work it into trains in the Vancouver yards, thus eliminating the haul through Portland and avoiding congestion at the local terminals. A short connecting link will have to be built between Orenco on the Oregon Electric Railway's Forest Grove line to Helvetia on the United Railways.

Public Service Railway Not Required to Sell Tickets.—The Board of Public Utilities Commissioners of New Jersey have dismissed the petition asking that the Public Service Railway be compelled to resume the sale of tickets. The complaint sets forth that the carrying of tickets would be a convenience and would assist in the quick loading of cars. The company alleged that the printing and sale of tickets entailed a heavy expense and that the tickets are likely to be counterfeited. The company exhibited samples of devices to register fares in boxes and explained that the mechanism could be worked only by the use of coins.

P. A. Y. E. Cars in Milwaukee.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., placed in service in Milwaukee on Sunday, April 30, 1911, fifty-two of the 100 pay-as-you-enter cars ordered some time ago from the St. Louis Car Company under license from the Pay-As-You-Enter Car Corporation. The cars are all of the double-end, double-truck type and are 59 ft. long over all. They are all equipped with Hedley anti-climbers. Several of the cars were stationed in different parts of the city before the service was begun and the public was invited to inspect them and become acquainted with their workings.

Long Island Railroad Record.—On May 8, 1911, the Long Island Railroad issued a statement to the effect that more than one-third of a billion passengers had been carried in eighteen years and a half and not one killed as the result of train accident. The official figures show that this road has carried exactly 335,148,826 passengers since June 1, 1893. The density of the traffic is shown by the fact that the number of passengers carried one mile since 1893 is 4,904,736,994. In 1900 the number of passengers carried was 12,387,649. Five years later it was 18,199,162; in 1907 it was approximately 24,000,000; in 1909 more than 27,000,000, and last year it reached 31,000,000.

Freight Service Between Philadelphia and West Chester.—Announcement has been made that the Philadelphia (Pa.)

Rapid Transit Company and the Philadelphia & West Chester Electric Railway have entered into a contract whereby they will operate a joint freight service from Market Street ferry, Philadelphia, to West Chester. According to the plans freight from Philadelphia may be shipped on cars of the Philadelphia Rapid Transit Company to the terminal station at Sixty-third and Market Streets, where it will be transferred to cars of the Philadelphia & West Chester Electric Railway, by which the freight will be carried and distributed as far as West Chester. The process will be reversed on freight coming into Philadelphia from West Chester and intermediate points. Plans have been drawn for a freight transfer station at Sixty-third Street and Market Street.

Report of Interborough Rapid Transit Company Voluntary Relief Department.—The report of the Interborough Rapid Transit Company Voluntary Relief Department, composed of employees of the Interborough Rapid Transit Company, New York, N. Y., for the year ended Dec. 31, 1910, was made public recently. The statement shows that there was a net increase of 434 in membership during 1909, and that about 57 per cent of the employees of the company are members of the association. During 1910 the medical examiners made 4436 calls on disabled members, and examined for admission to the fund 2513 applicants. The operating expenses of the association from its organization to Dec. 31, 1910, paid by the company, amounted to \$64,482. During 1910 a total of 77 death claims were paid, amounting to \$36,283. Thirty-two members who have been disabled one year were drawing half-rate benefits when the report was made. The receipts previously reported were \$204,840, the total receipts were \$286,485, the total payments were \$223,556, and the balance of cash on hand at the close of business on Dec. 31, 1910, was \$63,569.

"No-Seat-No-Fare" Ordinance in San Francisco.—At a meeting of the Board of Supervisors of San Francisco on April 24, 1911, Supervisor Walsh introduced a no-seat-no-fare ordinance and had it referred to the Public Utilities Committee. The bill as sent to the committee follows: "Section 1—It shall be the duty of any person or corporation operating a street railway within the limits of the city and county of San Francisco between the hours of 6 and 9 o'clock in the forenoon and between the hours of 4:30 and 7 o'clock in the afternoon to furnish and operate a sufficient number of cars to provide a seat for every person from whom a fare is demanded. Section 2—No person desiring transportation shall be kept waiting for a car longer than 10 consecutive minutes, except in cases of accident resulting in the suspension of traffic. Section 3—Any person or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than \$50 nor more than \$500, or by imprisonment in the county jail for a period of not more than six months, or by both such fine and imprisonment."

School Tickets in New Jersey.—The Board of Public Utility Commissioners of New Jersey has issued the following order restoring the sale of school children's tickets by the Public Service Railway and calling for a public hearing on the subject: "The Public Service Railway having discontinued the sale of tickets at a reduced rate for the transportation of children to and from school over its several lines, and such discontinuance resulting in the increase of the then existing rate for the transportation of children to and from school, the Board of Public Utility Commissioners, of its own initiative, hereby calls a hearing upon the question whether such increased rate is just and reasonable, and hereby fixes May 17, 1911, at the hour of 10 o'clock in the forenoon of such day, at the court house in Newark, as the time and place of such hearing. And said board hereby orders the said Public Service Railway, pending such hearing and determination therein, to suspend the said increased rate for the transportation of children to and from school for the period of one month from the date hereof, and during the period of such suspension to continue the sale of tickets at the rate prevailing at the time of such increase to such children for such transportation. And it is further ordered that this order be forthwith served by the secretary of the board upon the Public Service Railway."

Personal Mention

Mr. Charles Winter has resigned as master mechanic of the Rockford & Interurban Railway, Rockford, Ill.

Mr. C. Q. Richmond, general manager of the Berkshire Street Railway, Pittsfield, Mass., has also been elected vice-president of the company.

Mr. A. S. May, treasurer of the Connecticut Company, New Haven, Conn., has been elected treasurer of the Berkshire Street Railway, Pittsfield, Mass., to succeed Mr. L. Candee.

Mr. John A. Shackelford, who was recently appointed counsel for the Tacoma Railway & Power Company, Tacoma, Wash., has been elected president of the company to succeed Mr. Russell Robb.

Mr. Edwin Main has resigned as chief engineer of the Rockford & Interurban Railway, Rockford, Ill., to become city engineer of Rockford, a position which he held prior to engaging in electric railway work.

Mr. G. A. de Hasseth, who has been connected with the Seattle (Wash.) Electric Company, has been appointed engineering superintendent of the railway lines of the Galveston (Tex.) Electric Company.

Mr. A. M. Hunt has been appointed by the Board of Public Works of San Francisco, Cal., as consulting engineer to direct the reconstruction of the Geary Street, Park & Ocean Railway as a municipal enterprise.

Mr. F. V. Skelley has been appointed assistant superintendent of the Moline, East Moline & Watertown Railway, Moline, Ill. Mr. Skelley was formerly connected with the Western Electric Company and the Tri-City Railway, Davenport, Ia.

Mr. F. I. Annabel, who has been general superintendent of the Arizona & Swansea Railroad, Swansea, Ariz., has been appointed assistant superintendent of the north division of the Pacific Electric Railway to succeed Mr. J. C. McPherson.

Mr. F. H. Cutshall, formerly auditor and purchasing agent of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., has been appointed general manager of the Lima (Ohio) Gas Light Company.

Mr. James E. Burr has been appointed assistant claim agent of the Eastern Pennsylvania Railways, Pottsville, Pa. Mr. Burr became connected with the company as a clerk in the transportation department in October, 1906. Prior to entering the service of the Eastern Pennsylvania Railways Mr. Burr served for two and one-half years in the transportation department of the Public Service Corporation of New Jersey at Camden.

Mr. C. T. Chapman, for the last six years traffic manager of the Toledo & Western Railroad, Toledo, Ohio, a subsidiary of the Toledo Railways & Light Company, has resigned to accept a similar position with the Interurban Railway, Des Moines, Ia. Mr. Chapman began his railroad career as a telegraph operator and agent of the Clover Leaf Railroad and later served in the general passenger and freight department of that company as a clerk.

Mr. C. S. Mellen, president of the New York, New Haven & Hartford Railroad and the Connecticut Company, New Haven, Conn., has been elected president of the Berkshire Street Railway to succeed Mr. L. S. Storrs, president of the New England Security & Investment Company, Springfield, Mass., the stock of the Berkshire Street Railway having been acquired by the New York, New Haven & Hartford Railroad by authority of the Massachusetts Legislature in June, 1910.

Mr. Fred A. Stowe has resigned as assistant to Mr. T. E. Mitten, president of the Chicago (Ill.) City Railway, having successfully concluded the work which devolved upon him in connection with the rehabilitation of the physical property of the company. Mr. Stowe was born in Chicago on Aug. 29, 1872, and was graduated from the collegiate department of the University of Iowa in 1892. Later he took a post-graduate course in political economy and political science at the University of Chicago and in law at Northwestern University, Evanston, Ill. After leaving college Mr.

Stowe became connected with the *Chicago Tribune*. Subsequently he served the *Chicago Chronicle* for ten years as political editor. Mr. Stowe became connected with the Chicago City Railway as assistant to the president in the fall of 1907.

Mr. Charles J. Davidson has resigned as chief engineer of power plants of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to become associated with Mr. Fay Woodmansee as consulting engineer in Chicago. Mr. Davidson became connected with the Milwaukee Electric Railway & Light Company ten years ago. He was formerly chief engineer of the Sioux City (Ia.) Traction Company. While in Milwaukee he superintended the construction of the Commerce Street plant, the rebuilding of the Oneida Street plant, the creation of the plant in the public service building occupied by the company for offices, the reconstruction of the Racine plant and the building of the various substations. Mr. Davidson was also superintendent of the Central Heating Company, Milwaukee. He is a member of the American Society of Mechanical Engineers, the American Society of Naval Engineers and other scientific bodies. He organized and was one of the first presidents of the Milwaukee branch of the A. S. M. E.

Mr. Thomas A. Cross, general manager of the United Railways & Electric Company, Baltimore, Md., was also elected second vice-president of the company at the recent annual meeting of the company. Mr. Cross is a native of Baltimore and has been connected with the street railways in that city since a young man. His first work was with the North Avenue Electric Railway, the service of which he entered in 1890. This company was succeeded by the Lake Roland Elevated Railway and Mr. Cross was advanced until in 1893 he was selected by the Baltimore Traction Company to take charge of its overhead work, motor equipment and power stations. When this company was consolidated with the City & Suburban Railway as the Consolidated Electric Railway Mr. Cross' duties were further increased and in 1899, when all the lines were merged as the United Railways & Electric Company, Mr. Cross was appointed to the position of superintendent of overhead work, cables, etc. In April, 1907, he was appointed general manager of the company.

Mr. J. H. Pardee, operating manager of J. G. White & Company, Inc., New York, N. Y., has been elected a vice-president and director of that company and will continue to have charge of the operating department as formerly. Mr. Pardee has been connected with J. G. White & Company, Inc., since January, 1907. He was born at Lysander, N. Y., in 1867, and was graduated from Hamilton College in 1889. In 1891 he was admitted to the bar of New York and began practice as a member of Petrie, Zimmerman & Pardee, with whom he continued until 1898. Meanwhile Mr. Pardee perfected the reorganization of the railway lighting and gas company at Canandaigua, N. Y., and was appointed general manager of the Ontario Light & Traction Company and the Canandaigua Gas Light Company. In 1898 he was appointed general manager of the Rochester & Eastern Rapid Railway and continued in this position until he became connected with J. G. White & Company, Inc. Mr. Pardee is a member of the board of directors and an officer in most of the companies operated by J. G. White & Company, Inc. Mr. Pardee has been connected with the Street Railway Association of the State of New York as an officer since 1903. He was secretary of the association from November, 1906, until June, 1910, when he was elected president of the association.

OBITUARY

Sidney M. Bamberger, vice-president and general manager of the Salt Lake & Ogden Electric Railway, Salt Lake City, Utah, died on May 9, 1911, in Baltimore, where he underwent an operation.

Charles J. Larson, chief engineer of the power stations of the Union Electric Company, Dubuque, Ia., since 1908, is dead. Mr. Larson was born in River Falls, Wis., on March 2, 1872, and was graduated from Rose Polytechnic Institute at Terre Haute, Ind., in 1900, as a mechanical engineer. He was connected with the Allis-Chalmers Company for seven years.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Colorado Interurban Railroad, Denver, Col.—Application for a charter has been made in Colorado by this company to build an electric railway in the northern part of Colorado to connect Denver, Fort Lupton, Greeley, Eaton, Ault, Pierce, Fort Collins, Firestone, Longmont and Idaho Creek. Surveys have been completed and right-of-way secured and construction will begin within three months. The line will carry passengers and freight. Capital stock, \$6,000,000. Incorporators: E. Armour, Charles H. Pierce, Irving Hale, James Leonard, O. S. Storrs, E. B. Reaser, D. E. Young, James W. Owen, William H. Davis, Samuel F. Eaton, A. H. Williams, Clarkson N. Guyer and Emil J. Reithman. [E. R. J., Aug. 14, '11.]

***United Public Utilities Company, New Orleans, La.**—Application for a charter has been made in Louisiana by this company to own and operate electric railways. Capital stock, \$1,257,600. Directors, Lynn H. Dinkins, Silas I. Hyman, Max Schwabacher, S. B. Sneath, A. C. Wuerpel, S. Wexler, P. H. Saunders and Charles P. Fenner.

North Carolina Interurban Railway, Raleigh, N. C.—Chartered in North Carolina to build an electric railway from any point on the Atlantic seaboard to Asheville and to connect Charlotte, Gastonia, Dallas, Cherryville, Shelby, Boiling Springs, Rutherfordton, Chimney Rock, Hickory Nut Gap, Fairview and Asheville. This company was formerly known as the Isothermal Traction Company, Rutherfordton. Capital stock, \$100,000, with the right to increase it to \$10,000,000. Incorporators: John C. Mills, L. L. Jenkins, W. A. Harrill, J. T. Gardner, M. L. Mauney, P. B. Babington, E. L. Wilson, J. Y. Hamrick, K. S. Finch and George L. McKay, Rutherfordton. [E. R. J., Dec. 17, '10.]

Northumberland County Traction Company, Sunbury, Pa.—Chartered in Pennsylvania to build an interurban railway to connect the electric lines in the counties of Northumberland, Union, Snyder, Montour, Columbia, Lycoming, Luzerne and Schuylkill. J. F. Schaffer, Sunbury, and John C. Johnson, Philadelphia, are the solicitors. [E. R. J., April 15, '11.]

***Washington & Old Dominion Railroad, Richmond, Va.**—Chartered in Virginia to build an electric railway from a point in Virginia opposite the District of Columbia to Winchester, Va., via Alexandria, Fairfax, Loudoun, Clarke and Frederick Counties. Maximum capital stock, \$3,000,000. Minimum, \$1,000,000. Headquarters: Rosslyn. Officers: Charles M. Henckley, president; W. B. Emmett, vice-president; George Howard, treasurer, and Charles E. Howe, secretary, all of Washington, D. C.

***Federal Electric Utilities Corporation, Richmond, Va.**—Incorporated in Virginia. Capital stock, \$6,000,000. Headquarters: Mutual Building, Richmond. Officers: E. Gregg Latimer, president; Dennie K. Keller, treasurer, and John E. Marsh, secretary, all of New York City, N. Y.

***Fairmont, Clarksburg & Grafton Railway, Grafton, W. Va.**—Incorporated in West Virginia to build a 30-mile electric railway to connect Grafton, Fairmont and Clarksburg. Construction will begin at once. Headquarters: Grafton. Capital stock, \$500,000. Officers: Charles F. Sutherland, Morgantown, president; John H. Roberts, general manager; C. Lee Reynolds, Pittsburgh, Pa., vice-president; A. B. Corder, Grafton, treasurer, and Charles C. Benton, Pittsburgh, Pa., secretary.

FRANCHISES

Berkeley, Cal.—The Oakland Traction Company has received a franchise from the City Council to extend its Euclid Avenue line north to the hills and also for the extension of the Bay View Avenue line east to Euclid Avenue, in Berkeley.

Corona, Cal.—The Pacific Electric Railway will ask the Board of Supervisors for a franchise to build its tracks from Arlington, the terminal of the Riverside line, to Corona.

Modesto, Cal.—The San Joaquin Valley Electric Railway

has received a twenty-five-year franchise from the Trustees to build a single or double-track railway between Modesto and Stockton.

Gary, Ind.—The Calumet United Railways, Indianapolis, has received a fifty-year franchise from the Board of Public Works to build its tracks through Gary. This line will connect Michigan City, Gary, Chesterton, Aetna, East Chicago and Hammond. James A. Slattery, Philadelphia, is interested. [E. R. J., April 29, '11.]

Mt. Carmel, Ind.—The Evansville, Mt. Carmel & Olney Traction Company, Evansville, has received a franchise from the City Council to build its tracks through Mt. Carmel. This projected 65-mile electric railway will connect Mt. Carmel, Highland, Darmstadt, Cynthiana, Owensville, Lancaster, Friendsville, Berryville and Olney. It is expected to begin construction shortly. E. Q. Lockyear, secretary. [E. R. J., Jan. 14, '11.]

Des Moines, Ia.—The Des Moines City Railway has asked the City Council for a franchise to rebuild and double-track some of its lines in Des Moines.

***Frankfort, Ky.**—Local interests have secured a franchise from the Council to build an electric railway from the forks of the Elkten River to Frankfort, a distance of six miles.

New Orleans, La.—The New Orleans Railway & Light Company has asked the City Council for a fifty-year franchise to build a double-track line on Claiborne Street, from Napoleon Avenue to the upper portion of New Orleans.

North Adams, Mass.—The Berkshire Street Railway, Pittsfield, has asked the Councils for a franchise to extend its line in North Adams to the Red Mills in Clarksburg and from there to Wilmington, Vt.

Ocean City, N. J.—The Ocean City Electric Railway has asked the Council for a franchise to extend its tracks on Eighteenth Street from Bay Avenue to Centre Avenue, and on Ninth Street from Wesley Avenue to the boardwalk in Ocean City.

Buffalo, N. Y.—The International Traction Company, Buffalo, has received a franchise from the Board of Aldermen to extend its tracks on Abbott Road, between Cazenovia Street and the city line in Buffalo.

Fremont, Ohio.—The Lake Shore Electric Railway, Sandusky, has asked the County Commissioners for a twenty-five-year extension of its franchise to build its railway through Fremont County. The company agrees to build a new bridge over the Sandusky River at Fremont, to cost \$25,000, if given the extension of time.

New Castle, Pa.—The New Castle & Beaver Falls Street Railway has asked the Council for another six months' extension of time in which to begin work on its proposed 22-mile electric railway to connect New Castle and Beaver Falls. [E. R. J., Dec. 31, '11.]

Philadelphia, Pa.—The Philadelphia Rapid Transit Company has received a franchise from the Select Council to extend its tracks on Bustleton Avenue to the county line road and to extend its lines on Red Lion Road to the Montgomery County line in northern Philadelphia.

Wilkes-Barre, Pa.—The Wilkes-Barre & Wyoming Valley Traction Company has asked the County Commissioners for a franchise to enlarge the West Market Street Bridge and to build a double track across the bridge in Wilkes-Barre.

Chattanooga, Tenn.—C. E. James and associates have received a franchise from the City Council to build an electric railway over the principal street in Chattanooga. Work must be begun within six months. [E. R. J., April 22, '11.]

Gallatin, Tenn.—The Nashville-Gallatin Interurban Railway, Gallatin, has received a franchise from the Board of Aldermen to build its tracks over certain streets in Gallatin. This 30-mile line will extend from Nashville to Gallatin. H. H. Mayberry is interested. [E. R. J., Feb. 25, '11.]

Centralia, Wash.—The Chehalis & Cowlitz Railroad, Chehalis, Ore., has asked the City Council for a fifty-year franchise to build its tracks in Centralia. This railway will connect Chehalis and Cowlitz, Ore., and Centralia, Wash. Geo. A. Robinson, Chehalis, is interested. [E. R. J., Feb. 4, '11.]

TRACK AND ROADWAY

Argenta (Ark.) Railway.—This company has been authorized to build a bridge over the Arkansas River, connecting Little Rock and Argenta, to be used as a street car bridge.

***Harrisburg, Ark.**—L. D. Freeman and J. D. Gant are preparing plans for building a 50-mile electric railway from Marked Tree to Harrisburg and Newport, Ark.

Los Angeles (Cal.) Railway.—This company has begun the reconstruction of its tracks on Broadway and on Central Avenue, in Los Angeles.

Sacramento Valley Westside Electric Railway, Sacramento, Cal.—This company, which is projecting a 50-mile railway between Red Bluff, Willows, Woodland, Colusa and Redding, is having surveys made, financial backing secured, and has organized by electing the following officers: C. L. Donohoe, Willows, president; W. N. Woodson, Corning, vice-president; J. F. Campbell, Colusa, treasurer, and E. L. Sisson, Red Bluff, secretary. [E. R. J., May 6, '11.]

Peninsular Railway, San José, Cal.—An extension will be built by this company from Santa Clara to Meridan Corners in the near future.

Groton & Stonington Street Railroad, New London, Conn.—A petition filed with the Secretary of State by this company asking for an amendment to its charter for an extension of its line in Mystic to Old Mystic, also an extension in Mystic, has been granted and a bond issue of \$100,000 authorized.

Boise & Interurban Railway, Ltd., Boise, Idaho.—Plans are being made by this company to build an extension from Boise to Roswell, via the Deer Flat country.

East St. Louis & St. Louis Traction Company, East St. Louis, Ill.—This company has been organized in the interests of the East St. Louis Railway, and proposes to construct some track in East St. Louis to connect with the new municipal bridge being built by the city of St. Louis. The details have not yet been completed, but it is probable that the new line will run for several blocks over the tracks of the East St. Louis Railway.

Gary, Hobart & Eastern Traction Company, Gary, Ind.—Contracts will be let about May 20 by this company for building a 5-mile line from Hobart to Broadway, Gary. W. P. Hood is interested. [E. R. J., April 1, '11.]

Arkansas City, Wellington & Northwestern Railway, Wellington, Kan.—This company advises that this railway will be operated by steam and not by electricity, as stated in the *ELECTRIC RAILWAY JOURNAL* of April 22, 1911. George H. Hunter, president.

***Owensboro, Ky.**—E. F. Wheaton plans to build a 51-mile electric railway to connect Owensboro, Madisonville, Utica and Calhoun.

Bangor Railway & Electric Company, Bangor, Maine.—This company will soon relay some of its tracks in Bangor with heavier rails.

Portland, Gray & Lewiston, Lewiston, Maine.—Work has been resumed by this company on its extension between Portland and Lewiston.

Towson & Cockeysville Electric Railway, Cockeysville, Md.—J. T. Harlow Contracting Company has been awarded the contract by this company to build its 8-mile electric railway between Towson and Cockeysville, via Lutherville, Timonium, Texas and Marble Hill. Construction has been begun. J. Alexis Shriver, Belair, president. [E. R. J., April 29, '11.]

Miller's River Street Railway, Orange, Mass.—This company advises that it will begin construction as soon as it receives franchises for its 14-mile electric railway to connect Miller's Falls, Erving, Farley, West Orange and Orange. The company will purchase power. Daniel P. Abercrombie, Jr., is interested. [E. R. J., May 6, '11.]

Duluth (Minn.) Street Railway.—This company has begun to rebuild its Woodland Park line with 80-lb. rails.

Metropolitan Street Railway, Kansas City, Mo.—Work has been begun by this company on the extensions of its Chelsea Street and Eighteenth Street lines in Kansas City.

Springfield & Western Railroad, Springfield, Mo.—This company is said to have awarded the contract for building its 60-mile electric railway to connect Joplin and Springfield via Pierce City, Paris Springs, Mount Vernon, Monett, Wentworth, Plano and Diamond. The surveys for a branch line to extend from Paris Springs to Joplin via Carthage, Carterville and Webb City will be completed within the

next two months. Mortimer M. Hollenback, Springfield, chief engineer. [E. R. J., April 8, '11.]

Columbia Falls, Mont.—Right-of-way and financial backing have been secured as far as Big Fork to build a proposed electric railway to connect Columbia Falls, Polsen, via Big Fork. James A. Talbot is said to be interested. [E. R. J., Jan. 7, '11.]

Helena Light & Railway Company Helena, Mont.—The directors of this company have authorized a bond issue of \$100,000, to be used to build a double-track extension from Helena to the fair grounds.

Suffern (N. Y.) Railway.—Maher & Ackerman are said to have been awarded the contract by this company for building an electric railway from Suffern, N. Y., to Mahwah, N. J. Work will begin at once. H. H. Parmlee, Paterson, N. J., is interested. [E. R. J., Sept. 17, '10.]

North Carolina Public Service Company, Greensboro, N. C.—Work will soon be begun by this company on three extensions. One branch will be the extension of the Lindley Park line in Greensboro, a distance of 3 miles, to the Masonic Home and Pomona cotton mills. Another extension will connect with the line on Elm Street and extend along Mendenhall Street to Spring Garden and connect with the Lindley line near the State Normal & Industrial College. A third extension will be from the present line at the intersection of Church Street with Elm Street, along North Elm Street to a point beyond the city limits near the proposed Greensboro Country Club.

Grand Forks (N. D.) Street Railway.—This company is preparing to extend its lines over a mile from Grand Forks into East Grand Forks, Minn. This will include the reinforcing of a bridge across the Red River.

Ohio Electric Railway, Cincinnati, Ohio.—This company has completed and placed in operation a new bridge across the Four-Mile Creek at Ohlenger. It will be used exclusively by this company.

Hocking-Sunny Creek Traction Company, Nelsonville, Ohio.—Charles Carr, Sugar Grove, has been awarded the contract by this company to deliver before August 30,000 ties and 600 poles, to be used for a 3-mile extension from Nelsonville to Athens. A meeting of the stockholders will be held on May 22 to consider the completion of the line to Athens and extending it to Lancaster, also the extension of a line from Chauncey to Glouster. It is expected to increase the capital stock to \$900,000. Bonds to the amount of \$200,000 have been sold.

Sand Springs Interurban Railway, Tulsa, Okla.—This company has begun the construction of its 6-mile electric railway from Sand Springs to Tulsa. Sixty-five-pound rails will be used. W. H. Henderson, First National Bank, Tulsa, chief engineer. [E. R. J., March 4, '11.]

Guelph (Ont.) Radial Railway.—Bids are being received by this company for building about a mile of new track in Guelph.

Niagara Falls, Welland & Lake Erie Railway, Niagara Falls, Ont.—Hendrick H. Leach & Company have been awarded the contract by this company to build an extension through Welland. Work has been begun. The line will connect Niagara Falls, Welland and Port Colborne, with branches to Port Dover on Lake Erie, and to Fort Erie on the Niagara River, opposite Buffalo. The Ontario Power Company will furnish the power. C. J. McLaughlin, Toronto, Ont., is interested. [E. R. J., March 4, '11.]

Indiana County Street Railway, Indiana, Pa.—Right-of-way is being secured by this company for building an extension from Clymer to Dixonville. A further extension of four miles from Dinonville to Marion Centre is being considered.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—Surveys have been completed, financial backing secured and contracts will be awarded by this company shortly for building its 22-mile electric railway to connect Ephrata, Lincoln, Clay, Hopeland, Schaeffertown, Kleinfetterville, Reisterville and Lebanon. M. H. Shirk, Lincoln, secretary. [E. R. J., April 29, '11.]

Philadelphia & Western Railway, Philadelphia, Pa.—A contract has been awarded to the Keystone State Construction Company by this company for grading and masonry

work for its double-track extension between Villanova and the Schuylkill River. The Pennsylvania Steel Company has the contract for building the bridge over the Schuylkill River, which with its viaduct approaches on each side will be 3800 ft. long and about 40 ft. high.

West Penn Railways, Pittsburgh, Pa.—This company has ordered 500 tons of steel rails from the Carnegie Steel Company.

Pottstown & Phoenixville Railway, Pottstown, Pa.—This company advises that it has begun construction and will buy material for 6 miles of track for its 14-mile electric railway to connect Pottstown, Sanatoga, Linfield, Spring City, Royersford, Parkersford, Phoenixville and Valley Forge. The company will operate twenty-nine cars. The power stations will be located at Pottstown and Phoenixville, and the repair shops at Sanatoga and Bonnie Brae. Capital stock, authorized, \$800,000; capital stock, issued, \$374,000. Bonds, authorized, \$800,000; bonds, issued, \$230,000. Officers: George N. Malsberger, Pottstown, president; C. Taylor Leland, 2215 Land & Title Building, Philadelphia, secretary, treasurer and purchasing agent; Harry F. Swinehart, Pottstown, general manager and superintendent, and Charles Johnson, Pottstown, electric and chief engineer. Headquarters, 2215 Land & Title Building, Philadelphia, Pa. [E. R. J., April 20, '11.]

Scranton & Binghamton Traction Company, Scranton, Pa.—Work has been begun by this company on its 62-mile electric railway between Scranton and Binghamton, via Brooklyn, Hart Lake, New Milford, Montrose and Factoryville. W. L. Connel, Scranton, president. [E. R. J., Feb. 18, '11.]

Somerset (Pa.) Railway.—It is reported that this company has secured capital and is now making surveys for its 11-mile electric railway between Somerset and Rockwood. Contracts will be awarded about June 15. J. A. Berkey, Somerset, president. [E. R. J., Dec. 3, '10.]

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesburg, Pa.—This company has completed and placed in operation its extension from Pen Mar to Highfield.

Sioux Falls (S. D.) Traction Company.—This company will expend \$20,000 extending its tracks to the plant of the Morrill Packing Company.

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—H. H. Mayberry, president of this company, announces that plans and specifications will be ready within thirty days and work will be begun next month for building this 30-mile railway between Gallatin and Nashville. [E. R. J., April 29, '11.]

***Johnson City, Tenn.**—Plans are being considered for organizing a company with a capital stock of \$100,000 to build a 55-mile electric railway between Johnson City and Newport, via Conkling.

***Dallas-Denton Interurban Railway, Dallas, Tex.**—Plans are being considered for the organization of this company to build an electric railway between Dallas and Denton, via Grapevine and Irving. Much of the right-of-way has been promised and some financial backing secured. Capital stock, \$1,000,000. Among those interested are: Alvin C. Owsley, Denton; Curtis Hancock and J. B. Nelson, Western Heights; E. A. Gebbard, Irving, and P. B. Hunt, Dallas.

Houston (Tex.) Electric Railway.—This company has completed and placed in operation its new Leeland Avenue line in Houston.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company has completed and placed in operation its extension to Fairview Heights.

Seattle, Wash.—Homer Crosby, 423 Hinckley Building, Seattle, is said to have been awarded the contract for building a 7-mile electric railway from Seattle to Lake Burien. F. E. Sander, Seattle, is interested. [E. R. J., Dec. 17, '10.]

Fairmont & Pittsburgh Railway, Fairmont, W. Va.—Contracts will be awarded during May by this company for building the first section of its 13-mile double-track railway to connect Waynesburg and Blacksville. Work will begin at Blacksville, on the State line between Pennsylvania and West Virginia. From Blacksville the company, under different charters, has built and is operating a railway to Fairmont and Morgantown. Right-of-way has been secured

from Waynesburg to Bridgeville, where a connection is to be made with the Wabash-Pittsburgh Terminal Company, which is to be electrified into the Liberty Avenue terminal. J. F. Seatty, general manager. [E. R. J., July 16, '10.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—It is reported that this company will soon build a new station at New Westminster. The cost is estimated to be about \$30,000.

Cincinnati, Louisville, Lexington & Maysville Traction Company, Dry Ridge, Ky.—Plans are being considered by this company for building a union depot at Dry Ridge. W. T. S. Blackburn, Dry Ridge, president. [E. R. J., May 11, '11.]

Rockland, Thomaston & Camden Electric Railway, Rockland, Maine.—This company has fitted up a new waiting room at Thomaston, Me., at the terminus of the main line, and close to the terminus of the extension to Warren.

Old Colony Street Railway, Quincy, Mass.—It is reported that plans are being considered for the construction of a freight depot on Washington Street, in Quincy, by this company.

Detroit (Mich.) United Railways.—This company has purchased the old armory on Huron Street, in Ann Arbor, next to its present waiting room, and some time during the summer will build an up-to-date interurban station.

Public Service Railway, Newark, N. J.—F. D. Hyde has been awarded a contract by this company for building its new carhouse on the north side of Springfield Avenue, near Fifty-third Street, Newark. The structure will be 200 ft. x 362 ft., and of brick, steel and concrete construction. It will include an office building and repair shops. The cost is estimated to be \$150,000. [E. R. J., Jan. 14, '11.]

Richmond & Henrico Railway, Richmond, Va.—An addition will be built by this company to its brick carhouse on Government Road, between Gillies Creek and Thirty-sixth Street, in Richmond. The cost is estimated to be about \$5,000.

Greenville Railway & Light Company, Greenville, Tex.—This company has about completed its carhouse on North Walnut Street, in Greenville. [E. R. J., Dec. 31, '10.]

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company has placed an order for a new electrical unit to cost \$10,500 at Lake Buntzen. The hydraulic energy will be generated by means of a watershed for which the contract has been awarded to McDougall & Company, while the generator will be supplied by the Canadian General Electric Company.

Minneapolis, St. Paul, Rochester & Dubuque Traction Company, Minneapolis, Minn.—It is reported that this company will build its new power house on Twenty-sixth Street, in South Minneapolis, between the tracks of the river division and those of the Iowa & Minnesota division. The cost is estimated to be about \$100,000.

St. Paul Southern Electric Railway, St. Paul, Minn.—Plans are being considered by this company for building new power houses at Hastings and at Lake City. W. L. Sontag, 810 Metropolitan Building, St. Paul, general manager. [E. R. J., April 15, '11.]

Tidewater Power Company, Wilmington, N. C.—This company will install additional machinery, including a 400-hp boiler, gas-plant improvements, etc. A. B. Skelding, Wilmington, purchasing agent.

Dayton & Troy Electric Railway, Dayton, Ohio.—This company will build additions to its power house in Tippicanoe instead of building a new power house at Tipp City. The plant will be used jointly by the Dayton & Troy Electric Railway and the Oakland Street Railway.

Oakland Street Railway, Dayton, Ohio.—Plans are being considered by this company for building additions to its power house in Dayton.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has placed smoke consumers in service at its power house in Knoxville.

Manufactures & Supplies

ROLLING STOCK

Oakland (Cal.) Traction Company is reported to be in the market for fifteen cars.

Schenectady (N. Y.) Railway, it is reported, will soon close contracts for twenty-four new cars.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., is reported to be in the market for twenty-five new cars.

Connecticut Company, New Haven, Conn., has ordered two 41-ft. express car bodies from the Wason Manufacturing Company.

Jersey Central Traction Company, Keyport, N. J., is in the market for five pairs of second-hand Brill 27 G-1 standard gage trucks.

Altoona & Logan Valley Electric Railway, Altoona, Pa., has ordered five single-truck pay-within motor cars from the Cincinnati Car Company.

Des Moines (Ia.) City Railway has ordered twenty 28-ft. 10-in. closed motor car bodies mounted on Brill 22-E trucks from the American Car Company.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has ordered one single-truck centrifugal sprinkler car body from The J. G. Brill Company.

Texarkana Gas & Electric Company, Texarkana, Ark., has ordered three 21-ft. semi-steel cars with turtle-back roofs from the St. Louis Car Company.

Benton Harbor & St. Joseph Railway & Light Company, Benton Harbor, Mich., has ordered eight Brill 27-M.C.B.-2 trucks from the G. C. Kuhlman Car Company.

People's Street Railway, Nanticoke, Pa., has ordered two 28-ft. semi-convertible motor car bodies complete with Brill 27 G-1 trucks from The J. G. Brill Company.

Saginaw Valley Traction Company, Saginaw, Mich., has ordered four 20-ft. vestibuled car bodies with trucks and seven 22-ft. vestibuled car bodies with trucks from the G. C. Kuhlman Car Company.

Comestoga Traction Company, Lancaster, Pa., has ordered three 30-ft. 8-in. closed vestibule motor car bodies, six Brill 27-M.C.B.-1 trucks and three 30-ft. 8-in. steel underframes from The J. G. Brill Company.

Boston (Mass.) Elevated Railway has ordered twenty motor and twenty trailer trucks from the Baldwin Locomotive Works. The motor trucks are to be Baldwin class 72-30-A and the trailer trucks are Baldwin class 66-30-T, both of the M. C. B type.

Atlantic Coast Electric Railway, Asbury Park, N. J., noted in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, as having ordered three 28-ft. closed vestibule motor cars from The J. G. Brill Company, has decided upon the following details:

Seating capacity	40	Curtain material...	Pantasote
Bolster centers, length...	17 ft.	Gears and pinions....	West.
Length of body.....	28 ft.	Gongs	Dedenda
Over vestibule	37 ft.	Hand brakes.....	vertical shaft
Width over sills....	8 ft. 2 in.	Headlights	Kirby-Neal
Over all	8 ft. 4 in.	Motors,	
Body	wood	West. 12-A-4, outside-hung	
Headlining	birch veneer	Registers	Sterling
Roof	monitor deck	Seats	Brill "Winner"
Axles	Brill	Springs	Brill
Bumpers	Brill angle iron	Trolley base	Union
Car trimmings....	solid bronze	Trucks	Brill 27 G-1
Couplers	Brill	Ventilators	Brill
Curtain fixtures...Cur. S. Co.		Wheels	33 in. cast iron

TRADE NOTES

Robert T. Lozier has become connected as engineer with the firm of Kountze Brothers, bankers, of New York.

Detroit Steel Products Company, Detroit, Mich., has moved its New York offices from 2 Rector Street to 225 Fifth Avenue.

Western Lumber & Pole Company, Denver, Col., has moved its offices from the Charles Building to the new Electric Building, Denver.

Indianapolis Brass Company, Indianapolis, Ind., has appointed the Southern Railway Supply Company, St. Louis, Mo., agents to handle its overhead line material.

Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., has appointed W. T. Hays general superintendent of its St. Louis plant, to succeed F. G. Dunbar, resigned.

Sprague Electric Company, New York, N. Y., has moved its Boston office from the Weld Building to 201 Devonshire Street, where larger floor space has been secured.

Pittsburgh Testing Laboratory, Pittsburgh, Pa., has moved into its new five-story office and laboratory building at Seventh Avenue and Redford Avenue, Pittsburgh.

General Electric Company, Schenectady, N. Y., at the annual meeting of its stockholders, elected M. F. Westover, secretary, a director to succeed C. P. Hamilton. Other directors were re-elected.

Beck Automatic Electric Safety & Signal Switch Company, St. Louis, Mo., has been incorporated to deal in safety appliances. The incorporators are Charles Beck, Arthur Beck and Morris Tucker.

Murray Iron Works Company, Burlington, Ia., has just completed an extensive addition to its boiler shops at Burlington. It is a steel frame building 140 ft. x 120 ft. and contains several traveling cranes.

Pittsburgh Steel Company, Pittsburgh, Pa., has appointed E. Sidney Lewis special sales agent with headquarters in Pittsburgh. Mr. Lewis was formerly sales agent for the Standard Steel Works Company, Philadelphia.

F. J. Mawby, of the Van Dyke Churchill Company, has resigned to become connected with the Peterson Engineering Company, New York, N. Y., which handles a line of continuous oiling systems and lubricating devices.

Walter B. Snow, Boston, Mass., publicity engineer, has recently added to his staff Mr. John S. Mitchell, late of the New York Edison Company, and formerly acting manager for F. W. Horne, importer of American machinery, Yokohama, Japan.

Canadian Car & Foundry Company, Montreal, Que., suffered the loss of the forge shops, machine shop and one of the iron foundries at its Amherst (N. S.) plant as the result of a fire on April 27. The damage is estimated to be \$200,000.

W. J. Jeandron, New York, N. Y., exclusive agent for Le Carbone brushes in the United States, sailed on Thursday of this week on the steamer *Provence* for Paris, where he will spend a few weeks looking over the manufacturing plant of the Le Carbone Company.

American Journal Bearing Company, Portland, Maine, has been incorporated to make bearings for locomotives, cars and machinery. The authorized stock issue is \$250,000. The officers are: Clarence E. Eaton, president; Albert F. Jones, treasurer; James E. Manter, clerk, all of Portland.

Call Switch & Frog Company, Denver, Col., the organization of which was noted in the *ELECTRIC RAILWAY JOURNAL* of April 22, 1911, has been incorporated as a subsidiary of the Call Switch Company, to make switches and track supplies. The company's plant at Denver is about completed.

S. J. Hall, until recently sales engineer in the Chicago branch of the Gould Storage Battery Company, has resigned his position with that company and has become associated with the Vivax Storage Battery Company as vice-president, with offices at 2228 Michigan Boulevard, Chicago.

McKeen Motor Car Company, Omaha, Neb., has shipped a 70-ft. motor car to the Ann Arbor Railroad via the Chicago & Northwestern Railway and the Manitowoc car ferry. Four more cars of the same size are on order for the Ann Arbor Railroad and will be delivered within the next month.

Indian Refining Company, Cincinnati, Ohio, has moved its general offices from Cincinnati to 123-133 William Street, New York, N. Y., where J. V. Smith, manager of the railway lubrication department, and F. W. Cherrington, manager of the wood-preserving department, will make their headquarters.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., advises that the 10,000-kva water-cooled transformers described in the *ELECTRIC RAILWAY JOURNAL* for May 6 on page 805 are of the shell type and not of the core type, as was erroneously stated in the original manuscript.

William C. Wilson, for several years past representing Bingham & Taylor, Buffalo, N. Y., in the steam and electric railway field in Eastern territory, has severed his connection with that firm and has accepted a position in the sales department of the Transportation Utilities Company, with headquarters at 30 Church Street, New York.

Hall Signal Company, New York, N. Y., will readjust its finances so as to permit it to extend its field. A committee consisting of J. S. Bache, Newman Erb, W. F. Morgan and W. P. Hall has been named to formulate plans for the reorganization of the company. Holders of the company's stock have been requested to deposit their certificates with the Empire Trust Company.

Lee's Railway Switch Device Company, San Diego, Cal., has been incorporated with a capital stock of \$500,000, to manufacture a device for opening switches on electric railways which has been patented by Thomas E. Lee. The incorporators are Thomas E. Lee, president; James W. Hاستain, secretary and treasurer; J. C. Hocker, W. A. Browne, D. S. Miller, C. F. Mohnike and W. V. O'Farrell.

E. W. Clark & Company, Philadelphia, Pa., announce that George W. Kendrick, third, has been admitted to partnership in their firm. Redmond & Company have discontinued their Philadelphia office and have made arrangements with E. W. Clark & Company to handle all their Philadelphia business. Casper W. Hacker, formerly with Harvey Fisk & Company, has also become associated with E. W. Clark & Company.

Southern Car Company, High Point, N. C., was formally reorganized on May 1 in accordance with the plans referred to in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911. The following officers and directors were elected: J. Elwood Cox, chairman; R. W. Morrison, president; Abraham Cook, vice-president and treasurer; J. L. Morrison, secretary; E. T. Robinson, general manager in charge of shop operations; Colonel Wescott Roberson and C. H. Hobbs.

Allis-Chalmers Company, Milwaukee, Wis., has appointed W. M. White manager and chief engineer of its hydraulic turbine department. During the past ten years Mr. White has been closely in touch with hydraulic turbine development in this country and for the past five years has had entire charge of the designing for the I. P. Morris Company, in which position he designed the hydraulic machinery for some of the largest installations in the country.

Nova Scotia Car Works, Ltd., Halifax, N. S., formed to take over the business of the Silliker Car Company, Halifax, has completed its organization. The new company is capitalized at \$2,415,800, which is divided into \$600,000 of 7 per cent cumulative first preferred, \$220,600 of 7 per cent non-cumulative second preferred, \$345,200 of 6 per cent non-cumulative third preferred and \$1,250,000 of common stock. There is also a \$115,000 4½ per cent mortgage loan outstanding, which was issued to cover a loan of this amount from the city of Halifax to the Silliker Company, which was assumed by the new company. New machinery is being installed to increase the capacity of the plant from four cars a day to ten cars.

Baldwin Locomotive Works, Philadelphia, Pa., through Alba B. Johnson, vice-president of the company, has issued the following announcement in regard to the admission of new interests into the company to be represented by Drexel & Company, Philadelphia, Pa., and White, Weld & Company, New York, N. Y.: "At a meeting of the directors and stockholders of the Baldwin Locomotive Works held on May 3 it was decided to reconstruct the present close corporation in such a way as to admit new interests into our company. No change, however, in policy or management is contemplated. This business has long been one of the standard industries of Philadelphia, and the same principles of management which have built up the property to its present proportions and have always yielded adequate profits to the owners will continue to prevail. Drexel & Company, Philadelphia, and White, Weld & Company, of New York, will act as bankers in connection with this matter."

Pennsylvania Steel Company, Steelton, Pa., in its annual report for the year ended Dec. 31, 1910, shows income from operations of \$3,779,824, a decline of \$29,634 from 1909. Other income increased, however, from \$196,821 to \$249,370, bringing the total income to \$4,029,125 against \$4,006,279 in

1909. Interest and depreciation charges increased, as did the requirements for preferred dividends, to an extent which reduced the surplus for the period from \$883,044 in 1909 to \$58,581 in the year just closed. The increases in these items were: Interest on bonds from \$1,441,379 in 1909 to \$1,702,918, and depreciation from \$526,854 to \$855,403. Preferred dividend disbursements from \$1,155,000 to \$1,412,293. The company produced 757,000 tons of pig iron in 1910, against 700,000 tons in 1909, and 847,000 tons of steel ingots, compared with 797,000 tons. During the year the equipment and extension to its manufacturing plants have progressed steadily. A new plant for the manufacture of frogs, switches, crossings, etc., was built at Steelton. A structural shop, with a capacity of 60,000 tons a year, has also been added to the Steelton plant. An ore crushing and concentrating plant has been constructed at Lebanon. New open hearth plants have been added to the Sparrow's Point and Steelton works. A new steel foundry has been built at Steelton, and mechanical ore unloaders and new wharves constructed at Sparrow's Point.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued its list of second-hand electrical machinery for May, 1911.

Arthur S. Partridge, St. Louis, Mo., has issued list No. 27 for May of second-hand electrical and steam machinery.

Pfannmueller Engineering Company, Chicago, Ill., has issued a catalog for May giving a list of second-hand power equipment.

George Bender, New York, N. Y., is mailing a list of second-hand 500-volt to 550-volt direct-current shunt-wound motors for use in parks and shops which he has on hand for immediate shipment.

C. W. Hunt Company, New York, N. Y., has issued Catalog 114, which describes and illustrates several types of its coal tubs, grab buckets, coal chutes and screens.

MacGovern, Archer & Company, New York, N. Y., are mailing a circular which calls attention to two engine-driven centrifugal circulating pumps which they have on hand for immediate delivery.

George J. Stocker, St. Louis, Mo., has issued Catalog No. 32 which describes and illustrates the Stocker cooling towers. The illustrations show several of the recent installations of this type of cooling tower.

Sangamo Electric Company, Springfield, Ill., has issued Treatise No. 28, which describes the application and use of trip reading watt-hour meters. A number of schemes also are suggested for comparing equipment, operators, checking line losses, etc.

Railway Improvement Company, Chicago, Ill., is mailing a circular which calls attention to its coasting time recorder. It also contains a reproduction of a letter from the London (Eng.) Underground Electric Railway commending this type of recorder.

Ohmer Fare Register Company, Dayton, Ohio, has issued an eight-page booklet which describes and illustrates the Ohmer turnstile register combination as installed on car No. 205 now operating on one of the lines of the People's Railway, Dayton, Ohio.

Barrett Manufacturing Company, New York, N. Y., is mailing a card on which are printed the Barrett specifications for felt, pitch and gravel or slag roofing over boards or concrete. A diagram is printed on the other side of the card which shows approximately the increased cost of constructing steep roofs as against those of flat surfaces. It also shows rise or pitch of roofs in inches and degrees.

The J. G. Brill Company, Philadelphia, Pa., in the April issue of the *Brill Magazine*, has, among other articles, the following: "Conditions Which Govern the Type of Car for City Service, Brooklyn, N. Y.;" "Interurban Cars for United Railways System of Portland, Ore.;" "Cars for the Michigan United Railways;" "One-Man Prepayment Cars for Selma, Ala.;" "Combination Cars for Ontario, Cal.;" "Prepayment Cars for Chattanooga, Tenn.;" "Rolling Stock for Lake Charles, La.;" "A Popular Type of Combination Car," and Part IV of "A History of The J. G. Brill Company." The magazine also contains an additional supplement which shows the plan, details and parts of the Brill No. 22 truck.

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CONTENTS.

Franchise Negotiations in Toledo.....	863
Posting Schedules.....	863
Fire Risk from Adjacent Structures.....	864
The Award of the Edison Medal.....	864
The Progress of Power Transmission.....	864
Maintenance Costs of New and Old Motors.....	865
The 1200-Volt Equipment of the Shore Line Electric Railway.....	866
New Express Cars of the Old Colony Street Railway.....	872
New Wrecking Train for the Illinois Traction System.....	874
Report of Maryland Commission.....	875
Metropolitan Street Railway Reorganization Plan.....	876
Electrical Maintenance Costs of the Third Avenue Railroad, New York.....	878
Annual Meeting of the American Institute of Electrical Engineers.....	879
Meeting of Committee on Power Distribution.....	880
Discussion on New Jersey Public Utilities Law.....	881
Lignite Deposits in the United States.....	881
Dispatcher Controlled Train Order Signals for Interurban Electric Railways.....	882
Portable Oil Burner.....	883
Features of Electrolytic Arresters.....	884
Regulating Pole Rotary Converter for Automatic Control of Power.....	884
Hydraulic Press for Forging Bearings.....	885
Flat Arch, Semi-Convertible Car for Coffeyville, Kan.....	885
Signal Installation on Terre Haute, Indianapolis & Eastern Traction Line.....	886
News of Electric Railways.....	887
Financial and Corporate.....	891
Traffic and Transportation.....	894
Personal Mention.....	896
Construction News.....	898
Manufacturers and Supplies.....	901

Franchise Negotiations in Toledo

Preliminary negotiations between the city of Toledo and the Toledo Railways & Light Company regarding the terms of the proposed new franchise have led to a point where the personnel of the engineers to be employed in making a valuation is under discussion. Before this stage was reached consideration was given to various points, such as the length of the franchise term, the construction of extensions, control of the city over questions of operation, use of city tracks by interurban cars, relations with employees and right of city to purchase at future dates. On practically all of these vital matters it was decided, after full discussion between the representatives of the city and the company, to defer agreement until later. The tentative franchise which embodied ideas for the proposed new contract has served the purpose of suggesting the most important particulars for further negotiations, although its treatment of these points has been questioned by the representatives of the company. The suggested valuation precedes detailed consideration of the subject of fares, but is a work of such magnitude that its proper disposition will necessarily require some time. Nevertheless all negotiations of the character of those outlined are prolific consumers of both time and money in any city whose public utilities operate under limited-term franchises and, since these conditions prevail in Toledo, the company and the municipality have to accept them. The best hope is that the delay before the final acceptance of a fair ordinance will be short.

Posting Schedules

From the failure of many companies to post their car schedules at important transfer and intersection points it appears that the benefits of such a policy are not fully realized. Without going into the details of the matter, which has more than once been discussed in these columns, we know of no more inexpensive way of holding traffic in a district where competition is sharp than to eliminate so far as possible any sources of dissatisfaction due to long waits at points where a through trip must be broken. As the size of a system increases it becomes more and more difficult to maintain a sufficient number of through routes to satisfy the old demands for continuous trips. Moreover, on account of the operating economies gained by shortening the length of trips outward from the business districts, it becomes more and more necessary to interpolate between the long-route cars others which cover only part of the distance. Hence the time required to traverse a given route may be ten or fifteen minutes longer at one time than at another, on account of the difficulties of making proper connections at the intersection points. These points where posted schedules are desirable are generally in suburban or semi-rural districts, so that the established schedule time can usually be maintained with fair accuracy, and the plan of posting the definite passing times of

intersecting cars does a great deal to promote good feeling. The public naturally prefers through-car service to service involving changes, but where this is impracticable the substitution of definite knowledge of schedules will do much to remove possible dissatisfaction with the necessity of transferring after a delay of greater or less duration.

Fire Risk from Adjacent Structures

The danger of destruction by fire of a building depends not only on the construction of the building and the character of its contents, but also on the distance and character of surrounding structures. In a general conflagration like the Baltimore fire or the more recent Bangor fire even the most modern fireproof buildings were gutted. It is not always possible for the owner of a building to exercise control over all the surrounding buildings as regards methods of fire prevention and protective equipment, but where two or more adjacent structures are owned by the same interests it is money well spent to protect each building against the others by eliminating every possible source of danger from fire in all the buildings. Thus a wooden lumber shed separated by only a few feet from a fireproof carpenter shop building is a constant and unnecessary source of danger. The money spent on the so-called fireproof buildings and an elaborate sprinkler system probably would be wasted if a fire in the lumber shed got a good start. An electric railway in one of the large Eastern cities has just completed an expensive installation of sprinklers to protect a hundred or more cars stored on an elevated structure, but it still utilizes the ground space under the structure as a storage yard for the way department and has piled there several thousand creosoted yellow pine ties. Nothing could save the cars if these ties caught on fire underneath them. Paving blocks or steel rails piled on the ground under the cars would involve no risk, but to pile ties there for the sake of convenience in handling them is tempting Providence.

The Award of the Edison Medal

The award of the Edison medal to Frank J. Sprague on the evening of May 16 was a well-earned and proper recognition of Mr. Sprague's contributions to the art of electric transportation. To him more than to any other inventor, living or dead, the industry owes its advance of the past twenty-five years. In the early days he was the originator of the method now generally employed of flexibly supporting the motor on the car axle, of separating the feeder from the trolley wire, of controlling the speed of the motors by various combinations of the motor circuits instead of exclusively through a rheostat, and of many other features of the standard electrical car equipment of to-day. At a later period he made an equally important contribution to the art in his multiple-unit system for train operation, and still later he, with others, proved that electricity could be successfully applied to railway operations of the first magnitude, through his active part in the electrification of the New York Central and in the development of its under-running third-rail. These services of themselves would be sufficient to justify all of the honor to Mr. Sprague which took concrete expression in the award to him of the Edison medal, this week. But they do not comprise by any means the entirety of the indebtedness of the industry to him. He has been from the beginning an earnest, consistent and eloquent advocate of a wider use of electric power for transportation, and has not

hesitated on many occasions in the past to stake reputation and fortune upon the correctness of his engineering convictions. This combination of the inventor and of the man of affairs is rare, but by its possession Mr. Sprague undoubtedly brought about a more rapid adoption of his inventions and engineering ideas than would otherwise have been possible. In awarding to Mr. Sprague a medal for "meritorious achievement in electrical science, or electrical engineering, or the electrical arts," the Institute at the same time honored the industry which he did so much to create.

THE PROGRESS OF POWER TRANSMISSION

The growth of electric power transmission has been so rapid that it is no easy matter to find a viewpoint from which to get a perspective on the power situation. As time has gone on, limits to the possible expansion of the art have begun to appear, while on the other hand some quite serious difficulties have vanished. It is a curious and interesting phenomenon in the progress of power transmission that difficulties once dreaded have faded into insignificance at a closer view. They have been like the indeterminate objects seen through a thin fog which, when one has advanced a few paces ahead, shrink from frightful dimensions to their actual inconsequence. Not many years ago the transmission of 100 miles was looked upon as involving prodigious difficulties from static capacity and from inductance, but a very little experience convinced engineers that these factors in the situation were not of large importance. In the early days it was even believed that on such long transmissions as these it was necessary to drop the frequency perhaps to a very inconvenient degree. In point of fact the very longest systems in operation at the present time are working at 60 cycles. In a similar fashion a voltage of 50,000 or 60,000 ten years ago seemed precariously high, while to-day it is conservative.

Speaking broadly, the difficulties of high-voltage, long-distance transmission have been in fact very much less than was anticipated in the early days of the art. At the present time, however, there is a feeling that voltage and distance have both reached a point where further progress is by no means so easy as it has been up to the present. In fact, so excellent a judge of the situation as Dr. Steinmetz recently expressed the opinion that economic limits of long-distance transmission as such under present commercial conditions have been pretty nearly attained. This is possibly an ultra-conservative view, but it is at least well worthy of consideration. The fact is that at the higher voltages now in practical use, just over 100,000 volts, the insulating properties of the air itself are imperilled. Ionization goes on so rapidly at these extreme pressures that the actual loss from energy dissipated into air threatens to become very serious at the next increase of pressure and is already of a magnitude that causes concern. It would doubtless be practicable with the modern type of suspension insulators, which has made possible the present high voltages, to increase these to a very considerable extent, perhaps to double them, but the air losses would probably be of a formidable character unless in the transmission of a very large quantity of energy. These losses depend upon the voltage and the properties of the line rather than upon the current, so that in the case of a very large transmission, say, several hundred thousand horse-power, with relatively large conductors and very moderate frequency, the

difficulty might be reduced. On the other hand, there is a chance of meeting extreme voltage conditions with ^{from time to time} ~~been~~ proposed for current system, as has ^{plants have} ~~been~~ proposed for extreme cases enough to show the degree of immunity from ~~pressure~~ difficulties which may be expected from the use of direct current. These somewhat disquieting factors in the power situation need not, however, cause any undue alarm. It is possible with the voltages now successfully in use, and with a very modest expenditure for power, to cover considerably larger distances than now are common. There is a constant tendency to increase these distances, not by transmitting a certain amount of power from the generating station to, let us say, a station 200 miles distant, but by uniting two networks, each covering a radius of perhaps 100 miles, so as to exchange power and operate the complete network as a unit. The more territory covered and the more stations participating in the supply the greater on the whole is the security of the united service.

Lightning, in the past a very dangerous enemy, is now, since the introduction of electrolytic lightning arresters and well-developed guard-wire systems, much less to be feared than formerly. Indeed, as Dr. Steinmetz recently put it, the thing most to be feared is internal lightning in the form of surges. These, fortunately, are less rather than more dangerous as the voltage rises, other things being equal, since their magnitude depends on the current, which for a given amount of energy transmitted decreases with the voltage. With these improvements in line construction and protection against lightning large networks can be dealt with much more successfully than a few years ago, and their increase seems to be a well-marked feature of the present growth of electrical transmission. By uniting systems into huge networks covering many thousands of square miles not only is the power supply more secure as such but the system as a whole can take advantage of the varying hydraulic conditions on several watersheds so that the period of low water at certain generating points may be a period of reasonably great flow at others. For the fullest utilization of the hydraulic sources of the country such a union of systems with storage wherever obtainable is very important. In ordinary operation there would be no considerable transmission over very long distances, since in the main each station would supply its own territory, but in case of need even the most distant stations could be brought into action and the failure of power supply averted, although the temporary losses in transmission might be large.

From the standpoint of the electric railway engineer the evolution of great networks is an important matter, since it not only enables him to secure a power supply at many points along an extended line, but also gives an immunity from breakdown far greater than can be secured in a road supplied from a single power station. There are parts of the country even now where a railway several hundred miles long might be fed at any required number of convenient points by comparatively short branch lines from existing networks. This facility of supply may go far toward settling some of the outstanding problems regarding the methods of electrification to be followed in dealing with long lines. The present outlook is that the development of power transmission within the next few years will be an intensive one directed toward the more complete supply of regions where there is a market for power, toward

physical utilization of contiguous systems to secure the advantages of co-operation, and toward the fuller utilization of all the hydraulic resources of a State or even a group of States by making them all contribute to the fund of power on which the whole region may draw.

MAINTENANCE COSTS OF NEW AND OLD MOTORS

The motor maintenance costs of the Third Avenue Railroad, New York, which are published elsewhere in this issue, should make many a railway company stop and take time for a more or less profitable comparison. These figures are of exceptional interest because they show just what a city railway can expect from thoroughly modern motor equipments in the way of low inspection and repair charges combined with a dependable car service. Practically every active motor on the Third Avenue system is of the interpole type and less than three years old, so that one would be justified in expecting much lower costs than those obtained by the operators of older motors. How far these expectations have been met appears from the fact that for the three winter months quoted in the article the cost of motor maintenance, exclusive of the gearing, was less than 2 mills per car mile.

For purposes of comparison we might say that another company of approximately the same size and character of service, but in another city, has paid an average of nearly 4 mills per car mile for the maintenance of its old types of car motors. It is true that this latter figure has included a great deal of modernization work, like reborring of motor shells, slotting of commutators, application of better brushes, improvement of insulation, etc., but the work has been done under exceptionally good conditions, and it is unlikely that the future cost of maintaining these old motors, as long as they remain in service, will be less than 3 mills per car mile. This would still leave a difference of 1 mill per car mile in favor of the newer motors, which is equivalent to a sum of \$25 per annum per motor, based on a yearly performance of 25,000 car miles. To be sure, the length of time that the later motors would maintain this degree of superiority is problematical, but there is no good reason to suppose that they would deteriorate more rapidly than the rehabilitated motors. Some light on this aspect of the matter is cast by the experience of the Third Avenue Railroad, which estimates that its new motors will not require such important overhauling work as commutator re-turning until they have given ten years' service.

While a saving of \$25 per annum in maintenance per motor is attractive, it is not sufficiently so, at the present prices for interpole motors, to justify the second company in discarding its old equipment. It should be considered, however, that the foregoing cost of 4 mills per car mile is not only low, but that it represents the average of all of the types of motors on the system. Consequently the maintenance cost of some types must be greater than the average figure quoted, while that of others must be less. This fact offers a strong argument in favor of keeping separate maintenance accounts for each class of motor, either permanently or until sufficient data have been gathered to allow the company to determine accurately when certain types of motors should be considered obsolete. In the foregoing comparisons no allowance has been made in favor of the superior service reliability of the new motors, because the old motors have a very good record in this respect.

THE 1200-VOLT EQUIPMENT OF THE SHORE LINE ELECTRIC RAILWAY

The Shore Line Electric Railway follows the Connecticut shore of the Long Island Sound for a considerable portion of its length. Starting from New Haven, Conn., it runs to Guilford over a more or less inland route, but for the entire distance from Guilford to Old Saybrook it follows the shore and from

brook by the river for operating the system is generated at Saybrook. The turbines wound for 11,000 volts, 25 cycles, and is transmitted at this potential to two substation and the other at Guilford. The function of the power stations is similar, namely, to transform the energy from 11,000 volts a.c. to 370 volts a.c. and then convert it into a direct

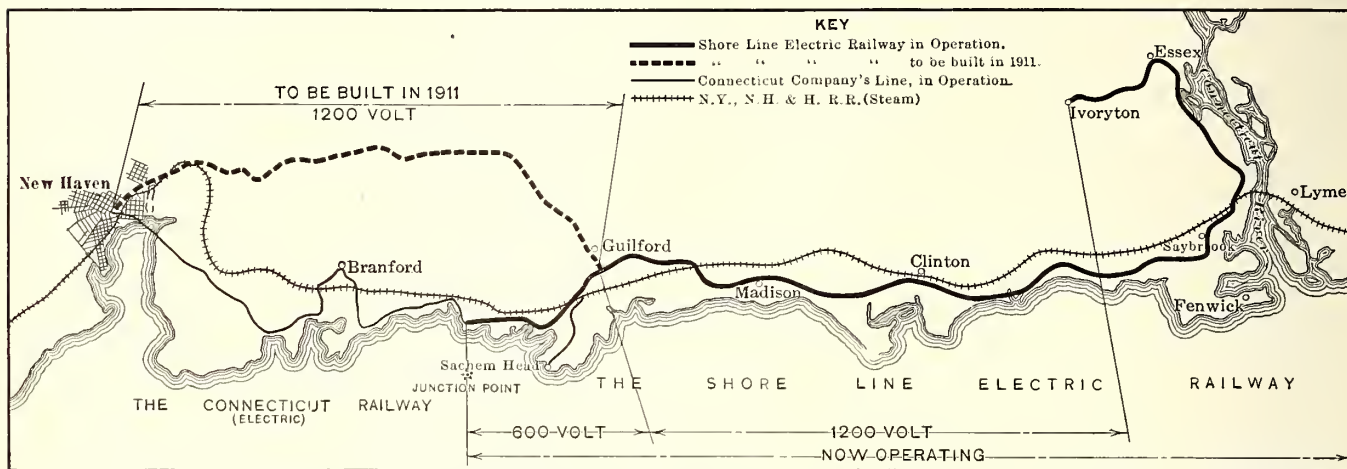


Fig. 1—Shore Line Railway—Map of Route Connection to New Haven

Old Saybrook it follows the Connecticut River to Essex, continuing to Ivorytown. The whole district between Guilford and Old Saybrook is famous for its summer resorts, as the shores of Long Island Sound are rich in beautiful beaches which attract large crowds to the summer cottages which are so plentiful all along the coast. There is also a steady but smaller winter business which is helped by the presence of numerous small factories along the line.

The accompanying map shows the route. At present the road is complete and in operation between Guilford and Ivory-

town. The whole district between Guilford and Old Saybrook is famous for its summer resorts, as the shores of Long Island Sound are rich in beautiful beaches which attract large crowds to the summer cottages which are so plentiful all along the coast. There is also a steady but smaller winter business which is helped by the presence of numerous small factories along the line.

POWER HOUSE

The power house is built on the banks of the Connecticut River about a mile distant from the town of Saybrook. It is constructed entirely of reinforced concrete. Fig. 2 gives an exterior view of the station and Fig. 3 an interior. From the former it will be seen that coal can be brought right alongside either by rail or water. The station is so planned that it can easily be extended to double its size.



Fig. 2—Shore Line Railway—Exterior View of Power Station and Coal Storage

town, while the portion between Guilford and New Haven will be completed and ready for traffic within a few weeks. The entire road from New Haven to Ivorytown has a 1200-volt trolley. Stony Creek and Guilford are connected by another line, which is operated at 600 volts; this branch connects the existing electric railway lines of the Connecticut Company with the new system.

The boilers and most of the auxiliary apparatus are located on the ground floor while the generators, switchboards and exciters are in the operating room. The prime movers are Curtis steam turbines of the vertical type. At present two such units are installed, each of 1500-kw capacity. They are designed to operate at a gage pressure of 160 lb., and with a vacuum of approximately 28½ in. of mercury. Each machine has four

stages, with two wheels per stage and one row of buckets per wheel. The condensers, which are Wheeler condensers of the surface type, form the base of the turbines, and each has a cooling surface of 4200 sq. ft. The generators are of the ATB type. Each has two poles and is wound for 11,000 volts, 25 cycles, and runs at 1500 r.p.m.

There are two exciter sets, the one a Curtis turbine set and the other a motor generator set. The former, consisting of a type CC two-pole, 35-kw, 125-volt generator, coupled to a Curtis steam turbine unit, runs at 3600 r.p.m. This exciter set operates non-condensing. The other set is composed of a CLB six-pole, 35-kw, 125-volt compound-wound generator direct-connected to a four-pole, 50-hp, 440-volt, form-K induction motor. The speed of this set is 750 r.p.m. Current at 440 volts is supplied to the motor-generator sets through the medium of three type H 20-kw, 11,000/400-volt, 25-cycle, oil-cooled transformers.

The switchboard for the power house consists of a swinging bracket provided with synchronous indicator and voltmeter for the exciter sets, one two-circuit exciter panel, one three-phase induction motor and transformer panel, two three-phase turbo generator panels, two blank panels for future generators, and two three-phase outgoing line panels. Lightning arresters of the electrolytic type are provided to protect the apparatus in the power house. The oil switches are of the K-4 type. All of the electrical apparatus in the power house was manufactured by the General Electric Company.

The boilers are of the water-tube type manufactured by Bigelow-Hornsby; there are three at present and provision is made for a fourth. The normal rating of each boiler is 625 hp, but this capacity can be practically doubled when forced draft is used. They are fed by Taylor mechanical stokers. The working pressure is 165 lb. per square inch. Foster superheaters are employed to give 125 deg. of superheat. The blowers, two in number, for the forced draft are of the rotary type driven by horizontal steam turbines, and the mechanical stokers are driven by chain gear from the shaft of one of these blower sets. Thus the speed for feeding coal and the air pressure are governed by regulating the speed of the blower set.

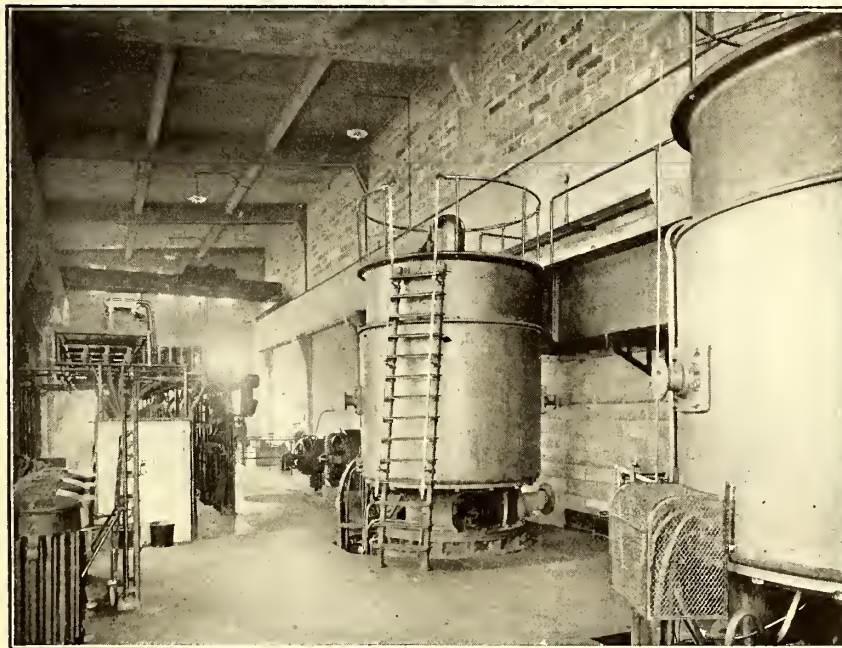


Fig. 3—Shore Line Railway—Interior of Turbine Room

Among the other auxiliary apparatus may be mentioned two horizontal feed pumps built by Davidson; two Wheeler steam-driven centrifugal circulating pumps; two vertical Wheeler steam-driven air pumps of the Edwards type; two horizontal steam-driven make-up pumps built by Davidson; two General Electric duplex step-bearing pumps and two General Electric hydraulic gear pumps. The feed water heater has a capacity of

2000 hp. It is of the Cochrane open type. Provision is made for another heater of like capacity. An air compressor is provided for cleaning the electrical machinery. A 20-ton traveling crane capable of serving the entire length of the operating room is installed and designed in such a manner that it can be run for some distance outside the building on girders to pick up its load from the ground outside and convey it to any part of the operating floor.

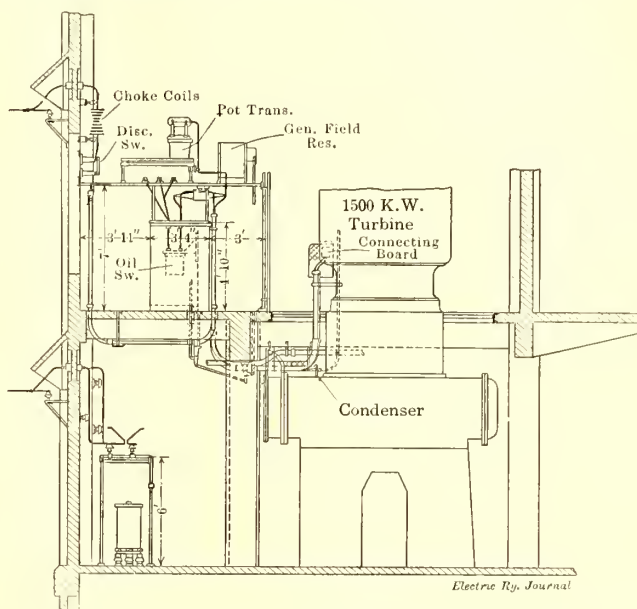


Fig. 4—Shore Line Railway—Section of Turbine Room

SUBSTATIONS AND CARHOUSES, ETC.

There are two substations, one at Saybrook, about one mile from the power station, and the other at Guilford, 21 miles from the power station. The Saybrook substation is included under the same roof as the carhouse, machine shops, office, etc. Very comfortable quarters are provided for the men there, a pool table and reading room furnishing amusement and recreation when they are off duty. The plan of the building is shown in Fig. 6 and an exterior view in Fig. 5. The building is constructed entirely of reinforced concrete and steel. All of the machines in the machine shop are electrically driven. The Guilford substation is in general of the same construction as that at Saybrook, but the adjoining carhouse is smaller and is used only for the storage of cars.

ELECTRICAL EQUIPMENT OF SAYBROOK SUBSTATION

The most important items of electrical equipment at the Saybrook substation are as follows:

Three type TC four-pole, 200-kw, 600-volt rotary converters, insulated for operation, two in series to give 1200 volts. The speed of these machines is 750 r.p.m.

Three HT 160-kw, 11,000/370-volt, three-phase, 25-cycle, oil-cooled transformers.

Three 30-kva oil-cooled reactive coils.

Switchboard with one incoming and one outgoing panel, three a.c. and three d.c. rotary converter panels and three d.c. feeder panels.

Electrolytic lightning arresters are provided for the protection of both incoming and outgoing lines.

An interior view of the Saybrook substation showing the rotary converters, transformers and switchboard is given in Fig. 7. Both the incoming lines and outgoing lines are protected by electrolytic lightning arresters (see Fig. 8). There is one 1200-volt bus and one 600-volt bus and both the negatives and equalizers are taken to the board. There is one panel for

each rotary and each rotary can be thrown on to either side of the three-wire 600 and 1200-volt bus, the operating position of the triple-pole double-throw lever switch determining

volts always being procurable so long as two machines are operative.

The lighting circuits for the substation, carhouse and office are taken from the 11,000-volt bus through expulsion fuses and disconnecting switches to a 10-kw single-phase transformer which gives 110 volts on the secondary side. This is the pressure used on all of the lighting circuits.

The special feature of interest concerning the rotary converters is that they are standard 600-volt machines with extra insulation and extra creepage distances to permit their operating two in series to give 1200 volts. Either machine can be operated on the high side. The flashing distances on the commutator are large and all parts are protected against flash-overs. The speed limit and end play device as well as the field break-up switch have been covered in order to protect the operator. These rotary converters, although of a smaller capacity, are of the same design as those installed on the Milwaukee Electric Railway & Light 1200-volt system, which was fully described in the *ELECTRIC RAILWAY JOURNAL* for July 16, 1910, so that a further detailed description is unnecessary.

In general the electrical equipment in the Guilford substation is so similar to that in Saybrook that a description will not be



Fig. 5—Shore Line Railway—Exterior of Saybrook Substation and Carhouse

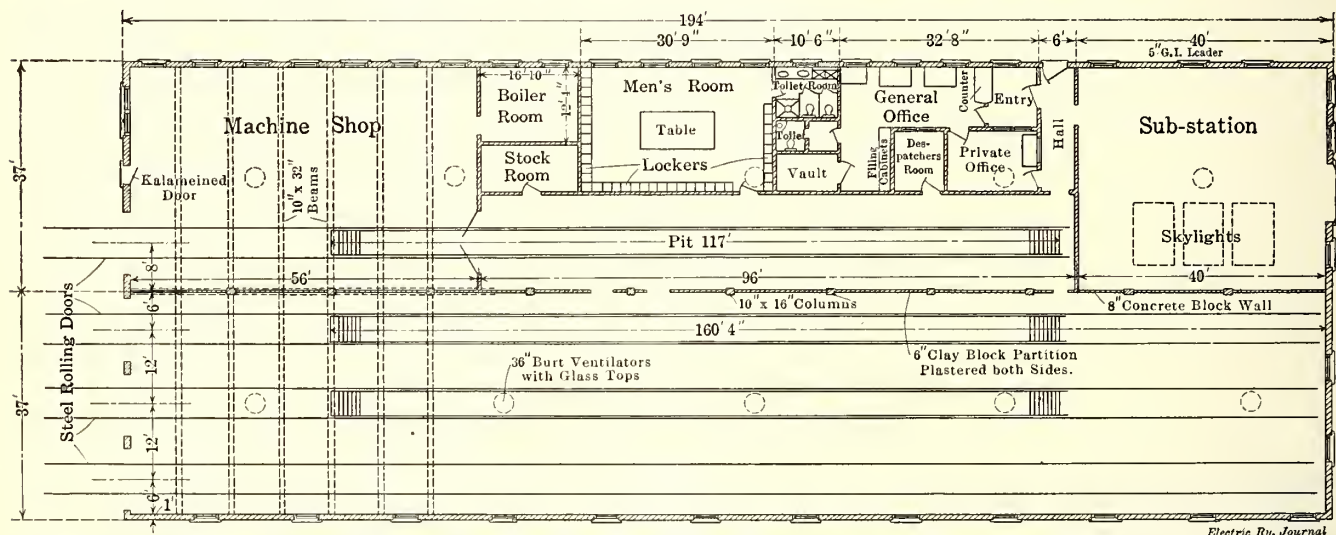


Fig. 6—Shore Line Railway—Floor Plan of Carhouse at Saybrook

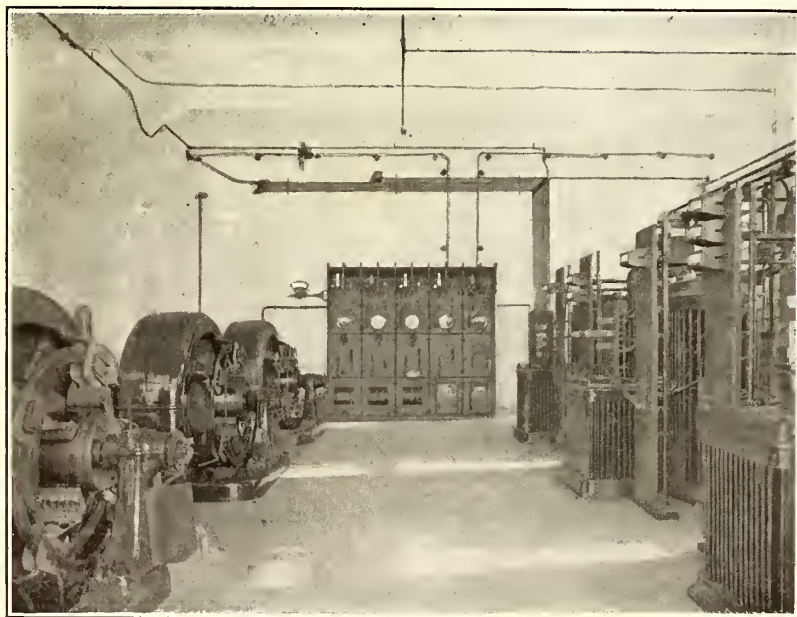


Fig. 7—Shore Line Railway—Interior of Substation at Saybrook



Fig. 8—Shore Line Railway—Electrolytic Lighting Arresters in Saybrook Substation

whether the rotary is on the high-voltage or low-voltage bus-bars. These triple-pole switches will be noticed on the subbase of the switchboard in Fig. 7. This arrangement insures 1200

given. The chief points of difference are that Guilford has no outgoing high-tension transmission line, as at present it is the terminal substation. The Guilford substation has one 600-volt

and one 1200-volt feeder instead of two 1200-volt feeders as at Saybrook.

ROLLING STOCK

The present rolling stock consists of ten combination smoking and passenger cars for the interurban service operated at 1200 volts, two cars of the city type for the Stony Creek to Guilford branch, one box car locomotive and a snow plow. The equipment of all ten combination smoking and passenger cars for

CAR BODY.

	Ft.	Ins.
Length over buffers.....	44	5
Length over car body.....	42	5
Length over passenger compartment.....	26	6
Length over smoking compartment.....	11	11
Length of vestibule.....	4	0
Width over sheathing.....	8	2½
Width over all (over stationary step).....	8	11
Width of aisle.....	21	½
Height under sill to top of roof.....	9	2
Height track to top of roof.....	12	2
Minimum total height.....	12	7½
Between bolster centers.....	30	3
Weight of car body, about.....	23,000	lb.

interurban service is the same. All are furnished with four GE-217 motors which have a rated capacity of 50 hp each and a complete complement of Sprague-General Electric type M non-automatic control. The GE-217 motor is of the commutat-

closing a switch which is situated on the motorman's cab.

The dynamotor has a capacity of approximately 10 kw and is designed for suspension under the car. General Electric emergency straight air brake equipments are provided for all ten

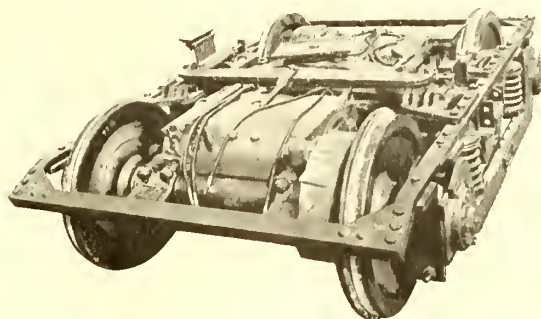


Fig. 12—Shore Line Railway—Two-Motor Truck

equipments and the compressors are of the CP-29 type, designed to operate direct on both 600 volts and 1200 volts. The governors are of the MH type which have been produced for 1200-volt operation. Quick service valves are employed to

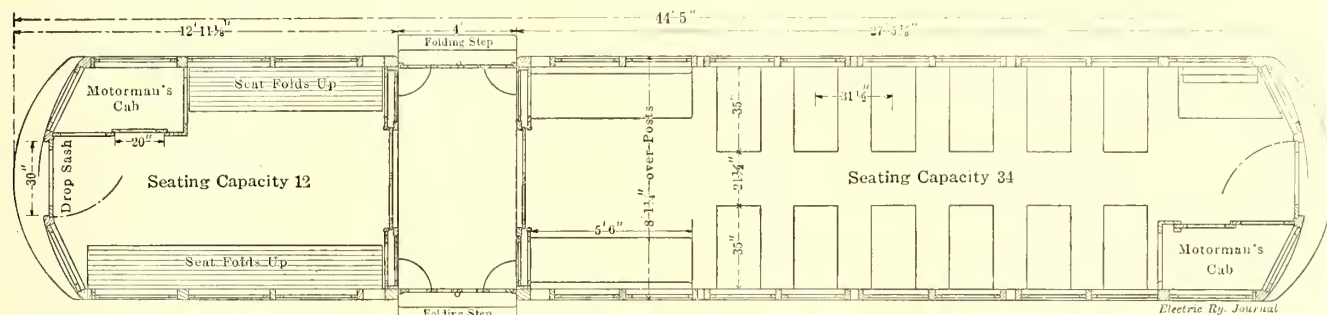
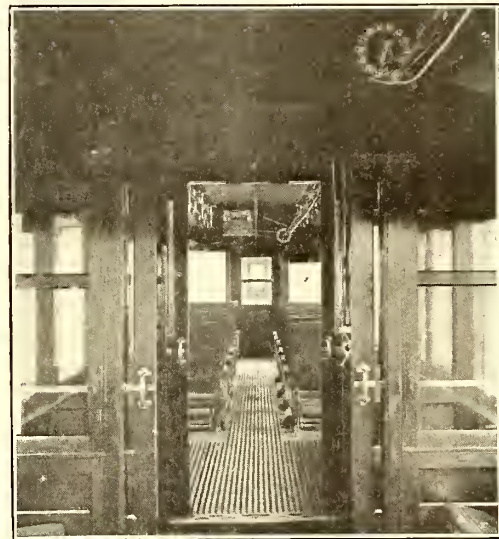
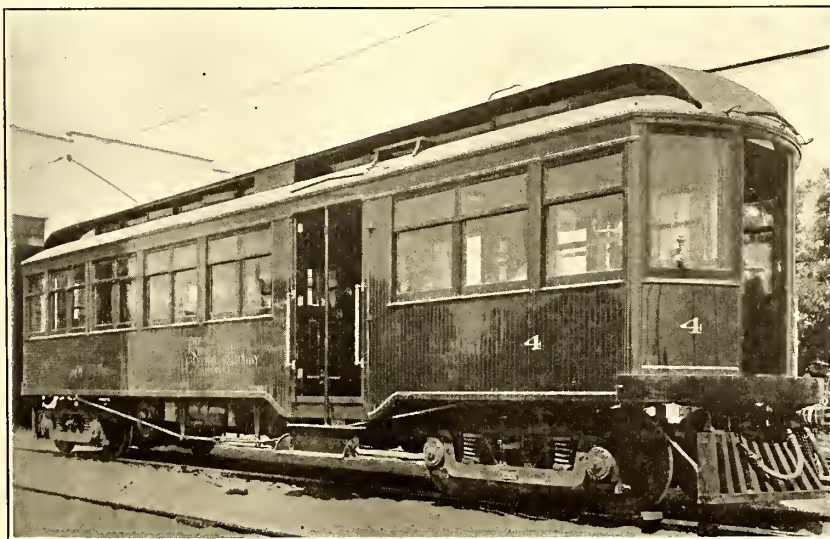


Fig. 9—Shore Line Railway—Plan of Side Entrance Car

ing pole type, is wound for both 600 and 1200 volts operation, is of the box frame construction and is bar-suspended. The cars will operate at 600 volts in New Haven and at 1200 volts on the interurban section. The motor circuits remain the same on both voltages and therefore only half speed is obtained on a 600-volt trolley. The control, car lighting and headlight circuits are fed direct from the trolley on 600 volts and from a

give a quicker application and release of the brakes. There are 16 electric heaters in each car; these are of special design for 1200 volts and are capable of giving three different heats. They were made by the Consolidated Car Heating Company. The headlights are General Electric luminous arc lamps.

The car bodies were constructed by the Jewett Car Company, of Newark, Ohio, and incorporate some very interesting fea-



Figs. 10 and 11—Shore Line Railway—Exterior and Interior of Combination Car

dynamotor on 1200 volts, so that these circuits under any circumstances are never subjected to more than 600 volts pressure. The dynamotor is connected to and disconnected from the trolley and control circuits by a two-position relay. When this relay is in the "gravity" position the trolley is connected to the dynamotor for 1200-volt operation, while on a 600-volt trolley the operating coil of this relay is energized by the motorman

tures of design, the most noticeable of which is the side entrance. The plan given in Fig. 9 will show the general arrangements. It will be noticed that a folding step is provided. The special underframing to accommodate the side entrance is illustrated in Fig. 13. The vestibule is situated between the smoking compartment and passenger compartment, an arrangement which has the great advantage that passengers can enter and

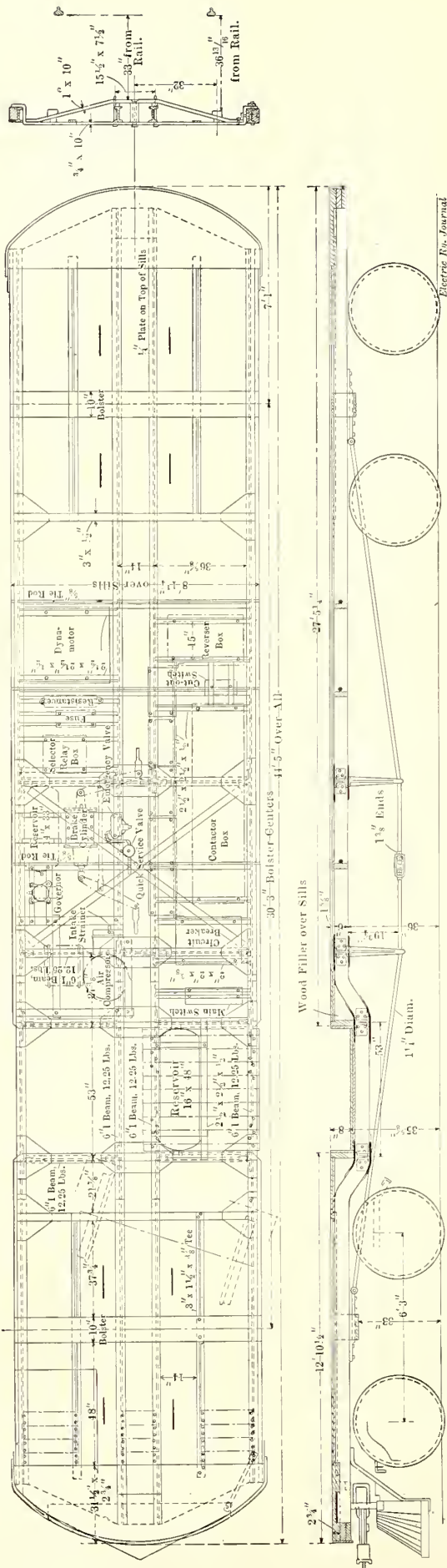


Fig. 13—Shore Line Railway—Plan and Side Elevation of Floor Framing, Showing Bent Sill for Side Entrance and Location of 1200-Volt Equipment

leave each compartment separately, that is to say, without passing through the other. This has been found to facilitate greatly the loading and unloading of the car.

The principal dimensions are given in the table on the preceding page.

The passenger compartment is provided with 12 Hale & Kilburn cross seats and three longitudinal seats and has a seating capacity of 34. The smoking compartment, which has longitudinal seats, has a seating capacity of 12, bringing the total seating capacity of the car up to 46.

The trucks were built by the Baldwin Locomotive Works and are of class 78-20-A, which are designed for a maximum center pin load of 20,000 lb. They were described in the issue of this paper for Oct. 22, 1910. The wheelbase of each truck is 75 in., and the wheels are standard rolled-steel wheels of 34-in. diameter. The weight of each truck, not including motors, is 7500 lb. Fig. 12 shows a view of one of these trucks equipped with two GE-217 motors.

The weight of the car and equipment is as follows:

TOTAL WEIGHT OF CAR.	
	Lb.
Car body.....	23,000
Two trucks.....	15,000
Four motors.....	12,920
Control equipment.....	5,500
Air brake equipment.....	2,900
Couplers.....	180
Total	59,500

This gives a car weight of 1443½ lb. per seated passenger. The maximum speed which the trucks and cars were designed for was 42 miles an hour. An interior and an exterior view of one of these cars are shown respectively in Figs. 10 and 11.

The foregoing remarks apply to the cars used in the interurban service. The two equipments employed between Stony Creek and Guilford are similar to the New Haven city cars, with the exception that they operate on 600 volts only and are equipped with GE-216 commutating pole motors. These motors are 40-hp units and are equipped with type K control. The air-brake equipment on these cars is of the General Electric straight air-brake type.

The equipment of the box-car locomotive and the snow plow are substantially the same as those already described on the interurban cars, that is to say, they are capable of operating on both 600 volts and 1200 volts. Both the locomotive and the snow plow are equipped with four GE-205 motors, which are commutating pole motors rated at 75 hp each. The control is the Sprague General Electric type M.

OVERHEAD CONSTRUCTION

The construction of the overhead trolley system is of peculiar interest owing to the many features incorporated to give a maximum flexibility. The catenary type of construction has been adopted with the three-point suspension and the poles are spaced 150 ft. apart. The messenger wire, which is of Siemens-Martin steel built up of seven strands, is 7/16 in. in diameter and supports a grooved copper trolley wire of No. 000 capacity. The insulation is, of course, for 1200 volts.

Among the new features of construction the loop hangers, the flexible pull-offs, the flexible anchor arrangement and the method adopted of supporting large radius curves by the use of extension brackets are of special importance.

One of these loop hangers is illustrated in Fig. 14. It is made up of a flat stool strap 1/8 in. by 1 in. with a loop formed at the top to allow the trolley wire a vertical movement of about 2 in. play before any pressure is brought to bear on the messenger cable. The trolley wire clamp is built of two malleable-iron interchangeable castings and the bolts are of standard machine type.

The form of pull-off adopted is seen clearly in Fig. 15, a photograph taken between Guilford and Saybrook. These pull-offs consist of a single curve yoke attached to a curve car of similar design to the straight line car excepting that it is 10 in. long and a separate sister hook casting for the messenger



Fig. 14—Hanger

cable. The distance between the trolley and messenger is maintained by a strut as shown. This arrangement is very flexible and has been found to eliminate the pounding of the trolley wheel at suspension points and the effect of the trolley wheel on the wire, and the reduction of trolley trouble to a minimum has been very marked on this particular road.



Fig. 15—Shore Line Railway—Pull-Off Construction on Curve Between Guilford and Saybrook

The anchor arrangements include separate clamps for messenger and trolley wires. These are attached to the brackets and the brackets are in turn guyed to the adjacent poles. The messenger clamp is located, as a rule, at the distance of approximately 10 ft. from the bracket; in this form of construction all the strain is relieved from the messenger cable and is taken on the anchor guy. The trolley clamps for anchor ears are

rent collector passes these points. A typical anchorage is shown in Figs. 17 and 18.

The brackets are standard 2½-in. by 2½-in. by 5/16-in. galvanized T-irons with a guy rod ½ in. in diameter. The fittings are of malleable iron, both insulators and anchorages being attached with 5/8 hook holes. The porcelain insulators are

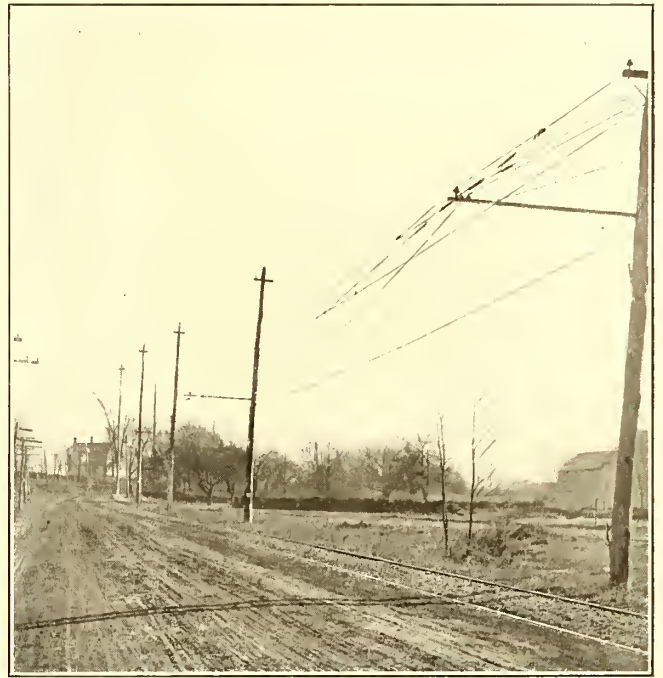


Fig. 17—Shore Line Railway—Overhead Construction at an Anchorage

standard. They are 3½ in. in height and 4½ in. in diameter.

HIGH-TENSION TRANSMISSION LINE

The high-tension transmission line extends from the power house at Saybrook to the Guilford substation, being tapped en route at the Saybrook substation. The working potential is 11,000 volts and the energy is transmitted three phase at 25 cycles. It is a single transmission system, that is to say, there

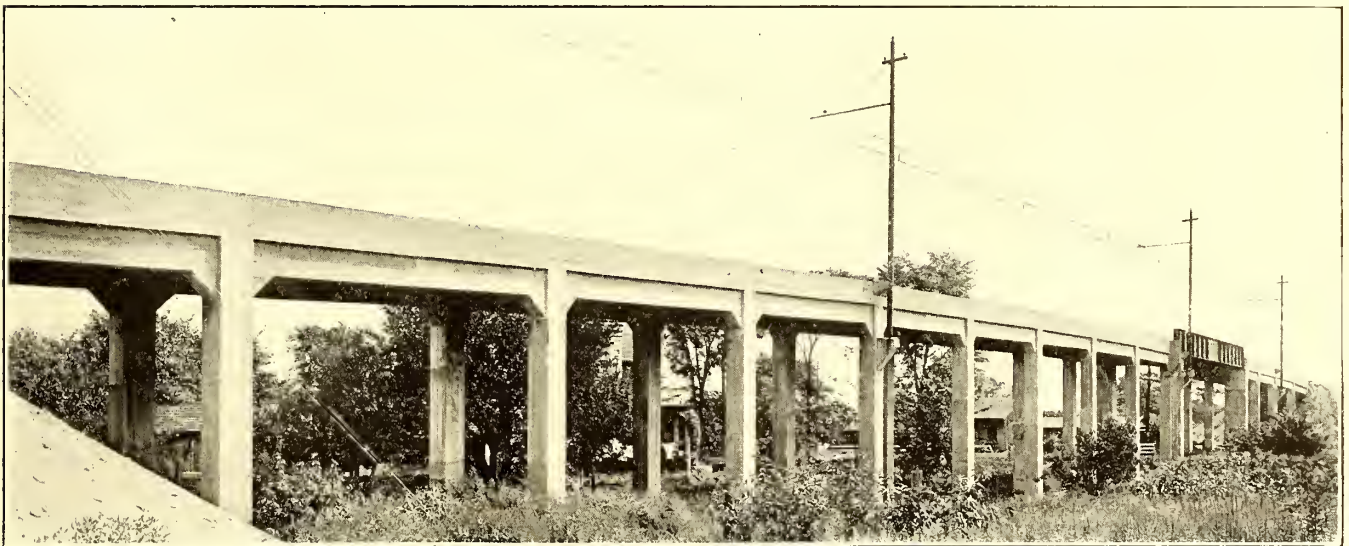


Fig. 16—Shore Line Railway—Concrete Approach and Viaduct Over Track of New York, New Haven & Hartford Railroad

located approximately 25 ft. or 30 ft. from the bracket so as to overcome the tendency to lift the trolley wire above its normal position. A turnbuckle is used on both the messenger and trolley anchors to permit the adjustment of slack between separate anchorages. This arrangement forms a very flexible anchorage and no pounding or shock is suffered when the cur-

are only three wires. These are No. 2 B & S copper wires. For the greater part of the distance the transmission line is carried on the same poles as the trolley wire, which are spaced 150 ft. apart. In some cases a pole as high as 75 ft. has to be employed to carry the line over the trees, as permission could not be obtained to cut the old elm trees for which the locality

is famous. The insulators are of standard single-petticoat type made by the Ohio Brass Company. They are supported on 9-ft. standard wooden screw pins.

Fig. 19 shows some interesting details of construction where the transmission line crosses the tracks of the New York, New Haven & Hartford Railroad. Here semi-hard drawn standard wire has been used and the minimum and maximum sag have been confined to 6 in. and 20 in. respectively, and the maximum tension has been limited to 30,000 lb. The wooden strain in-

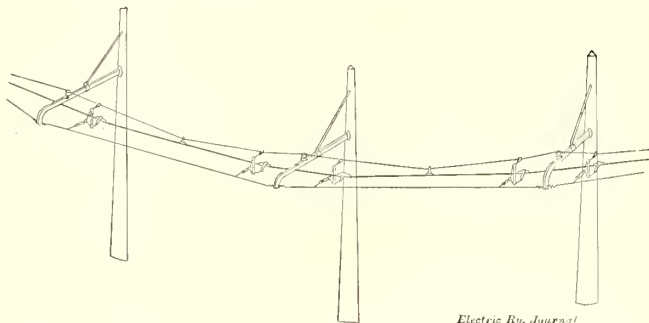


Fig. 18—Shore Line Railway—Single-Track Catenary Curve with Extension Bracket

sulators are 20 in. by $1\frac{1}{4}$ in. diameter and were made by the General Electric Company. The height of the poles is shown in the drawing.

TRACKS, ETC.

There are some quite notable civil engineering features in the construction of the Shore Line Electric Railway, mostly in the form of reinforced concrete structures. The smaller bridges and culverts are quite numerous, as the road traverses some marshy stretches of country. The viaduct over the track of the New York, New Haven & Hartford Railroad, illustrated

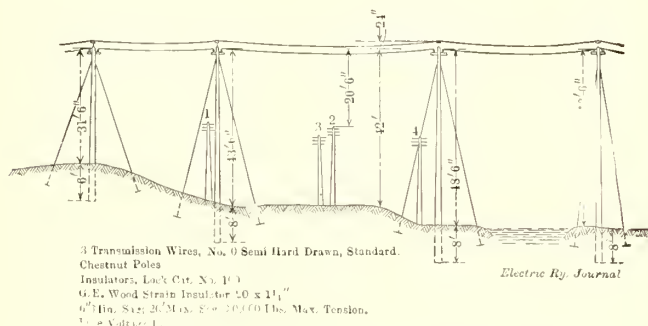


Fig. 19—Shore Line Railway—High-Tension Transmission Line Crossing Over Steam Railroad Tracks

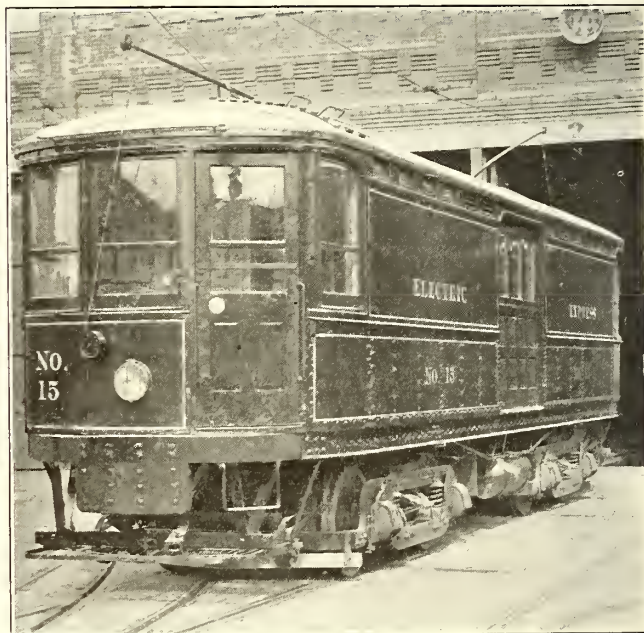
in Fig. 16, is a good example of the type of construction employed. The curves, which are fairly numerous, are all super-elevated to permit a high speed and in some places the grades are fairly heavy. For instance, there is a 5 per cent grade for about 1000 ft. at Signal Hall and where the electric line crosses the tracks of the New York, New Haven & Hartford Railroad, but, on the other hand, there are some long straight stretches of track that are practically level. The roadbed is for the major part made of crushed rock. The tracks are standard gage, namely, 4 ft. $8\frac{1}{2}$ in. The road is single track throughout, but exceptionally long crossovers and turnouts are provided which would accommodate trains of any length likely to be operated over the system. The rails are of the A.S.C.E. standard and weigh 70 lb. per yard. The bonds are of twin terminal type.

Dartmouth College, through its school of business and administration, the Amos Tuck School of Administration and Finance, announces a conference of scientific management for the benefit of the manufacturers and business men of New Hampshire and the neighboring States to be held at Hanover, N. H., Oct. 12, 13, and 14, 1911.

NEW EXPRESS CARS OF THE OLD COLONY STREET RAILWAY

The Old Colony Street Railway, Boston, Mass., has recently received from the builders, the Laconia Car Works Company, four semi-steel, high-speed express cars to be used in the territory south of Brockton, Mass. The cars were designed by E. W. Holst, superintendent of equipment Old Colony Street Railway, and were assembled and equipped at the Campello shops of the company. They have a number of interesting and unusual features, among which may be mentioned the long overhang beyond the bolsters, the arched roof construction, reinforcement in the end and side framing to prevent telescoping, and the use of movable slat ventilators along the eaves.

The cars are 39 ft. long over bumpers, and although the superstructure of the vestibules at each end is framed separately from the body the underframe is continuous and the floor of the vestibules is on a level with the floor of the car. The distance between bolster centers is only 18 ft., so that the overhang at each end is slightly greater than half the distance between supports and an equally balanced cantilever effect is obtained. The longitudinal members of the underframe consist of two 6-in., 12.25-lb. I-beam center sills and 8-in., 18-lb.



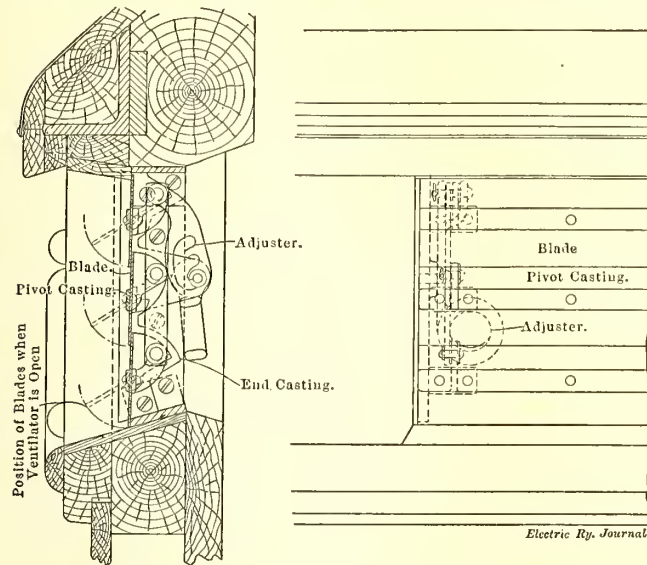
Old Colony Street Railway—Semi-Steel Express Car

I-beam side sills. The center sills are continuous from bumper to bumper, but beyond the body end sills they are spread apart a distance of 2 ft. 10 in.. Light angle corner braces extend back to the end sills and stiffen the connections of the center sills and the bumper. The side sills extend out 28 in. beyond the end sill and the 3-in. x 7-in. angle-iron bumper is riveted to them.

The end sills are formed of 4-in. I-beams reinforced by 3-in. x $3\frac{1}{2}$ -in. x $\frac{1}{4}$ -in. angles riveted to the bottom flanges of the longitudinal sills. The bolsters are of the built-up type with top and bottom plates 1 in. x 10 in. Between the bolsters the longitudinal sills are tied together with two 4-in. I-beam cross-ties and two $2\frac{1}{2}$ -in. x $\frac{1}{2}$ -in. diagonal braces. Angle-iron needlebeams are riveted under the longitudinal sills 24 in. on each side of the center of the car to support the body truss rod queen posts. The two truss rods are $1\frac{1}{8}$ in. in diameter and are anchored on top of the bolsters. They are tightened with turnbuckles inserted between the queen posts and have a drop of 9 in.

The framing of the superstructure is a combination of wood and steel members. The main side posts over the bolsters and

at the door openings are 4-in. 5.25-lb. channels, and the body corner posts are 6-in. x 6-in. x $\frac{3}{8}$ -in. angles. The posts on each side are tied together at the top by a 2½-in. x 2-in. x $\frac{1}{4}$ -in. angle and they are also stiffened by double diagonal braces of 2½-in. x $\frac{1}{4}$ -in. strap iron in each panel. A 2-in. x $\frac{3}{8}$ -in. over-



Cross Section.

Old Colony Express Car—Details of Ventilation

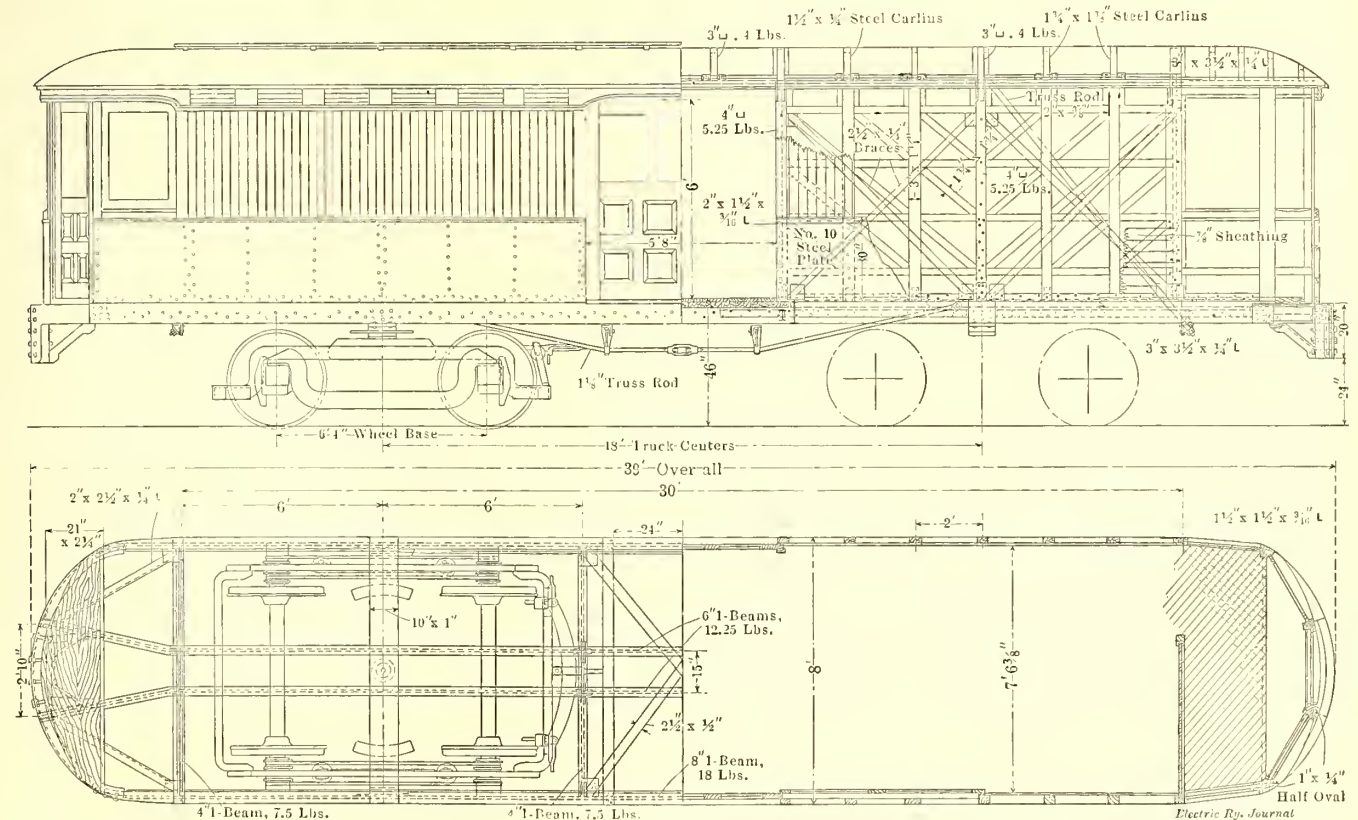
hang truss rod is anchored under the end sill at each end of the car and passes over the tops of the bolster posts. In the panels formed by the main posts are inserted two 3-in. x 1¾-in. wooden posts and four rows of horizontal furring strips to which the sheathing is fastened. The bottom half of the car

The roof is formed in a flat arch and the framing consists of 3-in. channel main carlines resting on the main posts, together with compound wood and steel intermediate carlines. A layer of ½-in. wood sheathing is placed on the carlines and over this a layer of roofing canvas is applied.

The vestibule framing consists of wooden posts and horizontal furring strips for the steel plate dasher. An end door is built in the left-hand side of each vestibule and the two door posts are reinforced with angle corner irons. The two posts on the right-hand side are reinforced with strips of half-oval iron, 1 in. x $\frac{1}{4}$ in., in order to prevent splintering of the posts in the event of minor collisions.

The special equipment of the cars includes four GE-80 motors with a gear ratio of 19:67; K-35-L double-end control; General Electric air brakes with CP-27 compressor; Root snow scrapers; Standard trucks with a wheelbase of 6 ft. 4 in. and 34-in. steel-tired wheels; Peacock hand brakes; Kilbourn sanders; Pfingst fenders and Consolidated heaters. An interesting detail is the drop bumper plate, 20 in. deep and 34 in. wide. This is made of ¼-in. steel plate and is strongly braced. Projecting square-head bolts are used to fasten the braces. These bolt heads, it is thought, will tend to prevent overriding in case of a collision. Another unusual feature is the use of circuit breakers at each end of the car, both of which are in series with the main motor circuit at all times. The conductor can open the circuit breaker at the rear end and shut off the current in case of emergency. The light weight of the cars is in the neighborhood of 25 tons.

These cars are equipped with special ventilators, which were designed by the equipment department. Twelve of these ventilators are installed on each side of the car in the space which otherwise would be occupied by the letterboard. The openings are 6 in. x 15½ in., and are closed by three steel blades, which are horizontally pivoted. These blades overlap when closed



Old Colony Express Car—Plan and Side Elevation, Showing the Principal Dimensions, the Sizes of the Main Members of the Framing, Side Sheathing, Truck Wheelbase, Etc.

side is formed of No. 10 gage steel plates, while the upper part is sheathed with wood ½ in. thick. On the inside of the car ⅞-in. wood sheathing is carried up to line 24 in. from the floor.

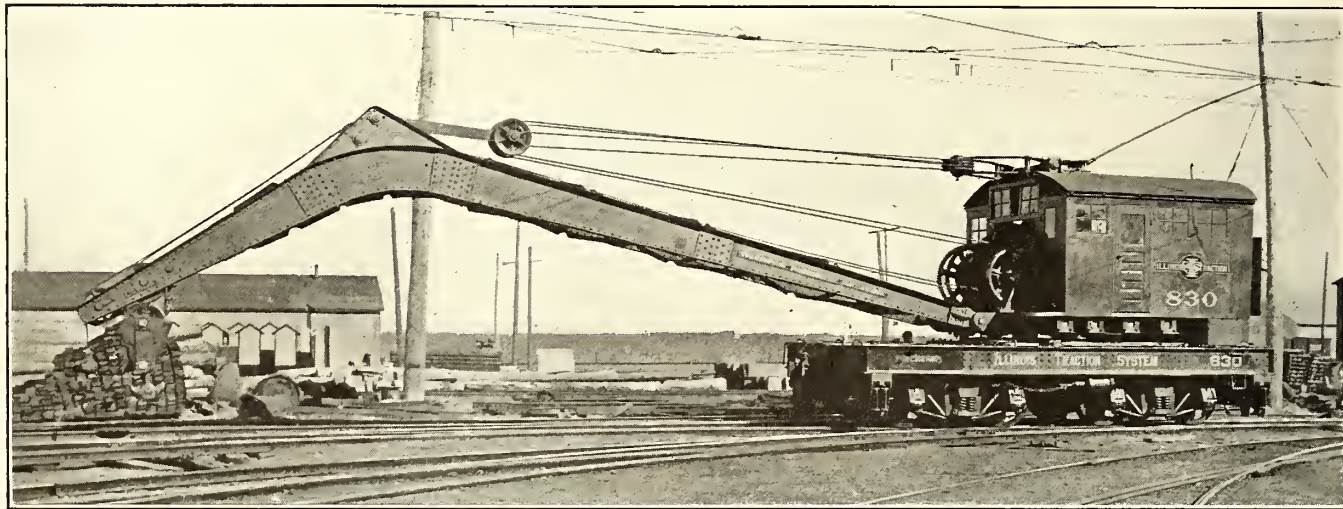
and when opened assume an inclined position which prevents the admission of rain while permitting the free passage of air. The details of this ventilator are shown in the accompanying drawing.

NEW WRECKING CRANE FOR THE ILLINOIS TRACTION SYSTEM

The Illinois Traction System has just equipped for service a No. 3 electrically operated wrecking crane built by the Browning Engineering Company, of Cleveland, Ohio. This crane has a capacity for handling the following loads: 10-ft. radius, 43,500 lb.; 25-ft. radius, 13,400 lb.; 40-ft. radius, 7100 lb.

which would be reliable under severe service. The bevel gears are cut from steel castings and the worm gear for raising the boom is made of bronze. The main casting which carries the turntable weighs 16,000 lb.

The second view shows a yard crane also used by the Illinois Traction Company and built by the Browning Engineering Company. This crane is fitted with a long boom so that it may be used for handling material around the storehouse and shop



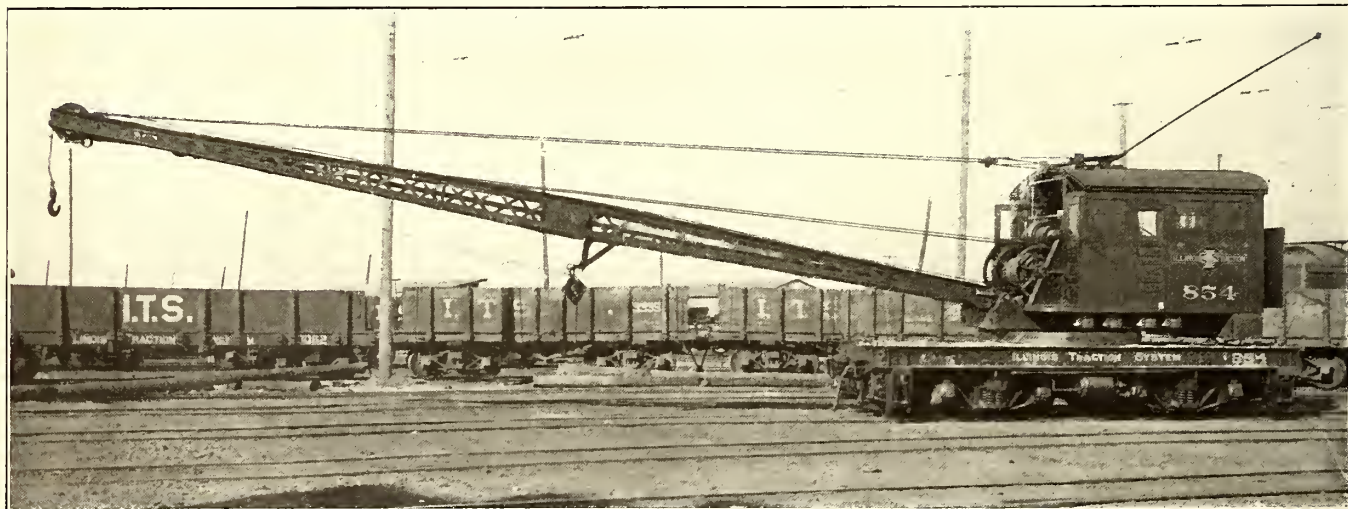
Wrecking Crane for the Illinois Traction System

The frame supporting the crane and the cab inclosing the machinery are made of steel. A single Westinghouse No. 303 railway motor of 100-hp capacity furnishes power for performing all the operations of the crane. The motor is controlled by an R 32-G reversing controller. The armature of the motor has two pinions which mesh with the gears of a main driving shaft. From this shaft, by means of clutches and bevel gears which are interlocked to provide against accident in case of confusion on the part of the operator, the power for the motor is distributed for performing the operations of swinging and lifting the boom and its load and for moving the crane car. The car is propelled along the track

yards or to reclaim coal from the submerged coal pits described in an earlier issue. The driving mechanism of this crane is similar to that of the wrecking crane. Practically the only difference is in the length and design of the boom.

THE LITTLE ROCK RAILWAY & ELECTRIC COMPANY

The Little Rock Railway & Electric Company, Little Rock, Ark., has announced a number of changes in the personnel of the lighting department of the company. C. E. Rose, who has been superintendent of lighting and sales departments, has



Yard Crane for the Illinois Traction System

through bevel gears connected to one of the axles. The speed of travel is 10 m.p.h.

The first engraving shows this wrecker and its boom. The boom is equipped with a main hoist and an auxiliary high-speed hoist. Outriggers and track anchors are provided for steadying the wrecker when the boom is swung to one side. The workmanship on this crane is said to have been very carefully executed with the idea of obtaining a mechanism

resigned to become vice-president and general manager of the Arkansas Cold Storage Company. Arthur E. Smith has been appointed superintendent of the sales department of the company to succeed Mr. Rose. Matthew J. Kenney has been appointed superintendent of the lighting department of the company to succeed Mr. Rose. Mr. Kenney has been in charge of lines and cables of the company for the past three years and an employee of the company for twelve years.

REPORT OF MARYLAND COMMISSION

A report of the Public Service Commission of Maryland for the eight months ended Dec. 31, 1910, reviews the preliminary work of the commission. In reference to the difficulties which arose from the fact that three important matters were brought before the commission at the outset the report says:

"In most of the States which have enacted public service commission laws a beginning has been made affecting only one or two classes of corporations, and from time to time other corporations have been brought under the operation of the law as the necessity arose and the advantages of this kind of supervision and control were disclosed by actual administration. In New York several commissions, with more or less complete organizations, were consolidated in the Public Service Commissions under the law of 1907. Even under these conditions the commissions in other States found difficulties in the way of proceeding immediately with all of their departments in full operation. The Maryland law is very broad and comprehensive, covering every class of public service corporation, and independently of the difficulties mentioned the commission soon reached the conclusion that it was impracticable to put all of the departments into active operation at once. Obviously, its first duty was to obtain all the information possible from the corporations under its jurisdiction, and by means of orders and circulars a large number of reports have been received. The commission was under the further obligation to the State to employ for the important work intrusted to it the best equipped men obtainable. This is a difficult task under the most favorable circumstances. In the meantime, the organization has been extended as occasion required in those directions in which supervision and inspection seemed of immediate importance, and many matters of varied interest and importance have engaged the serious attention and study of the commissioners."

Included in the list of companies under the jurisdiction of the commission are twenty-nine electric railway companies, with \$38,936,700 capital stock and \$81,318,618 bonds, a total of \$120,255,318. The report says in part:

"In all cases where stock and bonds are authorized the commission requires periodical reports, under oath, of the amount of sales or other disposition of the issue, and of the use made of the proceeds of such sales.

"Most of the cases of this class so far disposed of by the commission affected corporations in existence before the enactment of the Public Service Commission law, whose schemes of financing were in some instances already operative, and in others all of the plans had been agreed upon and construction work had actually begun. It was, in a few cases, a question of halting needed utilities upon which large expenditures had already been made, or trusting to supervision to improve conditions, and the latter view was adopted as promising the best results to the communities affected.

"Very few new corporations have asked approval of plans of construction or of the issue of stocks and bonds, but this class of cases may be expected to increase materially in the near future. Electric railroads and electric light and power plants are projected in many parts of the State, and will call for a large aggregate capital outlay for their development. The tendency to extend these utilities into farming sections is becoming very pronounced, and the supplying of electric power especially promises to solve many of the difficulties which surround modern farm life. The probable extension of utilities along these lines will vastly increase the number of people affected by them, and offers a safe field for the investment of capital, provided the management is intelligent and conservative and the supervision of public service commissions is alert and thorough. All that the commission can accomplish with respect to companies established and operating before the law was passed is to bring them by degrees to a satisfactory physical and financial condition.

"It is in this class of cases that one of the most delicate and important duties of the commission arises. We feel that we

should encourage, as far as possible, new enterprises which promise facilities for the use of the people, but the law imposes upon us the duty of seeing that such enterprises are feasible, that the plan of financing them is sound, that the nominal capital represents actual investment and not a fictitious basis for the establishment of rates, and that the properties are maintained at a proper standard of efficiency.

"The operation of electric railways has been the subject of much anxious consideration upon the part of the commission. Up to the present time attention has been given mainly to the city and suburban lines operated by the United Railways & Electric Company of Baltimore. By consolidation, lease or stock ownership this company operates under about seventy-five charters granted from time to time by the General Assembly or under the general corporation law of the State, and it has no competitor in the field occupied by it. It furnishes a unique example of the unwisdom of hasty and ill-considered plans of rival interests to establish public utilities, the lack of system in the location of lines of traffic which is finally imposed upon the community by such methods, the necessity of consolidation in the interest of economy and efficiency which ultimately arises, and of the enormous capital which results from the efforts of original investors to save themselves from loss. The existing condition was established long before the Public Service Commission was created and the commission has to deal with a situation which it found and not with one which it would have approved as an original proposition.

"The commission has endeavored to become informed of the appliances adopted by the company for the safety and convenience of the public. At a very early period the condition of the car fenders attracted attention, and through reports of its inspector and conferences with officers of the company a decided improvement is noticeable in the maintenance and efficiency of this safeguard against accident. But the fender is far from being the last word on the subject of safety appliances as it affects the great number of people who occupy the streets and cross the rights-of-way of the company. A careful study of devices and of the requirements and practices in other large cities in the United States and in other countries convinces us that something more can be done in Baltimore. But grades, character of street paving, types of cars, general traffic conditions and other matters all have a more or less important bearing upon the kind of appliance to be adopted. As to these things Baltimore presents some difficulties. There is scarcely a line of electric railway in the city which does not pass over every kind of street pavement, and in the course of its passage almost every car will meet different and widely varying conditions for the operation of safety appliances. The wheelguard, where it can be operated in connection with the fender, has been found a reliable and efficient instrument in saving the lives of pedestrians, and the commission is impressed with its value. The authorities of the United Railways are very decided in the opinion that it cannot be successfully operated in Baltimore, and the commission has not felt warranted in ordering its use until a careful inspection of track and traffic conditions in the city could be made by a competent engineer. The reasons why such inspection could not be made heretofore have been already detailed.

"Car service and schedules, also, have been under observation. As this is a subject in which a very large part of the population of the city is interested the commission has made a study of it in some parts of the city. The reports of public service commissions in other States disclosed many difficulties in the way of maintaining a regular time schedule and also in the way of preventing the overloading of cars, and it was to be expected that their experience would be repeated in Baltimore. Two series of observations were made—the first in July and August, the second in November and December. During the first period the cars, with very few exceptions, were of the open type with transverse seats, which have no standing room except between the seats and on the footboards. The results of thirty-four observations during July and August are given, and it is proper to state that every precaution was taken to insure

accuracy both as to the number of standing passengers and the intervals of time between cars, and that the observations were made at various points within what may be termed the crowded section of the city. They cover both morning and evening traffic and were designed to test the conditions at the rush hour in each direction. The average period of observation was one hour and forty-five minutes. The total number of cars observed was 1077, of which 326, or 30.27 per cent, contained standing passengers. The total number of standing passengers was 2478, of whom 1352, or 54.6 per cent, were standing between seats or in aisles, and 1126, or 45.4 per cent, on foot-boards. The average number of standing passengers for all cars run was 2.47, and for the cars with standing passengers 7.6. The greatest number standing in one car was 37 and the number exceeded 30 in two other instances. The morning and evening traffic does not vary materially in point of numbers, but the peak of traffic extends over a somewhat longer period in the evening than in the morning—the time being about one hour in the former and forty-five minutes in the latter. The average time between cars was 3.68 minutes, but this includes one tie-up of forty-seven minutes, which unduly increases the average.

"The winter conditions, with closed cars under observation, give a general car service practically the same as the summer schedule, the average interval between cars being 3.6 minutes. Of 850 cars observed 655, or 78.23 per cent, carried passengers standing in the aisles and on platforms. An aggregate of 11,704 standing passengers was counted in the 850 cars, of whom 6205, or 53.78 per cent, were in the aisles and 5499, or 46.22 per cent, were on the platforms. The average for all cars run was 13.4, and for cars with standing passengers 16.6. In seventy-seven instances the number of standing passengers exceeded the seating capacity of the cars.

"Car crowding is, as already stated, a difficult matter to deal with. The waiting passenger insists upon taking the first car that arrives, no matter how full it may be. Instances were frequent where an overloaded car was followed within half a minute by one which must have been in sight, but the full car was invariably taken in preference to a wait of thirty seconds. To some extent and in some aspects, therefore, the matter of overloaded cars is one which the public, rather than the company, can control.

"One matter may be mentioned, however, which bears directly and to a very considerable degree upon the subject of rapid transit, and which appears to the commission to be a removable cause of delay. Reference is made to the almost universal custom of using the car tracks by teams drawing heavily laden wagons. There are some localities where the practice is unavoidable, and in many places a vehicle drawn up to the curb forces passing vehicles to the car tracks, but there is no good reason why they should remain there. That the tracks provide smooth travel and somewhat relieve the burden of the horses is beyond question, but drivers should not be permitted for that reason to interfere with the movement of cars. The average driver, it has been observed, is very deliberate, if not intentionally obstinate, when it comes to getting out of the way of the cars, and a much more satisfactory service would be maintained if this cause of delay could be removed. It is a matter over which the commission has no control, falling, as it does, within the power of the municipality to regulate the use of the streets."

Ross J. Hazeltine, United States Vice-Consul at Tenerife, Canary Island, in a report to the Bureau of Manufactures of the Department of Commerce and Labor says: "The electric tramway which extends from Santa Cruz, Tenerife, to Tacoronte, installed several years ago, is still operated by a Belgian syndicate, which has a franchise for fifty years, expiring in 1945. The local government takes 25 per cent of the gross earnings of the company. The electric light and tram companies are affiliated and operated under the same name, *Compañía Electrica Industrial de Tenerife*."

METROPOLITAN STREET RAILWAY REORGANIZATION PLAN

At a hearing before the New York Public Service Commission, First District, on May 9 in regard to the bondholders' plan for reorganization of the Metropolitan Street Railway testimony was offered by H. Hobart Porter, James G. White, Charles F. Uebelacker and J. L. Quackenbush. Commissioner Milo R. Maltbie presided.

TESTIMONY OF H. HOBART PORTER

H. Hobart Porter, of Sanderson & Porter, was recalled to the stand and testified regarding the estimate, made by F. R. Ford, of \$18,097,654 for expenses of the development period. He said that on the assumption upon which the estimate had been built up, namely, that the property was to be created absolutely new and not upon the structure of previous horse car or cable lines, the percentage of the total represented by the \$18,000,000 item would probably be inadequate to produce the results. He could only base his opinion of the amount which would be proper upon experience in the organization and financing of new properties, none of which, of course, was a street railway constructed new in a large city absolutely without street railway facilities. But from the results in small cities and judging from the difficulty experienced in raising large amounts of capital for smaller enterprises he was led to the conclusion that the probable total cost would be at least 20 per cent of the total cost of the property. The cost of obtaining the capital for construction was as much a cost of the property as the cost of obtaining any of the physical portions that entered into it. Frequently bonds were not salable on property that had not yet been created and large amounts of money had to be obtained during construction and prior to the sale of the bonds. Such a condition required that the funds be obtained from bankers or syndicates and underwriting fees for capital for new properties were very great. Mr. Porter would allow in the cost of the property whatever sum was necessary to raise the money most economically. The fair value of the property went up or down as the cost of all things that entered into it moved.

TESTIMONY OF JAMES G. WHITE

James G. White, of J. G. White & Company, Inc., testified that the allowance of 8.8 per cent for incomplete inventories and incidentals was entirely reasonable. His general rule for work of this character would be an allowance of 10 per cent on estimates. The allowance of 10 per cent for contractors' profits would be the usual fee, but in work of this kind probably one-half would be used for general expenses and one-half would be profit. If the work was to be done by a lump bid, Mr. White would probably estimate more than 10 per cent and allow pretty liberally for contingencies, possible accidents and other unforeseen items. The allowance of 5 per cent for engineering was reasonable and the usual average cost. Under existing conditions in New York, 10 per cent was entirely reasonable for interest and taxes during construction.

There were two ways in which to arrive at a fair development cost. One was to make detail estimates, as had been done apparently in this case, and the other was to follow general experience and take the particular conditions into account. Twenty per cent was moderate and entirely reasonable in this case. There were many instances where total development charges exceeded 50 per cent. If paid in securities these charges sometimes ran up to several hundred per cent. A construction period of five years was reasonable.

TESTIMONY OF CHARLES F. UEBELACKER

Charles F. Uebelacker, chief engineer of Ford, Bacon & Davis, was recalled and testified that the engineering cost on the New York subway was 7.9 per cent. In engineering a project provision had to be made not only for the route adopted, but also for many alternate routes. He had known a great many instances where the engineering cost was 7½ per cent or more. Engineering included the preparation of working drawings, inspection and mill inspection. The estimate of 5 per cent in the exhibit was insufficient.

Ford, Bacon & Davis, testified regarding the liabilities of the Metropolitan system and the receivers in order to indicate how it was intended to transfer the property to the new company.

Commissioner Maltbie asked about an item of three-year notes.

Joseph P. Cotton, Jr., for the joint reorganization committee, stated that \$8,000,000 of these notes were issued on May 22, 1907, and delivered to the New York City Railway. On the same day they were delivered in turn to the Metropolitan Securities Company, the Interborough-Metropolitan Company and the Mercantile Trust Company of New York. Half of the notes are held by the trust company and the balance were the notes on which the receiver of the New York City Railway sued and recovered a large cash judgment.

Charles F. Mathewson, counsel for the committee, said that any recognition of the notes in the reorganization was entirely voluntary.

Mr. Mathewson stated in reference to the tort claims that the theory upon which they were included was that the obliga-

ELECTRICAL MAINTENANCE COSTS OF THE THIRD AVENUE RAILROAD, NEW YORK

During the past three years the Third Avenue Railroad, New York, has gradually taken its Westinghouse Nos. 56 and 68 motors out of active service and replaced them by Westinghouse No. 310 and GE-210 two-motor equipments. The adoption of these modern motors has led to a most gratifying improvement in service and to very reasonable maintenance charges. Motor defect failures have been practically eliminated and, in fact, not more than half a dozen armatures have been rewound during the past two years. The low maintenance costs are shown in the accompanying table, which presents the labor and material items for the first three months of the current year as made up from monthly material charges and the weekly payrolls. During this period 2,747,093 car miles were operated for a maintenance cost of 0.408 cent per car mile covering all electrical car equipment whatsoever except lighting, heater and push-

CAR EQUIPMENT MAINTENANCE COSTS ON THE THIRD AVENUE RAILROAD, NEW YORK, FOR THREE MONTHS OF 1911.

Class of Equipment.	JANUARY			FEBRUARY			MARCH		
	Material.	Labor.	Total.	Material.	Labor.	Total.	Material.	Labor.	Total.
Armatures, fields, brush-holders, bearings, etc., of G. E., 210 motors.....	\$132.50	\$74.60	\$207.10	\$99.40	\$74.20	\$173.60	\$318.78	\$78.80	\$397.58
Armatures, fields, brush-holders, bearings, etc., of Westinghouse No. 310 motors.....	228.75	234.23	462.98	297.90	199.45	497.35	302.80	241.06	543.86
Armatures, fields, brush-holders, bearings, etc., of miscellaneous motors.....	78.75	3.12	81.87	27.54	36.86	64.40	19.67	1.50	21.17
Controllers, rheostats and circuit breakers.....	225.98	491.32	617.30	192.56	495.88	688.44	173.09	564.97	738.06
Gears, pinions and gear cases.....	152.81	22.63	175.44	514.74	19.65	534.39	336.68	14.50	351.18
	\$318.79	\$825.90	\$1,544.69	\$1,132.14	\$826.04	\$1,958.18	\$1,151.02	\$900.83	\$2,051.85
Total mileage for three months.....									2,747,093
Total labor and material cost for three months of all electrical equipment as listed.....									\$11,209.44
Total labor and material cost for three months for motor equipments, exclusive of gears, pinions and gear cases.....									4,899.82
Labor and material cost per car mile of all electrical equipment as listed.....									0.00408
Labor and material cost per car mile of motors, exclusive of gears, pinions and gear cases.....									0.00178

COMPARATIVE STATEMENT OF CARHOUSE COSTS FOR MARCH, 1911.

THIRD AVENUE RAILROAD.											
Forty-second Street, Manhattan and St. Nicholas Avenue											
Third Avenue Division				Dry Dock and East Broadway Division				UNION RAILWAY.			
129th Street and Third Avenue and Sixty-fifth Street Carhouses Cars Maintained 233				129th Street and Amsterdam Avenue and Manhattan Street Carhouse Cars Maintained 150				West Farms and Port Morris Carhouses Cars Maintained 193			
Grand Street Carhouse Cars Maintained 56				Bronx River Carhouse Cars Maintained 75				Cars Maintained 268			
Cost				Cost				Cost			
Total Cost per Car				Total Cost per Car				Total Cost per Car			
Acct. No.	Classification	Total Cost	per Car	Acct. No.	Classification	Total Cost	per Car	Acct. No.	Classification	Total Cost	per Car
107	Car bodies.....	\$245.80	\$1.05	107	Car bodies.....	\$176.80	\$1.18	107	Car bodies.....	\$341.90	\$1.77
107C	Fenders.....	48.10	.20	107C	Fenders.....	69.50	.46	107C	Fenders.....	127.95	.77
107D	Trucks.....	125.00	.53	107D	Trucks.....	59.10	.39	107D	Trucks.....	140.35	1.87
107E	Wheels.....	22.80	.10	107E	Wheels.....	28.40	.19	107E	Wheels.....	9.65	.14
107F	Brakes (hand).....	164.20	.70	107F	Brakes (hand).....	196.80	1.31	107F	Brakes (hand).....	209.78	2.81
107G	Brakes (air).....	65.15	.28	107G	Brakes (air).....	72.10	.48	107G	Brakes (air).....		
107H	Heat and light.....	59.60	.26	107H	Heat and light.....	39.60	.26	107H	Heat and light.....		
108	Horse cars.....			108	Horse cars.....			108	Horse cars.....		
109	Service cars.....			109	Service cars.....			109	Service cars.....		
110	Motors.....			110	Motors.....			110	Motors.....		
110E	Control'rs, rheos, etc..	129.65	.55	110E	Control'rs, rheos, etc..	85.20	.57	110E	Control'rs, rheos, etc..	177.50	.96
110F	Plows.....	79.85	.34	110F	Plows.....			110F	Plows.....	59.77	.80
110G	Gears and pinions.....	2.60	.01	110G	Gears and pinions.....			110G	Gears and pinions.....		
110H	Wiring contr. cirts..	3.90	.02	110H	Wiring contr. cirts..			110H	Wiring contr. cirts..		
111A	Carhouse foremen....	312.00	1.33	111A	Carhouse foremen....	325.00	2.17	111A	Carhouse foremen....	177.50	2.36
111B	Carhouse employees..	412.00	1.81	111B	Carhouse employees..	182.20	1.22	111B	Carhouse employees..	41.50	.55
111C	Car shifters.....	573.00	2.45	111C	Car shifters.....	355.16	2.37	111C	Car shifters.....	29.55	.39
111D	Car cleaners.....	1,092.90	4.69	111D	Car cleaners.....	640.10	4.27	111D	Car cleaners.....	170.10	2.26
Total.....		\$3,336.55	\$14.32	Total.....		\$2,276.41	\$15.18	Total.....		\$1,192.63	\$15.90
Cost per car.....		\$14.32		Cost per car.....		\$15.18		Cost per car.....		\$15.90	
Mileage.....		559,669		Mileage.....		303,836		Mileage.....		282,027	
Cost per mile.....		\$0.006		Cost per mile.....		\$0.0074		Cost per mile.....		\$0.0042	
Type motor.....		Westinghouse No. 310		Type motor.....		Westinghouse No. 310 and GE-210		Type motor.....		GE-210 and GE-57	

tions rested really upon the estate and the property ought to bear obligations of this character, because the injuries arose from its use.

It is reported that the Budapest-Czinkota-Gödöllő suburban line has recently been converted to electric traction, this being the preliminary to the conversion of all the lines in the vicinity. The length of this section is about 20 miles, and it is double-tracked throughout. Three-phase current at 10,000 volts is generated in a station at Czinkota, where two 2200-hp steam turbines are at present erected. The three-phase current is converted in substations to direct current at 1000 volts. The cars are fitted with 160-hp motors and run at over 30 m.p.h.

button circuits. The cost of motor maintenance alone, exclusive of gear cases, was 0.0178 cent per car mile. The apparatus used during the period named in the table consisted of 301 Westinghouse No. 310, 131 GE-210 and nine miscellaneous equipments—all two-motors per car. These costs are given for all motors together as no mileage record is kept of motors according to type.

One of the most satisfactory developments has been the continued absence of visible commutator wear after three years' service. According to present appearances, the commutators should not require turning oftener than once in ten years. These excellent conditions are due in part to the use of modern motors and in part to high-grade carbon brushes applied at a ten-

sion of about 5 lb. With few exceptions, the original Le Carbone "G" brushes are still in the motors. Beginning in January, 1909, the company installed at various times some fifteen types of carbon brushes for test. These brushes as measured on March 10, 1911, showed some remarkable differences in wear and general behavior. The least wear, 0.0021 in. per 1000 miles, was shown by a brush which unfortunately was hard on the commutator. The best wear of the brushes which did not injure the commutator was 0.0044 in. per 1000 miles. Nearly one-half of the brushes were removed long before the end of their theoretical life on account of chipping and breakage at the top.

Probably the best index to the motor conditions of the Third Avenue Railroad is afforded by the armature and commutator shop. Formerly this shop had eighteen to twenty men constantly employed on repairs. Six of these men were armature winders and three were helpers. To-day only one man is occasionally required for railway armatures while not one commutator has been repaired in two years. With few exceptions, the original armature bearings have not been relined and most of the axle bearings have been relined only once.

MONTHLY COMPARISONS OF CARHOUSE LABOR COSTS

A feature of the organization of the car equipment department is the comparative record of carhouse labor per car and per car mile which is sent monthly to all the foremen. The cost per car would not give a fair comparison inasmuch as the average mileage per car varies considerably at the different carhouses. Thus one of the carhouses named in the accompanying table had a monthly labor cost of \$14.32 per car and \$0.006 per car mile, whereas another carhouse spent \$15.90 per car but its mileage per car was so much larger that the cost per car mile was only \$0.0042. The table shows that in March, 1911, 439 cars on the Third Avenue Railroad were maintained for \$14.63 each, or at \$0.0065 per car mile. During the same month the Union Railway, which is under the same management, operated 268 cars at a carhouse labor cost of \$16.10 per car, or \$0.0051 per car mile. The table also shows the character of equipment used on each system. In the records of the company special subdivisions, No. 107 GA and No. 107 GW, are provided to cover the two different types of air brakes used and likewise account No. 110 is subdivided into "A," "B" and "C" for three different classes of motors, in addition to the other electrical subdivisions shown in the table.

The accounts covered by the general title of carhouse costs relate to the following: carbodies, fenders, trucks, wheels, air and hand brakes, heating and lighting, service cars, horse cars, motors, controllers, rheostats, plows (or trolleys), gears and pinions, control wiring, carhouse foreman, carhouse employees, car shifters and car cleaners.

THE USE OF ELECTRICITY ON ITALIAN RAILWAYS

The report of the Italian State Railways for the year 1909 contains some interesting information with regard to the electrified steam lines and to the use of electricity on steam cars. The Busalla-Pontedecimo section of the Genoa-Busalla line was completed in January, 1910, and after a number of experimental runs regular train service was instituted in July with Westinghouse locomotives. The train weights were gradually raised to 400 metric tons and the speed to 45 km per hour (27.9 m.p.h.). Progress is reported in the electrification of the Bardonecchia-Modane section of the Mont Cenis Railway. A contract was made with the municipality of Turin whereby the latter will furnish 3000 kw for three years and, if necessary, for four years to the line named. Negotiations are under way looking to the purchase of power in case the Turin-Pinerollo line is electrified, which has been considered for single-phase operation. The Lecco-Calolzio Railway was also placed in service during the year.

On June 30, 1910, 4900 steam cars were equipped with electric lighting systems as compared with 1300 in June, 1905. During the same period the number of car storage batteries increased from 3800 to 16,200.

ANNUAL MEETING OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

The annual meeting of the American Institute of Electrical Engineers was held in New York on Tuesday evening, May 16. The principal business was the election of officers for the year beginning Aug. 1, 1911, the presentation of the Edison medal to Frank J. Sprague and the reading of three addresses relating to electric railways and one entitled "Electricity in the Navy." The last paper was presented by Commander S. S. Robison, Bureau of Steam Engineering, Navy Department. Five musical numbers formed a very enjoyable part of the proceedings.

Gano Dunn, vice-president and general manager of the Crocker-Wheeler Company, was elected as president for the ensuing year. After the reading of the annual report of the secretary and treasurer, Prof. Elihu Thomson, chairman of the Edison Medal Committee, announced that in accordance with the conditions of the bequest a gold medal would be presented to Frank Julian Sprague for his services in both horizontal and vertical transportation. Professor Thomson then recited the conditions under which the Edison Medal award came into existence. It was originated by a number of Mr. Edison's friends in commemoration of the twenty-fifth anniversary of the successful introduction of the incandescent lamp. The original organization for this purpose was founded Feb. 11, 1904, on the fifty-seventh birthday of Thomas A. Edison. The first recipient of the medal was Professor Thomson. In presenting the medal, President Jackson said that the name of Edison was one of the few that were destined to be linked with those of Watt and Stephenson.

Mr. Sprague acknowledged the gift of the medal in a happily worded address. He said that he was deeply moved by the cordial appreciation of his confrères in conferring upon him such an exceptional and almost unique distinction. He confessed that not alone was he honored but that he was also very glad to get the medal. He realized that he and Professor Thomson were members of a very select and limited society. Mr. Sprague then gave a witty account of his early connection with Thomas A. Edison, to whom he referred as the beloved Nestor of the electrical profession. In conclusion, Mr. Sprague paid a hearty tribute by name to many of his associates of pioneer days who had shown so much courage in entering the then undeveloped field of the practical application of electricity.

The first of the three addresses on electric railway subjects was the "Development of the Electric Railway," by W. B. Potter, chief engineer railway department, General Electric Company. Mr. Potter reviewed chronologically the progress of electricity from the first experiments with amber by the Greek philosophers up to the developments of the present day. The two great improvements which had accelerated electric railway progress to the greatest degree were the adoption of single reduction gearing for motors and the invention of multiple unit control. Mr. Potter also described the principal inventions of Mr. Sprague in other electrical fields.

Mr. Potter was followed by Franklin H. Giddings, professor of sociology, Columbia University, who delivered an address entitled "Social Results of the Introduction of the Electric Railway." Professor Giddings said that the real test of the efficiency of the electric railway was the result that it was producing in the social realm. One of the foolish prophecies which had been made about the electric railway was that it would relieve congestion in cities. It was true that it had done so in some cases, but on the whole it had not. What the electric railway had done was to redistribute the population in a way that promised interesting social consequences. Formerly men had to stay where they were put, even after the invention of steam railroads, and they did not travel every day. It was the electric railway which had changed the habits of a great many human beings in this respect. It had not had the effect of

destroying the country store, for while the department stores had drawn rural business, the country stores in turn had also come into contact with new fields of trade. The electric railway was sifting out people into three classes—those who want to be at the center of things in town, those who want to be reasonably near their business and those who want to be on a farm in the country. From this time on the population of the country districts would not be composed of those who were born on the spot and obliged to stay there, but of those who really preferred to live there. Thus the electric railway was making it possible for each person to live where he wanted to live. This was the most definite social aspect that could at present be ascribed to the electric railway. Another curious characteristic in the distribution of population brought about by the electric railway was that it made it possible for the inhabitants of rural districts to participate to a great extent in the things which formerly were enjoyed only by people living in more densely populated zones. The tendency of this was to make the population of our country more alike throughout. Professor Giddings thought that the peculiar distribution of population effected by the electric railway also tended to maintain the present political predominance of the middle class on which, he held, depended the stability of American institutions.

The last speaker on railway matters was George F. Swain, professor of civil engineering, Harvard University, who spoke on "The Relation of Government Control to the Development of Electric Railways and the Electrification of Steam Lines." The first part of Professor Swain's address was devoted to a historical review of the development of the electric railway, which he divided into three divisions—the introduction of electricity for propelling single cars, the application of the multiple unit system for train control, and, finally, the electrification of steam railroads, which was now the most active problem. The introduction of electricity on steam railroads would not show all the benefits possible until it was extended to at least the length of an engine run. Where the electrification was practically a question of terminals in big cities, the expense was too much out of proportion to the possible increase in business and in operation. It was plain that the electrification of steam lines was physically possible but the question was financial and economic rather than one of engineering. After discussing the question of government regulation in general, he said that there could be no objection to a wise regulation of public utilities; the only question was how far should such regulation go. It was for the public interest that these utilities should be monopolistic, but for that very reason also they should be subject to public supervision. The nearer a public utility approached to being a public necessity, the more urgent did the need for public control become. This control should be limited to insuring conditions that would give reasonable service, reasonable safety to the public and to the employees, and also reasonable charges with no discrimination. Everything else should be left to the individual initiative of the operators and owners of the properties. The public could well afford to pay very large profits to the men who had given it such great conveniences. Professor Swan was much opposed to the legislative attempts being made to compel electrification of steam railroads. He said that the history of electrification showed that there was no necessity for using force, and in any event the public would have to pay for the change. The electrification of steam lines was usually a luxury and it was wrong to force a company to spend vast amounts of money which could bring no adequate return.

The report of the New York Public Service Commission, Second District, on the record of passenger train performances on the steam railroads of the State for March shows that the number of trains run was 63,512. Of this number 88 per cent were on time at the divisional terminal. The average delay for each late train was 26.2 minutes and the average delay for each train run was 3.3 minutes.

MEETING OF COMMITTEE ON POWER DISTRIBUTION

The committee on power distribution of the Engineering Association held a meeting in New York on May 17. Those present were: A. F. Hovey, Interborough Rapid Transit Company, chairman; E. J. Dunne, Public Service Railway; William Roberts, Northern Ohio Light & Traction Company; Prof. A. S. Richey, Worcester Polytechnic Institute; S. D. Spring, J. G. White & Company, and G. W. Palmer, Boston & Northern Street Railway.

The first subject taken up was the specifications for crossings of trolley wires over railroads, prepared by a sub-committee of which Professor Richey is chairman. Tentative specifications were presented and approved by the whole committee. It was agreed that these specifications should be submitted in conference to a committee of the American Railway Engineering & Maintenance of Way Association for approval before submitting them to the Engineering Association for final adoption.

The next specifications submitted were those covering crossings of foreign wires over the trolley wires of electric railways. These specifications are substantially the same as the specifications for overhead crossings of power wires at steam railroad crossings with the exception that the clear head room between the foreign wire and the street railway company's rails is made not less than 30 ft. Mr. Palmer thought this requirement could not be enforced in the case of single pair telephone service wires. Professor Richey thought that if necessary an exception could be made for wires of this class provided that such wires could cross above trolley span wires at a lower height. The span wire would take the blow of a trolley pole which was off the trolley wire. It was agreed that these specifications should be submitted in conference to the National Electric Light Association, the American Railway Engineering & Maintenance of Way Association and representatives of the American Telephone & Telegraph Company for joint approval before adoption by the Engineering Association.

Professor Richey then presented proposed standard specifications for the joint use of poles. These cover the joint use of poles for wires and cables of electric railways, electric light and power wires, and telephone wires and cables. They differ in many respects from the proposed standard specifications of the National Electric Light Association, which consider railway wires and cables as a side issue only. The proposed Engineering Association specifications fix the location and attachments of electric power, electric light, telephone and railway wires on the poles, beginning at the top, and consider lead-covered telephone cables as bare ground wires which should be supported by insulators on cross-arms the same as negative feeders of railways.

The consensus of opinion of the committee on power distribution was that this subject was most important and that every effort should be made to secure the joint approval of fair and reasonable specifications by all of the telephone, electric light and railway interests concerned. The chairman was instructed to write to the president of the National Electric Light Association and to representatives of the American Telephone & Telegraph Company asking for a joint conference on both the specifications for overhead crossings of foreign wires and joint use of poles, this conference to be held at the earliest possible moment, with the view of reaching an agreement on specifications which would be satisfactory to all interests.

GROOVED TROLLEY WIRE

Mr. Dunne presented a memorandum on this subject stating that several manufacturers of trolley wire were making No. 00 and No. 000 grooved wire having exactly the same groove as the No. 0000 standard grooved wire. He stated that at least one manufacturer was making hangers and ears which could be used interchangeably with any of the three sizes of wire.

SPECIFICATIONS FOR HARD-DRAWN COPPER TROLLEY WIRE

Mr. Dunne read extracts from letters from a number of railway companies suggesting clauses to be used in a proposed standard specification for hard-drawn copper trolley wire. He thought that the specifications of the Boston & Northern Street

Railway for No. 00 round hard-drawn copper trolley wire afforded an excellent basis for standard specifications covering all sizes of round wire. Mr. Palmer argued in favor of the torsion test as being a better indication of the homogeneity and toughness of the copper than elongation tests. He presented several samples of good and bad wire which had been submitted to a torsion test. The torsion test detects the presence of seams, hard and soft spots and brittleness, and poor wire cannot pass such a test. The committee agreed to a few minor changes in the Boston & Northern Street Railway specifications and will submit the new specifications for adoption as standard.

CONCRETE, GALVANIZED TUBULAR AND LATTICED POLES

Mr. Roberts read a report prepared by him on the construction methods and costs of reinforced concrete poles and also a letter from S. L. Foster, of San Francisco, another member of the committee, who advocated for city use the ordinary type of tubular iron poles properly painted. Mr. Foster did not favor concrete poles on account of the great weight and large number of sizes which would have to be carried in stock. He thought latticed iron poles were open to the objection of serious corrosion due to the difficulty of painting them properly and that the extra cost of galvanized tubular poles was not warranted by an increase in their life over properly painted black iron poles.

Mr. Palmer moved that the sub-committee appointed to consider this subject continue its investigation and submit designs and specifications for different sizes of reinforced concrete poles and definite recommendations for or against the use of these poles, particularly as regards first cost and durability as compared with wooden poles. This motion was carried. It was decided to drop the further consideration of lattice poles owing to the limited use to which these poles seem to have been put. The sub-committee was instructed to prepare a standard specification for metal poles, this subject to be taken up next year if the sub-committee cannot complete the work this year.

SPECIFICATIONS FOR FEEDERS FOR 1200 VOLTS

Mr. Palmer, chairman of the sub-committee on this subject, said that he had received criticisms from several members of the committee on power distribution relating to the tentative specifications presented last year. The form of the specification proposed this year has been altered somewhat and is now more in accordance with the manufacturers' standard specifications subscribed to by most of the large cable manufacturers. The specifications are so drawn as to cover any size of cable.

DISCUSSION ON NEW JERSEY PUBLIC UTILITIES LAW

In a speech at the banquet of the New Jersey Bankers' Association, Atlantic City, May 12, Frank Bergen, general counsel Public Service Corporation, criticised the present public utilities act in New Jersey. He said in part: "The act, in large part, is aimed at evils that are no longer practised and at conditions that no longer exist. Like the ordinance of old Woulter von Twiller it frowns defiance at an absent enemy. There never was in this State any genuine public sentiment in favor of the enactment of such a law. The act, as finally passed, is made up of scraps of statutes enacted years ago by legislative bodies of other States, some of which have been declared to be unconstitutional by the Supreme Court of the United States and by the Supreme Court of this State."

In a recent interview Assemblyman Egan, of whose original bill the present public utilities law was the outcome, defended the law. He believed that under it school children could still be carried for 3 cents, and said: "It is unfortunate that the policemen and firemen in uniform were overlooked. It was never intended that they should be victims." To overcome this difficulty he suggested that the railway companies could enter into a contract with the city to carry these officials for a nominal consideration. In conclusion he said: "The law is the essence of justice and is one of the finest pieces of legislation that occupies a place on the statute books. No State in the Union can boast of a more perfect law."

President McCarter in referring to Mr. Egan's statement said that the action of the Public Service Railway Company in regard to policemen, firemen and school children was taken upon the recommendation of its counsel, who believed that any other action would be in violation of the provisions of the law. President McCarter said further that at the recent session of the Legislature the company, through its representatives, had opposed certain provisions of the law which it believed to be improper and impracticable, but that it would endeavor to obey the law in letter and in spirit. It was not opposed to State regulation. It had co-operated with the old commission from the day it took office until it was succeeded by the present commission, and it expected to co-operate with the present commission.

LIGNITE DEPOSITS IN THE UNITED STATES

In an address on lignite delivered before the American Philosophical Society, Philadelphia, May 3, by Joseph A. Holmes, director of the Bureau of Mines, the following figures were given on the extent of the lignite deposits in the United States:

	Lignite, Square Miles.	Sub-bituminous, Square Miles.
Alabama	6,000	....
Tennessee	1,000	....
Louisiana	8,800	....
Arkansas	5,900	....
Texas	53,000	....
South Dakota	4,000	....
North Dakota	31,000	....
Montana	7,000	8,800
Wyoming .....	....	21,360
Washington .....	....	1,100
New Mexico .....	....	5,000
Colorado .....	....	5,910
Idaho .....	....	1,200
Total	116,700	43,370

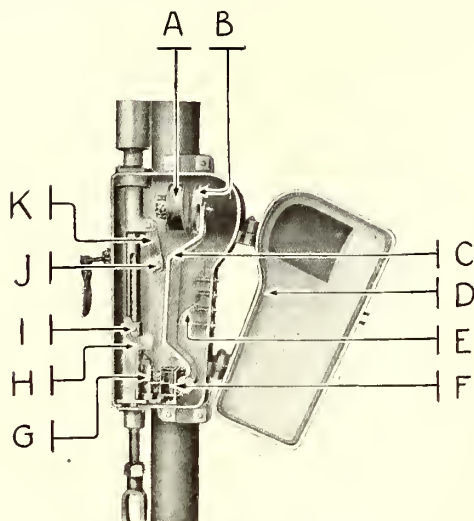
In a number of states in the Rocky Mountain region there are large areas of coal that represent a transition between typical lignite and bituminous coals. For these the name "sub-bituminous coals" has been suggested, and is tentatively used by the United States Geological Survey. The lignite beds in Alabama, Mississippi and Tennessee represent a transition between peat and the more typical lignites of the Dakotas and Texas. Little or no use has been made of the lignite beds in these three states. The lignites in Texas and Arkansas have been used to a limited extent, as have also the lignites of the Dakotas and eastern Montana. In this latter field the lignites contain 20 per cent and in some cases more than 40 per cent moisture, slackening badly and rapidly on exposure to the atmosphere. This quality seriously interferes with their use and value for fuel purposes.

The speaker said that the outlook for the utilization of lignites is favorable along three lines: In gas producers, without either drying or other treatment; in boilers of special construction, such as that installed more than a year ago at Williston, N. D., by the United States Reclamation Service, where lignite is used in its natural condition almost immediately after being brought from the mine; as briquettes, which requires that the lignite should be thoroughly and finely crushed and dried to a moisture content of from 5 per cent to 10 per cent and then compressed into briquettes while still warm.

Limited quantities of lignite from California, North Dakota and Texas have been made into satisfactory briquettes at the Government Mine Experiment Station at Pittsburgh, using the full-sized German briquetting press, which develops a pressure of 20,000 lb. to 25,000 lb. per square inch. In the cases just mentioned the briquettes were made without any binding material, because a sufficient amount of tarry material remained in the crushed and dried lignite to serve as a bond for the particles of the briquette. In conclusion Mr. Holmes stated the belief of his department that its investigations along this line will demonstrate the fact that the lignite in Texas, the Dakotas and Montana can be made into briquettes on a commercial scale, and that in this form the lignite can be used as a substitute for other domestic fuel in these regions.

DISPATCHER-CONTROLLED TRAIN-ORDER SIGNALS FOR INTERURBAN ELECTRIC RAILWAYS

As the result of studies into the conditions attending the development of interurban electric lines in the United States and in the light of experience gained in adopting electrical apparatus to steam railroad needs, particularly in the application of the telephone to train dispatching, the United States Electric Company, of New York and Chicago, has brought out a dispatcher-controlled train-order signal system for interurban electric rail-



Signal System—Semaphore Box

ways. The first public exhibition of this system was made at the Chicago Coliseum exhibit at the Maintenance of Way convention in March, and the *ELECTRIC RAILWAY JOURNAL* now presents the first description available to interurban railway interests.

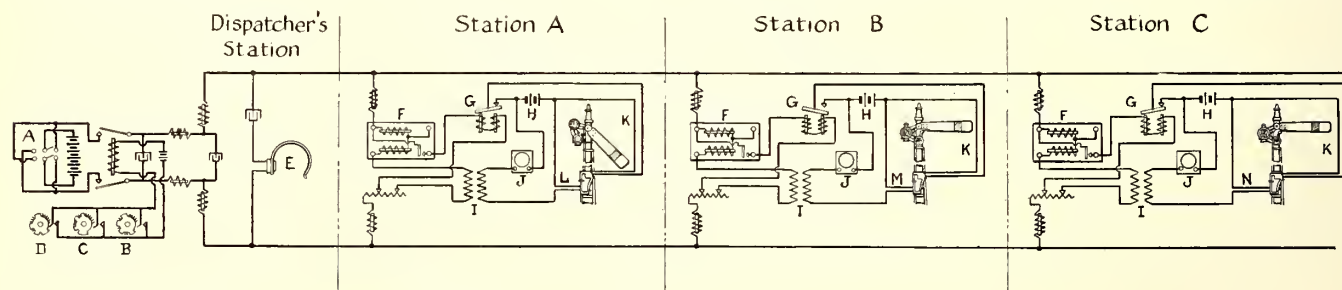
The earliest efforts to adapt the telephone to railroad uses included calling by code ringing by the magnets, every call being heard at every station practically as in calling by a Morse sounder in telegraph service. It was not until the Gill selector was made the essential feature of the system that telephone train dispatching received a great impetus. By the selective system the train dispatcher may discriminate from among the stations on a circuit that particular station with which he wishes to communicate, causing at the desired station, and at no other on the circuit, the selector to be operated to the contact position, and thereby signaling that station by either audible or visible means as may be preferred.

rod are at the left and the electromagnet at the right. Through the related action of the time wheel and the retaining pawl, only that selector is brought to a position to close its contact and to signal the station whose combination wheel corresponds exactly to the sequence of long and short impulses sent over the line. In all other selectors in the circuit the combination wheel has returned to its normal position and the station is consequently not signaled. In operation this selector will call the most remote station on the line in the time required to call the nearest. It cannot be operated by stray or induced currents from other wires or from the earth, for the operating current must be sent in certain combinations properly spaced before the selector will act.

An automatic calling key at the dispatcher's office sends the proper combination of impulses. This key consists of a simple train of gears operating a circuit-breaker somewhat similar to the district messenger box. One such key is provided for every station in the circuit, its specially cut circuit-breaker wheel making that combination of code impulses which will bring unfailingly to the contact position the selector in that station with the corresponding code number.

The complete dispatcher-controlled system comprises a combination of two pieces of equipment, the selector and the electric slot semaphore. Signals may be thrown to the "stop" or "danger" position by the dispatcher, wherever the signals are located or however attended. The signals are restored to "safety" by the train crew after receiving orders from the dispatcher and after his electrical consent to the restoring of the signal has been given. The system includes, however, equipment for the restoration of the signal by the dispatcher without the intervention of the train crew.

The semaphore signal equipment consists of a 20-ft. iron mast, two double spectacle lenses, blade, oil or electric lamp, electric slot, restoring lever and an answer-back mechanism. The selector equipment comprises a selector, semaphore relay, bell and induction coil. A 6-volt or 10-volt battery of the closed-circuit type is required with each signal. The signal blade is held in the "safety" or "clear" position because the magnet in the electric slot is continually energized by the local battery. When the dispatcher desires to throw any particular signal to the "stop" position he will turn the automatic calling key for that station. When the contact of the selector closes it completes the circuit of the semaphore relay, which then operates the slot, causing the blade to go to the "stop" position. Immediately on concluding this movement the dispatcher gets, by induction, over the telephone wire a definite, audible answer-back, comprising a repetition of the distinctive signal number and showing that the signal operated has gone to the desired position. When the semaphore has gone to the "stop" position the blade is mechanically locked, so that it is impossible for any



Signal System—Wiring Diagram for Dispatcher's Selective Signaling to Three Stations

The Gill selector consists essentially of a combination wheel and an electromagnet the armature of which is arranged to step the wheel forward, a retaining pawl to retain the teeth stepped and a time element, the function of which is to permit the retaining pawl to assume either one of two positions, according to the length of impulse of the current. The time element consists of a metal wheel carried on a shaft of small diameter and so arranged that it can roll on its axis or shaft down an inclined rod. In the cut on page 883 the time wheel and inclined

rod are at the left and the electromagnet at the right. Through the related action of the time wheel and the retaining pawl, only that selector is brought to a position to close its contact and to signal the station whose combination wheel corresponds exactly to the sequence of long and short impulses sent over the line.

After orders have been given to the train crew by telephone and properly verified, the dispatcher gives permission for the restoration of the signal. This is done by reversing the calling battery at the dispatcher's station by means of a switch and sending again the station's call by the individual key. This will again close the selector contact and open that of the semaphore

relay, permitting this signal to be restored to "clear" position.

The system is operated in a closed circuit and is so arranged that any failure of the current supply controlling a signal will set the signal at the "stop" position. When used as dispatcher's train-order signals but two positions are required for the semaphore. Either upper or lower quadrant signals may be furnished. Double lenses are provided when used to show light signals in both directions on a single-track road. Separate signals for movements in opposite directions may be furnished on a single pole. The selective signaling system may be connected direct to the ordinary train dispatcher's wire without interfering with the service at other stations where semaphore signals are not installed. The system is capable of conversion at any time into a part of an automatic block system by the addition of the necessary motor and track relay. The selector equipment would be retained for ringing operators at stations. No part of the present apparatus need be discarded in making such conversion.

The semaphore box on page 882 shows the slot magnet energized, the mechanical lock released and the slot latch in position to permit the blade to be reset to safety by the restoring lever. The view showing the parts indexed gives a clearer idea of the functions of the apparatus. *A* is the magnet for operating the signal. It is normally closed, but opened by the selector to set the signal. *B* is the armature operating through the armature lever slot latch *K* engaging the signal rod. *C* is the armature lever, the machine's left face forming a track for roller *J*. *D*



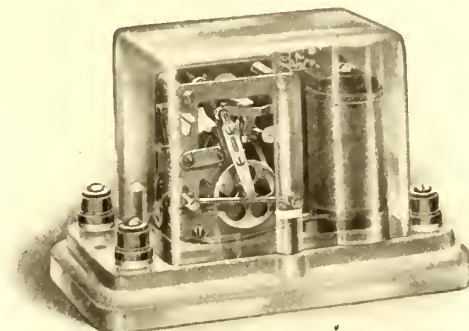
Signal System—Calling Key Cabinet

is a rubber gasket to prevent the entrance of moisture or dust. *E* is an armature lever spring to bring armature into contact with magnet. *F* is the answer-back mechanism which on the setting of the signal repeats the combination number to the dispatcher. *G* is the answer-back lever. The bracket carried by the signal rod depresses the plunger and operates the answer-back only when the signal is set in the "stop" or "danger" position. *H* is the mechanical locking lever engaging pin *I* and unlocked by a stud carried by the descending slot latch *K*. *I* is the locking pin carried by a sleeve working on the platted signal rod. *J* is the roller traveling on the face of armature lever *C* and actuating slot latch *K*. *K* is the slot latch engaging the signal rod. It cannot be engaged unless the magnet *A* is energized.

For brevity's sake the circuit diagram shows three stations only, with the electrical apparatus as with the three positions of the semaphore box mechanism. The reference letters in this diagram have the following meanings. *A*, reversing switch; *B*, *C* and *D*, calling keys 223, 241 and 421; *E*, telephone receiver; *F*, selectors; *G*, semaphore relays; *H*, local battery; *I*, induction coil; *J*, buzzer; *K*, wires to semaphore magnet; *L*, *M* and *N*, wires to answer-back 223, 241 and 421. The semaphore at station *A* is in the clear position and latched; that at station *B* in the stop position and mechanically locked; that at station *C* in the stop position but unlocked and ready to be cleared.

As illustrating the operative ability of selective telephone train dispatching it may be pointed out that there are on steam roads a number of circuits in excess of 250 miles, and on the Seaboard Air Line there is one circuit of 276 miles with fifty-two Gill selectors in service on it. The dispatcher-controlled signals will work as far as a telegraphic impulse can be effective and should prove reliable on the longest circuits which the interurban electric lines will present.

Two of these semaphore signals have recently been installed

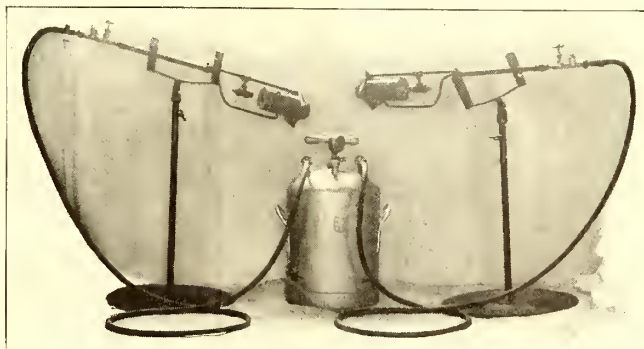


Signal System—The Selector

on the Indianapolis & Cincinnati Traction Company's interurban line, which consists of two branches extending from a point just outside of Indianapolis, one to Connorsville, a distance of 58 miles, and the other to Greensburg, a distance of 49 miles. The dispatcher's office is at Junction, near Indianapolis, and the semaphore signals are at Rushville, 37 miles from the dispatcher's office, and at Shelbyville carhouse, 22 miles from the dispatcher's office. This is an a.c. road, the trolley current being 3300 volts, 25 cycles, and the static charge on the telephone line is very great. One of these lines was so noisy that it was difficult to telephone over it, but the experience with the semaphores and the four selective stations installed shows that the selective signaling equipment will operate satisfactorily over a line which is hardly fit for talking. A party of Indiana interurban managers went over this line on May 12 to inspect these train-order semaphores and to witness their operation.

PORTABLE OIL BURNER

The accompanying illustration shows a portable oil burner built by the Hauck Manufacturing Company, Brooklyn, N. Y. This burner transforms oil and compressed air or oxygen into a heavy body of gas to give complete combustion. This result



Portable Oil Burner for Welding, Preheating and General Repairs

is obtained by placing crude fuel or kerosene oil in a tank under a pressure of from 15 lb. to 100 lb. per square inch, and connecting the oil tank with a line of tubing which conveys the fuel to the burner, where it becomes an intensely hot blue flame. The burner is therefore adapted for all kinds of repair work, which includes brazing, preheating in connection with electric or oxy-acetylene welding, tempering, annealing, melting,

etc. Its usefulness in car repair work may be appreciated from the fact that the No. 2 burner, which has a 15-gal. tank and consumes 3 gal. of oil and 15 cu. ft. of free air an hour, has bent a $\frac{1}{2}$ -in. steel plate 6 ft. x 10 ft. to right angles in 15 minutes. This meant the proper heating of an area 10 ft. x 8 in. with a 10-lb. burner. The portable outfit illustrated consists of one seamless tank equipped with a hand air pump, two sets of burners and hose attached to the tank and two adjustable stands to hold the burners in the proper position.

FEATURES OF ELECTROLYTIC ARRESTERS

Oil in the tanks of electrolytic lightning arresters is in contact with the electrolyte in the trays. Therefore, it soon becomes "wet"—that is, it absorbs moisture from the electrolyte.

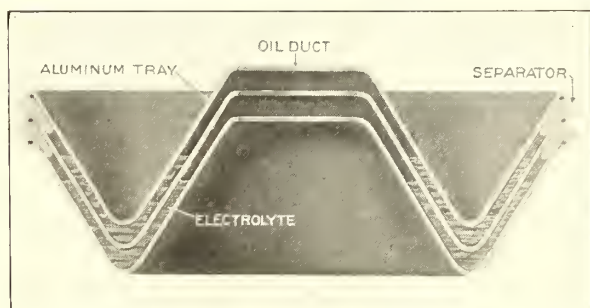


Fig. 1—Section of Three Trays of Electrolytic Arrester

It has been found that organic substances, such as wood or fiber, when used between electrolytic arrester trays, absorb moisture from the "wet" oil and thereby become conducting. They carbonize and difficulties ensue. To avoid trouble from this condition in Westinghouse electrolytic arresters, separators of porcelain are used between the trays. The wooden tie rods which bind the tray structure together are not in contact with

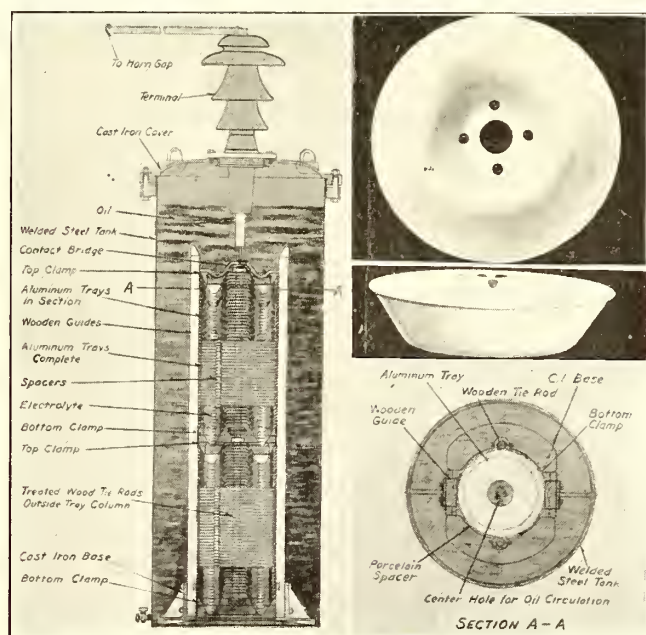


Fig. 2—Sections of Complete Arrester and Views of Trays

any trays except the top and bottom ones of each section.

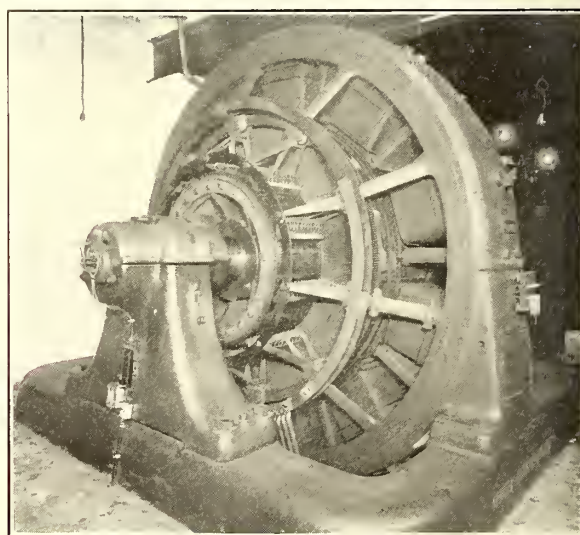
Fig. 1, a sectional view of three trays filled with electrolyte, shows how the porcelain separators are used. Four separators are installed between each pair of trays. Each stack of trays and separators is clamped with iron nuts turning on the threaded ends of wooden tie rods. In each electrolytic arrester tray there are four holes which, when the trays are stacked, form a vertical oil duct through which oil can circulate. This

promotes the discharge of bubbles from the electrolyte and assists in maintaining an arrester at a low temperature when it is operating continuously for a long period. Another feature that assists in the effective discharge of bubbles is the contour of the tray. The outer portion of each tray is of such shape and so inclined that bubbles forming in the electrolyte will be discharged directly into oil.

Tray structures for these electrolytic arresters are divided into sections or units, each small enough for ready handling by one man when he is putting it in or withdrawing it from a tank. There is ample oil space between the tray structure and the inner surface of the sheet-iron tank. In computing the clearance necessary between the trays and tank for sufficient insulation it was assumed that the oil would always be "wet." Two very desirable things accrue because of the allowance of this liberal clearance. One is that the oil volume, hence the ability of the arrester to discharge continuously, is greatly increased. The other is that it is not necessary to hang a circular screen of some organic insulating material down in the tank around the tray structure to prevent arcing between the trays and the tank.

REGULATING POLE ROTARY CONVERTER

A very interesting application of the General Electric regulating pole rotary converter is made by the Rochester Railway, Light & Power Company, which uses it to maintain constant the power which it takes from the Niagara & Lockport Power Company's transmission line. Electrical power is transmitted three-phase from Niagara Falls to Rochester at a potential of 60,000 volts, and is there stepped down to 11,000 volts for distribution. The power purchased from this transmission company by the Rochester Railway is transmitted to Station No. 6 and distributed from this to other substations which are supplied with regulating pole rotary converters. A current transformer, inserted in one of the lines, controls a contact-making ammeter which controls the motor circuit of a motor-operated rheostat inserted in the regulating pole field circuit of the rotary converter. When the power taken exceeds the fixed amount the contact-making ammeter closes the motor circuit and starts the motor. Resistance is thereby cut into the rotary regulating



Inter-Pole Rotary Converter Used in Rochester

pole field circuit to reduce the d.c. potential and cause the rotary converter to take less power. When the power is reduced to the fixed amount the contact-making ammeter breaks the motor circuit and the cutting of resistance into the rotary field circuit ceases. When the total power taken is less than the fixed amount the contact-making ammeter starts the motor in the reverse direction, cutting resistance out of the rotary field circuit, increasing the voltage and the load on the rotary.

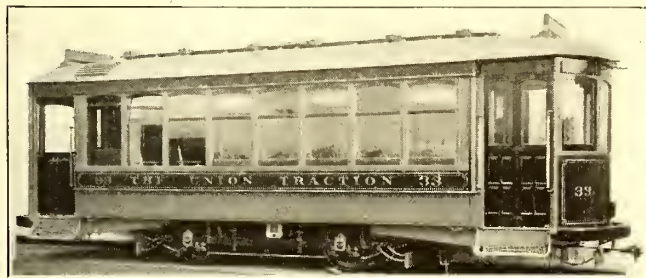
IMPROVED WATER-FLOW METERS

The General Electric Company has recently added a water-flow meter of recording and indicating type to its line of devices for measuring the flow of steam, air and gas. In appearance and general principles the new meter is similar to the steam and air flow meters which were described and illustrated on page 912 of the *ELECTRIC RAILWAY JOURNAL* for May 21, 1910.

Although the meter is calibrated to record the rate of flow in gallons per minute at 39.1 deg. Fahr., suitable means are provided for readily setting it for different temperatures, pipe diameters and rates of flow. This meter is useful for ascertaining the output of pumping plants, the input to water turbines and their loss of efficiency, the amount of feed water delivered to boilers, the amount of cooling water used in condensers, the slippage in pumps due to leaky plunger packing or worn-out valves, and for discovering losses due to leaks in water mains, etc.

FLAT-ARCH, SEMI-CONVERTIBLE CAR FOR COFFEYVILLE, KAN.

The Union Traction Company, Coffeyville, Kan., has recently received from the American Car Company, St. Louis, Mo., the single-truck, vestibuled car shown in the accompanying illustration.



Single-Truck Car for Coffeyville, Kan.

The window system is of the semi-convertible type. An especially interesting feature of this car is the flat-arch roof, which in turn required the installation of roof ventilators, as



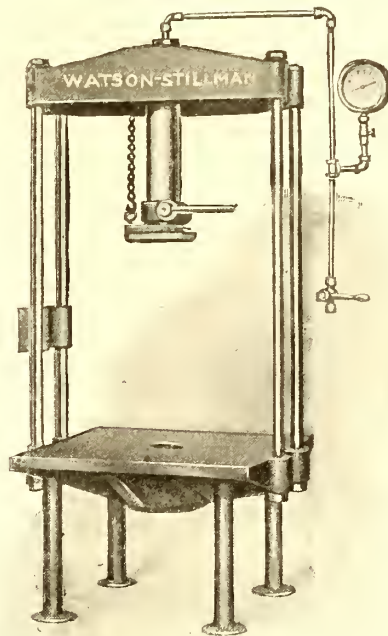
Interior of Coffeyville Car, Showing Ventilator Openings shown in the exterior and interior views. These ventilators are of the "Star" type and six are installed on each side.

This car is 30 ft. 1 in. over the vestibules, 20 ft. 8 in. over the body, 8 ft. 9 in. wide over all and 7 ft. 9½ in. wide over the sills. The height from the rail to the sills is 2 ft. 3 7/16 in. and from the sills to the trolley base 8 ft. 8 in. The underframe is of semi-steel and the body of wood. The interior trim is of Palace golden oak with a birch veneer headlining. The seats,

which are of the Brill "Winner" design, are made of wooden slats and seat thirty-two passengers. Forsythe curtain fixtures were installed. The car is mounted on No. 21-E trucks and is operated with Westinghouse No. 101-B-2 inside-hung motors. Among the specialties are Consolidated electric heaters, Syracuse headlights, Hunter destination signs and Peacock brakes.

HYDRAULIC PRESS FOR FORCING BEARINGS

The Watson-Stillman Company, New York, has added to its line another hydraulic press which is specially adapted to forcing bearings, bushings and making similar forced fits. The weight shown on the left counterbalances the ram, which can be handled independently of the pump by means of a rack, pinion and lever arrangement. A hole through the platen permits work to be projected or forced through. The capacity of



Hydraulic Press for Forcing Bearings

the press reaches its maximum of 30 tons under a hydraulic pressure of 6250 lb. per square inch, which may be produced by using either a hand or belt-driven pump attached to the pipe shown in the cut. The length of stroke of the ram is 18 in. and its diameter is 3½ in. An 18-in. stroke usually suffices for most press fitting. So long a stroke is often desirable.

1500-VOLT EQUIPMENT FOR PIEDMONT & NORTHERN RAILWAY

The Piedmont & Northern Railway, a subsidiary company of the Southern Power Company, Charlotte, N. C., has ordered from the Westinghouse Electric & Manufacturing Company all the substation and car and locomotive equipment for its 125-mile interurban line, which will be operated with direct current at 1500 volts. The aggregate cost of the equipment ordered is approximately \$400,000. It includes ten 500-kw motor-generator sets, twenty-three quadruple 90-hp motor car equipments and fourteen 55-ton electric locomotives, which will be used for hauling freight trains. This new line, which is now under construction, will connect Charlotte and Kings Mountain, N. C., and Spartanburg and Greenwood, S. C. It will have some long steep grades, but each of the locomotives is to be of sufficient capacity to haul a train of 800 tons. They will be equipped with four interpole motors geared to the axles. The Piedmont & Northern Railway is the first line which the Westinghouse Electric & Manufacturing Company has contracted to equip for operation with direct current at 1500 volts.

SIGNAL INSTALLATION ON TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION LINE

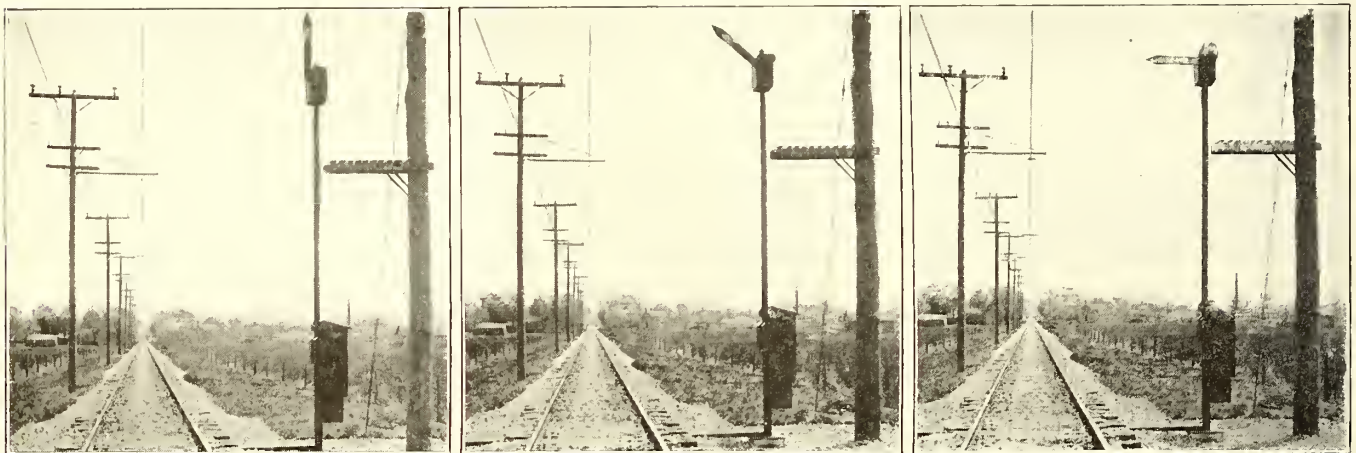
The Kinsman Block System Company, New York, has recently installed its signal system on a block of the Terre Haute, Indianapolis & Eastern Traction Company's line near Plainfield, Ind. This installation was examined on May 4 by members of the Indiana Railway Commission and by the Indiana interurban roads' committee on block signals, as noted on page 840 of the *ELECTRIC RAILWAY JOURNAL* for May 13. The only change suggested by those who inspected this equipment was that the counting mechanism should not repeat in case a car which had already registered backed up over the insulated track section. The Kinsman company states that this alteration can be made without difficulty.

The present apparatus consists essentially of two semaphores operated by track circuits using trolley current. No distant signals are used, but they can be applied if wanted. Relays at the end of the block permit operation on extreme variations in voltage. The experimental block is 3.47 miles long and one semaphore governs the track in each direction. Each signal is placed on a piece of single track about 300 ft. from the switch point of the siding which it protects. The signals are operated by track circuits at each end of the block. The track circuit consists of two adjacent insulated sections, each two rail lengths long. The sections are insulated by three Weber insulated joints. The section nearer the switch point controls the setting

vertical position. As a car enters a block the setting relay operates the controller at the entering end and the controller switches open. This breaks the circuit, de-energizing the signal at the distant end of the block, allowing it to fall by gravity to the horizontal or "stop" position. As a signal assumes the "stop" position it opens the circuit. When an entering car leaves the insulated section, the signal at the entering end is de-energized and falls by gravity to the 45-deg. or "caution" position and is held in this position by a slot magnet which is operated by the switch on the controller.

As each succeeding car enters the block it passes onto the insulated section and the signal moves from the 45-deg. position to the vertical position; then, after the car has passed over the insulated section, the signal falls back to the 45-deg. position. This indicates that the signal at the opposite end of the block will remain in the horizontal or "stop" position until the last entering car has passed entirely through the block. As each car passes out of the block the release relay operates and in turn actuates the controller at the entering end of the block one step back toward its normal position. As the last car passes out the controller switch is operated, which completes the circuit through the signal at both ends of the block, causing both to operate to the vertical position, which indicates that all cars are clear of the block.

The semaphore arm operates in the upper left-hand quadrant and has three positions as shown in the accompanying illustrations. The circuits between the two signals are completed by



Three Positions of Semaphore—Vertical When Block Is Unoccupied, 45 Deg. When Occupied by a Car or Cars Going in the Same Direction, and Horizontal When Occupied by Opposing Cars

of the signals, while the second section controls the release of the signals. The return circuit of the car propulsion current is carried around this insulated section to the opposite rail by bonds; also to the adjacent switch rails. Three wires are run from the insulated track sections through insulated wooden conduit to the base of the signal pole. One wire is grounded to the opposite rail, the second controls the setting relays and the third the releasing relays. All of the relays are in a box at the signal pole. They are operated by current from caustic soda batteries.

When a block is "clear" the normal position of the signal arm is vertical. The car in entering the block first passes over the setting section and operates the setting relay. This cuts out a release relay and makes both insulated sections a setting section. If a car is leaving a block it first passes over the release section, cutting the setting relay out of circuit and making both sections a release section. A step-by-step controller at each signal registers the movement of the cars in and out of the block and controls the circuit operating the signal. The controller switch is not thrown back to its normal position until the last car leaves the block.

The position of the signals is controlled by the position of the controller switch. When the block is unoccupied this switch is at normal position and the signals at both ends are in

three copper-clad line wires. Each signal has an 8-cp incandescent lamp for night indication. The lamp is behind a 4-in. lens. In front of the lens is a spectacle which carries green for "clear," yellow for "caution" and red for "stop." The indication side is red with a white stripe and the back is white with a black stripe. The metal signal blade is operated by a pair of magnets having a rotary armature which is directly connected to the shaft. The four circuit-breakers are operated by the position of the armature of the rotary magnets. One circuit-breaker opens the circuit when the signal assumes the "stop" position, one opens and closes its contacts as the signal moves from the "clear" position; the other two are installed to provide for future distant signals. The controller has a differential gear to operate both sides of the signal simultaneously without conflict in case one train is entering at the same time as another is leaving the other end of the block.

Twelve cars in which all the metallic portions of the body are made of aluminum have been put in service on the Zurich (Switzerland) tramways. In addition to its lightness, the metal has a further advantage, in that when it is cleaned with a sand blast simple painting suffices to protect it. The varnishing which is needed on steel plates is thus dispensed with.

News of Electric Railways

Meeting of Illinois Electric Railways Association

The Illinois Electric Railways Association is to meet at the La Salle Hotel, Chicago, Ill., at 10 a. m. on May 19, 1911. C. F. Flenner, auditor of the Aurora, Elgin & Chicago Railroad, who is secretary of the association, says that in addition to business matters of importance a paper on wood preservation will be read by C. P. Winslow, of the Forest Products Laboratory of the United States Department of Agriculture.

Program of Annual Meeting of Canadian Street Railway Association

The annual meeting of the Canadian Street Railway Association will be held on June 6 and 7, 1911, at the Windsor Club, Windsor, Ont., on invitation from the vice-president of the association, James Anderson, on behalf of the management of the Sandwich, Windsor & Amherstburg Railway. This railway is a part of the Detroit United Railway System, and every facility will be extended for a thorough investigation of the city and interurban lines of that company. It is probable that the second day's meeting on June 7 will be held in Detroit at the Cadillac Hotel and those who intend staying in Detroit will probably make their headquarters at the Cadillac. A number of important questions will be taken up at the meeting. The secretary-treasurer's report will deal with the association's work since the last annual meeting and will be discussed as read, section by section. The Board of Railway Commissioners of the Dominion having requested all electric railways under its jurisdiction to compile a code of rules for the operation of electric railways, to be submitted to the board for approval, a committee representing such companies will be appointed to draft the rules. It is intended to have this committee meet on June 6 or 7 so that the matter may be disposed of without the members of the committee having to attend another meeting for that purpose. Papers will be read on the following subjects:

"Cost of Production of Power."

"Notes on Distribution of Power in Street Railway Operations."

"The Use of T-Rails in Street Railway Construction."

"Modern Track Building," by John Kerwin, superintendent of tracks Detroit United Railway.

There will be topical discussions on the following questions:

Passenger fares of interurban electric railways, including the practice regarding one-way cash fares, one-way ticket and round-trip fares as compared to one-way cash fares; also if it is a practice to make reduced fares for special excursions, special parties or in commutation books, school books and mileage books, as far as that is a reduction from the regular one-way fare.

What is the safe limit of time to carry a load of 90 amp at 6600 volts on an a.c. generator which has a terminal amperage of 38 amp at 6600 volts?

Foundations for tracks in paving and foundations for tracks in intersection work.

Methods for handling freight in carload lots on interurban railways.

Training car crews.

The Question of Valuing the Toledo Property

On the evening of May 5, 1911, Prof. Edward W. Bemis, of New York, pointed out to the Council committee of the whole at Toledo, Ohio, some of the difficulties in arriving at a correct valuation of street railway property. He said from two to three months would be required to collect the data and arrive at conclusions. In one case mentioned it was said that the life of the rail was twenty years, but later developments showed it to be fifteen. This made a difference of many thousands of dollars in the valuation.

Professor Bemis said that the determination of the value of the Toledo plant equipment would be more difficult

than in Cleveland, because the Toledo Railway & Light Company does a lighting and industrial power business in addition to operating a street railway. The cost is more to produce current for lighting and power than for the operation of cars. The question of pavement was also a difficult one. Overhead and development charges were discussed at length, as was the question of depreciation. The company would gain by having a large depreciation charge, but this would affect the fare.

The value of the franchise, Mr. Bemis said, was small in his opinion. If he undertook the work he would want two or three helpers. A. B. DuPont, Cleveland, had offered to help without remuneration.

On May 10 the Council committee of the whole decided that an appropriation of \$8,000 should be made to cover the cost of securing an appraisal of the property. The question will be brought before Council at its regular meeting, and it is probable that the Mayor will be authorized to employ engineers.

H. E. Riggs, of Riggs & Sherman, Toledo, and F. T. Barcroft, Detroit, appeared before the committee. H. E. Riggs said his charges would be \$35 a day. Mr. Barcroft suggested that in case he did the work a price between \$25 and \$35 a day could be agreed upon.

Furthering Chicago Subway Plans

The Chicago City Council has ordered the corporation counsel to prepare a statement of the legal questions which should be settled before the construction of a passenger subway in Chicago can be begun. The resolution of the Council calling for the legal opinion included the following:

"What legislation is necessary to enable the city of Chicago (1) to construct by day labor or by contract and to own a system of subways for the transportation of passengers and merchandise and to provide for such underground municipal utilities as may be desired and to operate or to lease the same?

"To issue bonds for the construction and equipment of such subways, said bonds to be a lien upon such property only and not to be included in the bonded debt of the city.

"To exclusively pledge and pay the traction fund as interest upon such bond issue and to use any portion of such fund to aid in the creation of a sinking fund for the retirement of such bonds.

"To further use any net revenues received either from the operation or the leasing of such a system of subways, when constructed, for the purpose of paying off such bonds.

"To pay out of such bond issue the cost of the reconstruction of underground municipal utilities as are disturbed by the building of subways."

The question of including the word "merchandise" in the first paragraph was discussed at length. In speaking of the resolution Alderman Snow, its sponsor, said:

"The period of rehabilitation of the surface railway lines is practically over and Chicago now has the best street railway system in this country. The next step in providing for a perfect transportation system lies in the construction of means of through travel at high speed from one section of the city to the other, which shall supplement the slower surface systems.

"An ideal transportation situation would be one in which the long-distance traffic was gathered up by surface lines, carried to a subway entrance, transferred to high-speed trains to another section of the city, and finally redistributed by the surface roads. When this idea is reached we will have a condition in which both systems will perform their proper functions, the surface roads building up neighborhood centers and taking care of short hauls, and the subways connecting these centers by rapid train service.

"In order properly to co-ordinate the surface transportation with the subway transportation it is essential that the city of Chicago shall own its own subways."

As mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, Mayor Carter Harrison has requested Alderman Peter Reinberg, chairman of the local transportation com-

mittee, to appoint a sub-committee of three to take up at once plans for a subway in Chicago and report recommendations for starting work.

Trial of Rental Suit in Detroit

The trial of the suit of the city of Detroit against the Detroit (Mich.) United Railway to collect a rental of \$200 a day for the occupancy of the city streets by the Fort Street line since the expiration of the franchise in 1909 was begun in Circuit Court at Detroit on May 8, 1911, before Judges Henry A. Mandell, George S. Hosmer and Alfred J. Murphy. Corporation Counsel Hally asked that the hearing of testimony be dispensed with, as the city would admit that the rental demanded was excessive and that the question at issue was whether the city has the right to assess whatever fee it sees fit and whether it is really the owner of the streets. The court ruled to admit testimony and decided that Judge Mandell should preside. May 11, 1911, was the day set for taking testimony.

On May 11 Engineer Reifenberick, who was associated with Bion J. Arnold in appraising the property of the Detroit United Railway some years ago, testified that the reproduction value of the property within the single-fare zone was in round numbers \$26,000,000. Figures were presented by others to show a deficit of \$4,825 by the Fort Street line in 1910, and deficits aggregating \$83,489 for 1908, 1909 and 1910. It was also shown that the reproduction value of the Fort Street line was \$112,000 a mile, or an approximate total of \$1,827,760. William D. Bontron, of F. H. McPherson & Company, public accountants, testified that the deficit for 1910 was correct.

C. D. Joslyn, attorney for the company, said that no claim had been made that the company's rights in the streets where franchises have expired were such as to make it possible to dictate terms to the city. He said that the company, the municipality and the public have rights that are independent.

Fred A. Baker, attorney for the company, has asked that the Detroit *Evening News* and George G. Booth, president of the company which publishes that paper, should be cited for contempt of court, because of the publication of two articles and an editorial which are claimed to be false and misleading.

Progress of Hudson & Manhattan Railroad

William G. McAdoo, president of the Hudson & Manhattan Railroad, on his return from Europe recently, said in an interview in regard to the affairs of that company:

"A most gratifying feature of the annual report of the Hudson and Manhattan Company is the increase of 47 per cent in the number of passengers carried over the previous year's record. The 115 per cent increase received from advertising shows that our road is still in the development stage and will realize, in due time, the estimates made in the early stage of construction.

"We are still engaged in construction. Work is rapidly progressing on the Newark extension. This will be a most important feature of the company's development. It will mean (1) an efficient rapid transit service connecting Newark and Jersey City Heights with uptown and downtown centers of Manhattan; (2) utilization of the Hudson Terminal buildings as the downtown terminal of the Pennsylvania Railroad system; (3) a new local station in the heart of Newark affording frequent through service between Newark and New York. Undoubtedly this extension, tapping a vast territory, will mean large increases in passenger traffic and revenue.

"On the Manhattan side the extension to the Grand Central Station is yet to be built. The necessary property consents have been obtained for this extension, but it would be unwise to begin this work, or even finally to prepare plans for it, until the city officials have reached a decision on the main subway question. In order to make it most useful and efficient for the purposes intended, this extension should dovetail with any new subways which may be built.

"The same applies to the proposed extension from Sixth to Fourth Avenue under Ninth Street. The construction of these two extensions in Manhattan and the completion

of the Newark work will complete the Hudson & Manhattan Railroad as planned. We hope to be able to open the extension to Newark during the coming summer, but the completion of the Manhattan extensions will take several years.

"As for the present traffic, the Hudson & Manhattan Railroad had a record-breaking month during April. The total number of passengers carried for that month was 4,842,248, compared with 4,164,024 for April, 1910. This is an increase of 16 per cent over the previous year. This gives a daily average of 161,408 for April this year, as against a daily average of 138,801 in 1910."

Decision Against Public Service Commission in Wheel Guard Case

The Appellate Division of the Supreme Court on May 5, 1911, denied the motion of the Public Service Commission of the First District of New York to annul the trial before Justice Brady in the Supreme Court of a suit to collect penalties amounting to more than \$1,000,000 from Frederick W. Whitridge as receiver of the Third Avenue Railroad for failure to equip the cars of the Union Railway with wheel guards. Justice Brady dismissed the complaint and the Public Service Commission asked for a new trial on the ground that Justice Brady had been a stockholder of the Third Avenue Railroad, which controls the Union Railway, and was disqualified from hearing the case because of the ownership of the stock. The commission not only appealed from Justice Brady's judgment dismissing the complaint, but asked the Appellate Division to annul the proceedings because of the court's interest. The Appellate Division decided that Justice Brady's interest was too remote to affect his attitude on the trial of the case and affirmed his judgment, dismissing the complaint. When the case was called for trial Justice Brady informed counsel on both sides that he was a stockholder of the Third Avenue Railroad and counsel for both sides were willing to have the court hear the case.

Justice Scott, who wrote the majority opinion of the Appellate Division, notes that the Third Avenue Railroad was a distinct corporation from the Union Railway, which was being sued through its receiver, the only relation between the two being that in 1900 the Third Avenue Railroad, which owned all the stock of the Union Railway, pledged it to the Morton Trust Company under a mortgage which had been foreclosed in 1909 and had not only wiped out all the stock of the Union Railway, but the stock of the Third Avenue Railroad as well, so that Justice Brady's stock was of no value. Under the proposed reorganization plan of the Third Avenue Railroad, which the Public Service Commission has refused to approve, the stockholders of the Third Avenue Railroad were to have the right to purchase stock in the new corporation at \$45 a share. In his opinion Justice Scott said:

"The position of Justice Brady at the time of the trial was that as a stockholder of the Third Avenue Railroad he had been foreclosed of every possible interest, direct or contingent, in the stock of the Third Avenue Railroad, but that he might at some time in the future be able to acquire at a price stock in the Third Avenue Railway, which might or might not then own the capital stock of the Union Railway. As was well stated by Justice Bischoff at Special Term, 'This alleged interest is so remote and indeed so fanciful as to amount to nothing.'"

The court said that if that possibility constituted disqualification no judge could sit in an action affecting any corporation whose stock could be acquired in the market, because he might thereafter acquire some of the stock. Continuing Judge Scott said:

"The interest which will disqualify a judge to sit in a cause need not be large, but it must be real. It must be one which is visible, demonstrable and capable of precise proof. The alleged interest imputed to Justice Brady measures up to none of these requirements, and we entertain no doubt of his qualifications to sit in the cause."

The court expressed doubt as to whether, strictly speaking, Justice Brady would have been disqualified if he had held stock of the Union Railway itself, although he might and doubtless would have declined to sit to avoid possible criticism. If any judgment had been recovered it would

have been against Receiver Whitridge personally because of his omissions and not against the road. The court concludes:

"All he had before him was an action by the people against the individual who happened to be the receiver of the railway company."

Justice Scott, who also wrote the opinion affirming Justice Brady's judgment dismissing the case, remarks that the statute under which it was sought to collect \$5,000 a day from Receiver Whitridge is "punitive and very highly penal," and in order to make out a case the Public Service Commission must show that it actually issued an order which the defendant disobeyed. The order served upon Receiver Whitridge bore no signature or initials, and Justice Scott says that it is 'wholly insufficient as a self-proving document, and is of such a character that by itself it raises no presumption that it had in fact ever been adopted,' and the case against Receiver Whitridge is devoid of legal proof that any such order ever was adopted by the commission. The court said:

"Although the commission is a most important and powerful one it appeared that no minutes were kept of its proceedings, at least none were produced, although an opportunity was given plaintiffs to produce them if they existed. On this ground, if there were no other, the complaint was properly dismissed."

The court says, however, that Receiver Whitridge had anticipated tests of wheel guards being made by the commission and made some of his own, in the course of which he decided upon one that was rated highly by the commission. He contracted with the manufacturers to supply all his cars with these guards, but although many of them were equipped the receiver could not equip them all within the time specified in the order. The commission had suggested that if the receiver had asked for more time he could have got it, but the court says that the statute does not authorize the imposition of penalties for any such cause.

Philadelphia Loan Passed

The ordinance authorizing the Philadelphia (Pa.) Rapid Transit Company to increase its bonded indebtedness \$10,000,000 was passed by both chambers of Councils on May 11, 1911, as originally drafted. The amendment which was adopted by Common Council on May 5, 1911, as noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 847, was stricken out by Select Council and the bill was then passed by that chamber. Common Council at once concurred. Mayor Reyburn has announced that he will sign the ordinance. The loan bill was brought before Select Council on motion of E. E. Patton, who also moved to strike out the amendment. In supporting his motion Mr. Patton said:

"I am unalterably of the opinion that this amendment should be stricken from the bill; that it has no proper place in it. Your sub-committee on this matter has worked hard to get at the bottom of the situation, and we have been told positively that it is not the purpose of the Rapid Transit Company to accept such an amendment. The people who are to spend the money, they say, will refuse to accept it."

"Some time ago we asked the transit officials for information as to how they proposed to use this money, and received their letter setting forth their purposes. Now the company and its officers are bound just as much by these letters as they would be were they incorporated in the ordinance. I am assured that Mr. Stotesbury will absolutely refuse to go any further in the matter if this amendment is not stricken out. The Mayor has told me unequivocally that the bill should be passed exactly as it came from the committee, which is of course without the amendment. To fail to strike out this amendment would be the same thing as to kill the bill."

Transit Affairs in New York.

The committee of the Board of Estimate of New York, of which Borough President McAneny is chairman, and the members of the Public Service Commission of the First District of New York conferred on May 16, 1911, in regard to the report which the committee is to make to the Board of Estimate. When this conference adjourned it was learned that two members of the Public Service Com-

mission who have hitherto been in favor of the adoption of the offer of the Interborough Rapid Transit Company urged a division of territory. The division plan is said to be favored by Borough President Miller of the Bronx, Chairman Willcox of the commission and Commissioners Eustis and McCarroll. Mr. McAneny's position is understood to be that inasmuch as the Interborough Rapid Transit Company failed to adapt its amended offer to any suggestion of a compromise within the time allowed it by the city authorities to amend its offer, and inasmuch as the original plan of the Brooklyn Rapid Transit Company admitting of the division of the territory was superseded at the request of the city's conferees by a comprehensive plan for all boroughs, no object is to be accomplished in seeking to postpone definite arrangements with whichever company may have presented the better offer.

Ex-Controller Edward M. Grout, who was a former law partner of Mayor Gaynor, advocates the compromise plan, involving a division of territory between the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. In company with Bridge Commissioner Kingsley Martin, Mr. Grout called on Mayor Gaynor on May 16, 1911. Mr. Grout is now counsel for the Continuous Transit Securities Company, which has written two letters to the Public Service Commission objecting to the use of Broadway above Ninth Street by the subway extension proposed by the Brooklyn Rapid Transit Company and proposing a moving platform for that area. It is denied that members of the City Conference Committee favor withholding all subways from Broadway in connection with the present plans.

The proposals now before the commission from the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company have resulted in some striking display advertising in the daily newspapers. The Brooklyn Rapid Transit Company in one of its advertisements displayed two maps, one showing the lines embraced in its proposal and the other showing the lines embraced in the proposal of the Interborough Rapid Transit Company. The maps appeared under the heading "Maps Showing How B. R. T. Subway Extensions Would Provide Relief for Great Undeveloped Sections Not Considered in Interborough Plan." Under the heading "Study These Maps and See How Little Money the B. R. T. Offers to Put into Construction," the Interborough Rapid Transit Company, in one of its advertisements, which occupied an entire page with the exception of a column, presented three maps of the proposals, one under another, to influence public opinion. The first map was presented to show the Brooklyn Rapid Transit Company's original offer, the second map was presented to show the alternative proposition of the company and the third was presented to show that the Interborough Rapid Transit Company's own offer provided for city capital to the extent of \$69,720,500 for new construction as compared with \$133,824,500 from the company itself.

The proposition of the Continuous Transit Securities Company for the installation of a moving platform between Fourteenth Street and Forty-second Street on Broadway has taken definite shape in the submission of the plan to the Public Service Commission. In his letter accompanying the proposition Max E. Schmidt, president of the company, says:

"We understand that the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company have recently made extensive subway propositions and that in both cases a subway for trains on Broadway, Manhattan, has been included. We respectfully request that before you consent to the construction of any sort of subway for trains in Broadway you will give consideration to the following:

"Broadway crosses a great part of Manhattan diagonally and intersects all east and west streets and also nearly all the principal north and south avenues on the west side of the city. Broadway is the main artery of travel in Greater New York. For that reason it should receive special treatment and be provided with the best and most capacious method of transportation. The level at 20 ft. below the surface should be reserved for the installation of the best local collecting and distributing system that can be devised, with entrances and exits at every street.

"A subway equipped with ordinary trains could not possibly fulfil these requirements. It could not have stations located closer than four or five blocks apart, and the service would probably be taxed to the limit on the opening day and constantly overtaxed thereafter. A two-track train subway is plainly entirely insufficient, and likewise a four-track train subway, even if provided with the maximum number of stations, would certainly prove inadequate. On the other hand, a moving platform subway, such as proposed in our communication of June, 1909, would have fully twice the capacity of a four-track train subway, would have stations as close together as needed, could easily find space within the curbs and provide seats for everybody. It would also take care, as no train intermittent service could, of the constantly fluctuating volume of traffic due to sudden rushes at unexpected times, which occur in every congested district and which should be provided for.

"We therefore submit, in the event of a subway for trains being located in Broadway, that, first, it should be operated exclusively by express trains and solely for through traffic; and, second, it should be operated in conjunction with moving platforms placed on the 20-ft. level as the collecting and distributing agent."

Central Railway Club.—G. K. Heyer, railway sales engineer of the Western Electric Company, read a paper on train dispatching by telephone at a meeting of the Central Railway Club on May 12, 1911, at Buffalo, N. Y. This was the last meeting of the season for this organization, which has adjourned until September.

Paper on Physical Valuation.—William C. Boyrer, assistant electrical engineer of the New York Public Service Commission, First District, read a paper on "Physical Valuation" before the Brooklyn Engineers' Club on May 11. Mr. Boyrer considered the subject generally from four standpoints—reorganization on stock issue, bond issue, determination of rates and sale of property. He discussed the original cost, the cost to reproduce new, and the present value, taking up the questions of tangible and intangible capital, depreciation and salvage value. The paper was discussed by C. W. Wilder and Joseph Strachan.

Prospects of Sale of Winnipeg Electric Railway to City.—The recent increase in the quotations for stock of the Winnipeg Electric Railway from 218 to 240 has given rise to the report that an agreement is likely to be arrived at between Mayor Evans, of Winnipeg, and Sir William MacKenzie, president of the company, for the acquisition of the company's system by the city of Winnipeg. The Mayor has no authority to conclude such a transaction, however. On May 11, 1911, the company's transformer station at Lac du Bonnet was struck by lightning, and all current was cut off the power and street railway system in Winnipeg.

Amendments to Tayler Franchise at Cleveland.—Street Railway Commissioner Dahl, of Cleveland, is anxious to have the City Council take up the amendments to the Tayler franchise proposed by the Chamber of Commerce. When the ordinance embodying the recommendations of the Chamber of Commerce is introduced it is probable that public meetings will be held, as was done when the original negotiations were in progress. The officers of the company have not expressed any opinions on the report. Prosecuting Attorney Cline, of Cuyahoga County, is preparing a suit against the Cleveland Railway to recover \$269,358.05, claimed to be due for back taxes for 1903 and 1904.

Association Publications.—The American Electric Railway Association is mailing to members a pamphlet containing the complete paper by George H. Davis, of Ford, Bacon & Davis, on "The Adjustment of American Street Railway Rates to the Expansion of City Areas," read at the mid-year conference of the association on Jan. 27, 1911. An abstract of this paper was printed in the *ELECTRIC RAILWAY JOURNAL* for Feb. 4, 1911. The association has also issued a bulletin to member-companies which gives statistics concerning the wages of conductors and motormen, based on returns from 400 companies. Part of these are city lines, part are interurban lines and part are combination city and interurban lines. The statistics are classified in a number of ways, and further information in regard to them can be obtained from the secretary of the association.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

NEW YORK.

Senator Harte, chairman of the Senate committee on taxation and retrenchment, has introduced a bill which has for its purpose the creation of a new source of State revenue at the expense of railroad corporations. Briefly outlined, the scheme proposed provides for annual taxes, assessed against the railroad, on the privilege of displaying advertisements in or on platforms and maintaining news-stands and vending machines at rates which vary in different localities throughout the State, according to population. In New York City the companies must pay \$150 for each car; in other cities of the first class, \$100; in second class cities, \$80; in third class cities, \$60, and in all other places, \$50. News-stands on railroad property are to be subjected to a contribution of \$50 each in New York City, and are graded down to a minimum of \$20 in all places other than cities. Slot or vending machines are also to pay amounts varying from \$10 to \$4. In addition, every sign on a railroad station or platform is to be made subject to an annual tax equal to 50 cents for each square foot of space. The taxes imposed are to be paid to the State treasurer, and evidence of payment is to consist of metal plates similar to automobile tags, which are to vary in color from year to year, and are to be attached to each of the different cars, stands, slot machines and bill boards on which the tax is paid.

OHIO.

The House has refused to concur in the amendments made to the Winters public utilities bill by the Senate, and a conference committee has been appointed to formulate a bill that will be satisfactory to both branches of the Legislature. The Smith bill, which is intended to dispossess the so-called electric mule company of any rights on the banks of the Miami & Erie Canal between Cincinnati and Toledo, has been passed by the House and is now before the Senate. The company has been in the hands of a receiver for years. The House has passed the Johnson Senate bill. This measure makes it possible for Cincinnati to build a boulevard on the Miami & Erie Canal within the city limits and a subway under it. Representative Geleerd, of Toledo, endeavored to introduce an amendment to the Johnson bill to give cities power to issue bonds to construct street railways. The Edwards subway bill was passed by the House after amendments had been made which had been agreed upon between the Cleveland Underground Rapid Transit Company and the Cleveland city administration. Under the amendments the city will have the right to approve the general plan of the tubes before work can begin. Representative Ray Kennedy has introduced a bill intended to make possible the condemnation of property by an electric railway when city authorities and county commissioners disagree.

The Committee on Railroads and Telegraphs has reported favorably the Harmon bill which would limit fares on interurban railways to 2 cents a mile, make 5 cents the minimum fare and require distances to be measured between points of entering and leaving the car instead of between stations. The Schaffer bill has been reported for passage in the House, having received a favorable vote in the Senate. It would give electric railways the right to condemn property within municipalities and to strip trees along the right-of-way when they interfere with the operation of cars. The Keller bill to give electric railways the right to borrow money regardless of their capital stock, to be secured by notes and bonds, has passed both the House and the Senate and is before the Governor.

On May 2 Governor Harmon vetoed the Calvey bill, which provided that electric railway companies should provide closed vestibules for conductors. He said that there is not the same reason for a closed vestibule for conductors as for motormen.

PENNSYLVANIA.

The bill providing for the merger of street railways and power companies has been passed. The Public Service Commission bill has been passed by the House and is now before the Senate. Final adjournment will take place on May 25. Of more than 2275 bills introduced probably not more than half will get out of committee.

Financial and Corporate

New York Stock and Money Market

May 16, 1911.

Responding to the announcement of the decision of the Supreme Court in the case of the Standard Oil Company, most of the stocks advanced in price, and transactions for the day reached nearly 1,000,000 shares. The decision has removed one of the uncertainties which have exercised a restraining influence upon the business of the country and better conditions are now looked for both in financial markets and in general trade. Money markets show no marked change as yet. Quotations to-day were: Call, 2@2½ per cent; ninety days, 2½@2¾ per cent.

Other Markets

The tone of the Philadelphia market to-day was far more active than it has been for some time.

Traction shares were in demand on the Chicago exchange to-day as a result of satisfactory news of the conclusion of the Chicago Elevated merger. There was an increase of two points in Metropolitan Elevated and South Side Elevated, and a gain of nearly three points in Northwestern Elevated.

The Boston market was strong to-day, with gains throughout the list, and a substantial increase was made in the volume of transactions.

No changes of moment are reported for Baltimore.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 9.	May 16.
American Light & Traction Company (common).....	a288	a292
American Light & Traction Company (preferred).....	a106	a107
American Railways Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a44	44
Aurora, Elgin & Chicago Railroad (preferred).....	a86	86
Boston Elevated Railway.....	a127¾	a128
Boston Suburban Electric Companies (common).....	a15	a15
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a10	a10
Boston & Worcester Electric Companies (preferred).....	a48	a49
Brooklyn Rapid Transit Company.....	78¾	80¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s..	85	85¾
Capital Traction Company, Washington.....	130	128
Chicago City Railway.....	a195	a195
Chicago & Oak Park Elevated Railroad (common)....	3	2
Chicago & Oak Park Elevated Railroad (preferred)...	7	6
Chicago Railways, pteptg., ctf. 1.....	a85	a85
Chicago Railways, pteptg., ctf. 2.....	a22	a21½
Chicago Railways, pteptg., ctf. 3.....	a8¾	a8
Chicago Railways, pteptg., ctf. 4.....	a5	a5½
Cincinnati Street Railway.....	*131	a131
Cleveland Railway.....	a97	97
Columbus Railway (common).....	*96	a96
Columbus Railway (preferred).....	*100	a101
Consolidated Traction of New Jersey.....	a75	a77
Consolidated Traction of N. J., 5 per cent bonds....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a100	a100
Detroit United Railway.....	71	a70¾
General Electric Company.....	156	160
Georgia Railway & Electric Company (common).....	134	a136
Georgia Railway & Electric Company (preferred).....	a93	a92
Interborough Metropolitan Company (common).....	19¾	18¾
Interborough Metropolitan Company (preferred).....	53½	52½
Interborough Metropolitan Company (4½s).....	79¾	79½
Kansas City Railway & Light Company (common)....	a21	a20
Kansas City Railway & Light Company (preferred)...	a67¼	a66
Manhattan Railway.....	139	139
Massachusetts Electric Companies (common).....	a18½	a19
Massachusetts Electric Companies (preferred).....	a88	a89
Metropolitan West Side, Chicago (common).....	a24	a24
Metropolitan West Side, Chicago (preferred).....	a68	a69
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred)....	110	110
North American Company.....	73	73¾
Northern Ohio Light & Traction Company.....	a44	a46
Northwestern Elevated Railroad (common).....	a21½	23
Northwestern Elevated Railroad (preferred).....	a63	63
Philadelphia Company, Pittsburgh (common).....	a53	a56½
Philadelphia Company, Pittsburgh (preferred).....	a42¾	a43
Philadelphia Rapid Transit Company.....	a17¾	a18½
Philadelphia Traction Company.....	a83½	a83
Public Service Corporation, 5% col. notes (1913)....	a100½	a100½
Public Service Corporation, ctf. 5.....	a106½	a107
Seattle Electric Company (common).....	a109½	a109½
Seattle Electric Company (preferred).....	100	100
South Side Elevated Railroad (Chicago).....	a172	a73
Third Avenue Railroad, New York.....	11½	11½
Toledo Railways & Light Company.....	a8	a8
Twin City Rapid Transit, Minneapolis (common)....	a108½	a109
Union Traction Company, Philadelphia.....	a46	a47
United Rys. & Electric Company, Baltimore.....	a18¾	a18¾
United Rys. Inv. Co. (common).....	42	42
United Rys. Inv. Co. (preferred).....	71	72¾
Washington Ry. & Electric Company (common).....	35½	a34½
Washington Ry. & Electric Company (preferred).....	89¾	a87½
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	a103½	a103½
Westinghouse Elec. & Mfg. Co. (1st pref.).....	68½	72½
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a117	a117

a Asked. *Last sale.

ANNUAL REPORTS

Toronto Railway Company

The annual report of the Toronto Railway for the year ended Dec. 31, 1910, as compared with the previous year, shows the following:

	Year Ended Dec. 31, 1910.	1909.
Gross income.....	\$4,377,116	\$3,926,828
Operating and maintenance expenses.....	2,237,188	1,995,914
Net earnings.....	2,139,928	1,930,914
Passengers carried.....	109,415,264	98,117,991
Transfers.....	42,630,756	38,151,596
Percentage of operating expenses to passenger earnings.....	51.6	51.4

From the net earnings for 1910 there were deducted \$560,000 for dividends and \$201,288 for bond interest, etc., a total of \$761,288, and also the following payments to the city:

Percentage on earnings, \$596,297; paving charges, \$83,041; general taxes, \$48,142.

Sir William MacKenzie, the president, says in his report in part:

"It is gratifying to note that, notwithstanding heavy charges throughout the year, including an increase in wages granted the employees, the year's operations have resulted so satisfactory that your directors were enabled to transfer the sum of \$651,159 to the credit of profit and loss account.

"Large expenditures were made during the year upon capital account, the amount being \$633,786. The new car-house on Lansdowne Avenue, referred to in our last year's annual report, will be completed in a few months. Early in the year it was decided to build 100 more double-truck cars, upon the construction of which very large expenditures have been made in addition to providing the electrical equipment for same. Of these cars thirty have been completed and placed in commission, and work upon the balance is being rushed as rapidly as possible.

"In addition to the money expended on capital account, a large amount has been expended on the maintenance of the property of the company, and the board feels satisfied that the physical condition of the property has been greatly improved."

The balance sheet as of Dec. 31, 1910, shows that of \$1,302,006 set aside for renewals and depreciation \$664,127 has been used, leaving a balance in reserve of \$637,879.

A report of the nineteenth annual meeting of stockholders is included in the report. It says that Frederic Nicholls, the vice-president, who acted as chairman, referred to the large amount paid to the city of Toronto, and to the capital expenditure, and mentioned the fact that the company would have spent more if the city had not stood in its way, but the city had for years deliberately hindered the company in its progress. He said:

"In connection with the trial which has been going on, you must have seen from the newspapers that our general manager was able to show very conclusively from the official correspondence that for years we have been telling the City Council and the public that it is impossible to better conditions unless we have more streets to operate our cars on, as the present streets are being operated with as many cars as safety will permit. During the year we spent \$633,000 on betterments for the public. We have been going ahead building new cars, and we shall be ready to put them into operation as soon as the city will have the new streets ready for operation by the railway. And you must bear in mind, gentlemen, it is only after years of litigation, and after several decisions of the Privy Council in our favor, that this company is now being put in a position where it can reasonably expect to carry out what it considers its duty to the citizens by increasing its operating facilities. And the company has been blamed; it was inevitable that the company would be blamed. But the directors and the shareholders who attend the annual meetings know that the company has been endeavoring to do everything that was possible in the development of the business and for the comfort and convenience of the citizens, but we have been deliberately stopped by the Council from carrying out our policy of advancement in that respect.

"I would like to ask Mr. Fleming, our general manager, to say a few words. Mr. Fleming, as well as the directors.

but Mr. Fleming principally, has been the subject of a great deal of unjust criticism. Mr. Fleming has worked night and day in the interests of the company, and while the public may not realize it, the directors know that there is no manager of any public service corporation who, while trying to do his duty to his directors and shareholders, is more desirous of serving the public interest. The fact is that Mr. Fleming, having made a study of traffic conditions, knows better than anybody else what the public interest is, and he is advised by the best experts we can possibly get to show how far we can go in the direction of safety. The street railway in any city, more particularly though in Toronto, is always the butt of criticism, and I am sure Mr. Fleming has pursued the course that will in the end be justified."

Mr. Fleming said in part: "Not only have your officials made a careful and exhaustive study of the traffic conditions, but they have had the benefit of opinions of many railway experts from other large cities, which have substantiated our own observations that this company is giving a service not surpassed by any other company in America and equaled by few. Only during the past month we have had experts come here from a number of large cities in the United States, practical railroad men with a long and varied experience, who have gone into the witness box and sworn that in point of clean, well-lighted, sanitary, comfortable cars, car equipment, and car service in general, the Toronto Railway service compares favorably with the best systems in larger American cities, and that with regard to life-saving appliances, and safety of operation in particular, this company is the pioneer of all street railways. This is borne out by the remarks of the court that the evidence indicated that the company was not behind but actually in advance of any other company on this continent in life-saving appliances. Similar opinions have also been expressed by leading expert railway engineers who have been engaged by the city to report on the traffic situation. In view of this, it is perhaps unnecessary for me to dwell upon this point further than to report that the equipment is in first-class condition, which is evidenced by the fact that practically every car is in daily operation during the maximum traffic.

"It has been a continual and unpleasant fight for the last five years. Three years ago, when we got the judgment of the Privy Council in our favor, I thought our fighting would cease, and that, when we got an opportunity to lay down tracks upon the streets, we would be able to give the people such a service that there could be no reasonable cause for complaint. But you see the judgment of the Privy Council did not satisfy the City Council, and they appealed and again they fought and lost, and then they applied for further legislation. It was only last July, I believe, that the final order was passed and signed by the board instructing us to put down our tracks. We started during the year to do so, and I expect that during the current year we shall have probably 25 miles more of single track laid, and that we will have completed the balance of the 100 new cars now under construction. We will then be in a position where we can greatly relieve the present situation. At the present time we can do nothing; we cannot possibly operate more cars upon our present tracks.

"Almost since the franchise was secured the very fact that the company asked for something which it knew would be a benefit to the public appeared to be strongest reason why the aldermen should refuse the request. That was done simply for the purpose of giving the public the impression that their interests were being well looked after and that the railway company was always wrong, but the great majority of the public know entirely to the contrary, and it now looks as if opposition to progress on the part of the City Council of Toronto must soon be a thing of the past."

The number of passengers carried in 1910 was 109,415,264. The number of transfers issued by the company aggregated 42,630,756.

Gross income of the Toronto & York Radial Railway in 1910 was \$399,616, and maintenance and operating expenses were \$230,522, leaving a surplus of \$169,094. Interest on bonds and loans was \$113,096, leaving a net surplus of \$55,998.

Winnipeg Electric Railway

The annual report of the Winnipeg Electric Railway for the year ended Dec. 31, 1910, shows the following comparative statement:

Year Ended Dec. 31.	1910.	1909.
Gross receipts.....	\$3,284,341	\$2,623,731
Increase 1910 over 1909—25.18 per cent.....	660,610	
Operating expenses.....	1,654,833	1,320,665
Increase 1910 over 1909—25.31 per cent.....	334,168	
Operating expenses—		
Per cent of earnings.....	50.39	50.34
Net earnings.....	1,629,508	1,303,066
Increase 1910 over 1909—25.05 per cent....	326,442	
Net income per cent of capital.....	15.58	14.39
1910	6,000,000	
1909		6,000,000
Passengers carried.....	31,369,421	26,382,773
Increase 1910 over 1909.....	4,986,648	
Transfers	8,003,038	8,925,849
Railway earnings per capita.....	10.02	10.03

From the net earnings for 1910 there were deducted fixed charges of \$694,739 and dividends of \$600,000, leaving a surplus of \$334,769.

Sir William MacKenzie, the president, says in the report in part:

"All the properties of the company have been efficiently maintained.

"Twenty-six large double-truck closed motor cars with wide vestibules, equipped with air brakes, electric heaters both in the body of the car and the motorman's vestibule, and many other modern appliances to insure the safety of passengers and operators, were constructed in the company's Winnipeg shops and put into service.

"Three new snow sweepers of latest modern design were purchased during the year and are also in service."

Gross earnings of the Winnipeg, Selkirk & Lake Winnipeg Railway for the year were \$75,725, operating expenses \$35,642 and net earnings \$40,083. Interest on bonds was \$20,000 and taxes were \$12,644, leaving a surplus of \$7,439. Gross earnings of the Suburban Rapid Transit Company for the year amounted to \$56,016, while operating expenses were \$34,107 and net earnings \$21,909. Bond interest amounted to \$25,000 and taxes to \$1,209, leaving a deficit of \$4,300.

Long Island Railroad

Ralph Peters, president of the Long Island Railroad, refers to electrical operations of the company in the annual report for the calendar year 1910 as follows:

"The gross revenues from railroad lines increased \$818,720, or 9.14 per cent, due chiefly to a general increase in the passenger traffic and to the opening of the Pennsylvania tunnels and the consequent operation of a large number of passenger trains to and from the Pennsylvania station at Seventh Avenue and Thirty-second Street, Manhattan Borough, instead of to Long Island City and the connecting ferry to the foot of Thirty-fourth Street in said borough. This resulted in a heavy loss in ferry earnings, which was further increased by the operation of trolley cars directly into Manhattan Borough over the new Queensboro Bridge.

"The number of passengers carried increased 3,511,854, or 12.8 per cent; the passenger mileage increased 52,528,703, or 12.9 per cent, and the passenger train mileage increased 651,180 miles, or 15 per cent; 496,000 miles of the increase was made by electric trains, a large portion of which represents the service to and from the Pennsylvania station, in Manhattan Borough.

"In pursuance of trackage rights granted by the Pennsylvania Tunnel & Terminal Railroad Company and the Pennsylvania Railroad Company, which operates its railroad as agent, the trains of your company began running through the East River tunnels to the Pennsylvania station in Manhattan Borough on Sept. 8, 1910. The train service consists of 101 trains in each direction, with direct service to the Far Rockaway branch, the Hempstead branch and Long Beach, and connections made at Jamaica with all steam trains running to various points on the island, and at Woodside with all Port Washington branch and Whitestone branch trains. The service has been very satisfactory, although the increased earnings expected from the opening of the tunnels were not appreciable in 1910. Certain steam trains continue to run to Long Island City terminal, and this operation will be necessary until the Jamaica terminal

is completed, and the electrification of the North Shore branch is sufficiently advanced to permit of other arrangements.

"The results obtained from the operation of your electrified lines continue satisfactory both from the standpoint of economy and increased business.

"The improvement and electrification of your lines during the year consisted of finishing the four tracks between the mouth of the tunnels in Sunnyside yard and Jamaica, two tracks of the Glendale cut-off, one track from Springfield Junction to Valley Stream, two tracks from Valley Stream to Lynbrook, and single track, Lynbrook to Long Beach, third track on Far Rockaway branch, and the building of substations at Winfield and Mineola.

"The trolley lines held by your Long Island Consolidated Electrical Companies are showing improved results. No extensions were made in 1910. Six pay-as-you-enter cars were added to the equipment of the Ocean Electric Railway.

"The Public Service Commission for the First District approved your company's application to eliminate the grade crossings on the Port Washington division through Flushing, and the State and city will contribute \$400,000 toward this work. This will enable your company to abolish a number of grade crossings, extend second track to Great Neck and Whitestone, and electrify both branches so that through electric service can be operated to the Pennsylvania station.

"The general business of your company shows a healthy condition. The average number of daily commuters per month shows an increase of from 6387 in 1905 to 11,869 in 1910. Of the total number of passengers carried, amounting to 39,978,615, 28.8 per cent were commuters, 17.6 per cent local passengers on Atlantic Avenue, 4.4 per cent Rockaway Beach passengers from Delancey Street, New York, and the balance general first-class business to and from all points on the island."

Elevated Railroad Merger in Chicago

Announcement was made in Chicago on May 16 that Henry A. Blair had concluded negotiations by which the National City Bank of New York organizes a syndicate to furnish \$22,000,000 cash to be offered to stockholders of all the elevated railways in Chicago for the purpose of effecting a consolidation. It was stated that provision was made for a first and refunding bond issue to take up the \$18,000,000 Northwestern Elevated 4 per cent bonds due on Sept. 1, 1911, and that an agreement was made for an offer of either securities or cash to stockholders of the various companies. Mr. Blair announced that later in the week he would make public the details of the offer to the stockholders.

This consolidation will unite all the elevated roads in Chicago, which operate 177 miles of track and carry about 500,000 passengers daily. It is reported also that the merger of the elevated roads is preliminary to a final consolidation of these roads with the surface street railway transportation systems of Chicago, and possibly with the Commonwealth Edison Company, which supplies electrical energy for a great proportion of the mileage.

The syndicate, which is said to have agreed to Mr. Blair's program for consolidation of the elevated lines, includes the National City Bank of New York, Harris, Forbes & Company, Lee, Higginson & Company and others. The prices offered in cash to stockholders of the several elevated roads and which are said to have been acted upon favorably by the boards of directors are reported as follows: South Side Elevated Railroad, 75; Metropolitan West Side Elevated Railway, common, 27.5, and preferred, 72.5; Northwestern Elevated Railroad, common, 30, and preferred, 70.

Indianapolis & Louisville Traction Company, Scottsburg, Ind.—Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 853, of the plan formulated for the reorganization of the Indianapolis & Louisville Traction Company. It is proposed to issue new securities as follows: \$1,500,000 of 5 per cent, thirty-year, first-mortgage bonds, dated Jan. 1, 1911; \$600,000 of 6 per cent cumulative preferred stock and \$600,000 of common stock. The capitalization of the present company consists of \$1,250,000 of first-mortgage bonds, \$334,500 of second-mortgage bonds,

\$100,000 of preferred stock, and \$2,500,000 of common stock. According to the plan for the reorganization of the company the present first-mortgage bondholders will receive 70 per cent in new first-mortgage bonds and 30 per cent in common stock; the second-mortgage holders will receive 150 per cent in new preferred stock and \$200,000 in new common stock, and the preferred stockholders will receive 75 per cent in new preferred stock and 25 per cent in new common stock. Of the \$1,500,000 of new first-mortgage, thirty-year bonds, \$875,000 will go to the present holders of first-mortgage bonds, \$25,000 will be put in the treasury for working capital and \$600,000 will be issued for improvements at 80 per cent of the actual cost. Of the \$600,000 of 6 per cent cumulative preferred stock, \$501,750 will go to the holders of the second-mortgage bonds, \$75,000 will go to holders of the present preferred stock and \$23,250 will be placed in the treasury. Of the \$600,000 of common stock \$375,000 will go to present first-mortgage bondholders, \$200,000 will go to the second-mortgage bondholders and \$25,000 will go to the present preferred stockholders.

Norwich & Westerly Railway, Norwich, Conn.—Judge Noyse, in the United States Circuit Court at New Haven, Conn., on May 13, 1911, signed a decree of foreclosure of a mortgage on the Norwich & Westerly Railway, at the request of the bondholders, after passing to Robert W. Perkins, Norwich, as master, the question of the disposal of moneys in the hands of Frank B. Brandegee, the receiver of the company. The bonds outstanding had a par value of \$750,000, and with accrued interest the claim of the bondholders was \$933,302. The debts of the company above the mortgage are about \$200,000.

Otsego & Herkimer Railroad, Oneonta, N. Y.—At a meeting of the directors of the Otsego & Herkimer Railroad held in New York on May 9, 1911, William B. Reed, Jr., Brewster, N. Y., and John Reynolds, New York, N. Y., were elected directors to succeed H. T. Jennings and James W. McCabe, resigned, and William B. Reed, Jr., was elected vice-president of the company in place of Mr. Jennings. An application made by the company about two years ago to the Public Service Commission of the Second District for permission to issue securities is still before that body owing to the fact that the property has passed through several receiverships and that principles are involved that have not been before the commission heretofore. In acting upon the application, the commission wishes to make its decision a precedent for future decisions involving the same questions. It is believed now that the order is ready for promulgation. The company operates between Oneonta and Herkimer, and has about 65 miles of track. The earnings of the road during the present management have increased materially, although census reports show no increase in population of towns through which the road operates, except the two terminals. The company does a general passenger and freight business, carries express matter on express cars and operates a railroad post-office car. A considerable part of the business is done in the summer.

Philadelphia Company, Pittsburgh, Pa.—The report of James H. Reed, president of the Philadelphia Company for the year ended March 31, 1911, made public recently, shows earnings as follows: Gross earnings, \$20,140,035; operating expenses and taxes, \$10,918,214; net earnings, \$9,221,821; other income, \$277,586; total income, \$9,499,407; deductions from income, \$1,466,973; net income before deducting fixed charges, improvements, betterments, extensions, etc., \$8,032,434; fixed charges, \$3,411,719; net income after deducting fixed charges, \$4,620,714; improvements, betterments, extensions and extraordinary maintenance expenses, \$1,905,751; car trust notes issued Dec. 1, 1905, retired during the year, \$40,000; net income, surplus for the year, \$2,674,963; dividends on preferred stocks, \$382,961; balance, surplus for the year, \$2,292,002.

Philadelphia (Pa.) Rapid Transit Company.—The Chester & Philadelphia Railway, which, as noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 853, is controlled by the Philadelphia Rapid Transit Company, was incorporated in Pennsylvania in June, 1910, as the successor of the Philadelphia & Chester Railway. A new first mortgage has been made by the company to the Real Estate Title, Insurance & Trust Company, Philadelphia, Pa., as trustee,

to secure not more than \$600,000 of 5 per cent bonds dated July 1, 1910, and due 1940, but callable on and after July 1, 1915, at 105. Of the \$600,000 of bonds \$500,000 is now outstanding. The stock of the company is \$485,000. The officers are: Charles C. Kruger, president; R. B. Selfridge, secretary; I. H. Silverman, treasurer.

Toledo & Indiana Railway, Toledo, Ohio.—The Spitzer-Rorick Company, Toledo, Ohio, has purchased the entire issue of \$400,000 of 5 per cent, twenty-year bonds of the Toledo & Indiana Railway, and has offered the bonds for sale at 97. The bonds are redeemable after two years at 102½.

United Public Utilities Company, New Orleans, La.—The United Public Utilities Company, the incorporation of which was noted in the ELECTRIC RAILWAY JOURNAL of May 13, 1911, page 858, is to succeed the Southern Electric Securities Company, the security holdings of which were sold at auction in October, 1910.

United Railroads of San Francisco.—The annual report shows that its gross earnings were \$7,653,488 for the fiscal year ended Dec. 31 last. This compares with \$7,455,865 for the previous year. Operating expenses increased from \$4,242,549 in 1909 to \$4,301,169 in 1910, leaving net earnings for 1910 at \$3,352,319.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1½ per cent.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

City Traction Company, Pittsburgh, Pa., \$1.50.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, common.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent, common.

Metropolitan West Side Electric Railway, Chicago, Ill., quarterly, ¾ of 1 per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.

Washington Railway & Electric Company, Washington, D. C., 2½ per cent, preferred; 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS COMPANY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Apr. '11		\$318,954	.....	.....	.....	.....
1 " " '10		302,654	.....	.....	.....	.....
10 " " '11		3,314,568	.....	.....	.....	.....
10 " " '10		3,112,817	.....	.....	.....	.....
BROCKTON & PLYMOUTH STREET RAILWAY.						
1 m., Feb. '11		\$6,420	\$5,799	\$621	\$1,559	*\$938
1 " " '10		6,597	6,231	366	1,785	*1,419
12 " " '11		120,046	83,249	36,796	19,719	17,077
12 " " '10		130,442	94,725	35,717	21,008	14,709
BROOKLYN RAPID TRANSIT SYSTEM.						
1 m., Dec. '10		\$1,837,494	\$1,120,251	\$717,243	\$635,564	\$81,679
CENTRAL PARK, NORTH & EAST RIVER RAILROAD.						
1 m., Dec. '10		\$50,271	\$51,028	*\$758	\$2,414	*\$3,171
CONEY ISLAND & BROOKLYN RAILROAD.						
1 m., Dec. '10		\$106,878	\$75,952	\$30,926	\$32,413	*\$1,487
EL PASO ELECTRIC COMPANY.						
1 m., Feb. '11		\$54,850	\$31,056	\$23,800	\$8,341	\$15,459
1 " " '10		53,839	27,753	26,086	8,486	17,600
12 " " '11		645,479	376,827	268,653	98,479	170,174
12 " " '10		615,870	359,199	256,671	99,530	157,141
GALVESTON-HOUSTON ELECTRIC COMPANY.						
1 m., Feb. '11		\$99,928	\$65,932	\$33,997	\$24,620	\$9,376
1 " " '10		89,899	61,977	27,922	23,178	4,743
12 " " '11		1,337,550	801,229	536,321	293,218	243,104
12 " " '10		1,219,086	726,238	492,848	266,625	226,223
HUDSON & MANHATTAN RAILROAD.						
1 m., Dec. '10		\$332,296	\$109,700	\$222,596	\$210,928	\$11,668
INTERBOROUGH RAPID TRANSIT COMPANY.						
1 m., Dec. '10		\$2,787,710	\$1,214,317	\$1,573,392	\$1,046,257	\$527,136
JACKSONVILLE ELECTRIC COMPANY.						
1 m., Feb. '11		\$46,973	\$27,025	\$19,948	\$10,161	\$9,787
1 " " '10		43,690	22,802	20,888	9,132	11,756
12 " " '11		585,249	318,091	267,158	115,058	152,100
12 " " '10		502,619	271,677	230,942	112,439	118,503
METROPOLITAN STREET RAILWAY.						
1 m., Dec. '10		\$1,132,416	\$738,925	\$393,491	\$329,440	\$64,051
NEW YORK & QUEENS COUNTY RAILWAY.						
1 m., Dec. '10		\$8,570,207	\$100,379	*\$14,677	\$26,049	\$40,726
THIRD AVENUE RAILROAD.						
1 m., Dec. '10		\$297,425	\$146,819	\$150,607	\$56,510	\$94,096

Traffic and Transportation

Booming Baltimore

William A. House, president of the United Railways & Electric Company, Baltimore, Md., referred in part as follows in the pamphlet report of the company for the year ended Dec. 31, 1911, to the part which the company has played in booming Baltimore in the past, the idea of booming Baltimore having been taken up actively recently by the Greater Baltimore Committee:

"'Booming Baltimore' has recently been a subject of much discussion. Your company desires to participate and assist in this movement in every way. We believe that we have been largely a contributing factor in making possible the progress accredited to our city and suburban sections. Public service corporations come in for more or less unjust criticism in many cities of the country, but we feel that a substantial bond of friendship exists between the public and your company. No organization has labored more persistently to spread the good repute of the city. It has expended large sums to improve its service. The street railway hews the path for future suburban settlement and roads begin to radiate to right and left from its rails. These roads become streets and are gradually improved with homes. These railway lines into the suburbs and country are constructed and operated at first at a loss. In some instances they are still being maintained at a loss—that is, after the tracks are laid and equipment purchased, the revenue does not pay bare operating expenses, regardless of interest on investment or provision for depreciation. Yet your company has acted in this way as a developer of the city—as the agency through which the urban centre has expanded. It thus becomes possible for large numbers of our people to have their own homes, no matter where their work may be, and the city's fame as a residential town is thereby enhanced. The congestion of the population into crowded central sections and the existence of tenements becomes less necessary, and in this way health conditions are improved. The developed property is made available for a greatly increased valuation upon the tax books, and the public revenue is thereby increased.

"This much for the railway's part in helping the city to spread. Its course has been equally noteworthy in the development of the central portions of Baltimore. When protest is made about prevailing tax rates the reply is that Baltimore is now in a period of reconstruction and municipal development. Your company knows this better than any other taxpayer. Streets are repaired; street beds are torn up; grades are changed, and scarcely a step forward is made without requiring your company to bear a large and increasing expense in relaying its tracks or in reconstructing its lines.

"The growth of your company's business means much to every Baltimorean, for through the park tax the people of the city are directly benefited.

"Instead of expanding, developing and increasing the efficiency of its service, the company could well have lagged behind and have diverted a portion of its income to dividends to its stockholders, as has been done in some other cities. Your company, however, has not pursued this policy and the improvements, therefore, have been made in this sense at the expense of the common stockholder, who has not yet received a dividend upon his stock. The stockholder, for his reward, must look to the future, to the working out of a fair return upon these expenditures and to just treatment in turn by the public and the public authorities."

Pensions for Employees of American Railways Company

The American Railways Company, Philadelphia, Pa., has taken steps to establish a pension fund for its employees. In outline it provides that any employee of the company, or of its subsidiary companies or their predecessors, who has served continuously not less than twenty years and attained the age of sixty-five years may retire, or may be recommended for retirement by reason of disability, by his employing officer, or having attained the age of seventy years must retire upon a pension which will be 2 per cent of the average compensation for the last ten years of service multiplied by

the number of years continuous service. The maximum pension, however, is not to exceed \$30 per month. The board has appointed a committee to work out the details of the scheme and to co-operate with the employees relief associations which have been organized on most of the properties which the company controls, and to affect organizations among the employees upon roads where they do not exist at present. The board will also consider the establishment of saving funds. The pension system is to become effective on July 1, 1911, after which date no one having attained the age of forty-six will be permitted to enter the employ of the company unless recommended by the committee on pension system and approved by the board of directors.

Safety Gates in Louisville.—The Louisville (Ky.) Railway has put its new safety gates in operation on the 23 cars of the Portland Avenue line. The gates are controlled by the conductor. The gates prevent passengers from entering or leaving cars while the cars are in motion.

The Meeting of the Joint Committee on Express and Freight Accounting.—The meeting of the joint committee on express and freight accounting of the American Electric Railway Transportation & Traffic Association and the American Electric Railway Accountants' Association has been set for May 27, 1911, at Cincinnati, Ohio.

Contract for Street Sprinkling in Memphis.—The City Commissioners of Memphis, Tenn., have contracted with the Memphis (Tenn.) Street Railway to sprinkle the streets, two cars to be run at \$208.83 a month each. A clause was defeated which was intended to provide that when no sprinkling cars were sent out, as on rainy days, the lost time should be made up later.

Attractions at Winona Lake.—The Winona Interurban Railway, Warsaw, Ind., has contracted with Glen H. Curtiss to give personal exhibitions with his biplane at Winona Lake, Ind., on July 18, 1911. One flight will be made from land and another from water. The company is also securing \$25,000 worth of postal-card views of its line and attractions which are to be distributed free for advertising purposes.

Columbus, Delaware & Marion Railway Puts on Limited Cars.—The Columbus, Delaware & Marion Railway, Marion, Ohio, is operating a limited service in conjunction with the limited cars of the Cleveland, Southwestern & Columbus Railway, which reach Marion from the north. The limited cars run between Columbus and Marion in fifty-seven minutes. The schedule time between Columbus and Cleveland will be four hours and fifty minutes.

Winnipeg Employees Renew Agreement with Company.—The employees of the Winnipeg (Man.) Street Railway have decided to renew their agreement with the company with a few minor changes and accept the scale of wages offered. All of the men who were discharged at the time of the strike in the winter will be taken back. The new scale of wages follows: First six months, 23 cents per hour; second six months, 25 cents; second year, 26 cents; third year, 28½ cents; fourth and succeeding years, 29 cents.

Additional Transfer Points in Boston.—Under an order issued by the Railroad Commission of Massachusetts eight new free transfer points will be established on the lines of the Boston Elevated Railway, and existing transfer privileges at Northampton and Washington Streets and at the Church Street entrance to the Public Garden will be enlarged. The order is based on petitions of Mayor Fitzgerald and of improvement associations and citizens. It will become effective July 1, 1911, but as many changes as possible are to be completed before that time.

Decision in Albany Fare Case.—The Court of Appeals has decided that the Cohoes Railway must obey the Barnes act of 1905, reducing the fare between Albany and Rensselaer from 6 cents to 5 cents. The company claimed that 5 cents was for fare and the other cent was for tolls to be paid to a bridge company for permitting cars to cross. The decision of the commission in this case was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 3, 1910, page 1127, and the argument before the court on April 24, 1911, was referred to in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, page 767.

Indianapolis Trade Association Trips.—Members of the Indianapolis Trade Association made a two-day trip over the Lafayette division of the Terre Haute, Indianapolis & Eastern Traction Company's line recently in the interest of trade in Indianapolis. Every town and city on the division was visited. Three cars were required to carry the 400 members of the party. At Crawfordsville the cars were switched to the Indianapolis, Crawfordsville & Western Traction Company's line, over which the return trip was made. Last year the association made a number of similar trips which proved very profitable.

Long-Distance Excursion on Illinois Traction System.—On May 14, 1911, the Illinois Traction System put in effect a two-day, round-trip excursion to St. Louis from Peoria, Bloomington, Lincoln and Springfield. Peoria and Bloomington are each 175 miles from St. Louis, and Springfield is 100 miles from St. Louis. The steam roads had put into effect a rate of \$1 for the round trip, which rate was met by the Illinois Traction System and resulted in more than 2000 people taking the ride of 350 miles. On May 14 1244 passengers purchased tickets from Peoria to St. Louis and return, 400 from Bloomington, 100 from Lincoln and 500 from Springfield.

Decision in Regard to Baltimore Suburban Fare.—The Maryland Public Service Commission in the case of the Allied Committees of the Suburbs of Baltimore, growing out of the commission's order directing the withdrawal by the United Railways & Electric Company of the residents' books issued on the Catonsville, Govanstown and Emory Grove lines, takes the view that the form of the ticket heretofore issued was unduly discriminatory, as it is not open to purchase by all persons who may desire to use the railway, but it is only open to residents, and it, therefore, refuses to order the restoration of the tickets. The commission recommends the issuance of some form of commutation tickets open to the general public.

Accidents on Interstate Electric Railways.—The Interstate Commerce Commission has issued Accident Bulletin No. 38, which contains the record of railway accidents in the United States during the three months ended Dec. 31, 1910. The electric railways which come within the jurisdiction of the commission reported 114 persons killed during the quarter and 1031 injured. There were forty-six collisions and twenty-one derailments. Thirty-four passengers and six employees were killed in collisions and one employee was killed by a derailment. The total number of passengers killed was forty-two and the total number of employees killed was twenty. Thirty-seven trespassers were struck or run over, of which number twenty-five were killed and twelve were injured.

Plans to Meet Court's Interpretation of Minneapolis Car Ordinance.—W. J. Hield, vice-president and general manager of the Twin City Rapid Transit Company, Minneapolis, Minn., has issued the following statement in regard to the plans of the company to meet the requirements of the so-called straphangers' ordinance as interpreted by Judge Willard, reference to whose ruling was made in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, page 768: "Orders have been placed to equip all Minneapolis cars with 'capacity' signs as required by the service ordinance, and when this work is complete the officers of the company plan to comply to the best of their ability with the terms of the ordinance as outlined by Judge Willard. It may take a week or two to get the signs in the cars, during which time the necessary instructions will be given to the trainmen. It is the intention of the company to make a consistent effort to comply with the order of the City Council."

Central Pennsylvania Traction Company to Reduce Suburban Fare.—The Central Pennsylvania Traction Company, Harrisburg, Pa., will issue round-trip tickets to Rockville and return, and vice versa, for 15 cents, on recommendation of the State Railroad Commission. At present the fare is 10 cents each way. Since the opening of Wildwood Park and the Academy there has been a general demand for reduced fares to Rockville. The 15-cent round-trip tickets will entitle the holders to the same transfer privileges that they now have. In a statement in regard to the matter the commission said: "The respondent stated to the commission that a flat rate of 5 cents would not pay for the cost

of operation, and such being the case the commission, in accordance with a decision of the Supreme Court in the 2-cent rate fare, held that a recommendation for a 5-cent fare would not be sustained by the courts. It was therefore finally decided to make the round trip 15 cents, which rate will be put into effect within a few days."

Prize Essays by St. Louis Employees on Prevention of Accidents.—Bulletins have been posted at all carhouses of the United Railways, St. Louis, Mo., announcing that eight prizes will be awarded by the company for the best essays on how to avoid accidents written by the 2800 motormen and conductors of the system. The prizes are in cash, and four of them, in amounts of \$100, \$50, \$25 and \$10, are offered for the conductors and the same number for the motormen. New ideas are especially desired. The papers must not contain more than 500 words. They must be submitted by July 1, 1911, and the judges will pass upon them without knowing who wrote them. The awards will be made about Aug. 1, 1911, when the prize winners will be invited to read their productions at a meeting of their fellow-employees in the entertainment hall established by the company for the men. The competition is open to men who have been with the company since August, 1910. The identity of the judges will not be made public until after the awards are announced.

Recent Work of the Indiana Railroad Commission.—The Indiana Railroad Commission has inspected the automatic block signal system now in operation on the New York, Chicago & St. Louis Railroad. The commissioners and a number of officers of electric railways in the State witnessed a successful test of the Gill selective signal system on the Rushville division of the Indianapolis & Cincinnati Traction Company's line on May 12, 1911. The commission has decided to exercise the authority conferred by the last Legislature and grant permits to interurban electric railways to cross industrial steam roads without stopping their cars. Under a rule of the commission promulgated in accordance with previous legislation the conductor of an electric car was compelled to cross all such steam railroad tracks in advance of his car and signal the motorman to proceed. In localities where mining and manufacturing are carried on extensively this rule has caused a considerable loss of time. The commission has been asked to investigate the alleged discrimination on the part of steam railroads against the electric railways in the delivery of coal for use in their power houses.

Improvements in Interurban Service of the Detroit United Railway.—The new schedules of the Detroit (Mich.) United Railway, which go into effect on May 24, 1911, will affect about every line of the company, except the one to Jackson, the timetable of which was revised about a month ago. On the Rapid Railway the limited cars will leave Detroit at 7:15 a. m., and every two hours to 7:15 p. m. The company will also place an Algonac limited in operation, as an experiment, in response to requests of Detroit people who have cottages at Fair Haven and Pearl Beach. It will leave Detroit daily except Sunday at 5:15 p. m., as a section of the regular limited, and will run as a limited to Anchorville, where it will branch off for Algonac, running as a fast local and making all local stops to Marine City. Returning, the Algonac limited will leave Marine City daily, except Sunday, at 6:46 a. m., making all local stops to Anchorville, from which place it will come in on limited time, reaching the City Hall, Detroit, at 8:50 a. m. In addition to this a car will be run from Fairhaven and Pearl Beach Mondays only, as a local, so as to reach the City Hall, Detroit, at 7:50 a. m. The Flint division limited service will be increased to seven northbound and six southbound, all operating between Detroit, Flint and Saginaw. These limiteds will leave Detroit at 6:25 a. m., and every two hours to 6:25 p. m. There will also be an increase in the number of limited cars between Detroit and Toledo to seven. These cars will leave Detroit at 7:30 a. m. and every two hours to 7:30 p. m. The new schedule fits in with the limited schedule of the Lake Shore Electric Railway from Toledo to Detroit, so that passengers can make connections. It is expected before the end of June to establish through service without change of cars between Detroit, Sandusky, Lorain and Cleveland.

Personal Mention

Mr. Lee Landis has been appointed general manager of the Ocean Shore Railway, San Francisco, Cal.

Mr. A. G. Maish resigned as general manager of the Des Moines (Ia.) City Railway, effective on May 15, 1911.

Mr. W. G. Owens has resigned as superintendent and purchasing agent of the San Angelo (Tex.) Street Railway.

Mr. William B. Reed, Jr., has been elected vice-president of the Otsego & Herkimer Railroad, Oneonta, N. Y., to succeed Mr. H. T. Jennings, resigned.

Mr. Ray Parker has been appointed assistant auditor of the Petaluma & Santa Rosa Railway, Petaluma, Cal. Mr. Parker was formerly connected with the San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.

Mr. Michael C. Buckley has been appointed city traction expert of Chicago, Ill., by Mayor Harrison of that city to succeed Mr. Millard B. Hereley. Mr. Buckley is president of the organization which exists among the employees of the Chicago City Railway.

Mr. William E. Rolston, whose appointment to the Des Moines (Ia.) City Railway was announced in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, has been given the title of general superintendent of the Des Moines City Railway and the Inter-Urban Railway, Des Moines, Ia.

Mr. George S. Henry, who has been traffic manager of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., since the road was placed in operation, has resigned. Mr. C. O. Warfel, who has heretofore been chief clerk to the general manager, will succeed to the duties performed previously by Mr. Henry.

Mr. C. A. Cahill has been appointed chief engineer of power plants of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to succeed Mr. C. J. Davidson, whose resignation to enter the consulting engineering field in Chicago with Mr. Fay Woodmansee was noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911.

Mr. Sibbald MacDonald has recently been appointed auditor of the Duluth (Minn.) Street Railway, to succeed Mr. S. L. Reichert, who will continue as secretary and treasurer of the company. Mr. Reichert was appointed treasurer early in 1910 to succeed Mr. L. Mendenhall, who continues as a director of the company. Mr. MacDonald has been acting as Mr. Reichert's assistant for some years.

Mr. Earle W. Chafee, engineer of the Essex division of the Public Service Railway, Newark, N. J., sailed from New York on May 6, 1911, to become assistant chief engineer of the board of works of the Republic of Panama. Mr. Chafee was graduated from the United States Naval Academy at Annapolis. He began active railway work as instrument man with the Public Service Railway in 1906 and was advanced to the office of division engineer.

Mr. R. H. Wyatt, general freight and express agent of the Louisville & Interurban Railroad, Louisville, Ky., which operates the suburban lines controlled by the Louisville Railway, has been appointed general freight and passenger agent of the company in charge of all traffic over the lines. Mr. Wyatt is forty-seven years old and entered the service of the Louisville Railway twenty-seven years ago as a driver of one of the company's mule cars.

Mr. F. C. Potvin, formerly chief clerk to Mr. H. G. Kessler, secretary and auditor of the Saginaw-Bay City Railway, Saginaw, Mich., the gas and electric companies in Saginaw and Bay City, including the Saginaw Power Company and the Bay City Power Company, has been appointed to succeed Mr. Kessler with these companies, Mr. Kessler having been appointed general auditor of Hodenpyl, Hardy & Company, as noted elsewhere in this column.

Mr. C. O. Warfel has been made chief clerk to the president of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. Mr. Warfel began his railroad career with the Cincinnati, Hamilton & Dayton Railroad in the transportation department. In 1904 he entered the service of the Indianapolis & Cincinnati Traction Company as storekeeper. He was promoted to be a dispatcher and later entered the traffic department as a solicitor. Shortly afterward he was made general agent at Indianapolis.

Mr. Oscar Lively has been appointed superintendent of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. Mr. Lively entered the service of the Indianapolis, Shelbyville & Southeastern Traction Company in 1903 as dispatcher. Later he was promoted to the position of chief dispatcher. When the Shelbyville line was consolidated with the Connerville division he remained with the company as trainmaster of the Shelbyville division and shortly afterward was made trainmaster of both divisions of the road.

Mr. C. O. Sullivan has resigned as general freight and passenger agent of the Winona Interurban Railway, Warsaw, Ind., to become traffic manager of the Western Ohio Railroad at Lima, Ohio, to succeed Mr. C. C. Collins, whose appointment as traffic manager of the Lehigh Valley Transit Company is noted elsewhere in this column. Mr. Sullivan advanced through the traffic departments of steam railroads to the position of traveling freight agent with the Rock Island Railroad. He resigned from the Rock Island Railroad to enter the employ of the Winona Interurban Railway.

Mr. H. G. Kessler, who has been secretary and auditor of the Saginaw-Bay City Railway, Saginaw, Mich., the gas and electric companies in Saginaw and Bay City, including the Saginaw Power Company and the Bay City Power Company, has been appointed general auditor of Hodenpyl, Hardy & Company, New York, N. Y., under whose management have come the public service properties mentioned on page 902 of this issue of the *ELECTRIC RAILWAY JOURNAL*. Mr. Kessler was formerly connected with the Westchester Lighting Company. He was appointed to the companies at Saginaw and Bay City some time ago, and about three years ago he was elected secretary of the companies.

Mr. Melville Dozier, Jr., has resigned as assistant general manager of the Northern Electric Railway, Chico, Cal., to enter the construction business in Sacramento with the Dozier Construction Company. Mr. Dozier was born in Santa Rosa, Cal., and was educated in the public schools in that city and in Los Angeles. He became a civil engineer and entered the employ of the Southern Pacific Railway, of which he was finally made assistant engineer. He resigned from this company to become chief engineer of the maintenance of way department of the Pacific Electric Railway. He was also connected with the Vallejo Northern Railroad as president.

Mr. Frank S. Cummins has resigned as traffic manager and chief engineer of the Inter-Urban Railway, Des Moines, Ia., and has been elected vice-president of the Union Securities Company, Des Moines. Mr. Cummins' business career has been confined for the most part to railway work. He was connected with the engineering departments of the Chicago, Rock Island & Pacific Railway and other railroads and has been with the Inter-Urban Railway for the last nine years as traffic manager and chief engineer. As announced in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, Mr. Cummins will be succeeded as traffic manager of the Inter-Urban Railway by Mr. C. T. Chapman.

Mr. W. T. Maddox, whose appointment as superintendent of the Southern division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines was announced in the *ELECTRIC RAILWAY JOURNAL* for April 29, 1911, has been connected with the Pacific Electric Railway and the Los Angeles & Redondo Railway for the last nine years and has served these companies as train dispatcher, trainmaster, general freight and passenger agent and superintendent. Before becoming connected with the Pacific Electric Railway, Mr. Maddox served the Missouri Pacific Railroad and the Missouri, Kansas & Texas Railroad for nineteen years as operator, agent, clerk to the superintendent, train dispatcher and chief train dispatcher.

Mr. H. Wallerstedt has resigned as assistant engineer of the Pennsylvania Tunnel & Terminal Railroad, New York, N. Y., for which he served under Mr. George Gibbs, chief engineer of electric traction and station construction. Mr. Wallerstedt was born in Sweden in 1869. He came to the United States in 1889 and entered the employ of the Chicago office of the General Electric Company. Subsequently he was connected with the Metropolitan West Side Elevated Railway, Chicago, Ill., Sargent & Lundy, Chicago, and the

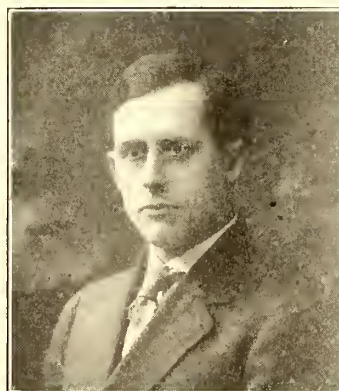
Illinois Steel Company. In 1899 he entered the employ of the Manhattan Elevated Railway, which was then being electrified, and continued with that company and its successor, the Interborough Rapid Transit Company, until 1906, as engineer of car equipment. He resigned from the Interborough Rapid Transit Company to become connected with Ford, Bacon & Davis, New York, N. Y.

Mr. J. C. McPherson, whose appointment as superintendent of the north division of the Pacific Electric Railway, Los Angeles, Cal., was noted in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, began his railroad work in 1884 in the machine shop of the Atchison, Topeka & Santa Fe Railroad at Raton, N. M., and also served this company in the boiler and blacksmith shops. He was promoted to the position of fireman in 1886. In 1889 Mr. McPherson was made a locomotive engineer with the company and continued with the company in that capacity until 1895, when he moved to Los Angeles and became connected with the Los Angeles-Pacific Railway. He has served the Los Angeles-Pacific Railway and the Pacific Electric Railway as conductor, motorman, timekeeper, dispatcher, chief dispatcher, trainmaster, assistant superintendent at Pasadena and superintendent of the city division of the Pacific Electric Railway at Los Angeles.

Mr. C. C. Collins has resigned as traffic manager of the Western Ohio Railroad, Lima, Ohio, to become traffic manager of the Lehigh Valley Transit Company, Allentown, Pa., succeeding Col. E. C. Spring, whose appointment as assistant to the president of the Philadelphia & Western Railway, Upper Darby, Pa., was announced in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, page 769. Mr. Collins began his railroad career with the Columbus & Eastern Railroad in 1890 as chief clerk in the traffic department. After the completion of the Columbus, Sandusky & Hoeking Railway and the merging of the Columbus & Eastern Railroad with that property he retained this position and was later appointed division freight agent of the Columbus, Sandusky & Hoeking Railway at Toledo. In 1898 this road was sold to the Pennsylvania lines, and Mr. Collins engaged in business in Porto Rico for several years. After his return to Ohio he entered the employ of the Detroit, Toledo & Ironton Railroad, but resigned from that company to accept a position with the Columbus, London & Springfield Railway, with which he remained as general express and passenger agent until 1907. In the latter year he entered the service of the Western Ohio Railroad as general freight agent, and in 1908 was made traffic manager of the system in charge of both the passenger and freight departments. Mr. Collins was one of the organizers of the Central Electric Railway Association and has always taken active interest in its affairs.

Mr. H. A. Mullett, who for the last two years has been assistant superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has

been appointed superintendent of rolling stock to succeed Mr. E. W. Olds, resigned. Mr. Mullett was graduated from Rose Polytechnic Institute in 1904. Previous to his appointment as assistant superintendent of rolling stock of the Milwaukee Electric Railway & Light Company he was electrical engineer of the rolling stock department of the company for three years. Before becoming connected with the Milwaukee Electric Railway & Light Company he was an assistant engineer in



H. A. Mullett

the railway department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, with which he served an apprenticeship course. Mr. Mullett was also connected for a short time with the St. Louis (Mo.) Transit Company and with the Weber Gas & Gasoline Engine Company, Kansas City, Mo.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Little Rock, Pine Bluff & Eastern Traction Company, Little Rock, Ark.**—Chartered in Arkansas to build an electric railway to connect Little Rock and Pine Bluff via Altheimer, Stuttgart, Helena and Clarendon. Capital stock authorized, \$1,500,000. Common stock, \$1,000,000; preferred stock, \$500,000. Officers: C. C. Kavanaugh, president; J. M. Mahaffey, secretary, and E. W. Jackson, treasurer.

***Sacramento-Folsom Electric Railway, Sacramento, Cal.**—Application for a charter has been made by this company in California to build an electric railway to connect Sacramento and Folsom. Capital stock, \$1,000,000. Directors: Francis V. Keesling, Herman H. Grau, Ernest L. Brune, J. W. Cook and Otto K. Grau.

***Chicago, Waukegan & Woodstock Traction Company, Springfield, Ill.**—Incorporated in Illinois to build an electric railway between Waukegan and Woodstock via Waukegan, McHenry and Lake Counties. Capital stock, \$500,000. Headquarters, Chicago. Incorporators: Charles A. Spenny, Columbus, Ohio; Irving B. Stevens, W. P. MacCracken, Peter B. Olsen and H. S. Hedberg, all of Chicago.

***Piedmont Railway & Electric Company, Burlington, N. C.**—Incorporated in North Carolina to build an electric railway to connect Burlington, Graham, Haw River, Hopevale, Carolina and Glenco. Capital stock, \$1,000,000. Incorporators: J. M. Cook, A. L. Davis, Burlington, and E. S. Parker, Graham.

North Randall Railway, Cleveland, Ohio.—Incorporated in Ohio to build a 7-mile electric railway between Cleveland and the race track at Randall. The company is negotiating to rent power and equipment from the Cleveland Railway. [E. R. J., May 6, '11.]

Dallas-Denton Interurban Railway, Dallas, Tex.—Application for a charter will be made by this company in Texas to build an electric railway to connect Dallas and Denton via Grapevine and Irving. Capital stock, \$500,000. Applicants for the charter are: Alvin C. Owsley, Denton; Curtis Hancock and J. H. Nelson, Western Heights; E. A. Gebbard, Irving, and P. B. Hunt, Dallas. [E. R. J., May 13, '11.]

FRANCHISES

***Alabama City, Ala.**—B. T. Head and associates have received a franchise from the City Council to build an electric railway in Alabama City. This is part of a plan to build a line to connect Alabama City, Gadsden and Attalia.

Newton, Ark.—The Arkansas Valley Interurban Railway, Little Rock, has received a twenty-year franchise from the Council to build its tracks through Newton. This line will connect Sedgwick, Newton and Halstead. O. A. Boyle, Wichita, Kan., general manager. [E. R. J., April 1, '11.]

Oakland, Cal.—The Oakland Traction Company has received a franchise from the City Council to extend its lines from East Sixteenth Street along the Foothill Boulevard to Ygnacio Avenue, and for a line along Market Street, from San Pablo Avenue to Fifty-fifth Street, with the stipulation that the company shall widen Market Street for five blocks.

Albany, Ga.—C. W. Rawson and associates have received a perpetual franchise from the City Council to build a three-mile electric railway in Albany. [E. R. J., Oct. 29, '11.]

Atlanta, Ga.—The Georgia Railway & Light Company has asked the council for a franchise to extend its tracks $2\frac{1}{2}$ miles from Buckhead to the boundary of Fulton County.

Vincennes, Ind.—The Vincennes-Interstate Traction Company has received a fifty-year franchise from the City Council to build its tracks over certain streets and across a bridge in Vincennes. This line will connect Vincennes and Bridgeport via Lawrenceville on the Illinois side of the Wabash River. C. W. Battin, Evansville, is interested. [E. R. J., April 1, '11.]

Paducah, Ky.—The Paducah Traction Company has received a twenty-year franchise from the Council to extend its lines in Paducah and to build a proposed extension to Mechanicsburg.

Boston, Mass.—The Boston & Northern Street Railway has received a franchise from the Board of Aldermen to double-track Union Street from Canal Street to the Duck Bridge in Boston, on condition that the company repave the street.

Biloxi, Miss.—The Gulfport & Mississippi Coast Traction Company, Gulfport, has asked the City Council for a franchise to build its tracks through Biloxi.

Summit, N. J.—The Morris County Traction Company, Morristown, has asked the City Council to condemn 15 ft. of land on the south side of Park Avenue from Overlook Road to Maple Street in Summit. It is reported that the company has secured right-of-way and will ask the Council for a thirty-five-year franchise to build its tracks over certain streets in Chatham.

New Rochelle, N. Y.—J. A. Young, representing the Westchester Electric Railway, White Plains, has received a franchise from the City Council to extend the Fifth Avenue line in New Rochelle to the east end of City Park, to extend the Webster Avenue line and to eliminate certain curves and to construct several turnouts in New Rochelle.

Niagara Falls, N. Y.—George H. Pettit and William C. Perkins, representing the Niagara Frontier Railway, have asked the Council for a franchise to build its tracks from Niagara-on-the-Lake to Fort Erie along the Niagara River. They have also asked the Stamford Council for a franchise. [E. R. J., Feb. 25, '11.]

Rochester, N. Y.—The New York State Railways, Rochester, has asked the Common Council for a franchise to build extensions in Culver Road and Clinton Avenue, South, in Rochester.

White Plains, N. Y.—The Hudson River & Eastern Traction Company, White Plains, has received a franchise from the Board of Trustees to extend its tracks over certain streets in White Plains.

Asheville, N. C.—The North Carolina Interurban Railway, Raleigh, has asked the Board of Aldermen for a franchise to build its tracks in Asheville. John C. Mills is interested. [E. R. J., May 13, '11.]

Carlisle, Pa.—The Cumberland Railway has received a ten-year franchise from the Council to build its tracks from Carlisle to Newville. Work has been begun.

Erie, Pa.—The Buffalo & Lake Erie Traction Company, Erie, has asked the City Council for five separate franchises. Two of the ordinances relate to franchise grants to the Erie & Suburban Company, a subsidiary line of this company, and are for a double-track line on East Twelfth Street and a single track on East Sixth Street. The other three ordinances provide for a single-track line on Wayne Street, a double track southwardly on State Street, and an extension of the East Twenty-sixth Street line from Ash Street to Pennsylvania Avenue in Erie.

Lansdowne, Pa.—The Terminal Street Railway, Lansdowne, has received permission to build its railway through Lansdowne. B. J. O'Connell, Land Title Building, Philadelphia. [E. R. J., April 15, '11.]

Knoxville, Tenn.—The Knoxville Railway & Light Company has received a franchise from the City Council to double-track Central Avenue from its intersection with Broadway, in Knoxville, north to the city limits.

Seattle, Wash.—George W. Write has asked the Board of Commissioners for a franchise to build a four-mile electric railway from the southern limits of Seattle to Lake Burien. [E. R. J., May 13, '11.]

TRACK AND ROADWAY

Dauphin Island Railway & Harbor Company, Mobile, Ala.—Plans are about completed by this company for building a trestle from Dauphin Island to Cedar Point. The structure will have three draw spans. The cost is estimated at \$420,000. The company plans to build an electric railway to connect Gadsden, Birmingham, Tuskaloosa and Dauphin Island. George T. Bishop, Cleveland, Ohio, president. [E. R. J., May 14, '10.]

Texarkana Gas & Electric Company, Texarkana, Ark.—This company has completed and placed in operation its 2-mile extension out beyond Rose Hill.

***Everett Street Railway, Glendale, Cal.**—This company is being promoted by E. D. Goode, general manager of the Glendale & Eagle Rock Railway, to build an electric railway over certain streets in Glendale.

Pacific Electric Railway, Los Angeles, Cal.—This company will soon call for bids for the grading for a double track and the building of a single track between Glendale and Burbank. This extension is $4\frac{1}{2}$ miles long.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—This company will let contracts for the construction of an extension from Petaluma to McNear's Point. At the terminus of the line a trestle upward of a mile in length will be built from the main land but in the direction of Marin Islands. The company has closed negotiations by which the necessary money is available to build the line to McNear's Point and to acquire two fast steamers to ply between the terminus on the bay and San Francisco. The Pacific Gas & Electric Company will supply the power.

Crescent City Railway, Riverside, Cal.—This company has completed and placed in operation its $2\frac{1}{2}$ -mile extension to Bloomington.

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—Right-of-way has been secured and construction will soon be begun by this company on the extension of its Elmhurst line.

St. Simons Railway, St. Simons Island, Ga.—E. A. Peniman, Brunswick, is making a preliminary survey for this company on St. Simons for building a railway on St. Simons Island from Ocean Pier on the western part of the island to a point where Pastell and Bank Creek flow into the Atlantic Ocean on the eastern side of the island. Work will begin as soon as the survey is finished. Gasoline motor cars will be used. [E. R. J., Dec. 31.]

Twin Falls, Idaho.—W. L. Cherry, Twin Falls, advises that he is now securing right-of-way for an electric railway from Twin Falls to Snake River Canyon. [E. R. J., April 29, '11.]

***Delavan, Ill.**—John Fitzgerald, Pekin, and J. W. Crabb, Delavan, plan to build an electric railway between Pekin and Delavan.

***Galesburg, Ill.**—J. J. Ford and associates are interested in a plan to construct an electric railway between Galesburg and Galva.

Quincy, Mt. Sterling & Northeastern Traction Company, Quincy, Ill.—This company advises that it has surveyed from Liberty to Rushville; part of the right-of-way has been secured, but nothing definite has been done relative to financing the project. It is probable that this line will be merged later with another company. E. G. Koch, Fifth and Ohio Streets, Quincy, Ill. [E. R. J., Sept. 4, '09.]

Sterling-Moline Traction Company, Sterling, Ill.—This company has begun a survey from Walnut west to Deer Grove and thence to Sterling, passing through Normandy. It is stated that farmers have subscribed for stock to the amount necessary to pay for the preliminary work. J. J. Cotter, connected with the La Salle Bank of Chicago, is stated to have become interested financially in this road. He has looked over the proposed right-of-way from Sterling to Moline and from Sterling to Princeton, and is quoted as having said that if stock in the neighborhood of \$250,000 is subscribed for locally the complete financing can be done with ease. A. van Patten, Sterling, general manager. [E. R. J., Jan. 7, '11.]

Ft. Wayne & Springfield Railway, Decatur, Ind.—Plans are being considered by this company to build an extension from Decatur to Monroe, Berne and Geneva.

Ft. Wayne & Winona Traction Company, Ft. Wayne, Ind.—This company advises that it will begin construction some time during the summer on its 40-mile electric railway to connect Ft. Wayne, Warsaw, Coesse, Arcola, Columbia City, Larwell, Piercetown and Winona Lake. The company's power station will be located at Fort Wayne and its repair shops will be built in Columbia City. It will furnish power for lighting purposes outside of Ft. Wayne. Capital stock authorized, \$100,000. Officers: J. A. Barry,

Ft. Wayne, president, general manager and purchasing agent; G. W. Leslie, vice-president, and E. W. Cook, treasurer. [E. R. J., Aug. 13, '10.]

Iowa Light & Traction Company, Eldora, Ia.—Surveys have been begun by this company for an extension from Oskaloosa to Waterloo.

***Savannah, Ia.**—A. H. Ross and C. B. Judd are considering plans to build an electric railway between Savannah and Blanchard via Tarkio, Graham and Fillmore. Another line also to be built from Clarinda to Villisca, a distance of 16 miles.

Paducah (Ky.) Traction Company.—Plans are being considered by this company for building a concrete bridge across Island Creek.

United Water, Light & Traction Company, Somerset, Ky.—Work has been begun by this company to extend and improve its lines in Somerset. The improvements will cost \$100,000.

Southwestern Traction & Power Company, New Orleans, La.—This company advises that it has awarded a contract to build the first division of its railway from Spanish Lake through Iberia to Jeanerette, a distance of 17 miles. Construction will begin within a month. The line will be 65 miles long and will connect Lafayette, Beaux Bridge, St. Martinsville, Spanish Lake, New Iberia, Jeanerette, Franklin, Patterson, Garden City, Berwick City and Morgan City with possible extensions. Its power station and carhouse will be located at New Iberia and it will operate 15 cars. The company will also furnish power for lighting purposes. Capital stock authorized, \$1,500,000. Officers: F. W. Crosby, Tenegre Building, New Orleans, president; P. H. Mentz, vice-president; R. E. L. C. Ries, Hennen Building, New Orleans, secretary and treasurer, and H. A. Mentz, engineer. [E. R. J., May 6, '11.]

Hagerstown & Clear Spring Railway, Hagerstown, Md.—This company advises that it is now completing surveys and that construction will be begun about June 1. The contract for construction and equipment will probably be awarded to the Burton Construction Company, Richmond, Va. The repair shops will be located at Conococheague Creek, and the company will purchase power from the Hagerstown Railway, Hagerstown. Six cars will be operated. Capital stock authorized, \$250,000. Bonds authorized, \$250,000. The Public Service Commission has issued an order empowering this company to issue \$250,000 first mortgage 5 per cent bonds, and to sell in addition such stock as will produce a sum not to exceed \$93,000. Officers: L. N. Downs, Hagerstown, president; O. D. Bowers, vice-president; H. L. Kirby, Hagerstown, secretary and treasurer, and J. B. Ferguson, engineer. [E. R. J., April 15, '11.]

Boston (Mass.) Elevated Railway.—Rapid progress is being made by this company on its extension being built from the North Station, Boston, to Lechmere Square, Cambridge.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company has ordered 1200 tons of rails from the Illinois Steel Company.

Saginaw Valley Traction Company, Saginaw, Mich.—It is reported that this company will soon build an extension to Bay City.

***Duluth & Northern Traction Company, Duluth, Minn.**—This company is said to have been organized to build a 5-mile electric railway in Duluth from Hardy Street to Tischer Road. Charles P. Craig and J. G. Williams are interested.

Minneapolis Northern Suburban Railway, Minneapolis, Minn.—This company will begin the construction of its line from Minneapolis to Anoka and Little Falls about June 1. Charles Sherman is interested. [E. R. J., Oct. 1, '10.]

Winona Railway & Light Company, Winona, Minn.—Contracts have been placed by this company for building about $1\frac{1}{2}$ miles of track with 60-lb., 6-in. Lorain section high T-rails.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—This company has applied to the Kansas State Board of Railroad Commissioners for permission to issue \$300,000 of stock to double track from Thirty-ninth Street, Kansas City, to Overland Park and reballast and retie the entire line and for the acquisition of additional power equipment.

***West Point, Neb.**—Plans are being made to build an electric railway from Omaha to Sioux City, via Bennington, Elk City, Arlington, Craig, Telebasta, Bertha, Lyons, Walthill, Winnebago and Homer. Branches are proposed from Elk City to Fremont, Howell, Stanton and Norfolk. Another branch to extend from Oakland to West Point. It is reported that construction will soon begin.

Asheville (N. C.) Electric Company.—Active work has been begun by this company on relaying the Patton Avenue line in Asheville with 70-lb. steel rails and paving between the rails with vitrified brick. Several other lines will be relaid with heavier steel, and the improvements will entail an expense of over \$100,000. The company has completed and placed in operation its 4-mile extension to West Asheville. This line will be extended in the direction of Conton.

Durham (N. C.) Traction Company.—A 3-mile extension will be built by this company to the Country Club in Durham.

Piedmont Traction Company, Gastonia, N. C.—This company will soon build several new bridges in North and South Carolina, one of which, across the Catawba River at Mount Holly, will cost \$60,000. The company has ordered 1400 tons of bridge work from the American Bridge Company. This 16-mile electric railway will connect Charlotte and Mount Holly. T. C. Lee, engineer in charge. [E. R. J., Sept. 10, '10.]

***Cambridge, Ohio.**—It is reported that a company is being formed to build an electric railway from Cambridge, Ohio, to Wheeling, W. Va., via Barnesville and St. Clairsville. It will connect with the Wheeling Traction Company at Bridgeport.

Cincinnati Short Line Railroad & Traction Company, Cincinnati, Ohio.—This company has completed surveys and will begin construction soon on its double-track 8-mile electric and steam railway to connect Red Bank, Madisonville, Oakley, Norwood, Bond Hill and Winton Place. Capital stock, authorized, \$1,000,000. Bonds, authorized, \$1,000,000. Peter Eichels, Cincinnati, Ohio, is interested. [E. R. J., May 6, '11.]

Oklahoma Union Traction Company, Tulsa, Okla.—About 2 miles of new track will be built by this company in Tulsa in the near future.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—This company will build during the next few weeks a 5-mile extension between Blenheim and its main line. W. Norris, general manager.

United Railways, Portland, Ore.—A 3½-mile extension has been built by this company from North Plains to Banks.

South Dakota Interurban Railway, Centerville, S. D.—About 52 miles of track will be built by this company from Sioux City to the north line of Garfield during the summer. This projected 160-mile electric railway will connect Parkston, Bijou Hills, Chamberlain and Sioux City. W. E. Miller, Bijou Hills, president. [E. R. J., July 30, '10.]

***Haskell, Tex.**—M. R. Hemphill, Haskell, plans to build a 12-mile electric railway between Haskell and Rule. It is expected to begin construction June 1.

Grafton (W. Va.) Traction Company.—Construction has been begun by this company on its 2-mile extension from Grafton to Grafton Park.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—This company has completed and placed in operation its extension from Fairmont to Fairview.

Parkersburg, Mariette & Interurban Railway, Parkersburg, W. Va.—Plans are being made by this company to build an extension from Parkersburg to Fairview Heights.

SHOPS AND BUILDINGS

Los Angeles (Cal.) Railway.—Plans are being made by this company for building an 8-story office building to be erected on Childs Place, in Los Angeles. The cost is estimated to be about \$500,000.

Chicago, Aurora & De Kalb Railroad, Aurora, Ind.—Contracts will be awarded by this company during the next four weeks for building a new station and waiting room at De Kalb and Maple Park.

Meridan Light & Railway Company, Meridan, Miss.—Contracts will soon be awarded by this company to build a new storeroom 60 ft. x 100 ft., of brick, steel and concrete construction. A. B. Paterson, general manager.

Atlantic Coast Electric Railway, Asbury Park, N. J.—This company is now building a new section to its carhouse in Asbury Park. The addition will be 36 ft. x 215 ft. S. F. Hazelrigg, Asbury Park, general manager.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—This company expects to place contracts during the next few weeks for building a freight shed and spur; also connections with the Grand Trunk Railway at Chatham.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—This company will build a new carhouse on Clare Avenue and South Eighth Street in Sheboygan. The structure will be one-story, 80 ft. x 120 ft., of brick construction.

POWER HOUSES AND SUBSTATIONS

Geary Street Railway, San Francisco, Cal.—This company has purchased a site in San Francisco at Jefferson Street and Jones Street on which it intends to build a power house.

Portland, Gray & Lewiston Railroad, Lewiston, Maine.—Messrs. Libbey & Dingley have placed an order with the General Electric Company for the equipment of the Portland, Gray & Lewiston Railway from Portland to Lewiston, Maine. The order includes three substation equipments each consisting of 300-kw rotary converters, transformers and switchboard. The switchboard in substation No. 1 will consist of a 10,000-volt incoming line and transformer panel, one rotary converter panel and a 600-volt d.c. rotary converter panel. The power is received from the Lewiston & Auburn Electric Light Company at a potential of 10,000 volts and stepped up to 33,000 volts for transmission to substations Nos. 2 and 3. The switchboard in No. 2 will consist of an incoming line and rotary converter panel, a d.c. rotary converter panel and two 600-volt d.c. feeders. The switchboard of No. 3 is the same as that of No. 2, except there is but one 600-volt d.c. feeder.

Boston (Mass.) Elevated Railway.—This company has ordered the following apparatus from the General Electric Company for the equipment of its new power station at South Boston: Two 15,000-kw, 6600-volt, 25-cycle turbo-alternators, six 2500-kva compensators and two motor-operated rheostats. The turbines will generate power at 6600 volts and this will be stepped up to 13,200 by the compensators, which are designed with a high reactance to reduce the current and thus prevent the turbines from receiving a heavy shock on a short circuit. The station will supply power to seven rotary converter railway substations, four of which will contain 2000-kw units and the other three 1000-kw units. The present installation of rotary converter equipments consists of eight 2000-kw and four 1000-kw units complete with transformers and switchboards.

Piedmont & Northern Railway, Charlotte, N. C.—This company has awarded a contract through W. S. Lee, of the Southern Power Company, to the Westinghouse Electric & Manufacturing Company for ten 500-kw motor generator sets. This equipment will be located at proper distances along the route from Charlotte to King's Mountain, N. C., and from Spartanburg to Greenwood, S. C. It is understood that the Piedmont & Northern Railway will order additional equipment in the near future.

Western Ohio Railway, Lima, Ohio.—This company expects to purchase in the near future coal handling machinery for its power house. F. D. Carpenter, Lima, general manager.

El Paso (Tex.) Electric Railway.—Permits have been secured by this company to build an addition to its power house in El Paso. The new structure will be 120 ft. x 58 ft. and 78 ft. high and of steel and brick construction. The cost is estimated at \$83,290. The cost of the equipment to be installed will be about \$62,350.

Fairmont, Clarksburg & Grafton Railway, Grafton, W. Va.—This company expects to build a power house in Grafton. Charles F. Sutherland, Morgantown, president. [E. R. J., May 13, '11.]

Manufactures & Supplies

ROLLING STOCK

Austin (Tex.) Street Railway is considering the immediate purchase of six closed cars.

People's Electric Railway, Muskogee, Okla., has ordered two 70-ft. McKee gasoline motor cars.

Saginaw-Bay City Railway, Saginaw, Mich., has ordered seven Brill 21-E trucks from the G. C. Kuhlman Car Company.

Tri-State Railway & Electric Company, East Liverpool, Ohio, will purchase four cars through J. G. White & Co., New York, N. Y.

Windsor, Essex & Lake Shore Railway, Kingsville, Ont., has ordered one 55-ft. express car from the Preston Car & Coach Company.

Northern Texas Traction Company, Ft. Worth, Tex., has ordered eight Baldwin class 79-25-8 motor trucks from the Baldwin Locomotive Works.

San Francisco, Oakland & San José Railway, Oakland, Cal., has ordered twenty-five motor coaches, 69 ft. 3½ in. long, and trucks from the St. Louis Car Company.

New York, Westchester & Boston Railway, New York, N. Y., has ordered thirty double-motor equipments from the Westinghouse Electric & Manufacturing Company.

Portland, Gray & Lewiston Railroad, Lewiston, Maine, has ordered General Electric quadruple motor equipment with type M control for use on a general utility car.

Houston (Tex.) Electric Company has ordered, through the Stone & Webster Engineering Corporation, Boston, Mass., thirty No. 39-E trucks from The J. G. Brill Company.

Montreal (Que.) Street Railway, noted in the *ELECTRIC RAILWAY JOURNAL* of March 11, 1911, as considering the purchase of fifty cars, is said to be preparing specifications for twenty-five cars.

Boston (Mass.) Elevated Railway has ordered forty No. 27-MCB-2 trucks, without wheels and axles, and forty No. 27-MCB-3 trucks, without wheels and axles, from The J. G. Brill Company.

Connecticut Company, New Haven, Conn., has ordered thirty-three 30-ft. 8-in. closed motor car bodies from the Wason Manufacturing Company and forty closed cars from the Osgood Bradley Car Company.

Piedmont & Northern Railway, Charlotte, N. C., has ordered twenty-three quadruple 90-hp motor equipments and fourteen 55-ton electric locomotives from the Westinghouse Electric & Manufacturing Company.

Pottstown & Phoenixville Railway, Philadelphia, Pa., will probably purchase twenty-nine cars for use on its line which is now being built between Pottstown and Phoenixville, Pa. C. T. Leland, 2215 Land Title Building, Philadelphia, is secretary.

Metropolitan Street Railway, Kansas City, Mo., has ordered one hundred No. 306 motor equipments from the Westinghouse Electric & Manufacturing Company. This is a duplicate order for two hundred motors placed by the company with the Westinghouse Electric & Manufacturing Company last year.

Des Moines (Ia.) City Railway, noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, as having ordered twenty cars from the American Car Company, has purchased twenty-five cars. They are of the double-end, pay-as-you-enter type, and will be equipped with maximum traction trucks, Peter Smith hot-air heaters, National Brake & Electric Company's air brakes, and two General Electric No. 98, 50-hp motors.

TRADE NOTES

P. & M. Company, Chicago, Ill., has moved its Chicago office to 637 Railway Exchange Building.

Central Locomotive & Car Works, Chicago, Ill., has filed a certificate of incorporation in Augusta, Maine, with \$500,000 preferred stock and \$100,000 common stock.

L. A. Irwin, formerly purchasing agent of the Quincy, Omaha & Kansas City Railroad, has become connected with the Western Railway Supply Company, Kansas City, Mo.

Burton W. Mudge & Company, Chicago, Ill., dealers in railroad supplies, have elected Thomas H. Garland, the inventor of the Garland ventilator, a director of the company.

Corrugated Bar Company, St. Louis, Mo., has purchased the General Reinforcement Company, Youngstown, Ohio, and will continue to operate the plant of that company at Youngstown.

Ohmer Fare Register Company, Dayton, Ohio, announces the removal of its Pacific Coast representative, J. C. Liggett, from 171 Second Street to 402 First National Bank Building, San Francisco, Cal.

Ackley Brake Company, New York, N. Y., reports the receipt of orders through the Deutsche Ackley Bremsen Company for additional Ackley brakes for Lübeck, Germany, and Teschen, Austria.

Baldwin Locomotive Works, Philadelphia, Pa., have purchased thirty acres of land at Eddystone, Pa., adjoining the present plant. The company has announced that it has no immediate plans for using this property for extensions.

David Lupton's Sons Company, Philadelphia, Pa., has opened an office in the Oliver Building, Pittsburgh, Pa. Walter C. Scott, civil engineer, has resigned from the National Tube Company, Pittsburgh, Pa., to take charge of this new office.

Loraine Smelting & Refining Company, Chicago, Ill., dealer in zinc and lead refuse from storage batteries, announces that it has added a babbitt metal department to its organization and that it is now prepared to manufacture high-grade babbitt metals on specifications.

Wheeler Manufacturing Company, Philadelphia, Pa., announces that F. S. Broadhurst has again become connected with the company as sales manager, with headquarters at Philadelphia. Mr. Broadhurst was recently connected with the Westinghouse Machine Company.

United States Metal & Manufacturing Company, New York, N. Y., has opened a branch office in the Morris Building, Philadelphia, Pa., which will be in charge of L. Weimer Murray, formerly in charge of the company's office at Lebanon, Pa. The Lebanon office has been discontinued.

International Steam Pump Company, New York, N. Y., reports for the year ended March 31 as follows: Net profits, \$2,464,420; increase, \$461,267; depreciation, \$404,948; increase, \$494,948. Charges, \$489,650; increase, \$48,918. Balance for dividends, \$1,479,822; decrease, \$82,599; preferred dividends, \$859,800; surplus after dividends, \$620,022; decrease, \$82,599. Reserve for sinking funds, etc., \$241,531; increase, \$123,473; surplus, \$378,490; decrease, \$206,072.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., will build a pattern shop this year to form part of its foundry plant at Trafford City, Pa. About 1000 tons of steel will be used in the construction of the building. Another foundry building for making large castings will also be erected. Approximately 3000 men will be employed at the Trafford City plant when it is entirely completed and all the foundry work of the Westinghouse Companies will be carried on there.

International Railway Tie Company, New Orleans, La., has been organized to place on the market a concrete tie and a concrete base for poles. The base is driven into the ground and extends about 1 ft. above the earth. On it can be set a wooden, concrete or metal pole. The company claims that wooden or iron poles do not decay or corrode as rapidly when mounted in this way as when they are in contact with the ground, and when renewed there is a saving of 5 ft. or more in length. The company has sample concrete ties on several steam railroads in the Southwest. The officers of the company are: L. S. Boudreaux, president; J. C. Telotte, vice-president; Robert J. Perkins, secretary, and William Drews, treasurer.

J. S. & W. S. Kuhn, Inc., Pittsburgh, Pa., bankers and dealers in securities, announces the reorganization of its executive staff on March 31, 1911, at its general offices in Pittsburgh, the following officers being elected: James S. Kuhn, president; W. S. Kuhn, vice-president; E. L. McClelland, vice-president; H. C. Ward, secretary; James K. Duff, treasurer; F. S. Carmack, assistant secretary; J. G. North, assistant treasurer; F. D. Glover, manager of sales; S. M. Vockel, manager municipal department; C. G. Apple-

gate, assistant manager of sales; F. O. March, advertising manager. The offices in Chicago, Philadelphia and New York will remain in charge of A. B. MacCaughy, W. G. Audenried, Jr., and Otto Billo, respectively.

Westinghouse Machine Company, Pittsburgh, Pa., has just completed two marine turbines and reduction gears for installation upon the United States collier *Neptune*, a ship of about 19,000 tons. The feature of this equipment is that the turbine operates at the high speed at which it is most efficient and this speed is reduced through gearing to that required for a screw propeller. It is claimed that the weight of this machinery is less than half that of other turbines having the propellers coupled direct to the turbine shafts or of reciprocating engines and that the steam consumption is from 20 per cent to 30 per cent less. The speed of the turbines is capable of being controlled directly from the bridge, a feature of high importance in maneuvering. In fact, the man on the bridge can reverse either or both turbines from full speed ahead to full speed astern in less than fifteen seconds.

Westinghouse, Church, Kerr & Company, New York, N. Y., have elected John F. Wallace president of the company to succeed H. H. Westinghouse. Mr. Wallace still retains the chairmanship of the board of directors of the company. Following his resignation as chief engineer of the Panama Canal, Mr. Wallace acted as confidential consulting engineer for the Chicago & Northwestern Railroad in the general design of the new passenger station for that company in Chicago, which has just been completed. He then took the office he has held until his present change. Mr. Wallace is also president of the Electric Properties Company, New York, which controls Westinghouse, Church, Kerr & Company. Among the directors elected at the annual meeting of Westinghouse, Church, Kerr & Company are N. W. Halsey and F. Q. Brown, New York; George Westinghouse and J. R. McGinley, Pittsburgh, Pa., and Homer Loring, Boston, Mass.

Francis E. Drake, who for several years has been the managing director of the Société Anonyme Westinghouse of Paris and Havre, and principal officer in several of the Continental Westinghouse interests, has resigned from the active management of these properties to occupy himself with certain private interests, and, after a period of rest and recuperation, will establish his office at No. 16 rue Halévy, Paris. Mr. Drake is well known in general electrical circles for his work as director of machinery and electricity for the United States at the Paris Exposition of 1900, and as reorganizing expert of the Union Elektrizitäts Gesellschaft, Berlin, before the fusion with the Allgemeine Elektrizitäts Gesellschaft. Mr. Drake is interested in several electric enterprises in Europe and will build, as engineer and contractor, certain railway lines now in process of development. The efforts of Mr. Drake in behalf of electric traction, especially in the direction of a single-phase development, and other aid rendered to French industries, recently received the recognition of the French government in the shape of promotion to the rank of officer in the Legion of Honor. Mr. Drake is a member of the Engineers' Club, New York, and a life member of the American Chamber of Commerce in Paris.

Hodenpyl, Hardy & Company, New York, N. Y., the organization of which was noted in the *ELECTRIC RAILWAY JOURNAL* of May 6, 1911, is interested in and will manage the major portion of the gas, electric and railway properties formerly managed by the recently dissolved firm of Hodenpyl, Walbridge & Company, New York, N. Y. The companies managed by the new firm are the Union Railway, Gas & Electric Company and the Commonwealth Power, Railway & Light Company, which will have their executive offices with Hodenpyl, Hardy & Company. The Union Railway, Gas & Electric Company controls the Evansville Gas & Electric Light Company, the Peoria Light Company, the Springfield Railway & Light Company, the Rockford & Interurban Railway, the Janesville Traction Company, the Rockford City Railway and the Consumers' Gas & Electric Company. The Commonwealth Power, Railway & Light Company controls constituent companies as follows: The Consumers' Power Company, the Michigan Light Company, the Cadillac Water & Light Company, the Grand Rapids Railway and Saginaw-Bay City Railway. Anton C. Hoden-

pyl, G. E. Hardy, J. C. Weadock and S. E. Wolff, of the new firm, have for years been prominent in the financing and management of public service and other corporations. Bernard C. Cobb has been closely identified with the executive management of gas companies in Michigan, Illinois and Indiana, and his activities have also extended along similar lines in the management of electric light, power and street railway companies in Michigan, Illinois and Wisconsin. William H. Barthold has for many years served the companies which will be managed by the new firm as consulting engineer. William M. Eaton has for some time given his attention to the development of water powers and the firm's electric light and power interests in Michigan. E. J. Bechtel will serve the new firm as its consulting electrical engineer.

ADVERTISING LITERATURE

Howard Metal Company, Reading, Pa., is mailing a card calling attention to Howard composite car bearings.

Mesta Machine Company, Pittsburgh, Pa., has just published a pamphlet on its horizontal, double-acting, four-cycle gas engines, which are built in sizes from 400 hp up.

Barrett Manufacturing Company, New York, N. Y., has printed a sixteen-page catalog which contains a description of Travia and information regarding the construction of roads with this product.

Standard Third Rail Company, New York, N. Y., has just issued a pamphlet entitled "W-S Standard Under-Running Third Rail." The pamphlet illustrates views along the New York Central electrical zone, the West Shore Railroad, the Philadelphia Elevated Railway and other lines equipped with the Wilgus-Sprague under-running third rail.

Westinghouse Machine Company, East Pittsburgh, Pa., has printed a catalog on the new model Roney mechanical stoker. Numerous installations of the old and new types of these stokers are illustrated. An appendix to the catalog contains brief references to the Westinghouse chain grate stoker and the Westinghouse coal crusher.

Crocker-Wheeler Company, Ampere, N. J., has issued Bulletin No. 132 on form 1 belt-type, direct-current motors in sizes from $3\frac{3}{4}$ hp to 50 hp. Another bulletin, No. 129, is devoted to several types of direct-current crane and hoist motors. The Crocker-Wheeler Company is also mailing a card calling attention to the advantages of its three-wire direct-current generators.

National Metal Molding Company, Pittsburgh, Pa., is mailing to the trade a wall placard or hanger illustrating the different forms in which sherardized national metal conduit and molding fittings are supplied. The hanger illustrates the different types of couplings, outlets, rosettes, elbows, etc., and gives the number of parts packed in a box, weight, prices and other information.

British Westinghouse Electric & Manufacturing Company, Limited, Manchester, England, has just published a leaflet in regard to the construction of the Westinghouse-Leblanc jet condenser. The circular points out that this condenser is particularly desirable for use in connection with steam turbines where a high vacuum is necessary. It also emphasizes the simplicity of its construction, the small area of floor space occupied, its high efficiency and the impossibility of its flooding the engine or turbine with which the condenser is connected.

Edgar Allen American Manganese Steel Company, Chicago, Ill., has issued two pamphlets, one giving a list of the uses of the manganese steel castings made by the company and the other giving an account of the application of manganese steel to ceramic industries. In the former the uses for electric railway work for which this material is mentioned as being particularly useful are frogs, crossings and other special work, rails which are subject to great wear and wheels. The second pamphlet is interesting particularly because it gives a history of the application of manganese steel by Edgar Allen & Company, Limited, Sheffield, and the Edgar Allen American Manganese Steel Company. One of the first uses for manganese steel castings was for dredge pins and afterward for the lips of the buckets and dredges of steam shovels. The employment of manganese steel for the jaw plates of rock crushers followed, and then its use for material subject to great wear became general.

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CONTENTS.

Abolition of Dark Corners in Power Stations.....	903
The Hardness of Wheels.....	903
Chicago Subway Plans.....	904
Car-Lighting Economics.....	904
Criticisms of the Service.....	904
Single-Truck Cars and Other Features of the Havana System.....	905
System of the Havana Electric Railway Company.....	906
Results of 1200-Volt Direct-Current Operation on the Washington, Baltimore & Annapolis Electric Railway.....	913
Metropolitan Street Railway Reorganization Plan.....	916
Meeting of Committee on Buildings and Structures.....	917
Proposed Depreciation Account in Nebraska.....	919
May Meeting of the Illinois Electric Railways Association.....	919
Provisions of New Hampshire Public Service Commission Law.....	921
Chicago Subway Plans.....	922
Advertising in Connection with the New York Subway Proposals.....	922
Cos Cob Power Station of the New Haven Railroad to Be Enlarged.....	922
Notes on the Philadelphia Elevated-Subway System.....	923
One-Man Prepayment Cars at Missoula, Mont.....	924
The Correction of Motor Lubrication Troubles.....	924
Slow Speed Direct-Current Locomotive for Colliery Service.....	925
Gasoline Motor Car for Tulsa, Okla.....	926
News of Electric Railways.....	927
Financial and Corporate.....	930
Traffic and Transportation.....	933
Personal Mention.....	934
Construction News.....	935
Manufactures and Supplies.....	938

Abolition of Dark Corners in Power Stations

The design of some recently built power stations shows a very desirable trend toward placing auxiliaries in more accessible positions than has been done in the past. Of course, the high price of land generally makes it necessary to crowd the apparatus to an extent very uncomfortable for the station employee, but there seems to be no excuse for having any part of the machinery shrouded in absolute darkness. This condition has been mitigated to a large extent by using gratings for the engine or turbine-room floor. But still more light would penetrate the basement if the generating-room level was supplied only with the walkways actually required for travel from unit to unit. Such an alteration would be analogous to the change from closed to open-pit construction in carhouses. It is a fact that the highly developed steam electric sets of to-day, especially turbo-generators, require much less attention than do their auxiliaries. The solid-floor generating room with its wide spaces between the several units lends itself readily to imposing and handsome interiors. Nevertheless, considerations of appearance should not be permitted to affect the convenient maintenance of the pumps, heaters, condensers and other auxiliaries upon which the efficiency of the station so largely depends.

The Hardness of Wheels

In its report last year the committee on equipment referred to the advantages of lighter weight and saving in cost of turning which would accrue from the use of one-wear steel wheels. The net saving per wheel per 10,000 miles was calculated at 88 cents, based on a life of 75,000 miles. A much larger saving would result if the life of the wheels could be increased by increasing the hardness and wearing qualities of the metal in the tread. It has been suggested that steel wheels might be subjected to heat treatment of the same character as is given to gears and pinions, without adding greatly to the cost, and that the hardness imparted to the metal on the surface of the tread would prolong the life of the wheel by a considerable amount. Undoubtedly heat treatment would do this, but there are two possible disadvantages. One is the difficulty of removing flat spots due to skidding. Flat spots on a case-hardened steel wheel probably would not roll out as they do in soft steel wheels, but would either have to be ground off, or, if allowed to run, might shell out to such an extent that the wheel would have to be scrapped. The other disadvantage would be the increased wear on the rails. The tendency in recent rail specifications has been to raise the percentages of carbon and silicon and obtain a harder and more durable rail. If the wheels are made very hard, then the wear must take place on the rail rather than on the wheel. In attempting to reduce the cost of wheel renewals sight should not be lost of the far greater cost of rail renewals.

Chicago Subway Plans

Subway affairs in Chicago advanced this week along a much smoother course than ever before. Some days ago Mayor Harrison announced that the policy of the new administration would be for Chicago to build its own subways, using as a nucleus for the work the traction fund contributed by the surface lines. This amounts to about \$6,000,000 and is increasing at the rate of \$1,500,000 per year. The administration's announcement was confirmed by resolutions in the City Council to retain jurisdiction over the subway problem rather than pass on the responsibility to a subway commission. Several comprehensive plans are available for the use of the representatives of the City Council, who are expected to choose a subway engineer and adopt plans so that the subway work may proceed at the earliest consistent date. These plans have been submitted by a number of engineers, notably by Bion J. Arnold, George W. Jackson, John Ericson and R. C. St. John. Their gist, except those prepared by Mr. St. John, which are noted elsewhere in this issue, have been presented in earlier issues of this paper, dating back as far as 1900. During the week the local transportation committee held open meetings at which the later plans were considered. The hearings were expected to have been completed during the week and thus make possible an early choice and prosecution of the work. The retiring administration cleared away a number of barriers which had withheld subway progress, and now, since the present administration has announced its policy and since money is available for the construction of a first unit of a comprehensive subway, real work may be expected at no far distant date.

Car-Lighting Economies

The handling of car-lighting circuits during non-revenue runs deserves a little consideration as a possible source of economy on large systems. The savings which may be made by cutting off lights in the car interior when no passengers are being received or carried are obviously trifling per car per diem, but in the course of a year on a system operating many hundreds of cars between route termini and adjacent carhouses only, with signs turned against receiving traffic, there is an unquestionable economy in running the empty cars practically dark. It goes without saying that all non-revenue mileage should be cut down to the lowest possible limit, but where good reason exists for operating cars empty over distances of from 1 to 2 miles at the beginning and end of their evening service it would impose very little additional trouble upon the conductor or motorman to require him to cut off all but the headlight circuit when carrying no patronage. Such a course would indicate to the public that the car was bound for a carhouse or route terminus only, and would in some cases obviate the necessity of slowing down to explain to would-be patrons that the car was running light, with a consequent slight but annually multiplied saving in power and brakeshoes. The practice of running empty cars lighted to the fullest extent perhaps may be commended on the ground that it advertises the service to a slight degree, but it is probable that the public would prefer the operation of dark cars on these non-revenue runs, so that there would be no chance of error from hastening to catch a non-passenger car. Dark or semi-dark cars are operated without trouble by steam railroads when not handling passengers, and the possible saving is worth looking into on electric railways of the larger class.

CRITICISMS OF THE SERVICE

The constant stream of criticisms and comments on the service which flows into the executive offices of every important street railway system from one source or another is inevitably a burden to conscientious managers. It is impossible to escape the tide of public opinion so long as the patronage of the road is composed of the diversified elements encountered even in cities and towns of moderate size, but in the long run a progressive management welcomes suggestions and complaints which are genuine and well-founded. Upon the attitude of the general public depend many corporate policies for success or failure, particularly in connection with the adoption of those equipment details which directly concern passengers.

Of a few typical criticisms overheard recently of extended service under highly competitive conditions it is worth noting that most of them bore upon matters of an incidental character in the territories traversed. One complaint emphasized the difficulty of locating the exact stopping points of cars near congested street corners, on account of the variations in headway and the impracticability of maintaining an evenly distributed service in approaching the series of two or three marked stops beyond each corner. It is doubtful if operating companies can do much to help this situation except to require street inspectors, starters and policemen so far as possible to point out the probable stopping points of specific cars as they approach. The difficulties mentioned occur chiefly during the rush hours, when extra inspectors are on the lines. Something can perhaps be done to save the time lost when a car slows down to, say, 1 m.p.h. and then hitches slowly forward to the next designated car stop. There is unquestionably a point in the speed of a car where it is better to come to a full stop and receive or discharge passengers than to slow down almost to a standstill and then proceed at a snail's pace to the marked post farthest from a given street intersection. In other words, it does not always pay to try to fill regularly designated berths beyond each street intersection, but the public must depend upon the judgment of inspectors and motormen.

Another complaint common on large systems where waiting rooms are sub-let in part to victuallers is directed against the condition of these premises, when permitted to be run without strict supervision by the railway company. It is unnecessary to emphasize the influence of clean, well-ventilated and comfortable waiting rooms upon competitive traffic, but it is worth while to point out that unless the company exercises rather strict oversight of the conditions, the ventilation is likely to be neglected, dirt will accumulate, unpleasant odors will assail patrons who are driven indoors by unseasonable weather, and sometimes considerable disorder exists. It costs very little to hold the lessees of waiting room privileges in check if the matter is properly arranged in the original agreement, to enforce rules against the smoking of employees in uniform in and about such places, and to provide inexpensive seats on the outside for passengers who prefer to stay there while waiting for connections.

The question of car design in relation to popular satisfaction with the service is always one of live interest and is too broad to be disposed of in a paragraph. Only two or three points can be mentioned. Serious criticism has been voiced concerning the location of electric heaters immediately under the

seats and within a few inches of the body; the installation of narrow running boards has been subjected to adverse comment, as has the foreshortening of running boards at the platform ends of open cars. The use of large projecting bolts in the side sills directly over narrow running boards has also attracted unfavorable discussion. Of course, car design is necessarily a question of many compromises, and space liberalized at one point restricts that available elsewhere within the clearance diagram. But it will pay to study all such points with extreme care in the design or purchase of new rolling stock.

SINGLE-TRUCK CARS AND OTHER FEATURES OF THE HAVANA SYSTEM

In the interesting article on the Havana Electric Railway from the pen of F. W. Hild, formerly assistant general manager of the Havana Electric Railway, published elsewhere in this issue, we believe that no one feature will attract more attention than the discussion of the author on the relative merits of single and double-truck cars. Stated briefly, all city service in Havana is conducted with single-truck cars, and Mr. Hild justifies this practice by the results which have been secured in that city in the way of large traffic and in low power consumption per car mile, per seat mile and per passenger carried. Due allowance should be made for the fact that the use of the single-truck car was necessary because of the conditions in Havana. The city is one of the oldest in the Western Hemisphere, and with its narrow streets is more like one of the old towns in southern Europe than like a typical city of the same size in the United States. It is well known that in many of the European cities where double-truck cars are used in the newer portions of the city single-truck cars have to be employed in the older portions, because of the physical limitations of clearance. But whether the double-truck car was practicable in Havana or not this fact does not explain away the low power consumption, the small accident expense and the high traffic records of the short single-truck cars in that city.

Operating practice in the United States at present is distinctly in favor of long, double-truck cars for service in large cities, but this has been the case for only the past ten or fifteen years. Up to about 1895 nearly all electric railway cars in large cities were mounted on single trucks. Then, as Mr. Hild says, the much larger carrying capacity of the double-truck car, or, expressed in another way, the reduced operating cost per seat for motormen and conductors, was so evident that the long, double-truck car became standard in most cities. The St. Louis electric railway system was among the first to introduce double-truck cars, and from that point the practice soon spread eastward and westward. For a long time single-truck cars were retained in Washington and were run to a large extent in trains, but now only a few companies consider their retention advisable for city service. Perhaps the United Traction Company of Albany is the most prominent advocate left of the single-truck car. Three main arguments are advanced in its favor. One is its low power consumption. The second is that more cars can be run at the same operating cost—that is, for the same cost a shorter headway between cars can be given than if double-truck cars are used. The third is that the truck maintenance cost is less, because only one-half the number of trucks is employed. Against this must be placed a

high labor operating cost per seat and possibly a higher track maintenance per passenger.

As Mr. Hild says, the question is one which must be determined largely by local conditions. No general rule can be laid down that long cars are superior to short cars under all circumstances, or vice versa. We believe, however, that, whatever the past situation, two recent developments in car construction have modified materially the relation between these two types of cars. One of these is the great reduction in weight per seat which has been effected in double-truck cars. This has resulted in a corresponding decrease in the power consumption per seat. A proportional reduction in weight may be possible in the average single-truck car. But these changes practically reopen the entire question of relative power consumption per seat of both types of car, and all existing figures will have to be revised to accord with the latest figures on weights.

The second factor which has thrown a new light upon the question under consideration is the general adoption for city service of the principle of prepayment operation. One serious charge against long cars has always been that when the car was crowded and passengers were constantly entering and leaving the car it was difficult for the conductor to collect all the fares. In fact, the advocates of short cars have claimed that the loss through missed fares often more than made up the difference in the cost of labor between the long car and the short car. But if the conductor of a long prepayment car collects the fares of passengers as they enter, the difficulty of missed fares should practically disappear. Hence, so far as fare collection is concerned, there is almost no limit to the car length except that the effect of using too long a car would be unduly to lengthen the time of stops. So far as the stimulation of traffic is concerned, there does not seem to be any fixed relation between the volume of traffic and the headway of cars. When the headway is less than a certain minimum, say two minutes or one and one-half minutes, cars pass so frequently that probably no real benefit is derived from operating at a shorter interval. As the interval is increased a certain proportion of those who otherwise would ride short distances will walk, so that while it is difficult, if not impossible, to say how many passengers are lost in this way in any particular case, a frequent service is necessarily a stimulant of traffic.

The operating practice in Havana embodies a number of other interesting points besides that of the use of short cars. One is the employment of mixed-pressure turbines, designed normally to operate with the exhaust steam from the reciprocating engines with which they are thermodynamically connected, but so arranged as to run at constant speed, irrespective of the amount of exhaust steam received from the engine. This result is accomplished by supplying steam directly from the boiler when greater pressure is required and by shunting the exhaust steam from the engine past the turbine and directly to the condenser when a lower pressure in the turbine is necessary.

Another interesting feature is the use of surface condensers whose shells and pipes are lined with aluminum to reduce or eliminate the corrosion due to the circulating water. Conditions in regard to corrosion of condensing parts, not uncommon where salt water is used, seem to be unusually severe in Havana, and the use in that city of aluminum surfaces to prevent its occurrence will constitute a very interesting experiment.

SYSTEM OF THE HAVANA ELECTRIC RAILWAY COMPANY

BY F. W. HILD, FORMERLY ASSISTANT GENERAL MANAGER AND CHIEF ENGINEER OF THE COMPANY AND NOW GENERAL MANAGER OF THE PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

The American visitor to Havana will find many things to surprise him. Conscious of the wonderful progress of his own great cities, many a tourist on his first journey, recalling somewhat dimly that only during the last decade has Havana been undergoing modernizing influences, feels it his bounden duty to show the "benighted" native the advantages and glories of modern appliances and conveniences. He will instruct him in the mysteries of the electric bell, the telephone, the electric light, the electric street car, the phonograph, the camera and so on. On arrival he is amazed to find that the Cuban is not only entirely accustomed to all these modern appliances, but the tourist often finds that in Havana the latter are frequently of more recent and advanced design than those of his own city. Fortunately for the appreciation of our own intelligence, this

cious "patios," their soft coloring, the old Spain of the discoverers and the conquerors. One can easily imagine emerging from them the mailclad "caballeros," clanking impressively along the crooked, narrow streets.

In the cool interiors of these quaint old buildings the business man will store and display the very latest goods of the European and American markets. He will have for evening illumination the latest metallic-filament lamps, the most recent arc lamps. He will communicate over the latest type of automatic telephone, secure that no one can "listen in." He will see cabs and "taxis" passing at frequent intervals, and street cars one about every minute.

When it comes to street cars, the Habanero who has traveled will tell you with pride that there are few better systems anywhere. The natural modesty of the writer, who was connected with the street railway system for some years, although he has left Havana for other fields, forbids the expression of his opinion. Nevertheless he cannot refrain from pointing out certain features for some of which superlatives might be used.

Excluding subway and elevated systems and confining ourselves to street surface railway systems, it will be found that the Havana Electric Railway Company:

(a) Earns more per track mile per annum than most other surface systems. For 1910 this exceeded \$44,000 per mile of single track.

(b) Operates probably more cars per mile of track than most other systems.

(c) Operates cars on more frequent, that is on less, headway than any system in cities of its size, and it probably is true that in much larger cities the car densities do not exceed that of Havana. Thus the daily schedules call for an average of 210 cars on some 50 miles of city track, or more than four cars per track mile. In the downtown districts there are several stretches where 146 cars per hour are operated, while in the outlying districts, virtually the suburbs, the headways range from 4 minutes between cars of the Principe division, which is the weakest, to 55 seconds and 1½ minutes on the Vedado, Jesús del Monte and Cerro divisions. Thus it is clear that the basic principle of successful electric street railway service, i. e., very frequent small units, finds probably its fullest expression in Havana; and that it pays is shown by the substantial earnings of the company and the harmonious relations of the latter with the public.

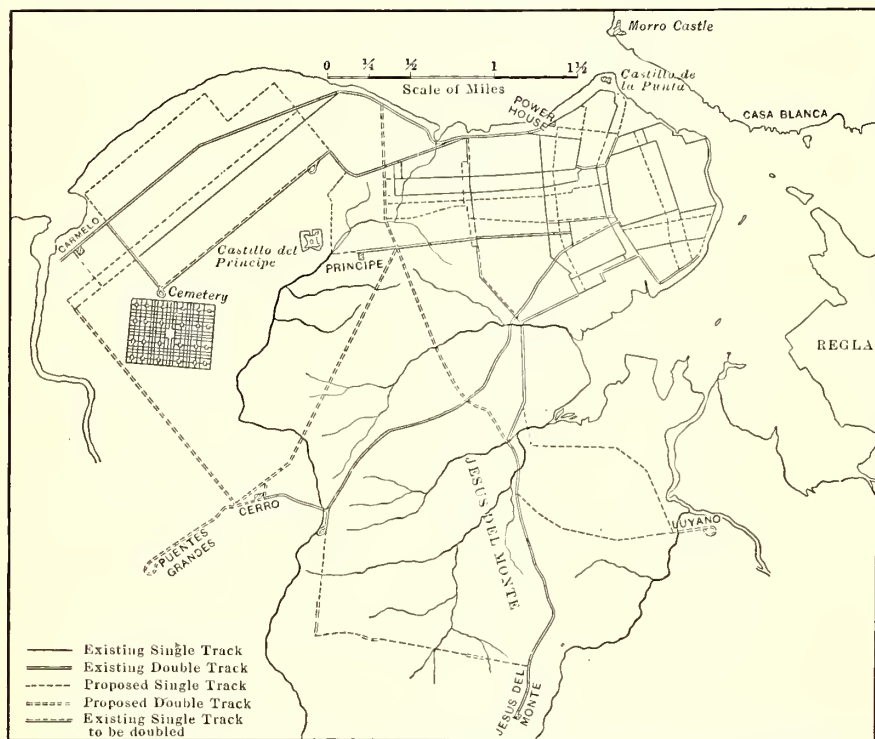
(d) Operates more cars and carries more passengers per unit power required than probably any other; and, accordingly,

(e) Has probably the smallest power plant for the number of cars and passengers moved.

During 1910 the following obtained:

Power plant capacity, 2550 kw. To this, during the last months of the year, was added 1500 kw in mixed-pressure turbines, of which one-half has been called upon for occasional operation.	
Output of plant, kw-hours.....	13,261,126
Purchased power, kw-hours.....	674,681
Revenue car miles.....	8,283,804
Freight and other car mileage (estimated in equivalent passenger car miles).....	207,000
Passengers carried	46,228,453
Average kw-hours per car mile.....	1.64
Average watt-hours per seat mile.....	51.2
Average watt-hours per passenger carried.....	301

(f) Has probably a smaller accident account than any other railway system of equal or even of much smaller size. During 1910 all items of expenditures entering into this amount,



Havana Electric Railway—Map of City Showing Lines of the Havana Electric Railway Company

type of American visitor is met very infrequently now. The great majority of Havana's visitors had already heard of the beauty and progress of this famous Cuban capital, and are, therefore, in a measure prepared to see and enjoy what is beyond question one of the cleanest, most picturesque and most beautiful cities in the world.

The climate is unequalled, being far more comfortable in summer than that of our Northern cities and, of course, much milder in winter than any of the Southern cities. Those who have sweltered in the street "canyons" made by the tall buildings in our large cities and who recall the many deaths and prostrations due to summer heat may perhaps be surprised to learn that in Havana the thermometer rarely, if ever, registers above 85 deg. Fahr. in the shade and that heat prostrations are unknown. There is always a cool, balmy breeze tempered by the ocean. It is small wonder that the electric fan has practically no sale in Havana.

No city in the Western Hemisphere presents such contrasts of the old and the new. Forming the extremely narrow streets are ancient, massive, solid masonry structures, suggesting in their design, their high columns, arches and portals, their spa-

including salary of claim agent, totaled \$5,502.73, or less than one-quarter of 1 per cent of the gross receipts.

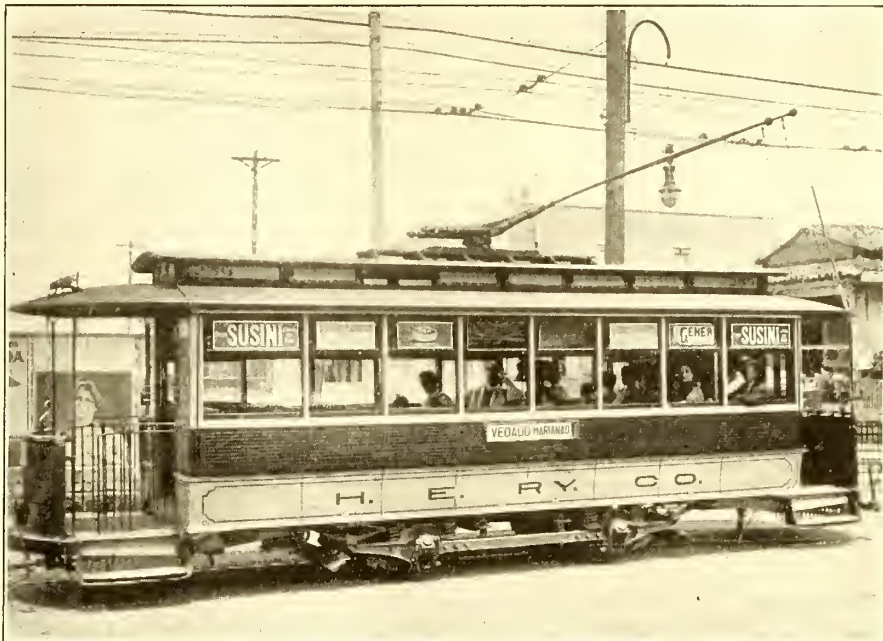
Much of this remarkable showing is due not so much to managerial and engineering foresight as to the natural limitations imposed by local conditions. Thus the extremely narrow streets and the consequent sharp curves have compelled the adoption of the compact, light, single-truck car and adherence to that model. Finally, the track mileage, totaling about 60 miles, is much less than that found in cities of equal size and population.

Let us consider the effect of the single-truck car. Some years ago a man in a Middle West city found his attention riveted by the fact that nearly one-half of the total operating cost was platform labor. It was by far the largest of all the items in the cost of operation. He reasoned, "If I build cars twice as big and run them half as often I shall still be able to carry the same number of passengers and cut the platform expense in half." Thus came the big double-truck car, but with it also came of necessity vastly larger car equipments, enormously greater power plants, heavier distributing and trolley copper, heavier and more costly rails. From the standpoint of the public the less frequent headway was unsatisfactory and eventually a return to the headway of the smaller cars came about.

From the standpoint of the company there were a number of other disadvantages to the long cars. For appreciable periods during the day they carried relatively few passengers per car. The dead weight per passenger carried, and hence the cost of moving him, greatly increased; but, probably worst of all, the fares collected with respect to the number of passengers carried greatly decreased. Now, it is the belief of the writer, based upon some observation and experience, that the great majority of street car employees are thoroughly honest, and that by far the greatest percentage of shortage in fare collections is due to the inability of the conductor to make the col-

thirty-two people is too capable a man to continue long in the job. He would inevitably advance into a better position.

Of course, prepayment systems, and, to less extent, recent improvements in car construction in the way of reducing weight, have largely met the difficulties outlined above. The writer does not wish to be understood as advocating the smaller single truck car everywhere in preference to the big double truck car. On the contrary, the larger car is undoubtedly in-



Havana Electric Railway—Side View of Standard Single-Truck Car

dispensable in many places. He believes, however, that the big car idea has been greatly overdone, and that on nearly every surface system there is room and profitable use for the light small car.

The net result of the adoption of the big car, however, has been an increase in the operating ratio, whereas the Havana system, in spite of certain operating difficulties later touched upon, operates at a ratio lower than most other properties.

The present relatively small track mileage of Havana, together with the liberal concession for extensions to the system obtained by General Manager Steinhart for the company, permits of intelligent, non-competitive, profitable expansion. The per capita earnings, \$8.24, are well below the saturation point for a city of this size.

FORMATION OF THE COMPANY

Shortly after the Spanish War a syndicate of Canadian, American and French capitalists formed the Havana Electric Railway Company and acquired:

- The Trigo concession,
- The Torre-Plá concession, and
- The Ferro-carril Urbano,

comprising one steam dummy line and sundry little horse car lines. These concessions were exchanged by military decree during the first intervention for the present concessions and franchises of the Havana Electric Railway Company. In 1908,

during the second intervention, General Manager Steinhart succeeded in having some 30 miles of extensions approved and authorized by governmental decree.

The old systems were torn out and scrapped and an entirely new railway was built, so that the present system is to-day about ten years old. Subsequently, in 1904 the Tranvia de Marianao and the Insular Railway, joining Havana and the town of Marianao, were built; they are owned and operated



Havana Electric Railway—Bird's-Eye View of City

lections, whether because of the type of the car or because he cannot remember the passengers who should have paid. Doubtless every reader of this article recalls instances of having ridden on a street car without payment of his fare. It is a further theory of the writer (leaving out of consideration the recent developments in prepayment and fare box constructions) that any man who can successfully perform all the duties of a conductor and collect all the fares in a car seating more than

by the Havana Electric Railway Company. All the concessions and franchises run to 1949. A system of mule-drawn stages operating in the city and suburbs was also purchased in 1905 and is operated by the company.

The terms of the concessions were laid down by the military engineers of the first intervention, under the direction of Col. William H. Black, then head of the department of public works of the island of Cuba. The construction called for was of the highest class.

who believed that any other would be unduly hard on the wheels of the cabs and coaches. This, of course, necessitates careful attention and considerable work by the track men. In addition to the section before mentioned the track includes some Phoenix rail, 95.3 lb., from Arthur Koppel, Germany; some Trilby rail, P. S. 243, 90 lb., from the Pennsylvania Steel Company, and more recently some Ougrée X, 1909, 95.3-lb. rail made by the Société Anonyme d'Ougrée, Marihay, Belgium. The original special work was of Pennsylvania construction;



Havana Electric Railway—View of City from Across the Bay

The census of 1907 gave to Havana a population of 302,526, but as this includes the small towns on the east side of the bay the population served by the railway system is about 275,000. The city is for the most part quite level, but toward the south, as indicated by the names "Cerro" (hill) and "Jesús del Monte" (Jesus of the Mountain), the ground rises considerably and affords some long and fairly severe grades for the cars to negotiate.

TRACK AND ROADWAY

The map on page 906 shows the system as constructed and

the newer work is of Lorain guarantee construction with renewable manganese centers.

A form of track gage and standard devised locally has been found rather useful. It consists of rail sections united by I-beams and is frequently checked by comparing with it the wheel gage and a good steel tape. Experience showed that the ordinary track gage, because of rough handling, soon became inaccurate. Hence each of the present gages consists of two heavy forgings united solidly by a 2-in. pipe. These gages have proved very satisfactory and although checked with the



Havana Electric Railway—A Handsome Avenue in Havana

projected. The roadbed throughout Havana and Marianao is solid concrete with steel ties spaced 10 ft. apart. The rail specified by the army engineers was Pennsylvania section, No. 255, weighing 90 lb. This is an extremely difficult section for operation owing to its very shallow and narrow groove, so that a very slight departure from the gage, which is standard, makes itself known by the sound and wear of the car wheels. This section was insisted upon by the army engineers,

standard semi-weekly have very seldom required adjustment. During the construction of new track the gages are checked daily.

Along part of the bay front the tracks are raised and carried by a steel elevated structure. A plate girder drawbridge for single track with wood trestle approaches spans the Almendares River and joins the Havana Electric Railway Company tracks with the Insular Railway.

The company is required to pave between its rails and tracks and for 50 cm outside its rails. The paving is wood block, asphalt block, macadam and, for the most part, granite blocks. At present the city of Havana is being sewered and paved, so that considerable of the existing older pavement will have to be replaced with granite. The granite blocks came from Norway, which produces a very excellent quality of blocks.

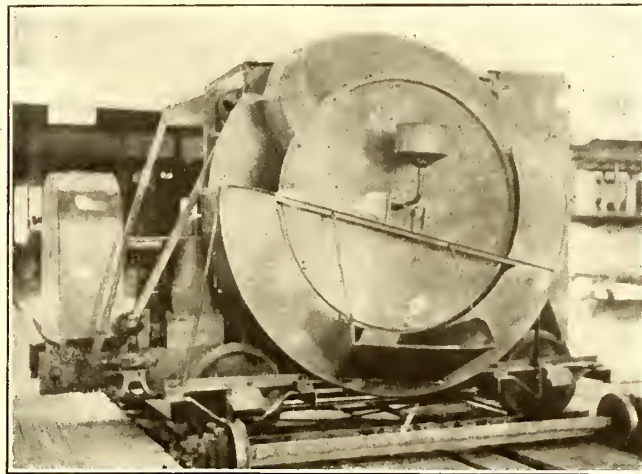
The Insular Railway, which is double-tracked, has native hardwood ties spaced 24 in.; 60-lb. T-rails, made by John Cockerill, of Belgium, and 75-lb. T-rails, made by the Lorain Steel Company. The ballast used is broken stone and cinders mixed.

The requirement of concrete roadbed in the city work has resulted in the development of a special concrete mixer, which has been found very satisfactory and economical as to handling. As shown in the illustration, it is a motor-driven drum mixer, mounted on a special steel truck with 20-in. cast-iron car wheels. The unique feature is the system of loading: Three large vanes secured to one side of the drum and projecting some 18 in. beyond its perimeter scoop the material from the loading bin, which is fastened to the truck very close to the ground. These vanes have curved surfaces so that as the drum revolves the material slides along these surfaces by gravity and falls into the drum itself. On repair jobs the mixer is derailed beside the work and the material wheeled and dumped into the bin by wheelbarrows. On new work the mixer remains on the rails coupled to two flat cars containing the material, the water being carried in barrels or in tanks and the entire train moved by a motor car. The mixture is discharged from the mixer into a chute which conducts the concrete to a platform forming the front part of the mixer, from which it is shoveled or raked into place between the rails ready for the tamper. The mixer was built in the shops of the company.

POWER PLANT

The power house is a prominent sight from the steamers passing or entering the Havana harbor. It is practically on the ocean front at the corner of Colon and Blanco Streets, and its tall steel smokestacks can be seen from a great distance. Judging from its construction, the builders evidently had in

River, and is hauled by the company's cars to the storage bins at the power house, which have a normal capacity of 400 tons. From these bins, which are built of reinforced concrete and located on the ground, the upper surface being level with the boiler-room floor, the coal is conveyed to the boilers by a Heyl & Patterson traveling crane conveyor. The crane receives the coal into its buckets from openings at the bottom of the bins and carries it by means of an endless chain up and over to the



Havana Electric Railway—Concrete Mixer

boilers. Six Muñoz 500-hp boilers with individual stacks and arranged for hand firing form the steam-generating equipment, and saturated steam at 140 lb. gage pressure is generated. A concrete reservoir having a capacity of some 340,000 gal. receives the condensation from the surface condensers and this water is delivered to a Cochrane feed water heater by two motor-driven Worthington centrifugal pumps. From the feed water heater three Smith-Vaile duplex steam pumps supply the boilers. The plant includes a Kennicott water softener for treating the make-up water, which contains much lime and

magnesia. An interesting feature is the open construction of the boiler room which the climate permits. It has no sides other than the fire wall which separates it from the engine room and, excepting the corrugated steel roof which projects and overhangs enough to protect the firemen from the sun's rays, the boiler room and its contents are quite exposed.

The engine room contains three Allis-Chalmers vertical cross-compound condensing engines, 28 in. and 60 in. x 42 in., direct-coupled to G. E. direct-current generators, rated at M.P.-10-850 kw, 550 volts, 80 r.m.p. One G. E. rotary converter rated T.C.-12-500-600-600-r.p.m. is used, with a bank of airblast transformers stepping down from 2300 volts. The switchboard for the equipment is G. E. standard for double trolley, and includes twenty-two black-



Havana Electric Railway—Plaza de Arma

mind the hurricanes which occasionally visit this part of the island. Its huge massive brick walls, some 30 in. thick, are solidly founded on massive concrete carried down to solid rock. It has never suffered damage from any of the storms of which that of last October was one of the most severe. A similar heavily constructed fire wall separates the boiler plant from the engine and generator plant.

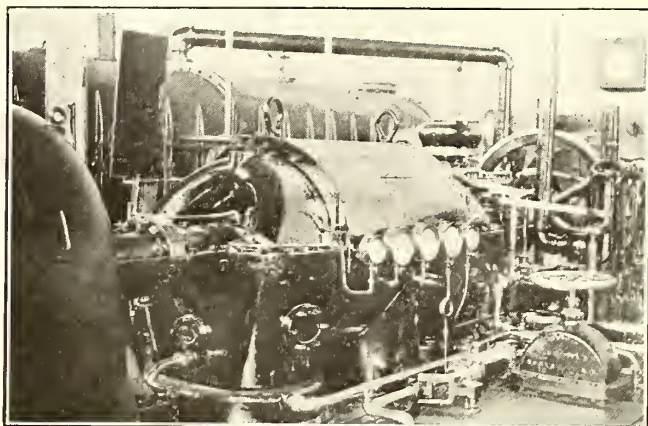
Coal is stored at La Puntilla, at the mouth of the Almendares

enamed slate panels. The feeder panels have double-throw switches cross-connected so as to enable the accidental grounds to be confined to one polarity. Wheeler surface condensers of the Admiralty type are provided, one for each engine.

When the need of additional power became manifest, and as the company had been purchasing power for two of its outlying lines, it was decided to install alternating-current machinery and transmit three-phase, 60-cycle current at 13,200

volts to two substations. Therefore, during the last part of the year just ended there were added to the plant two Westinghouse mixed-pressure turbines, each rated at 750 kw, three-phase, 60 cycles, 2300 volts, 3600 r.p.m. Each turbine has a direct-coupled exciter. In addition, a 20-kw motor-generator set is available for excitation.

For each turbine there is provided a Wheeler surface condenser outfit consisting of:



Havana Electric Railway—Mixed Pressure Turbine and Condenser

One Wheeler surface condenser and feed water heater, having not less than 5350 sq. ft. of cooling surface.

One 14-in. centrifugal circulating pump direct connected to 10-in. x 10-in. vertical steam engine.

One 8-in. x 18-in. x 12-in. rotary dry vacuum pump.

One 6-in. x 10-in. x 10-in. horizontal direct-acting suction, valveless, hot-well pump with hot well and float.

For the control of the alternating-current system is provided a switchboard consisting of:

Two exciter panels.

Two generator panels.

Two transformer panels.

One tie-line panel connecting to the lighting system.

Two outgoing line panels.

Three blank panels for future needs.

The three-phase, 2300-volt current from the generators is conveyed by triple-conductor varnished-cambric lead-covered cable to oil switches and to the 2300-volt buses, which are located in the basement directly below the switchboard panels. From this bus system the current is led through oil switches to the G. E. transformers which supply the 500-kw rotary converter and to two banks of oil-cooled Westinghouse transformers having a total capacity of 1200 kw and stepping up the voltage to 13,200. From these transformers the high-voltage current is carried by cables to oil switches and the 13,200-volt buses, which are contained in a concrete structure on a gallery directly above the switchboard panels. From these buses three high-tension feeders supply, by means of varnished-cambric, lead-covered cables, the two outlying substations and the portable substation which is normally kept at the power house. All the cable was furnished by the Standard Underground Cable Company, and, with the exception of the airblast transformers and the converter which constitute the 500-kw rotary outfit, all the alternating-current machinery in the plant and in the three substations is of Westinghouse manufacture.

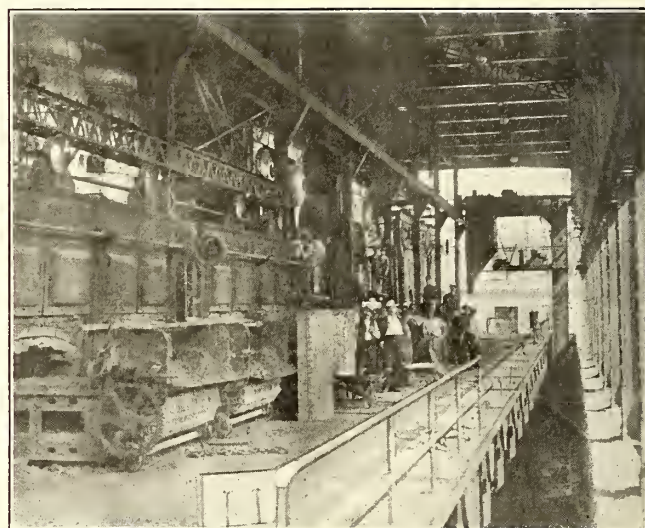
The electrical installation is of the usual type, and contains no special features. The steam installation, however, has two quite new features, one with the turbines and the other with the condensers.

STEAM INSTALLATION

The turbines are of the Westinghouse-Parsons mixed pressure reaction type, each designed to take the exhaust steam from an engine. Since the loads on the engine and turbine are in a measure independent, the former generating direct current

and the latter alternating current, a governor on the turbine is necessary. The 500-kw G. E. rotary and the 300-kw Westinghouse rotary in the portable substation tie these two loads together. Nevertheless, the fluctuations and differences of loads are such that the turbine usually has more or less exhaust steam than its loads demand. The design of the turbine is such that not only variable quantities of steam but also variable pressures at the turbine inlet are required for proportionately variable loads. Thus the pressure on the low-pressure piping and against the low-pressure piston of the engine varies with the load, and no attempt is made to utilize the low-pressure piping for a storage reservoir. To handle these conditions, the Westinghouse engineers have devised a very ingenious form of governor. It is in effect a modification of the governor used on the high-pressure Westinghouse turbines. When there is a lack of low-pressure steam or a lack of inlet pressure the governor automatically admits boiler pressure steam into the pipe leading to the turbine, the steam first being expanded to the pressure required by the turbine. This part of the governor mechanism functions then substantially like a reducing valve. On the other hand, when there is an excess of steam or excess of inlet pressure the governor automatically opens a by-pass valve and shunts the excess of steam into the condenser, thereby lowering the inlet pressure to that required by the turbine. Of course when the pressure of the exhaust steam from the engine is just what the turbine requires, then both the high-pressure valve and the by-pass valve remain closed and only the exhaust steam passes into the turbine. Each turbine with 27½-in. vacuum at its discharge is designed to deliver 450 b.h.p. at 10 lb. absolute pressure at the inlet, or 1350 b.h.p. at 20½ lb. absolute pressure at the inlet, with intermediate outputs at substantially proportionate inlet pressures.

The original plans for the power house contemplated the building of a tunnel from the power house site to the ocean to convey cooling water for the condensers. It was found, however, that a large well which was to form the end of the tunnel, into which both salt water and fresh water seeped, sufficed to supply the plant requirements. This water, however, has proved to be extremely hard on the condensers, which suffered corrosion from it at a very rapid rate. Tubes of every manu-



Havana Electric Railway—Open Boiler Room

facture known were tried, but all failed in a comparatively short time.

CONDENSERS

The older condensers in use with the engines are cast iron throughout, excepting the tubes, pump valves, the pump piston rod and the pump cylinder lining, all of which are brass. While, of course, the tubes owing to their thinness failed more frequently than any of the other parts of the condensers, it was found that the rate of corrosion was more rapid with the cast-

iron parts than with the brass pieces. Careful investigation showed that there were no stray ground currents of electricity which might be causing electrolytic corrosion. This was to be expected, for the d.c. distribution system is insulated in both polarities, the double trolley being used. This was further confirmed by the fact that the corrosion was confined to the metals in contact with the circulating water. The other parts of the condensers handling the condensation showed only moderate rusting and the ordinary mechanical wear.

Analysis of the circulating water showed it to have the elements of an electrolyte. It is of course well understood that practically all commercial castings and alloys contain two or more dissimilar elemental metals; thus in the iron castings are found carbon, manganese, silicon and phosphorus, while in the brass castings, tubes and drawn brass are found copper, zinc, tin and sometimes nickel.

It follows that given two or more dissimilar metals in the presence of an electrolyte we have in effect a battery, and when these dissimilar metals are fused together as in castings and alloys we have a short-circuited battery. The metal which is electro-positive to the others then disintegrates and thus we have roughly the modern theory of corrosion.

The solution which naturally suggests itself is to construct whatever apparatus is thus liable to corrosion so that only one

ocean is now in progress of construction. This tunnel and the well will be lined throughout with concrete so that the future cooling water supply will be sea water.

SUBSTATIONS

The largest of the three substations is located on the Calzada de Jesús del Monte. It is known as the "Agua Dulce substation" and consists of a reinforced concrete structure containing two 300-kw, 60-cycle Westinghouse rotaries with two sets of oil-cooled transformers, stepping down from 13,200 volts to the voltage required by the rotaries. Electrolytic lightning arresters are connected to the high-tension feeders close to the wire entrances and cable pot-head, and the feeders then pass through choke coils, disconnecting and oil switches to the high-tension bus, which is in a concrete compartment. From the bus the current is led through oil switches to the transformers. The switchboard includes eight black slate panels for the control of the substation apparatus and three pairs of d.c. feeders. Two feeders, one of triple-conductor lead-covered cable, direct from the power house, and the other an exposed aerial line from the Insular substation, supply the alternating current. The substation building is in the rear of a two-story residence building newly erected and owned by the company, the rentals from which more than pay the interest charges of the buildings and machinery.



Havana Electric Railway—Portable Substation



Dwelling House and Substation

metal, preferably an elemental metal well down in the electro-negative end of the metallic series, will be the only metal to come in contact with the electrolyte, i.e., the circulating water in the case of these condensers. It was hoped that lead, which has so well proved its corrosion-resisting qualities in the lining of vessels containing hydrochloric acid, in storage batteries and as the covering of insulated cables in salt water, could be so adapted, but the several condenser manufacturers claimed that the inert quality of lead and its low heat conductivity made it impracticable. However, the Wheeler Condenser & Engineering Company in conjunction with the Aluminum Company of America developed and constructed two surface condensers lined with aluminum throughout the path of the circulating water, and these have recently been installed in Havana. The tubes are of copper, lined with aluminum. The condenser shell is cast iron lined with sheet aluminum; the tube sheet is rolled aluminum; the centrifugal circulating pump is cast aluminum, as is also the foot valve. The suction and discharge pipes are sheet aluminum, shaped to pipe form, with the edges lap-welded.

The city of Havana is now having constructed a complete system of sewers and drains, and in the prosecution of this work considerable pumping is necessary. It was feared, as this work neared the power house, that this pumping would diminish the available cooling water in the well, so a tunnel to the

The Insular substation, a reinforced concrete building, located at the intersection of the Insular Railway and the Ferrocarril de Marianao, an electrified branch of the United (steam) Railways, contains one 300-kw Westinghouse rotary converter with the customary transformers, switchboard, arresters, etc.

The portable substation contains equipment identical with that in the Insular substation. It is contained in a special constructed double truck car, and has proved its value many times.

ELECTRICAL TRANSMISSION

The scheme of high-tension transmission embodies a triangular feed. Starting from the power house, one high-tension cable is carried directly south to the Agua Dulce substation. One other goes west to the Almendares River where it is spliced into an armored submarine cable and thereby conducted to a switch house on the west bank of the river. From this switch house three bare copper wires, made up of old scrap trolley wires, are carried on a cross-arm on the top of the Insular Railway poles to the Insular substation. From this station three similar bare-copper wires are carried across open country on steel towers, spaced 175 ft. apart, to the Agua Dulce substation.

On the outer ends of the cross-arms of both the Insular poles and the tie-line poles are ground wires, for which old scrap trolley wire was used. The Insular poles are creosoted

pine and the cross-arms are native hard wood called "majagua," and are painted with carbolineum. The cross-arm braces are flat steel bars extended to about 11 in. above the cross-arms and serve to carry the ground wires about level with the transmission wires. About one-half of the poles carry vertical ground wires from the junction of the cross-arm braces into the ground. The ground wires on the cross-country tie line are threaded through eyebolts which project above the steel cross-arms to which they are bolted and of course each tower makes good ground connection. These ground wires together with the Westinghouse electrolytic lightning arresters installed at the two substations, the switch house and the power house form very effective lightning protection, no injury to the apparatus having as yet occurred despite several very severe electrical storms. Prior to the installation of the alternating-current apparatus ground wires had demonstrated their efficacy in protecting the car equipments. On the Insular Railway this piece of track runs through exposed open country for about 6½ km (4 miles), and it was a regular experience up to the summer of 1907 to lose a number of motor armatures during nearly every storm. That summer a couple of ground wires, made up of old scrap trolley wire, were put up and since then not an armature has been lost due to electrical storms.

The insulators used on the 13,200-volt lines are Thomas No. 2017, 5⅜ in. high by 6¾ in. diameter, tested to 50,000 volts. Steel bolts are cemented into the insulators and with porcelain bases form the pins for carrying the insulators.

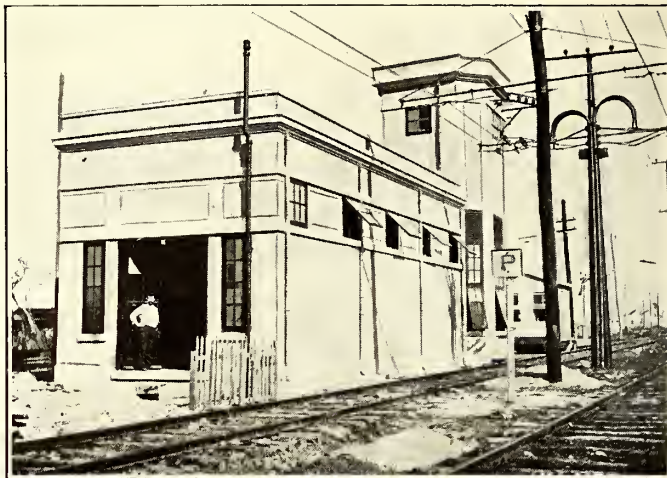
The steel towers were built by the American Steel Company of Cuba. They came through the October hurricane without a single instance of failure or bending. A number of built-up steel poles of other types used in the service of other companies were bent double by the same storms. The steel towers are built in three sections, two of which when assembled and erected project 30 ft. above the ground, while the three sections make a tower 49 ft. 6 in. high above ground. The cross-arm is a 6-in., 8-lb. steel channel, 7 ft. 10 in. long with five holes punched 23 in. apart to receive the insulator pins and the ground wire eyebolts, and is bolted to the flat surface forming the top of the tower.

The high-tension cables and the d.c. feeder cables are carried by the steel tubular poles which support the span wires carrying the trolley wires. The d.c. feeder cables were originally run through conduit laid along the tracks in various parts of the city, but since the beginning of the sewer and paving work

strength of the latter. The arrangement adopted has proved to be very satisfactory.

DOUBLE TROLLEY SYSTEM

The double trolley system is used throughout the Havana Electric Railway Company's lines, and while it multiplies the number of overhead wires and always necessitates the presence of the car conductor on the rear platform at curves and special works in order to guide the trolleys, no difficulty in op-



Havana Electric Railway—Insular Substation

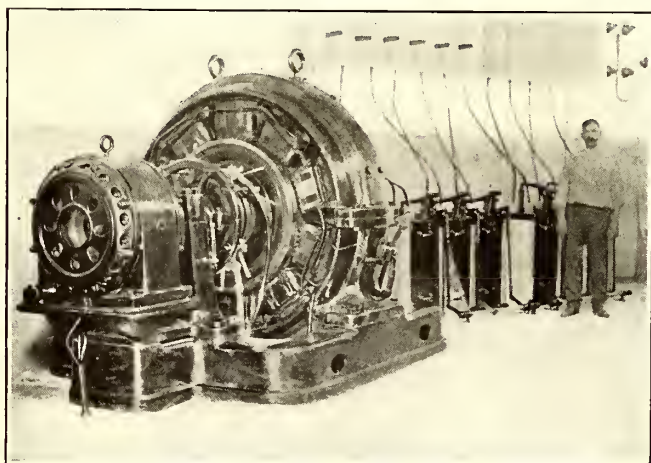
eration is encountered. Practically all the overhead special work was designed and constructed in Havana. Except on the Insular Railway, which has center poles and brackets, and in parts of Marianao, which have a small stretch of side poles and brackets, span wire support of the trolley wires is the general construction. Ordinarily 26 ft. 6 in. top, three-section, steel tubular poles placed along the curbs are used, with of course larger and heavier poles in certain locations. In the very narrow streets of old Havana 4-in. pipes are placed opposite each other on both sides of the street, close against the fronts of the buildings, and these vertical pipes are joined together by a horizontal pipe and elbows. Span wires secured to the vertical pipes carry the trolley wires. The overhead insulators for the d.c. system were supplied principally by the General Electric Company, but the products of most of the other supply companies are also in use.

NEXT ARTICLE

In a following article the writer will describe the shops, rolling stock and operating practice of the Havana Electric Railway Company.

GERMANY BEGINS TRUNK LINE ELECTRIFICATION

Germany took an important step toward the electrification of its trunk line railways on March 27 when the Prussian House of Deputies voted a credit of £2,500,000 as a first instalment for the electrification of several sections of the Prussian State Railways. The sections on which electric traction is to be introduced are Magdeburg-Leipzig, a distance of 80 miles of double track, and several lines in Silesia, having an aggregate length of 280 miles of double track. Apart from the main lines there are sidings and additional lines at or near stations, making a grand total of 960 miles of single track to be completed within two years. It is understood that the military experts hesitated to indorse electrification at first, owing to the opinion entertained by some that it was easier for the enemy to interrupt traffic on an electrified line than on an ordinary railway, but any objections originally entertained by the Ministry of War were withdrawn. The Prussian Ministry of Public Works intends to propose further electrification of the State lines as speedily as the money can be found for this purpose by the Minister of Finance and voted by the Prussian Diet.



Havana Electric Railway—Interior of Substation

they have been withdrawn from the ducts and are now being carried overhead. Steel bands clamped to the top of the poles, holding a wood block with ordinary 2-in. porcelain knob laid on its side, carry a 7/16-in. galvanized steel messenger cable, from which the feeder cable is suspended by zinc clips spaced 24 in. apart. This form of construction, common in telephone work, was deemed necessary by the frequent joints in the cables, which it was believed greatly decreased the mechanical

RESULTS OF 1200-VOLT DIRECT-CURRENT OPERATION ON THE WASHINGTON, BALTIMORE & ANNAPOLIS ELECTRIC RAILWAY

On Feb. 7, 1908, the Washington, Baltimore & Annapolis Electric Railway, comprising 96.33 miles of single track between the cities named, was opened for a combined single-phase and direct-current operation. It was soon found that the complicated equipment required to operate with both systems was not satisfactory for the development of a reliable and profitable service. Therefore, after careful consideration it was determined to replace the combination equipment by a 1200-volt d.c. system. This change was inaugurated on Feb. 15, 1910, without any interruption of the schedules.

FINANCIAL IMPROVEMENTS

The installation of the d.c. equipment produced immediate economies in current consumption and greater reliability of service. Furthermore, successful operation for over a year has demonstrated that the maintenance of 1200-volt d.c. equipment offers no greater difficulties than standard 600-volt ap-

per car mile. On the other hand, the gross earnings rose from 41.36 cents per car mile to 42.56 cents per car mile. Owing to the reduction in operating expenses the net income was 23.71 cents per car mile, as against 17.58 cents per car mile. Still better results appear in the comparative statement for January, 1911, and January, 1910, which shows an increase of 17.37 per cent in gross earnings, a decrease of 1.38 per cent in operating expenses and an increase of 70.1 per cent in net earnings. For the seven months from July 1, 1910, to Jan. 31, 1911, the percentage of operating expenses was only 50.43 per cent as against 60.8 per cent for the same period a year before.

COMPARISON OF TRAIN DETENTIONS

The great betterment in the service will be appreciated by examining the accompanying tables, which give the train detentions in February, 1910 and 1911. These tables show that the total schedule car miles operated increased from 103,718 miles to 117,416 miles and that the number of car miles operated per minute detention from all causes increased from 28.97 miles to 104.46 miles. Fully 97.9 per cent of the d.c. trains were on time. The analysis of causes shows that the greatest improvement was effected in the item marked "electrical," which covers

REPORT OF TRAIN DETENTIONS—FEBRUARY, 1910.

Total number scheduled trains operated.....	3,276
Total number scheduled trains operated on time.....	3,027
Total number scheduled trains operated late.....	249
Total number minutes detentions scheduled trains operated.....	3,579
Per cent of scheduled trains on time.....	92.39+
Per cent of scheduled trains late.....	7.60—
Average delay of each train late (minutes).....	14.37
Total scheduled car miles operated.....	103,718
Total car miles per minute detention.....	28.97

DETENTIONS SEGREGATED—FEBRUARY, 1910.

Causes.	Detentions, Percentage.	Total Minutes Detentions.
Mechanical	4.5	161
Electrical	33.1	1,186
Trolley pole.....	1.7	61
Overhead	2.7	96
Track .....	...	...
Meeting and passing points.....	6.7	240
Traffic	2.3	83
Fires .....	...	...
City cars	3.4	123
Local business.....	5.6	202
Connections	3.7	134
Power off.....	16.3	586
Deraillments .....	.2	8
Interlocking and signals.....	.2	8
Other trains.....	5.9	213
Train orders.....	2.1	77
Baggage express.....	.1	3
Doubleheading, etc.....	1.1	42
Arriving late.....	5.4	194
No available cars.....	1.6	70
Miscellaneous	2.5	92
	99.1	3,579

REPORT OF TRAIN DETENTIONS—FEBRUARY, 1911.

Total number of scheduled trains operated.....	3,384
Total number of scheduled trains operated on time.....	3,313
Total number of scheduled trains operated late.....	71
Total number minutes detention scheduled trains operated.....	1,124
Percentage of scheduled trains operated on time.....	97.90
Percentage of scheduled trains operated late.....	2.10
Average delay of each train late (minutes).....	15.83
Total scheduled car miles operated.....	117,416.36
Total scheduled car miles operated per minute detention.....	104.46

DETENTIONS SEGREGATED—FEBRUARY, 1911.

Causes.	Detentions Percentage.	Total Minutes Detentions.
Mechanical	2.31	26
Electrical	19.12	215
Trolley pole.....	4.00	46
Overhead	6.31	71
Meeting points.....	2.22	25
Passing points.....	2.22	25
Traffic	8.54	96
City cars (Washington).....	16.28	183
Local business.....	1.25	14
Arriving late.....	2.40	27
Doubleheading .....	.98	11
Flow trouble .....	.89	10
Connections	5.96	67
Power off (U. Ry.).....	.44	5
Power off (Washn. Ry.).....	2.40	27
Power off (W. B. & A.).....	2.22	25
Deraillments	6.68	75
Other trains.....	2.58	29
Train orders.....	.53	6
Snow .....	.44	5
Ice on trolley wire.....	8.01	90
Accidents	3.65	41
Miscellaneous .....	.44	5
	99.96	1,124

Washington, Baltimore & Annapolis Railway—Comparative Record of Train Detentions from All Causes During February, 1910, and February, 1911

paratus. The records of the company show that there has been a noteworthy decrease in those operating costs which are affected by the character of the equipment. Comparing the last six months of 1909 and 1910 respectively, it appears that the maintenance of the a.c. passenger cars, item 32 of the interstate classification, cost 0.85 cent per car mile, whereas with the d.c. passenger cars the same item amounted to only 0.19 cent per car mile. The maintenance of the electrical equipment of the cars, item 36, was reduced from 0.37 cent to 0.24 cent per car mile. It should be added that the figure of 0.37 cent per car mile for electrical equipment of a.c. car does not include the amounts spent by the manufacturers and which were not included in the railway company's accounts. The transportation expense for carhouse employees, item 66 of the classification, was reduced from 1.08 cents per car mile to 0.49 cent per car mile. Stated in another way the latter figures mean that 25 men instead of 60 are now employed in the maintenance of the cars. Perhaps the most significant change was in the power consumption, the cost of which was reduced from 5.89 cents per car mile to 3.82 cents per car mile, a difference so great that, roughly speaking, it would require one additional passenger per car mile to pay for it, assuming a fare rate of 2 cents per car mile.

The total operating expenses for the semi-annual periods named were reduced from 23.78 cents per car mile to 19 cents

all operating equipment on the car. When single-phase rolling stock was in service electrical causes were responsible for 33.1 per cent of the detentions, amounting to a delay of 1186 minutes. Under the 1200-volt system the same causes were responsible for 19.12 per cent of the delays, but the total number of minutes' detention was reduced in much greater proportion, amounting to 215 minutes only. Another significant item is that of "power off." The delays from this cause were lowered from 586 minutes to 62 minutes. The total minutes detention from all causes was reduced from 3579 to 1124. A portion of these delays is unavoidable because this company operates over foreign lines in Baltimore and Washington. In Washington, particularly, the cars are likely to be held up by blockades, as shown by the fact that 183 minutes were lost from this cause in February, 1911. It should be stated, also, that even the present electrical equipment of the cars is quite complicated, as the conditions call for operation with 1200-volt single trolley and ground return on the interurban division, 600-volt single trolley in Baltimore, and 600-volt double trolley and underground conduit in Washington. In view of these handicaps the records now made on this line are in every way creditable to the equipment and to those who maintain it. The tables of detentions show only the scheduled trains, as no extras or express cars are recorded.

ROLLING STOCK

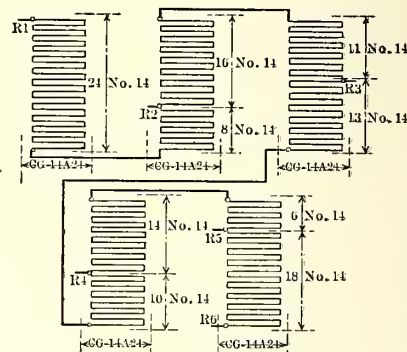
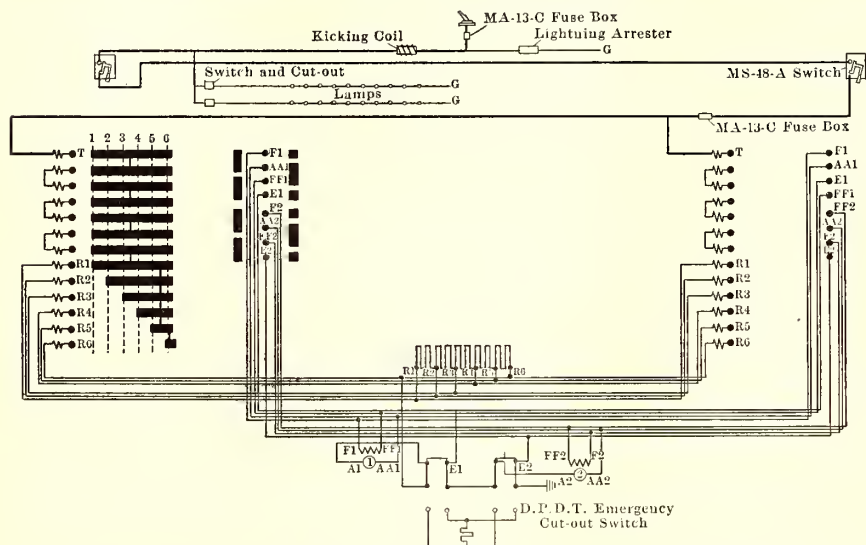
The original single-phase cars were 24 in number, 62 ft. long over all and weighed 59 tons complete. The d.c. cars are 51 ft. long and weigh 39 tons complete. The present rolling stock is made up of 44 cars as follows: 26 straight passenger cars; 13 combination passenger, smoking and baggage cars; 3 motor-equipped baggage cars; 1 private car; 1 city type car for Annapolis. There are besides 25 flat car trailers.

The 26 straight passenger cars include 9 cars ordered in September, 1910, and which have just been equipped. The

The 1200-volt car has been in operation since September, 1910, without having cost a cent for replacement, except in the renewal of 15 grid resistances which were burned out on account of snow. The car is inspected weekly on a 500-mile basis at a cost of about 60 cents per inspection. The lamps on this car are arranged 12 in series.

MAINTENANCE AND EQUIPMENT FEATURES

Careful attention has been given to the wiring of all cars in view of the use of a potential which sometimes goes as high as 1300 volts. Formerly the 600-volt and 1200-volt cir-



Approximate Resistance.

R1-R2	5.66 Ohms.	R1-R6	21.23 Ohms Total.
R2-R3	4.78 "	R2-R6	15.57 "
R3-R4	4.07 "	R3-R6	10.79 "
R4-R5	3.54 "	R4-R6	6.72 "
R5-R6	3.18 "	R5-R6	3.18 "
		R6	0 "

Electric Ry. Journal

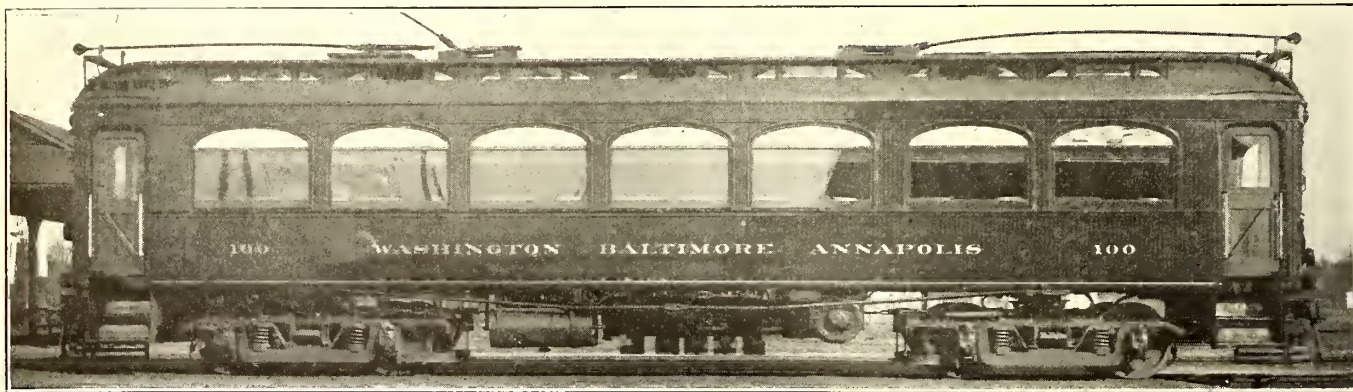
Washington, Baltimore & Annapolis Railway—Connections of R-200-A Controllers, Two Motors and Trolley and the Resistance Connections of the Permanent 1200-Volt D.C. Equipment

standard equipment embraces Niles bodies, Baldwin trucks, four GE-205 motors per car, C-80 automatic control and 650-volt motor-generator sets for the lighting and control service. The three baggage motor cars are each equipped with four GE-207 125-hp motors and C-74 hand controllers. They are used for hauling freight cars in the interchange business with the Baltimore & Ohio and the Pennsylvania Railroads.

The private car does not differ materially from the standard passenger cars. It has no end observation windows, but the

cuits were run together, but they now are placed in separate iron conduits to avoid all possibility of short-circuits between adjacent wires. The positive trolley wire has also been placed in conduit. The panel-boards are placed in transite-lined cabinets, with the 1200-volt board at the bottom. The heaters are 12 in series on the 1200-volt circuit, while the lights are five in series on the 650-volt motor-generator circuit.

The motors have given very satisfactory service. In fact, there have been no burn-outs whatever except on one occasion,



Washington, Baltimore & Annapolis Railway—Special Car for Excursions

side sash are much larger. This car was built principally to accommodate parties of diplomats, foreign military attachés and others who visit the United States Naval Academy at Annapolis in large parties. A charge of \$60 is made for the trip between Baltimore and Washington or Washington and Annapolis, corresponding to an 80-mile excursion. The rate for the shorter trip from Baltimore to Annapolis is \$40.

The single hand-braked city car is used in local service at Annapolis. It is unique in being operated at 1200 volts at all times. This car carries two GE-217-A 50-hp motors and R-200-A control. The wiring diagram and resistance connections of this equipment are shown in the accompanying illustrations.

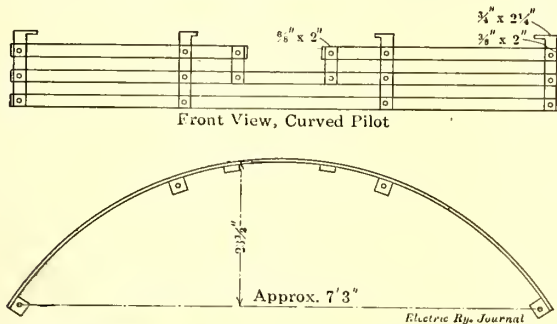
when three motors were injured in this way on account of running through water. All of the motors were installed with slotted commutators and Le Carbone type E brushes applied at 4-lb. tension. While a few of these brushes have been broken in service, not one has been worn out, although some of them had run for 80,000 miles from Feb. 15, 1910, to April 6, 1911.

The pinions and gears are of the General Electric Company's grade F type. None of these have shown any signs of serious wear since their installation on Feb. 15, 1910. The gears are lubricated with Galena gear grease, 1 lb. of grease being applied every month instead of say 5 lb. at longer inter-

vals. This practice avoids the fouling of the streets, which is an important matter in Washington, and economizes material.

The original armature bearings are still in service, without exception. These bearings are brass, lined with GE-17 alloy, and as purchased for replacement cost 32 cents per pound. The axle bearings are cast iron lined with babbitt metal costing $8\frac{1}{2}$ cents per pound and made up by the company as follows: 75 per cent lead, 15 per cent antimony and 10 per cent tin. These axle bearings have run for 35,000 miles and were then removed principally because of collar wear. The journal bearings are brass lined with the same composition, and are still in use after having made 80,000 miles since their installation in February, 1910, up to April 6, 1911.

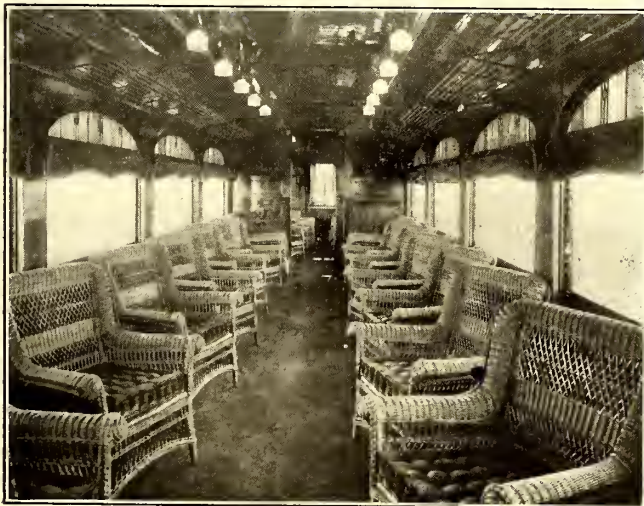
The company's experience with Standard rolled-steel wheels has been very satisfactory. These wheels are turned about every 45,000 miles, which corresponds to the general overhaul-



Washington, Baltimore & Annapolis Railway—Home-Made Car Pilot

ing period. Some of the wheels have already made over 90,000 miles and are still in use. The original single-phase cars were equipped with steel-tired wheels.

Reference has already been made to the lubrication of gears and pinions. The lubrication of rolling stock has also been done according to a Galena mileage contract. The accompanying drawing shows a compressor oil reclaiming tank which was built by the railway in line with suggestions made



Washington, Baltimore & Annapolis Railway—Interior of Special Car

by the lubricating company. The railway has also devised two steam-heated soaking tanks for reclaiming waste and draining car oil.

Among the miscellaneous features of the car equipment are home-made curved pilots, built up of $\frac{3}{8}$ -in. x 2-in. iron bars as shown in an accompanying drawing; also copper sheathing to protect the wooden risers of the car steps. The sheathing is screwed into the risers on the old cars, but is tacked on in the later cars.

The effective sanding of the track at all times is obtained

by the use of the Ohio Brass Company's diaphragm sander valve in connection with armored hose and iron pipe. The sand is led through a hose placed directly over the center of the truck. Then it is blown through a connecting iron pipe which is carried from the truck frame with a bend for discharging the sand directly in front of the wheel.

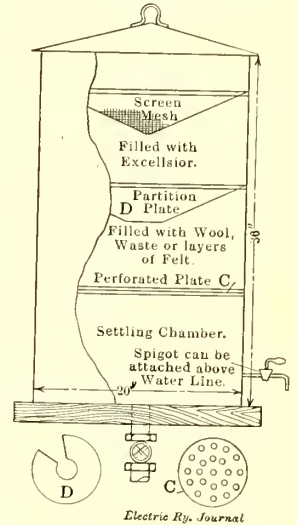
SHOP EQUIPMENT, PAINTING AND MISCELLANEOUS

The general layout of the shops of this company was shown on page 246 of the *ELECTRIC RAILWAY JOURNAL* of Feb. 15, 1908. The equipment comprises just the machinery required for straight maintenance, such as a wheel lathe, wheel press, two turning lathes, two drill presses, shaper, planer, circular saw, band saw, bolt cutter, armature bander, armature slotter and an emery wheel. There is also a blacksmith's shop equipped with a steam hammer, forges and babbitt pot. The transportation facilities of the shop include a transfer table and a Whiting 30,000-lb. crane.

The sand-drying arrangement is rather unusual. It consists of a solid concrete structure which has two large openings at the top for the entrance of wet sand and a small trapdoor at the side for the removal of the sand. The sand is dried by six coils of 1-in. steam pipe which are carried on the inner walls of the structure.

Cars go into the paint shop once a year. Under present conditions this brings three cars into the shop every month for an exterior touch-up consisting of three coats of varnish. The first two outside coats are given two days each and the third coat three days for drying, making seven days in all. In addition to this, two coats of varnish are given inside. The cost of doing this work varies from \$77 to \$80. The standard outside car color is Sherwin-Williams body green. Only plain soap and water are used for car cleaning.

The operation of the Washington, Baltimore & Annapolis Electric Railway is in charge of J. N. Shannahan, second vice-president and general manager; the general superintendent is J. J. Doyle and the master mechanic Joseph Osbelt.



Tank for Reclaiming Compressor Oil

BIRMINGHAM TRAMWAYS REPORT

The Birmingham municipal tramways committee reports that for the financial year ended March 31, 1911, the gross profits amounted to £122,503. The committee decided to allocate £41,000 to the relief of the tax rates and place £24,000 to reserve, the balance of the gross profits being applied to the payment of interest and sinking fund. The amount handed over to the city treasurer toward the reduction of the taxes twelve months ago was £32,914. The adoption of current meters on the cars resulted in a saving of about £5,000 in nine months. The number of passengers carried on the city lines was 84,727,449. There are over 56 miles of single track, and the average traffic revenue per car mile was 23.16 cents, against 23.26 cents; the total revenue was £318,882, against £308,283, and the operating expenses £196,379. The average expense per car mile was 14.6 cents, as against 15.138 cents in the preceding year. The average fare paid per passenger was 1.8 cents, and the average cost per passenger 1.6 cents, the same as in the preceding year. The number of car miles run on the city lines was 6,536,471, and the number of car miles run inside and outside the city was 7,575,662. The average number of miles per car a day was 79.26 and the average number of car hours a day was 10.67. Estimating the population of the city at 570,113, the average journeys per capita per annum was 149, as compared with 144 in the preceding year.

METROPOLITAN STREET RAILWAY REORGANIZATION PLAN

An estimate of the earning capacity of the present Metropolitan Street Railway system was submitted by Guy E. Tripp, of Stone & Webster, chairman of the joint committee of bondholders, at the hearing before the New York Public Service Commission, First District, on May 17.

Commissioner Maltbie asked for a statement of the assets of the Metropolitan Street Railway as shown by its books and by the books of the receivers as of Sept. 30, 1910, without any reference to the physical property which has been inventoried and appraised. He thought that in order to reach a decision as to what assets were absolutely good the commission ought to know what expectations there were of securing money or its equivalent from other sources. There were certain things that might be called contingent assets, that might turn into property or its equivalent.

Charles F. Mathewson, counsel for the joint reorganization committee, thought the appraisal sheet included every absolute asset and the suggestion that there would be \$5,000,000 reorganization assets outside of the physical properties had been explained as far as was possible at the present time. The decisions of the courts up to date assured the ownership of \$1,200,000 Central Park, North & East River Railroad bonds.

Schuyler C. Stivers, accountant for Ford, Bacon & Davis, testified that from the beginning of the receivership to March 31, 1911, there had been expended on the physical property which is now a part of the Metropolitan system \$7,605,125, of which \$194,964 had accrued since Sept. 30, 1910. These expenditures were for rehabilitation of the property and were as follows: Extraordinary expenditures on physical property included in extraordinary operating expenses, \$2,772,922; extraordinary expenditures on physical property not included in operating expenses, \$6,879,540; total extraordinary expenditures on physical property, \$9,652,462; additions included in operating expenses and paid for by receivers' certificates, \$624,825; total, \$10,277,287; less amount paid from trust funds (insurance and sale of property, etc.), \$2,672,162; net addition to property, \$7,605,125.

Another table presented by Mr. Stivers showed that from Sept. 25, 1907 to March 31, 1911 the following maintenance charges were included in operating expenses by the receivers: Way and structures, \$2,851,702; equipment, \$4,465,457; total, \$7,317,159. These amounts are in addition to the extraordinary expenditures shown in the preceding paragraph.

TESTIMONY OF GUY E. TRIPP

Guy E. Tripp, of Stone & Webster, chairman of the joint reorganization committee, testified that from an analysis made in his office he found that the expenditures made by the receivers on the leased lines to March 31, 1911, were \$2,409,000.

Mr. Tripp made the estimate of earnings given on page 917. In making this estimate he added to the gross earnings as shown by the receivers' reports to the bondholders' committee an item of \$43,000, representing the increased revenue from the advertising contract from Jan. 1, which made the total revenue from this source \$300,000 per year. Mr. Tripp took the operating expenses as shown in the report of the receivers and deducted an amount to bring the charges for injuries and damages to 7 per cent of the gross earnings, which called for a reduction of \$298,000. In his judgment there was no possible chance under ordinary business conditions that the fixed charges would fail to be met and that there would be a very substantial surplus. If one cent were allowed for transfers, about \$1,000,000 would be added. The property was in good operating condition.

The amount charged by the receivers during the period for maintenance was that which Mr. Tripp thought should be allowed, so that he made no change in this item. He believed that the expenditure or reservation of \$2,650,000 annually would maintain the property in first class operating condition. A new company should start with a surplus or sufficient work-

ing capital to provide necessary funds while this sum was being built up. This amount is about 20 per cent of gross earnings and is based on a study of the earnings of the electric properties in the system from the year ended June 30, 1898, to the year ended June 30, 1909, made by H. W. Brown, formerly auditor for the receivers. Mr. Tripp supplemented this by actual figures obtained from the receivers' reports and from other sources so as to carry the results to March 31, 1911. Mr. Brown eliminated in his calculations the subsidiary properties that were dropped from the system from time to time. This caused complications because Mr. Tripp wanted to include the expenditures made by the receivers in rehabilitating the properties and add them to the other figures, particularly in the case of the Third Avenue Railroad, which was turned over to the receiver in poor condition.

Mr. Tripp's estimate of the earnings of the electric railways on Manhattan Island from July 1, 1897 to March 31, 1911, including the Third Avenue road, showed \$187,000,000. The expenditures for maintenance and renewals, including those for the Third Avenue road as nearly as they could be figured, were \$36,777,000, or nearly 20 per cent. Included in these expenditures were items of new property, like purchases of cars for the Third Avenue system, \$3,200,000; purchases of cars by the receivers of the Metropolitan system, \$2,200,000; new track and extensions by the Metropolitan receivers, \$400,000; and expenditures on carhouses in addition to the insurance on properties destroyed by fire, \$1,200,000. If 20 per cent of the gross revenues proved sufficient under these conditions, the calculation verified Mr. Tripp's general opinion that that proportion would be sufficient on the average to take care of maintenance and depreciation of street railways in any part of the United States.

To determine this expense Mr. Tripp personally made an examination of the Chicago surface railways at the time of the receivership of the Chicago Union Traction Company properties for Judge Grosscup of the United States Circuit Court and recommended the adoption of 20 per cent on one system and 22 per cent on the other. The allowance of 20 per cent had worked out satisfactorily on the Stone & Webster properties.

Mr. Tripp testified that the Stone & Webster properties had made agreements with non-cumulative preferred shareholders that before dividends were declared 20 per cent of the gross earnings should be set aside for maintenance and depreciation, the preferred shareholders agreeing that that was fair and a protection against the undue withholding of dividends and the common stockholders believing that after that had been done they were safe in paying dividends on the non-cumulative preferred stock.

It was almost impossible to draw a line closely between maintenance and depreciation as street railway accounts were kept ordinarily because many charges to maintenance were really replacements and renewals.

Mr. Tripp testified that the total capitalization of the street railways controlled by Stone & Webster was about \$150,000,000 and their gross earnings last year were \$23,000,000. The firm had on its books and under way over \$40,000,000 of work, a large portion of which was for outside clients.

In Mr. Tripp's opinion the presence of some physical deterioration would not make a property worth less if it had been in operation for a number of years and had been well maintained in operating condition. The going concern value would be sufficient to offset the physical depreciation in such a case. The determination of going concern value was a matter of business judgment.

Mr. Mathewson, referring to the expenditure of \$985,000 for storage battery experiments and of over \$300,000 for experiments with compressed air propulsion, representing a part of \$13,355,000 of superseded property, asked Mr. Tripp whether it was necessary to make experiments and expenditures in the development of the going concern value before the highest state was reached. Mr. Tripp answered that it was and that he would consider such items a proper part of the cost of the financial going concern value. Con-

sidering the cost of underground construction in New York these expenditures were proper and prudent and should be capitalized for part of the cost at the beginning of the enterprise.

Commissioner Maltbie asked whether the cost of all of the experiments made from the beginning of the enterprise should be so capitalized and Mr. Tripp said that it was not necessary that all should be so treated. The line should be drawn at what ordinary business prudence would direct the management to do when it was considering such a change as that from cable power to an underground conduit system. All these costs should be capitalized perpetually from the beginning or a return should be allowed sufficient to enable the investor to get his capital back. If the capital had not been so returned these costs should be capitalized. In this case, whether the money had been returned or not, Mr. Tripp believed the costs should be capitalized.

Common sense and ordinary business conditions would not allow the continual capitalization of subsequent expenditures throughout the period of existence of a successful company, and Mr. Tripp thought that after a reasonable time and expenditure had been allowed to enable the management to get the property into good condition a higher return might be permitted so as to meet necessary expenses of this nature. Thereafter the best way to provide for these expenditures would be to charge them to operating expenses if the company could secure the necessary rates.

In a going concern it would be preferable if the company continued in business to repay the investor the cost of acquiring the going value through the method of a larger return in later years. But in a case like this where the company was bankrupt and a new arrangement was to be made with new owners, not necessarily the original owners, capitalization was only fair. The value was to be based on the cost of reproduction and this should include the cost of reproduction of every bit of the property. The cost of reproducing the going value was just as tangible a cost as that of reproducing an engine. It was a valuable asset and the owners of the property were entitled to it. If it were possible to conceive the streets of New York free from a surface line and the existing system was created therein it would take five years after the completion of construction to arrive at the present efficient operating condition, that is to say, to get the physical parts of the property working properly.

ESTIMATE OF EARNING CAPACITY METROPOLITAN STREET RAILWAY COMPANY OF NEW YORK.

SUBMITTED BY GUY E. TRIPP, OF STONE & WEBSTER.

Gross passenger earnings, year ending March 31, 1911.....	\$13,011,660
Other income, year ending March 31, 1911.....	654,606
Increase in advertising from \$256,822, as shown in "other income" account to \$300,000 (the new contract).....	43,177
Total gross earnings.....	\$13,709,443
Operating expenses, year ending March 31, 1911.....	9,087,751
Less decrease in injuries and damages account from \$1,208,893 to \$910,816.....	298,077
Total operating expenses, including depreciation, 64.1 per cent.....	\$8,789,674
Net earnings.....	\$4,919,769
Taxes.....	\$1,296,759
Less decrease in franchise taxes from \$590,793 to \$200,000....	390,793
Total taxes, 6.6 per cent.....	\$905,966
Net profits.....	\$4,013,803
Fixed charges:	
Rentals \$1,810,553, less \$212,000 on securities held by committees.....	\$1,598,553
Interest on underlying bonds.....	542,500
Interest on real estate mortgage.....	47,500
Interest on \$11,768,100 new 4's.....	470,724
Total fixed charges.....	\$2,659,277
Balance for \$38,933,400 income bonds, or about 3.48 per cent..	\$1,354,526

As an illustration Mr. Tripp recalled an experience he had in the installation of a turbo-generator at an old power station where three years were required to make the generator operate properly and at the efficiency guaranteed by the manufacturer. To meet the excess operating expense during this period a claim for \$20,000 was made. The manufacturer paid

\$10,000 for an amicable settlement and the balance of \$10,000 was charged to operating expense by the company.

In the case of the Metropolitan system time and money would be required to adjust the property to the needs of the people. During the first period of five years the operating ratio, excluding maintenance items, would be higher than after the conclusion of that period and the gross earnings would be 5 per cent less than they would after the public became accustomed to more riding and the service was made better. This would mean that instead of earning \$4,000,000 net the property would show average net earnings for five years of between \$2,000,000 and \$3,000,000. The difference, say \$5,000,000, would be the cost of securing the going value. The cost of the experiments with compressed air and storage batteries should be added.

MEETING OF COMMITTEE ON BUILDINGS AND STRUCTURES

A meeting of the committee on buildings and structures of the American Electric Railway Engineering Association was held in New York on Monday, May 22. The committee members present were the following: Chairman, Martin Schreiber, engineer maintenance of way Public Service Railway, Newark, N. J.; vice-chairman, F. F. Low, architect Boston Elevated Railway, Boston, Mass.; G. H. Pegram, chief engineer Interborough Rapid Transit Company, New York, N. Y.; C. H. Clark, engineer maintenance of way Cleveland Railway, Cleveland, Ohio.; M. H. Bronsdon, chief engineer Rhode Island Company, Providence, R. I.; F. G. Simmons, superintendent of way Milwaukee Electric Railway & Light Company, Milwaukee, Wis., and J. H. Frank, architect Philadelphia Rapid Transit Company, Philadelphia, Pa. H. H. Adams, superintendent rolling stock and shops Metropolitan Street Railway, New York, was also present.

The subjects discussed were those relating to economical maintenance of buildings and bridges, heating systems for carhouses, shops and waiting rooms, roof and floor construction, types of doors and toilets, use of cold-water paint, proper facilities for employees, division of facilities in carhouses and methods of fire protection.

REPORTS ON BRIDGES AND BUILDINGS

Mr. Schreiber reported that the great majority of companies which replied on the data sheet maintained their buildings and bridges directly instead of by the contract system quite customary some years ago. Mr. Simmons said that in Milwaukee there was a superintendent of buildings who employed bricklayers, plumbers, steamfitters and any other kind of mechanics required. Such men might be regular employees of another department, but they were subject to the call of the superintendent of buildings. The bricklayers, for instance, might be required to lay conduit.

Mr. Pegram thought that it was foolish even for a small road to let out maintenance work on contract. One advantage of hiring the men directly was that they could be secured for much lower wages because their steady employment was guaranteed. Furthermore, such men were more reliable and did better work than those secured at higher prices for intermittent employment.

Mr. Bronsdon said he employed two masons and five carpenters with one foreman to care for all bridges, buildings, culverts, etc. They did practically all kinds of mechanical work except plumbing.

It appeared from the replies on the data sheets that most of the companies did not file written reports at regular intervals on bridges and buildings. Mr. Simmons was strongly in favor of such reports. Mr. Bronsdon said that formal bridge reports were made annually, all changes being noted on the individual drawings. Minor details, like the replacement of bridge planking, were considered as matters of daily maintenance. Messrs. Clark and Schreiber have written reports at frequent intervals.

It was agreed that the committee should submit two report forms for adoption, one covering bridges and another covering buildings.

HEATING SYSTEMS

The next subject discussed was the heating of carhouses, shops and waiting rooms. Mr. Simmons said that in Milwaukee the steam and hot-air systems required practically the same b.t.u. output from the central station, but the maintenance of the direct steam heating was much less for the same efficiency. He did not believe in heating storage carhouses, but considered heat necessary for operating carhouses in Northern climates, owing to the necessity of thawing snow off cars, etc. Mr. Schreiber said that his company did not heat operating carhouses. One of the great difficulties in proper heating was due to the frequent opening of the track doors. Personally he was in favor of a blower system, because of its low first cost, low upkeep and ease of control as contrasted with the difficulty of maintaining long lines of steam piping.

The replies to the data sheet showed that over one-half of the companies favored steam heating. The discussion by the committee on various methods of steam heating for carhouses tended to bring out the superiority of the vacuum system for long-distance service.

There was a general sentiment in favor of the blower system for all shops except the painting department. It was pointed out that in the latter case the dust particles brought in by the blower would injure the varnish on the cars. Mr. Schreiber said that his company used both direct and indirect heating in its Plank Roads shops. It was concluded to present in an appendix to the report a series of letters from users explaining the merits of each system and to summarize these expressions in the report itself.

A discussion on the heating of waiting rooms followed. Mr. Schreiber referred to the use of two sizes of standardized cast-iron pot stoves in Detroit. He favored a hot-water system for small isolated waiting rooms instead of steam owing to the simplicity of installation. If stoves were used, they should be of the simplest type with interchangeable parts as developed in Detroit.

ROOF CONSTRUCTION

Mr. Schreiber introduced the subject of the most economical roof construction from the maintenance standpoint. Concrete was very costly in his territory. For instance, the estimated price of one concrete roof was \$30,000. A fixed charge of 5 per cent on this sum would readily take care of a great deal of maintenance if a cheaper construction was adopted. Mr. Low thought that the roof covering and flashings were the really important items of roof maintenance. Messrs. Bronsdon, Low and Simmons said they were using center gutters on their buildings to keep the water away from the walls. The water, however, is discharged at the side. Mr. Low said that in Boston the new tar and gravel roofs are given a top layer of a home-made composition of coal tar, asbestos fiber and ground slate. This is also used for patching old tar and gravel roofs and for mopping over patented roof coverings. It could also be used for corrugated-iron roofs. As this composition makes a smooth covering any leak can readily be detected. There was a general feeling in favor of copper for flashing and of copper or lead for counter-flashing.

FLOOR CONSTRUCTION

The data sheet showed an overwhelming sentiment in favor of concrete for carhouse floors. Mr. Simmons uses renewable wood strips along the rails to avoid trouble from the break-up of concrete. Mr. Schreiber advocated first-class track construction in carhouses and the use of good concrete over 12 in. of cinders to avoid trouble from disintegration. Mr. Simmons thought that the wood strips would accomplish the same end for less money. Sulphur-bearing cinders should be used only where they could be kept dry in order to avoid shortening the life of rails.

For carshops the committee favored cement floors except wood blocks for machine shops where there is much dragging.

Cinders were suggested for blacksmith shops, concrete with or without tile finish for engine rooms. Offices and men's rooms should be of wood, preferably maple. Concrete or cinder floors were suitable for shelters, according to the character of the structure.

CARHOUSE DOORS

The discussion on carhouse doors brought out some interesting experiences with rolling steel doors. From the maintenance point of view the wooden door was favored. Mr. Pegram said that he was now using folding or lift doors. Mr. Low thought that any door used should be capable of repair at home.

COLD-WATER PAINT

Mr. Schreiber said that he used cold-water paint over oil paint in all buildings. It was good for at least five years. He recommended the use of white paint for brightening interiors.

PROPER FACILITIES FOR EMPLOYEES

The first matter taken up under facilities for employees was whether the location of the men's quarters should be on the ground floor or on the second floor. Mr. Schreiber said that his company had tried both ways and found that it was difficult to make the men go upstairs. In one of the Chicago carhouses even the auditorium was located on the ground floor despite the high price of land. Mr. Schreiber submitted drawings of the latest Chicago and Public Service carhouses, showing the comparative areas for employees' facilities, including lockers, receiving rooms, shops, etc. The latest Public Service carhouse has a clubroom on the second floor with stage and kitchen equipment. The toilets are on the ground floor adjacent to the men's room, which is in constant use. Mr. Frank also submitted plans of the men's rooms at the elevated-subway terminal at West Philadelphia.

Mr. Adams said that the New York practice was to have the dispatchers' and receivers' offices, and, if possible, the lunch room on the ground floor. Mr. Adams thought that it was of questionable wisdom to install shower baths at carhouses as they were seldom, if ever, used.

Quite a number of companies were of opinion that lockers for transportation men were unnecessary if protected motor-man's cabs were used, since in that case arctics, rubber coats, etc., are not needed by the men. There was some discussion about the possession of the locker keys. Many of the companies furnish individual keys to the men, but have a master key as well.

ASSEMBLY ROOMS

The discussion on clubrooms showed that the men take much more interest in them when a room is located in each carhouse rather than at a central point. It was the general feeling that every carhouse ought to have an assembly room of some kind.

Mr. Pegram spoke strongly in favor of lunch rooms and barber shops for operating carhouses. Mr. Adams said that one of his lunch rooms was proving profitable despite outside competition. Food is sold at cost plus a slight profit for the holder of the privilege. The rental money is turned over to the employees' fund.

Mr. Simmons said that in a smaller city not one-fourth of the men would use a carhouse lunch room because they can go home. Mr. Low had found that a carhouse restaurant was desirable in Boston residence sections. Mr. Schreiber thought that the development of the dairy lunch room in recent years had done much to keep the men away from the saloons. In general, such eating places ought to prove a good thing for large operating carhouses.

Mr. Simmons said he would favor barber shops whenever he could get a barber to install a complete equipment and pay rent for the space. Mr. Adams said that the Metropolitan Street Railway Company's barber shops were quite successful. Mr. Schreiber thought that ordinarily a barber shop in carhouses was inadvisable.

Referring to amusements and games, Mr. Schreiber said that bowling alleys were too costly for most companies. Pool was

popular and far less expensive to maintain. One company provides only such table games as checkers, chess and cards. Mr. Schreiber believed that it would be desirable to get expressions of opinions on this topic from transportation superintendents. Messrs. Low and Simmons thought that it was very desirable to have the recreation rooms in charge of an attendant and to charge small fees for such games as pool and bowling.

THE 100-CAR CARHOUSE

The next topic taken up was the division of floor area in a 100-car operating carhouse for the superintendent, depot master or starter, clerks and receivers, men's room, locker room, toilet room with number of closets and urinals and assembly room or auditorium. The final report will contain a number of drawings showing sizes and locations of the utilities mentioned.

FIRE PROTECTION

The subject of fire protection for carhouses and car yards was introduced by Mr. Clark, who submitted an illustrated paper by Henry N. Staats. Mr. Staats described the sprinkler installations of the Cleveland Railway Company, and mentioned the excellent service they had given to date. He also referred to the protection of yards by a system of standpipes with monitor nozzles as described in the *ELECTRIC RAILWAY JOURNAL* of Oct. 8, 1910.

The general discussion on fire-protection devices brought out the fact that small chemical fire extinguishers had proved an excellent auxiliary for controlling small fires before the sprinklers were affected. Mr. Schreiber read the underwriters' rules for sprinkler maintenance, which he followed with a specification submitted by the Fire Underwriters' Electrical Bureau, New York, for the complete fire-protection system of a proposed carhouse.

In conclusion there was a general discussion on inside hose connections, water and salt pails, rules for the government of employees in case of fire, fire drills, and on the general responsibility for the maintenance of fire-fighting equipment. On the Public Service Railway weekly reports are made by the shop foremen and monthly reports by the building department. This checking system has been found very satisfactory.

PROPOSED DEPRECIATION ACCOUNT IN NEBRASKA

A hearing was held before the Nebraska State Railway Commission at Lincoln, Neb., on May 10 in reference to a proposed depreciation account for electric railways. The hearing was based on tentative rules which the commission proposed to adopt, ordering both the street and interurban railways to set aside to the credit of maintenance and depreciation accounts through monthly charges to operating expenses 5 per cent per annum of the present value of their depreciable physical property used in operation. The subject was raised primarily in connection with an application by the Lincoln Traction Company to increase rates. This company asserted that it has not been allowed enough for depreciation.

R. A. Luessler, assistant general manager Omaha & Council Bluffs Street Railway, argued at first that depreciation should be based on gross receipts on the ground that earnings reflected the use of the property and that use was the principal but not the only factor in depreciation. Later he approved a suggestion to base the depreciation charge on the car mileage. J. H. Smith, secretary Lincoln Traction Company, approved the use of car miles as a basis for the charge. He urged that a rule be adopted that would apply alike to all companies in the State.

Mr. Luessler thought that conditions were different in every city and that the commission should make a separate rule for each company. He suggested that the commission fix a minimum charge for depreciation. He said that the Omaha company set aside last year 17 per cent of its gross earnings for maintenance, depreciation and replacement.

L. E. Wetting, an accountant for the commission, said that the Omaha & Council Bluffs company set aside \$33,000 more than it expended. He added that the Lincoln company expended altogether \$80,000 for these purposes last year and had asked permission to set aside \$107,000.

MAY MEETING OF THE ILLINOIS ELECTRIC RAILWAYS ASSOCIATION

Representatives of fourteen electric railways, members of the new Illinois Electric Railways Association, held a profitable meeting at the La Salle Hotel in Chicago on May 19. G. T. Seeley, general manager South Side Elevated Railroad Company, presided and announced that H. E. Chubbuck, president of the association, was en route to Cuba on a business trip. The roll call was answered by representatives of the following roads: Chicago & Joliet; Chicago & Southern; Rockford & Interurban; Illinois Traction System; Springfield Consolidated; East St. Louis & Suburban; Aurora, Elgin & Chicago; Central Illinois Public Service Company; Chicago, Ottawa & Peoria; Chicago, Lake Shore & South Bend; South Side Elevated; Metropolitan West Side Elevated; Northwestern Elevated; Chicago & Oak Park Elevated.

REPORT OF CONFERENCE COMMITTEE

H. J. Vance, superintendent Chicago, Ottawa & Peoria Railway, reported that the committee appointed to confer with the Central Electric Railway Association had been unsuccessful in its attempt to make arrangements for use of the Central Electric Railway Association mileage books. Mr. Vance had just received a letter from that body stating that it declined to permit the members of the Illinois association to use its interchangeable mileage unless the Illinois roads became members and assisted in the support of the Central Electric Railway Association. Mr. Vance thought that because none of the Illinois systems had physical connections with the Indiana roads it would not be feasible for them to join the Central Electric Railway Association only for the sake of the mileage. He said that six or seven of the Illinois roads still issued and honored the mileage books authorized by the Illinois Bureau, which really had been the predecessor of the new Illinois Electric Railways Association. He recommended that the chair appoint a committee of traffic representatives of the Illinois lines to formulate plans for extending the use of the present Illinois mileage books.

INTERCHANGEABLE MILEAGE

C. E. Flenner, Aurora, Elgin & Chicago Railway, told of the work of the Illinois Mileage Bureau which was established six or seven years ago. The books of this bureau were still sold in large numbers on some of the roads, and monthly settlements were made between the roads according to the coupons lifted. Mr. Flenner favored the continuation of this plan.

On motion of George Quackenbush, Illinois Traction System, the association instructed the chair to appoint a committee of five with power to organize and represent the association in working out plans for continuing and promoting the use of an interchangeable mileage book. The present books are sold at the reduction of one-sixth under the regular rates. Mr. Quackenbush said the Illinois Traction System rates were based on 2 cents a mile and 1000-mile books were sold at 1½ cents per mile.

Robert Barnett, Chicago & Southern Traction Company, reported that the plans for a joint ticket office and information bureau in Chicago has not yet been completed for submission to the association. Expressions of willingness to enter into the project had been received from the Illinois Traction System, the Chicago, Ottawa & Peoria Railway and all the roads reaching Chicago except the Chicago & Joliet Electric Railway and the Chicago & Milwaukee Electric Railroad.

L. E. Gould, *ELECTRIC RAILWAY JOURNAL*, reported for the block signal committee that it had accepted an invitation to meet with the membership of the block signal committee of the American Electric Railway Engineering Association and Transportation & Traffic Association at Pittsburgh on May 8, but the Pittsburgh meeting had been postponed to a date later to be announced. After this meeting the Illinois committee would have a definite report to make. The committee was inclined to co-operate fully with the committee of the American Association and was grateful for the privilege of meeting with it.

Marshall E. Sampson, Central Illinois Public Service Company, made a report of the work of the executive committee and a résumé of the recent legislation which he thought might be of interest to electric railways in Illinois. This report was discussed by C. F. Hewitt, East St. Louis & Suburban Railway; George Quackenbush, Illinois Traction System, and J. M. Felldhake, South Side Elevated Railroad, Chicago.

The chair announced that, as instructed at the March meeting, it appointed as members of the program committee C. E. Flenner, George Quackenbush and L. E. Gould.

WOOD PRESERVATION

An address by C. P. Winslow, Forest Service United States Department of Agriculture, on the subject of preservative treatments of timber, was then delivered and illustrated by lantern-slide views. A few of the more important features of Mr. Winslow's address are presented.

The annual consumption of timber in this country is about 23,000,000 cu. ft., which, if combined, would make a block of wood 800 ft. high and 1 mile square. Because this amount of timber is three or four times the annual growth, considerable increase in price must be expected unless the use of wood is greatly economized. More than 85 per cent of the railroad ties annually replaced have been destroyed by decay and the rest by rail wear. Since 1904 the number of wood-preserving plants in this country has increased from 30 to 82, and since 1907 the amount of timber treated has increased from 68,000,000 cu. ft. to 99,000,000 cu. ft., an increase of 45 per cent in three years. The railroads are given credit for having been pioneers in work of wood preservation. The electric lines in 1909 used 835,000 ties, of which 10 per cent had been treated. Fifteen tie-treating plants are now owned by steam and electric railways. The first step in the preservation of a tie was to peel the bark from it, which process more than paid for itself by giving increased life. The second process was to pile the ties openly so that moisture would not collect and so that seasoning might proceed rapidly. The third and most important step was to inject or apply some preservative.

The materials used for preservation might be subdivided into two classes, oils and salts. In the oil class were crude oil and creosote, which represented the distillates of coal tar. Both of these materials preserved ties by making them waterproof. Crude oil was much used by the Santa Fé Railroad. The salts used as preservatives were represented chiefly by zinc chloride, customarily applied as a 3 per cent or 4 per cent solution forced into the tie, with the intention of having the tie retain $\frac{1}{2}$ lb. to $\frac{1}{3}$ lb. per cubic foot of wood. The chief objection to this zinc chloride process was its tendency to leach out, but this was balanced by its low cost.

The methods followed in applying preservatives were by brush, open-tank or pressure-cylinder treatment. The Indianapolis, Columbus & Southern Traction Company had a pressure plant built under the supervision of the Forest Service at a cost of about \$8,000. The pressure cylinder of this plant was 6 ft. in diameter by 45 ft. long, and the plant had a capacity of 85,000 ties per year if operated steadily. Such plants give very efficient service.

The speaker then presented a considerable number of data on the economies of timber preservation. He said that many roads anticipated a life of ten years for ties treated with zinc chloride. He called attention to experiments made by the Forest Service in which 3000 hemlock and tamarack ties were laid in 1907. Of these ties 2700 had been treated and these were now in excellent condition. The 300 ties which had not been treated were in such condition that 14 per cent must be renewed immediately. From 40 per cent to 60 per cent of the latter number had been rail-cut $\frac{1}{2}$ in. and the remainder were affected with decay.

The speaker stated that the wood preservative committee of the American Railway Engineering & Maintenance of Way Association estimated the life of creosoted ties to be from fifteen and one-half to nineteen years and zinc-treated ties from ten to fourteen years.

The preservation of poles was next discussed. Measure-

ments had been taken of the circumference of 186 poles of chestnut wood that had been butt-treated six years ago. These now showed a reduction in diameter of sound wood of less than 0.5 per cent. The Bell Telephone Company was reinforcing decayed poles by setting a creosote stub close to them and bolting and wiring the old pole to the stub. This was cheaper than renewing the old pole.

The speaker next discussed the cost of treatment and illustrated his remarks with charts showing the costs of treated and untreated ties after successive years of use. The annual saving based on his figures was about 6 cents per tie per year if some preservative was used. He spoke favorably of the use of tie plates and noted that the preservation of a tie relieved the company of repurchasing a tie at an increased cost due to the general up-trend of prices.

The speaker said that white cedar poles had a life of from fourteen to fifteen years and could have butt treatment with creosote at a cost of about \$1.25. This treatment should increase their life considerably, and he estimated that if only two years' additional service was obtained from a pole its treatment would have paid for itself. He next described in general the work and facilities of the Forest Service Laboratory at the University of Wisconsin, in Madison. The university furnishes a \$50,000 building and the government supplies the apparatus and employs about fifty technical men to conduct the work. Some of the studies regularly conducted by the government experts are on the following subjects: Cell structures and heat conductivity of wood, chemical analysis of preservatives, timber testing, wood preservation, distillation, paper and pulp, and engineering work in connection with the construction of treating plants. The department would appreciate closer relations with the electric railways and would welcome inquiries or statement of results having to do with the subject of the use and preservation of wood.

DISCUSSION OF WOOD PRESERVATION

When questioned by A. A. Anderson, Springfield Consolidated Traction Company, Mr. Winslow said that several methods had been evolved for the combined use of zinc chloride and creosote, and also for the use of zinc glue and tannin in combination. These processes are designed to provide against the zinc chloride leaching out of the wood.

C. N. Wilcoxon described the treatment which had been given the 45-ft. transmission-line poles on the Chicago, Lake Shore & South Bend single-phase road. These poles were impregnated with creosote for their full length, were set in concrete and after several years' service showed no evidence of decay.

B. I. Budd, Metropolitan West Side Elevated, said that his company required for renewals from 1,500,000 ft. to 2,000,000 ft. of lumber per year for its elevated structure. He called attention to the way in which the inner guard rails had been coated with grease by drippings from some earlier equipment that had been grease-lubricated. These guard rails had been in service seventeen years and still were in good condition while the outer guard rails had required frequent renewal. G. T. Seeley, South Side Elevated Railroad, said that practically 90 per cent of his track was laid with tie-plates and screw spikes and that a life of fifteen to seventeen years was anticipated for the ties.

ENTERTAINMENT

After luncheon at the La Salle Hotel a party of thirty was entertained on a 100-mile ride over the third-rail system of the Aurora, Elgin & Chicago Railroad as the guests of E. C. Faber, general manager. A special train consisting of a day coach and a buffet parlor car took the party from the joint terminal of the Aurora, Elgin & Chicago Railroad and the Metropolitan West Side Elevated Railroad over the latter road to the Chicago city limits and thence over the Aurora, Elgin & Chicago Railway to Aurora, then back to Eola Junction and thence to the power plant at Batavia, where an inspection was made by the party. On the return trip luncheon was served and the party reached the Fifth Avenue terminal in Chicago at 6 o'clock.

The next meeting of the association will be held in September.

PROVISIONS OF NEW HAMPSHIRE PUBLIC SERVICE COMMISSION LAW

The measure to create a public service commission in New Hampshire, the passage of which by the Legislature of that State was noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 849, was signed by the Governor on April 15, 1911. The measure is entitled "An Act to Establish a Public Service Commission," and the term "public utility" as defined in the bill was made to include "every corporation, company, association, joint stock association, partnership and person, their lessees, trustees or receivers appointed by any court whatsoever, except municipal corporations, owning, operating or managing any plant or equipment or any part of the same, for the conveyance of telephone or telegraph messages, or for the manufacture or furnishing of light, heat, power or water for the public, or owning or operating any ferry or toll bridge."

The commission is to be composed of three persons to be appointed by the Governor with the consent of the Council. The terms of the first appointees are to expire the first Monday in June, 1913, the first Monday in June, 1915, and the first Monday in June, 1917. Successors to the first commissioner are to be appointed for six years. The chairman of the commission is to be appointed and commissioned as such, and is to receive a salary of \$3,500 a year; the member who is to be known as the clerk is to receive a salary of \$3,200 a year, and the other member of the commission is to receive \$3,000 a year. No person who has any pecuniary interest in a railroad or public utility is to be appointed to the commission. The commission is authorized to expend not more than \$4,000 annually, but with the consent of the Governor and Council is to have power to expend such additional sums as may be deemed necessary.

The office of the commission is to be at the State House. The commission is empowered to investigate complaints if made by city councils, mayors or selectmen, or upon appeal in writing of 100 or more customers or subscribers in cities of 20,000 inhabitants, or on complaint of not less than 25 persons in all other cities or towns. All hearings are to be open to the public. The commission is empowered to subpoena witnesses and administer oaths and in the case of witnesses who refuse to testify, the commission is authorized to apply to any justice of the Superior Court for an order directing any person so refusing to show cause before the Superior Court why he should not be committed for contempt. No person is to be excused from testifying upon the grounds that the evidence might tend to incriminate him. All the powers and duties conferred upon the Board of Railroad Commissioners, except in so far as they might be inconsistent with powers or duties imposed in the new act, are conferred upon the new commission.

The act stipulates that "every railroad corporation and every public utility shall furnish such service and facilities as shall be reasonably safe and adequate and in all respects just and reasonable" and "all charges made or demanded * * * by any public utility * * * shall be just and reasonable and not more than is allowed by law or by order of the commission." The commission is empowered to inspect any of the property or records of the companies which come within its jurisdiction, and is also empowered to establish a system of accounting and records to be used by public utilities and prescribe a system of accounts for each class. No public utility, however, is to be required to keep any system of accounts or records which would conflict with any requirements made of it by the Interstate Commerce Commission.

Every company which comes within the jurisdiction of the commission is to file with the commission and keep open to public inspection schedules showing the rates, fares, charges, etc., for any service rendered by it. These records are to be in such form as the commission may require. No change

is to be made in any charge by any company except after thirty days' notice to the commission. The commission is empowered to investigate difference in rates and pending such an investigation is empowered to suspend the schedule during the investigation for not more than six months. If in the opinion of the commission, after a hearing, any charge demanded or proposed to be demanded is deemed unreasonable, or if any rate is deemed insufficient, the commission can determine the reasonable charges to be observed and fix the same by order. The burden of proving the necessity of the increase rests with the corporation.

No railroad is to begin the construction of an extension or branch without the consent of the commission and no franchise or right under any franchise is to be assigned, transferred or leased without the approval of the commission. Any company that proposes to transact a business which comes under the provisions of the act is not to begin business in the State without the consent of the commission. "No public utility shall directly or indirectly acquire the stocks or bonds of any other corporation incorporated or doing business in this State and engaged in the same or a similar business unless authorized to do so by order of the commission."

No company coming within the provisions of the act is to issue any stocks, bonds, notes or other evidence of indebtedness payable more than twelve months from date without first procuring an order from the commission. The amount of bonds is to be fixed by the commission in accordance with its opinion of what is reasonably requisite for the purpose for which the issue is to be made. Every company issuing stocks, bonds or other evidence of indebtedness is to file with the commission an account showing such details as the commission may require in regard to the disposition of the proceeds of the issue. When a corporation increases its capital stock it is to offer the new shares proportionately to its stockholders at a price not less than par determined by its stockholders. Exceptions to this provision, however, is made when an increase in capital stock does not exceed 4 per cent in the capital stock of the corporation. In such cases the directors may sell the new shares at public auction to the highest bidder at not less than par.

The commission is to investigate the causes of all accidents on the railroads of the State which result in the loss of life and all other accidents which in the opinion of the commission ought to be investigated.

Article B of Section 14 of the law provides: "Any party in interest aggrieved by any order of the commission, or by any part of an order containing distinct and severable provisions, may appeal therefrom by complaint in the nature of a bill in equity filed in the Superior Court in any county in which the appealing party might commence an action at law, or at the option of such party in the county of Merrimack, against the commission as defendant, to vacate and set aside such order or part thereof upon the ground that the same is unlawful or unreasonable. If such order contains distinct provisions, the complaint shall state whether the whole thereof is claimed to be unjust and unreasonable, and shall distinctly specify the portions complained of if less than the whole. Upon the filing of such complaint the clerk of the Superior Court shall issue an order of notice in accordance with equity practice, which shall be served upon some member of the commission. The answer of the commission shall be filed and a copy furnished to the appellant within thirty days of service, whereupon the proceedings shall be at issue and stand ready for trial upon thirty days' notice given by either party to the other, and the same shall be tried and determined as other suits in equity. Any person or corporation interested may intervene and become a party to such proceedings, and the court may order such persons or corporations to be joined as parties as justice may require. All issues presented by such an appeal shall be tried and determined by the court."

A fine not to exceed \$5,000 may be imposed upon any company which violates any provision of the act or which fails to comply with any order or requirement of the commission.

CHICAGO SUBWAY PLANS

On May 22 the Council transportation committee began public hearings at which were received plans of several engineers who desired to be appointed chief subway engineer for the proposed subways which the city of Chicago will build with its traction fund. Among the engineers speaking for their plans were Bion J. Arnold, John Ericson, George W. Jackson and R. C. St. John, who formerly was assistant subway engineer under Mr. Arnold. The subway schemes of these engineers, except that of Mr. St. John, have been announced in previous issues of this paper.

The St. John plan comprises 5.4 miles of subway, or 21.5 miles of single track. The cost per mile of single track would be \$700,000. He proposes to continue the stub terminals of the L roads, and suggests utilizing two sides of the present loop—on Fifth Avenue and Van Buren Street—so as to give another means of through routing in addition to the subway. Eventually these elevated structures would be replaced by subways, but Mr. St. John thinks the section involved should not be shut off from adequate service, nor should a subway loop succeed the present overhead scheme. The routing plan is as follows:

A north and south subway from Chicago Avenue to Twelfth Street through North and South State Streets, with a two-track connection with the Northwestern Elevated at or near Franklin Street and a two-track connection with the South Side Elevated at or near Twelfth Street. Also a portal at Chicago Avenue near Dearborn Avenue, and a portal in South State Street, near Twelfth, for connection with the surface lines. Cost, \$7,500,000.

There are also to be two east and west subways, one of which should be in Randolph Street from North State Street to a connection with the Oak Park Elevated at or near Sangamon Street, and a portal just east of Desplaines Street for a connection with the surface lines; the other in Harrison Street from South State to a connection with the Metropolitan Elevated lines at or near Sangamon, and a portal just east of Desplaines for connection with the surface lines. Cost, \$7,500,000.

The St. John plan is for a high-level subway, with room for a lower level without encountering the Illinois tunnel. The cantilever style of construction would permit this, it is asserted. It is found impossible to include the Van Buren, Washington and La Salle Street River tunnels, the engineer claiming that "they are not located so that they might economically be used in connection with any initial subway system."

This plan has single bores between stations and a drainage system so the tubes can be washed nightly to improve hygienic and aromatic conditions. A system of ventilation by fans and exhaust pipes is also provided.

Mr. St. John favors the widening of sidewalks as on State Street from 20 ft. to 30 ft. as facilitating the arrangement of station entrances as well as being essential for pedestrian traffic. With surface cars in subways he thinks vehicle traffic can easily be handled in a roadway of 20 ft. less width.

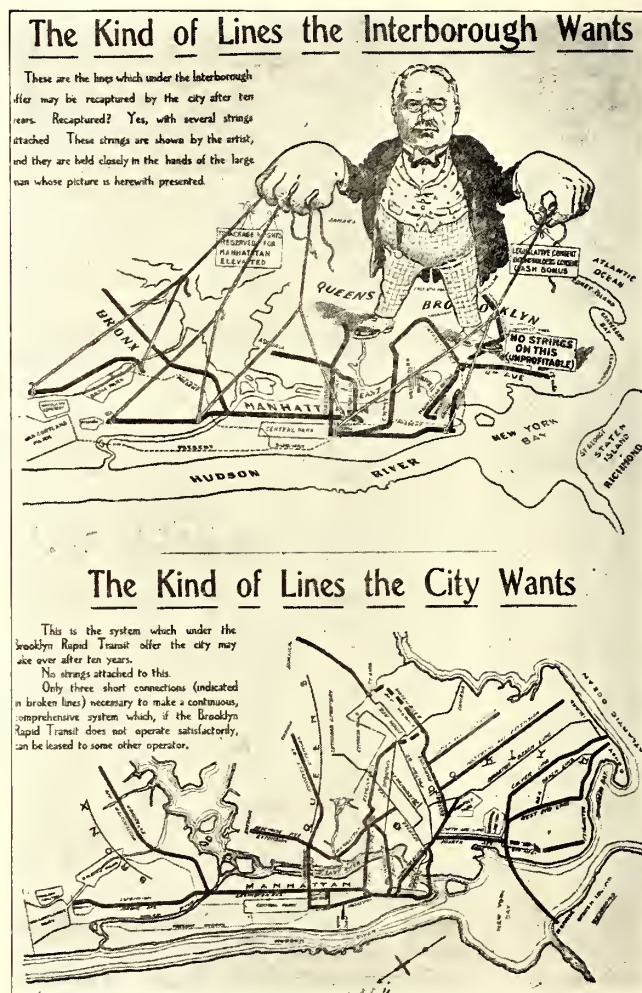
The initial plan provides for four tracks each on Harrison and Randolph, two surface and two elevated, and six on State Street. The latter tube will have a capacity for eight tracks, if the necessity arises, at but little additional expense. Mr. St. John estimates that ten-car trains can be run at one and one-half minute intervals at the maximum.

R. C. St. John, the engineer who submits the report, has been actively engaged in municipal and railroad engineering problems since within a year of his graduation from the College of Civil Engineering, Cornell University, in 1887. He has served as trainmaster on the Iron Mountain Railway, assistant superintendent and acting superintendent of the Great Northern, assistant engineer Pennsylvania Railroad and chief assistant engineer Michigan Central Railroad. He did the principal subway work in Chicago for John Ericson and made a complete supplemental report for him on the Chicago sub-

way in 1909 for which he was awarded a gold medal by Cornell University. For eighteen months prior to last April he was chief assistant engineer for Bion J. Arnold, Chicago's traction expert.

ADVERTISING IN CONNECTION WITH THE NEW YORK SUBWAY PROPOSALS

The campaigns which are being conducted by the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company to interest the public in their respective proposals for the construction of rapid transit lines in Greater New York has been referred to previously in the *ELECTRIC RAILWAY JOURNAL*. Both companies are distributing liberally pamphlets showing the routes of the lines which they propose to build and giving the principal provisions of their offers. One of the most striking advertisements in the daily papers is repro-



Advertisement in New York Subway Campaign

duced herewith. This advertisement was published by the Brooklyn Rapid Transit Company. In reproducing it the details of the routes have been lost, but the wording in the upper left-hand corner of each map can be read without difficulty.

COS COB POWER STATION OF NEW HAVEN RAILROAD TO BE ENLARGED

The New York, New Haven & Hartford Railroad will more than double the size of its Cos Cob (Conn.) power station. Orders have been placed for four Westinghouse-Parsons turbo-generators each of 4000-kw capacity, single-phase rating, at 80 per cent power factor, which will increase the generating capacity of the station from 12,000 kw to 28,000 kw. The present boiler equipment will be increased proportionately and

the coal-handling plant will be rearranged and enlarged. The Fred T. Ley Company, of Springfield, has been awarded the contract for erecting the addition to the present building in which the new machinery will be installed. The additional capacity of the station will be utilized for supplying current to the electrified Harlem River branch, the New York, Westchester & Boston Railway, the Tarrytown, White Plains & Mamaroneck Railway, the local street railway system in Port Chester, N. Y., and the lighting system in Greenwich, Conn. It will also take care of future extensions of the main-line electrification east of Stamford, Conn.

NOTES ON THE PHILADELPHIA ELEVATED-SUBWAY SYSTEM

The Elevated-Subway division of the Philadelphia Rapid Transit Company, which was incorporated as the Market Street Elevated Passenger Railway Company, now consists of 7.32 miles of double track. The first section of 4.98 miles of double track was placed in operation in March, 1907. The second section, 1.41 miles (all subway), was opened for service in August, 1908. The entire system was completed on Oct. 4, 1908.

The following paragraphs will review the growth and character of this service and will also present data on various features of rolling stock maintenance.

INCREASE IN CARS

At the beginning of operation the equipment consisted of forty cars. This number was increased to eighty in February, 1908, further increased to 100 in December, 1909, increased to 120 at the close of 1910 and to a total of 135 by May, 1911.

All cars are equipped with two GE-66 motors, 125 hp each, Westinghouse compressors, type D. 2 E. G. and D. 2 E. Z. with electro-pneumatic brake and the M. E. 17 brake valve. The car bodies are of steel construction with steel side sheets and steel underframes as built by the Pressed Steel Car Company. The interior finish is mahogany. The bodies are mounted on Curtis or Brill M. C. B. type 27 trucks. The first forty cars have 6-in. axles and $4\frac{1}{4}$ -in. x 8-in. journals. The balance of the cars have 6-in. axles, and 5-in. x 9-in. journals. Both steel-tired and solid steel wheels are in service in these trucks. Hedley anti-climbers are being applied to all cars.

INCREASE IN PASSENGERS AND CHANGES IN TRAIN SERVICE

The average number of passengers carried daily has increased as follows:

During 1907	40,000 on 498 miles of double track
During 1908	60,911 on 587 miles of double track
During 1909	83,677 on 732 miles of double track
During 1910	113,365 on 732 miles of double track
During 1911 (to May 15)	126,000 on 732 miles of double track

At first the schedule called for two-car trains on a 5-minute headway from 5:00 a. m., until 11:45 p. m. from the Sixty-ninth Street terminal in West Philadelphia. The length of trains has been gradually increased and the headway shortened so that today five-car trains and a $2\frac{1}{2}$ -minute flat headway is maintained during the a. m. and p. m. rush hours. During the non-rush hours a three-car train service with a $3\frac{1}{2}$ -minute headway is maintained. The average speed, including stops, is 15.76 m.p.h. The average station stop is 22 seconds.

MAINTENANCE COST OF IMPORTANT ITEMS

The average cost for a period of six months in the year of 1910 for electrical inspection and repairs, which comprise control and motor inspection and repairs, was \$1.78 per 1000 car miles. For the same period the cost of pit inspection and repairs, comprising control, motors and third-rail shoes, was \$1.08 per 1000 car miles.

The cost of lubrication is remarkably low as shown by the following figures:

Year.	Cost per 1000 Miles.
1908	\$0.1027
1909	0.0803
1910	0.0880

LUBRICATION METHODS

Perfection packing and Galena oils are used exclusively for car lubrication. New waste is thoroughly saturated for a period of 60 hours. It is then wrung by hand so that 1 lb. of waste will contain about 3 pints of oil before it is placed in armature and axle-bearing boxes in layers. When cars are in for inspection the top layer only is removed, and a fresh one applied. To lubricate journal boxes, a piece of waste is made into the form of a roll and placed in the rear of the box around the journal, thus forming a dust and oil guard. The box is then packed so that the waste extends to the center of the journal on each side. On this division it has been found that this method of packing journal boxes will make further lubrication unnecessary for a period of one year except when a journal bearing is changed, upon which only enough oil to lubricate the newly supplied bearing is added. Waste that is removed is kept in separate cans for armature, axle and journal use. After the waste has been re-saturated for forty-eight hours, it is re-used in the same class of bearings from which it was removed.

The initial lubrication of gears and pinions consists of 13 lb. of lubricant to each gear. The lubricant is applied so as to coat both the gear and pinion thoroughly. At each inspection period or every 1350 miles the lower half of the gear casing is removed to re-apply to the gear and pinion whatever quantity of lubricant has dropped into the bottom half of the casing. The average amount of new lubricant applied is about $\frac{1}{2}$ lb. for every 5000 miles of service.

STAGGERED MOTOR BRUSHES AND IMPROVED THIRD-RAIL SHOES

L. A. McCoubrie, superintendent of the elevated division, and C. F. Raydure, shop foreman, have patented two devices which are now extensively used on the elevated-subway rolling stock. One of these devices is a brush holder which permits the motor brushes to be set in staggered relation and the other is an improved type of third-rail shoe.

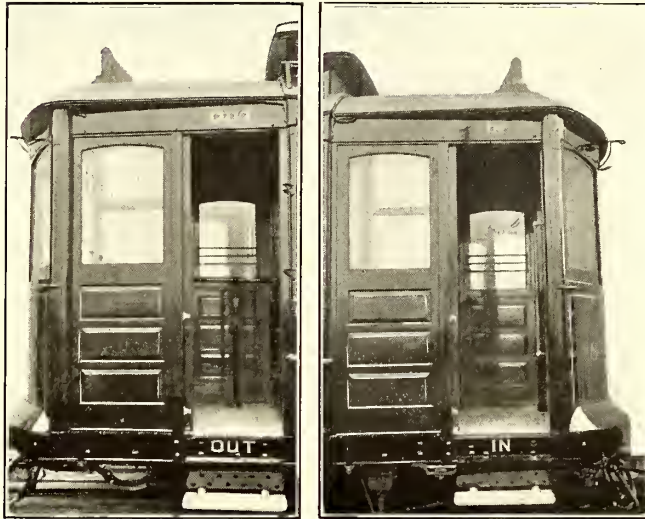
The brushes are set so that those of the same size are diagonally opposite. This arrangement prevents the formation of ribs or ridges on the commutator because any inequality started by the edge of one brush is immediately worn away by the other brush. Both of the long brushes overlap the center line of the commutator by $\frac{1}{2}$ in. Before the staggered brushes were used it was necessary to turn down the commutators every 30,000 miles. The re-equipped commutators, however, have already made over twice this mileage and still show no need for turning.

The original under-running third-rail shoes used on the Philadelphia system were equipped with half-coil springs, the tension of which was maintained with difficulty. When the spring broke about half an hour was required to drive out the holding pins to insert another spring. It was frequently necessary to adjust the tension by moving the shoe holder along the vertical rack. In spite of this, the old type could not be kept from chattering and gave poor contact when passing over special work. The first new shoes were applied in March, 1910. They are now giving satisfactory service on cars. The full coil spring used on this shoe has its tension easily maintained by the adjustment of one nut. The contact piece, which is attached by two easily removable studs, is made of plain gray iron and costs about 26 cents for tapping and drilling. Up to March 8, 1911, 41,855 miles had been obtained from the first of these shoes without renewing the contact piece. No adjustments have been necessary on any of the new shoes since their installation. The company manufactures all parts of the shoe except the springs. It is figured that these shoes will save \$25 a week in labor maintenance charges alone when applied on 120 cars.

William G. McAdoo, president of the Hudson & Manhattan Railroad, was injured on May 18, 1911, by being thrown from an automobile which he was driving near New Brunswick, N. J. Mr. McAdoo is understood to be convalescing rapidly.

ONE-MAN PREPAYMENT CARS AT MISSOULA, MONT.

The Missoula (Mont.) Street Railway is now operating ten prepayment cars of the conductorless type on 17 miles of track, of which about 10 miles is outside of the city limits and constitutes a semi-interurban run. These cars are 38 ft. 9 in. long over the vestibules, 25 ft. 9 in. over the body and 6 ft. 6 in. over each platform. The width of the car inside is 8 ft. 2 in.; of the eight cross seats on each side 35½ in., and of the two sliding doors at each end 27½ in. The bodies are mounted on



Exit and Entrance of Missoula One-Man Prepayment Car

No. 39-E maximum traction trucks with their pony wheels placed forward to secure the greatest overhang. Two E-G 219 motors are supplied per car.

S. R. Inch, manager of the Missoula company, reports that so far the one-man system of operation and fare collection has proved entirely satisfactory. It has been in operation for over a year, during which period not a single platform accident has occurred. The local public is used to the system and little trouble has been experienced in explaining it to strangers.

The marked success of the one-man method has led the Missoula management to believe that such operation, owing to

ate in conjunction with the steps, which are 14 in. wide. The exit door and step is operated by one lever and the entrance door and step by another. Both levers are under the control of the motorman and no doors are opened until the car has reached a complete stop. The exit and entrance portions of the platform are separated by the usual pipe railing, as shown in one of the illustrations. All vestibule grab-handles are concealed when the doors are closed so that it is not possible to board the car while it is in motion. A Brill No. 4-A fare box is used for fare collections, tickets being deposited in it as cash. The passengers deposit their own fares and the motorman makes change only. Although the cars are equipped with air brakes and trolley retrievers, it has not been found that the motorman has too much to do to enable him to look after his other duties. The cars are provided with the usual push-buttons to permit passengers to give alighting signals.

THE CORRECTION OF MOTOR LUBRICATION TROUBLES

The Galena-Signal Oil Company recently has assembled some practical data on car maintenance practice in a pamphlet entitled "Fifty Motor Troubles and Suggestions." The following paragraphs constitute a digest of the principal features of this booklet which relate to lubrication:

The non-alignment of bearing shell openings in motor shells produces bearing troubles by the tilting of the armature. The openings should be rebored and the shafts trued. Shimming with liners is not good mechanical practice.

It is not considered good practice to use bearings babbitted out of center.

All split bearings should be chamfered lengthwise to within ¼ in. of each end. This prevents the bearing from pinching on the shaft, permits the oil to be drawn freely to the inside of the bearing and stops the oil from flowing outside.

An oil-soaked armature will cause grounding, sparking, heating and other serious damage. Use no more oil than necessary, Varnish the bead ring and inspect frequently.

When small portions of babbitt break off at the bearing collar they work back and become lodged between the shaft and the inner side of the bearings. The grinding of these particles heats the bearing.

When the dowel pins are in poor condition or missing, or when the dowel pin holes are worn badly, the bearing will shift



One-Man Prepayment Car for the Missoula Street Railway Company

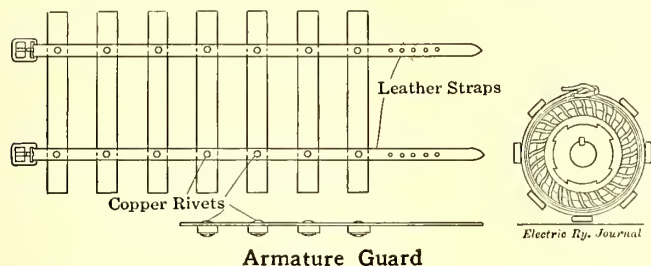
its low labor cost, should prove particularly attractive to other cities which serve populations of 20,000 or less. The method of operating this type of car is as follows:

Passengers enter and alight at the front platform, entering the car at the right of the motorman and leaving the car at his left. Cars are stopped at the near crossings. The doors of the rear platform are locked to prevent passengers boarding and alighting from that end. The rear platform is used for smokers. The vestibule doors are of the sliding type and oper-

ate in conjunction with the steps, which are 14 in. wide. The exit door and step is operated by one lever and the entrance door and step by another. Both levers are under the control of the motorman and no doors are opened until the car has reached a complete stop. The exit and entrance portions of the platform are separated by the usual pipe railing, as shown in one of the illustrations. All vestibule grab-handles are concealed when the doors are closed so that it is not possible to board the car while it is in motion. A Brill No. 4-A fare box is used for fare collections, tickets being deposited in it as cash. The passengers deposit their own fares and the motorman makes change only. Although the cars are equipped with air brakes and trolley retrievers, it has not been found that the motorman has too much to do to enable him to look after his other duties. The cars are provided with the usual push-buttons to permit passengers to give alighting signals.

If the slot in the grease receptacle of a motor shell is too small and out of center it should be enlarged either by closing and drilling a $1\frac{1}{2}$ -in. hole in the center or by widening and lengthening the original slot. A large percentage of hot bearings and lubricating troubles is due to the improper position of the dowel pin and slot.

The rapid starting of a car tends to make the pinions of the motors climb on the engaging gear. When motormen skip resistance points a destructive pounding is set up on the bearings



if there is any play due to worn shaft or babbitt as the result of rise and fall of the heavy armature at every start and stop of the motor.

A knife-edge will be formed if the inside edge of the oblong slot in the top of the bearing is not beveled off. This edge will cut the oil away instead of allowing it to work its way between the shaft and the inside of the bearings.

Proper clearance should be allowed in fitting the bearings to the shaft. Under heat there is an expansion of the shaft from 0.005 in. to 0.007 in.; therefore, .01 in. should be allowed between the shaft and the bearing to insure sufficient space for lubrication. This suggestion applies especially to the GE-800 motor.

When the dust cap on the commutator is off, grit and iron from the brake shoes will get into the bearings. Gear grease will work into the bearings at times and cause them to heat.

An armature should never be permitted to lie or to be rolled on the floor. It should be placed on a rack and carefully covered, especially in shops where iron dust is prevalent and where machine work is done. If it is necessary to roll an armature on any part of the floor, canvas or carpet strips should be avoided owing to their liability to pick up and hold metal particles which frequently penetrate the insulation and cause serious damage. A simple method for preventing such trouble can be introduced in the form of wooden strips, which are wrapped around the armature as shown in the accompanying sketch of an armature guard.

Weak fields will cause heating by allowing an extra amount of current to pass through them, thus unbalancing the motors. This unbalanced condition will eventually cause hot bearings.

Bottom oil feeders will become glazed if they are allowed to press too tightly against the shaft or are permitted to remain too long in service. They then wipe off oil instead of furnishing it to the bearing.

Capillary feeding is impossible in the new type of oil-lubricated motors if the wool waste is forced into receptacles which are too tight. Poor waste may cause heating by hardening and drying.

Babbitt metal which is too hard or too soft causes trouble. Metals which are remelted or overheated lose their good properties and should be reinforced with new material. Poor tinning and insufficient heating of the mandrel often produce defects after pouring and give bad results.

Hot bearings are sometimes caused by the use of fouled lubricating vessels.

Short circuits in armature coils generate heat which is communicated through the core to the bearings.

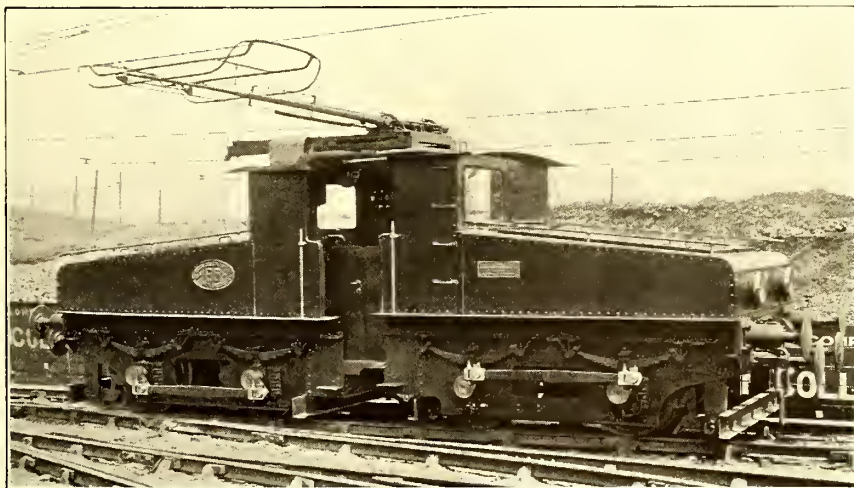
SLOW-SPEED DIRECT-CURRENT LOCOMOTIVES FOR COLLIERY SERVICE

The adaptability of the electric locomotive for switching and low-grade freight service is shown by an installation made for the Harton Coal Company, Limited, South Shields, England, by Siemens Brothers' Dynamo Works, Limited, of London. Since December, 1908, six locomotives have been placed in service from time to time on 7.2 miles of single track. The comparative operating cost of steam and electric locomotives has not yet been exactly determined by the coal company, but the latter was so well pleased with the electrified lines that it decided to install electric service on an entirely new branch. Currents up to 800 amp are taken from a 500-volt d.c. line carrying one or two figure 8 wires of 65 mm (about No. 00 B. & S. gage) cross-section. The Siemens sliding bows used for this purpose operate successfully for clearances varying from 10 ft. 6 in. to 21 ft. above the level of the rails.

Of the six locomotives in service the first two have two axles, the third and fourth have four-wheel swiveling trucks and the fifth and sixth are of the articulated design shown in the accompanying cut. The first locomotive weighs 25.85 long tons and carries two 130-hp motors, each of which is coupled to the driving axle by gearing with a ratio of 1:5.47. The truck wheelbase is 9 ft. 10 $\frac{1}{4}$ in., the wheel diameter 39 $\frac{3}{8}$ in., and the total length over the buffers 20 ft. 3 in. The tractive effort is four tons. The second locomotive is similar to the first, but is considerably lighter. It carries only two 50-hp motors, geared 1:6.25. This locomotive weighs 14.4 tons, has a wheelbase of 5 ft. 11 in., a wheel diameter of 31 $\frac{1}{2}$ in. and a total length over the buffers of 17 ft. to facilitate operation on short curves. The tractive effort, based on the hour rating of the motors, is 1.87 tons.

Locomotives Nos. 3 and 4 are operated on a line on which loads of about 110 tons must be hauled over a maximum grade of 2 $\frac{1}{2}$ per cent. Each of these locomotives is equipped with four 50-hp commutating pole motors, similar to those on locomotive No. 2. The trucks are of 4 ft. 9 in. wheelbase each and 12 ft. 6 in. between centers. The wheels are 33 $\frac{1}{2}$ in. diameter. The total weight of each locomotive is 33.25 tons, and the tractive effort 3.76 tons.

Locomotives Nos. 5 and 6 are used for switching in the yard



British Direct-Current Locomotive for Colliery Service

and must operate over a curve of 36-ft. radius. As a result of the previous experiences with the other locomotives it was considered advisable to retain the minimum wheelbase of 4 ft. 9 in. and the wheel diameter of 33 $\frac{1}{2}$ in., but to adopt a construction which would reduce to the lowest possible limit the overhang of the buffers on curves. Each locomotive weighs 17 tons and is 27 ft. 8 in. over all. It was found necessary in order to obtain this weight without exceeding 7 ft. 7 in. between the ends of the buffers and the center of

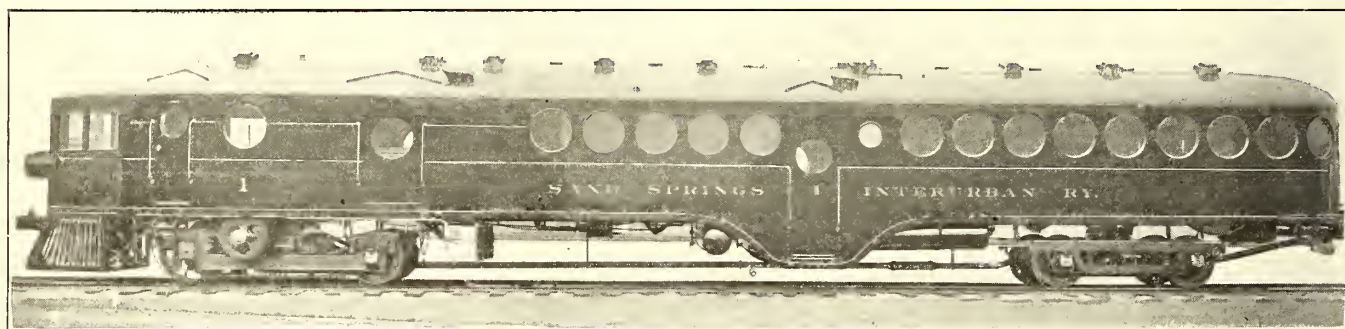
the wheelbase to construct the locomotive in two halves. These halves are joined in the center by link couplings to form a single articulated locomotive. Each part carries a 150-hp commutating-pole motor and runs on fixed axles independently of the position of the other half. Each motor is coupled to one of the driving axles in the ordinary way, the other axle being driven by means of side coupling rods and cranks. In this way the entire weight of the locomotive is made available for adhesion.

The seventh and eighth locomotives will weigh about 40 tons and will be equipped with four 70-hp motors, giving a tractive effort of 5 tons. They will be used on an overhead line 8 miles long, which will be equipped with a Siemens catenary having spans up to 210 ft.

GASOLINE MOTOR CAR FOR TULSA, OKLA.

The accompanying illustration shows a 72-ft. gasoline motor car recently built by the McKen Motor Car Company of Omaha, Neb., for the Sand Springs Interurban Railway of Tulsa, Okla. This railway company has now about 6 miles of track in operation with this one motor car but is planning to extend its line and has placed an order for a second car, which is to be a duplicate of the car now in service on its line.

The general dimensions of the car body is as follows: Gage, 4 ft. 8½ in.; length over sills, 70 ft.; length over all, 72 ft. 9¾ in.; width over side sills, 9 ft. 8 in.; width over all, 10 ft. 2¾ in.; height, inside floor to ceiling, 7 ft. 5½ in.; height, rail to roof, 11 ft. 9 3/16 in.; length of passenger compartment, 28 ft. 7/8 in.; length of smoking compartment, 16 ft. 4½ in.;



Gasoline Motor Car for Tulsa, Okla.

length of baggage compartment, 8 ft. 6 in.; total seating capacity, 83 passengers; total weight, 68,000 lb.

The engine is a McKen 200 hp, with six 10-in. x 12-in. cylinders, air-starting and reversible. The engine frame is of one solid casting of cast steel. The cylinders are cast in sets of three, of high grade cast iron, and the water jackets are ⅛-in. copper. The crankshaft is of high grade carbon steel, each crank being fitted with a counterbalance. The crankshaft sprocket, securing the two halves of the crankshaft together, is of forged steel. The drive from the crankshaft is by means of 5-in. Morse silent chain. All bearing brasses are hard phosphor bronze and all valves are nickel steel.

All gears used in the transmission are of vanadium cast steel, and the other castings are of cast steel. The clutches are operated by means of two air cylinders controlled by an actuating valve in the engine room convenient to the motorman. The car is equipped with extra low gear, giving a speed of 8 m.p.h. on low speed and 22 m.p.h. on direct speed.

The car is equipped with New York Gregory brake valve, emergency hand brake, Wyoming sanders, acetylene headlight, M. C. B. Climax couplers, whistle, warning gong, communicating signals, lamp and flag brackets, tools, etc.

The motor truck is of built-up steel design with a wheelbase of 9 ft. 5 in. The front axle journals are 6 in. x 10 in. and the rear axle journals are the standard 4¼ in. x 8 in. The total weight on the drivers is 24,000 lb. The bolsters are fitted with automatic frictionless roller side bearings, and the journal bear-

ings and wedges are standard M. C. B. All castings are malleable iron. The driving wheels are 42-in. steel-tired spoked wheels, and the rear wheels are 33-in. rolled steel of special design.

The rear truck is of built-up steel design with a 7-ft. wheelbase, and M. C. B. journals 4¼ in. x 8 in. are used. The truck is built on a solid cast-steel frame center. The bolsters are of cast steel, fitted with automatic frictionless roller side bearings. The wheels are 33 in. rolled steel of special design.

The underframing of the car is constructed of structural steel shapes, with one-piece cast-steel body bolsters. The center sill is a 8-in., 22¾-lb. I-beam and the side sills are 6-in. 8-lb. channels. The upper framing is largely of 2-in. grooved steel and 3-in. and 4-in. channels. The sections are securely braced to resist the maximum strain. The windows are round, with an opening of 24¾ in. The sheathing is No. 12 American Bessemer, securely riveted to the framing and forming trusses to support the car.

The roof is of No. 16 sheet steel, closely riveted, and all seams are soldered solid, so as to make an absolutely tight roof. Draft rigging is applied at each end. The pilot is of structural steel frame, the slats being of ¾-in. pipe, securely bolted and braced to the front of the car underframe.

Compressed air for brakes and whistles and for starting the engine and operating the clutch gears is supplied by a pump driven by the engine and also by an emergency gasoline-driven air compressor installed in the engine room. The supply is carried in two 18-in. x 96-in. and one 18-in. x 111-in. seamless steel tanks, secured in the car underframe. The gasoline is carried in an 18-in. x 111-in. seamless steel tank, with a total

capacity of 120 gal., and connected to the air system through a special valve and reducer, which delivers the gasoline to a small gasoline tank in the engine room, whence it flows by gravity to the engine. The water cooling circulation consists of rotary circulation pump, cooling coils and expansion tank.

The car is lighted by an acetylene system, with thirteen oval lamps in the passenger compartment, one bracket lamp in the baggage-room, one bracket lamp in each toilet, one bracket lamp in the engine-room and one lamp in the center vestibule. The car is heated by hot water, the heating system being connected into the water circulation from the engine. Ventilation is provided by means of intake air ducts, which deliver air at various points adjacent to the floor of the car, and foul air is exhausted at the roof by suction or exhaust ventilators.

The interior finish of the car is in mahogany, with two toilet-rooms fitted with Duner hoppers. The floor is of 13/16-in. hard maple with false flooring of No. 12 sheet steel. The ceiling in the passenger compartment is of pressed board formed to fit the roof of the car.

The seats are Hale & Kilburn spring cushions, upholstered in plush for the passenger compartment and in rattan for the smoking compartment. Drop benches are provided in the baggage compartment for use by negroes.

The car is thoroughly insulated by the use of pith placed between the top and the false flooring, and between sheets and interior finish and by linofelt placed between roof sheets and ceiling. The aisles in the car are covered with rubber matting.

News of Electric Railways

Public Hearings on Chicago Subway Plans

At the suggestion of Mayor Harrison the committee of the City Council of Chicago on local transportation has placed itself on record as favoring absolute municipal ownership of the subways, the construction to be paid for entirely by the city without aid from any other outside source. The initial cost will be paid from the city's traction funds, and the construction will be limited to the extent of these funds unless other municipal funds are found available.

The committee proposes to hold a series of hearings on subway plans, the first on May 22, 1911. They will be open to the public. Three engineers who have presented subway recommendations or plans to the Council will be invited to present arguments in support of their plans. They are Bion J. Arnold, chairman of the board of supervising engineers; City Engineer John Ericson, under whose supervision the municipal subway bureau prepared the plans known as the Johnston plans, and George W. Jackson, who submitted a report to the Council. The first of the public hearings is referred to at length on page 922 of this issue.

Mayor Harrison appeared at a recent committee meeting and asked to be notified when the subway discussion was taken up. The Mayor is reported to have said that he would like to see the committee adopt a policy of municipal ownership and construction of the subway with the city's share of the traction company profits or such other funds as may be available for city use.

Alderman Charles M. Foell, who acted as spokesman for the Republican minority on the committee, declared himself in favor of municipal ownership of the subway and control of it through leases to the users, but he expressed doubt about the wisdom of limiting the committee's study to a subway such as can be built from the traction fund, which now contains \$6,100,835, and is increasing at the rate of \$1,500,000 a year.

Mayor Harrison is reported to have said:

"Chicago will not need a large subway like New York for at least fifty years to come. One of the pledges of my election was that I would give the people a municipally owned subway, and that is my policy now. What I ask is that the committee go on record for a municipally owned subway, built with the funds now in the hands of the city, obtained as the city's portion of traction receipts, and not take any money from outsiders. If you take money from the street car companies they become part owners of the subway, and I do not want this."

Governor Foss Again Urges Utilities Commission in Massachusetts

Eugene N. Foss, Governor of Massachusetts, on May 19, 1911, again urged the Legislature of that State to establish a public service commission in accordance with the recommendations which he made in his message to that body. On May 19, 1911, the Governor said:

"I again call attention to the desirability of establishing in this State a utilities board. I have already advocated the establishment of a utilities board which should comprise the functions of the present Railroad Commission, the Gas & Electric Light Commission, the Boston Transit Commission, and the Highway Commission. I believe that the large expenditures now incurred by these several boards as a whole can be rendered far more efficient by a combined general management, controlling the several divisions of work properly assigned to subordinate offices. The very fact that there now exists a difference in efficiency between these different commissions indicates the necessity of raising them all to at least the standard of the one that is now best.

"I recommended Mr. Scovall's report to your careful attention with the further comment that I believe the present annual expense at \$4,750, which is paid for office rent by the Highway Commission, can be eliminated when the commission now at work upon the office space within the State House shall have concluded its work. I believe also that a far larger proportion of the expenses of this commis-

sion should be met by increased license fees on high-powered motor vehicles, since these expenses are kept at a high figure largely because of the excessive wear due to these vehicles. I approve the pending appropriation for the Highway Commission, amounting to \$261,250, with the urgent recommendation that the commission be consolidated with others, as stated, into a utilities board."

Report on Cost of Toronto Municipal Railway

The City Engineer of Toronto, Ont., has prepared a report on the cost of constructing the proposed municipal street railway lines on St. Clair Avenue and on Gerrard Street East. The cost of construction of the St. Clair Avenue line, from Avenue Road to the Grand Trunk tracks, 2.65 miles, follows:

Rail structure.....	\$111,450
Overhead construction.....	10,600
Car houses and repair shops.....	35,000
Passenger equipment.....	49,000
Operating equipment.....	16,500
Transformer station and feeder wires.....	40,000
	\$262,550
Contingencies, engineering, etc.....	18,378
	\$280,928

The cost of the Gerrard Street East line, from Greenwood Avenue to Main Street, 1.85 miles, follows:

Rail structure.....	\$69,000
Overhead construction.....	8,510
Car houses and repair shops.....	35,000
Passenger equipment.....	42,000
Operating equipment.....	16,500
Transformer station and feeder wire.....	40,000
	\$211,010
Engineering, contingencies, etc.....	14,770
	\$225,780

The cost of operation of the two lines is estimated by the engineer as follows:

	St. Clair Line.	Gerrard Line.
Day service, 6 a. m. till 12 p. m.		
Speed—miles per hour.....	7.95	7.40
Cars required.....	4	3
Total car mileage—527.4, at 31.7 cents per car mile.....	\$181.45	
Total car mileage—399.6, at 31.7 cents.....		\$126.67
Night service, 12 p. m. to 6 a. m.		
Total car mileage, 63.6.....	20.16	
Total car mileage, 44.4.....		14.7
Total cost of operation on a 24-hour service..	\$201.61	\$140.74

It is expected that the engineer's report will be presented to the Ontario Railway & Municipal Board when the city's application comes before that body for the construction and operation of the lines as a municipal undertaking.

Proposed Boston & Western Electric Railroad Has Novel Construction Plan

The Boston & Western Electric Railroad, which has been chartered to build a high-speed interurban electric railway from Waltham to Marlboro, and which secured a certificate of exigency from the Massachusetts Railroad Commission, despite the protests of the Boston & Maine Railroad, which it would parallel for a long distance, and the Boston & Worcester Street Railway, with which it would enter into competition, has practically reached an agreement with the Boston & Maine Railroad to use the Central Massachusetts Railroad right-of-way from Waltham through Weston and Wayland to South Sudbury. The Central Massachusetts Railroad has a wide roadbed, or right-of-way, and uses only the north side of it. This would avoid any takings of private land except in a few places where the right-of-way may not be wide enough, and it would create no additional structure in the places it passes through.

When Mr. Hight, of counsel for the Boston & Maine Railroad, referred to the matter before the Railroad Commission, he said that since it has been determined that the Boston & Western Electric Railroad is to be built the Boston & Maine Railroad is willing to co-operate for the benefit of the public. Samuel W. Powers, who is counsel for the Boston & Western Electric Railroad, explained what his

company has been doing to secure a route. It was intended to build through private land on the south side of the Central Massachusetts, and the people there suggested that the road be built on the north side. On the north, however, the people raised the same objections and argued that the line should go on the south side. Then the use of the line owned by the Central Massachusetts Railroad was suggested.

The only objection raised before the Railroad Commission was that of the Boston & Worcester Street Railway, through its counsel, Guy W. Cox. Mr. Cox declared that the Boston & Maine Railroad was to acquire the Boston & Western Electric Railroad so that it virtually would mean the electrification of the Central Massachusetts Railroad for a distance to the injury of the Boston & Worcester Street Railway. The matter comes up for a hearing on June 8, 1911, before the Railroad Commission. Then the Boston & Western Electric Railroad will have detailed plans to offer.

Public Meeting to Consider Cleveland Franchise Amendments

Councilman Kramer, chairman of the street railway committee of the City Council of Cleveland, announced that he would call a meeting of the committee on May 24 or May 25, 1911, to consider the proposed amendments to the Tayler franchise. The city officials, officers of the Cleveland Railway and the public were to be invited to be present, as the committee wished to hear arguments for and against the amendments. The committee expects the discussion to center about the amendment to require the company to spend \$2,500,000 at once for improvements. This will add \$125,000 a year to the interest fund and some questions are likely to be asked as to whether increased traffic will care for this additional expense. The officers state that for each dollar expended for cars the same amount will have to be added for extensions at the power plants, which are running up to capacity now. It would seem that the \$250,000 will have to be about evenly divided between cars and power. Several members of the Council believe that the addition recently made to the operating expenses and the additional interest required by the issue of bonds can all be cared for within the 3-cent fare limit, as the growth in traffic will be heavy with the greater facilities.

Argument in Detroit Rental Suit in June

At the close of the session of the Wayne County Circuit Court on May 15, 1911, it was agreed that arguments in the case of the City of Detroit against the Detroit United Railways should be begun on June 5, 1911. The city has made a charge of \$200 a day for the use of streets occupied by the Fort Wayne and Belle Isle line, which the company has refused to pay. The company contends that the interests of the city, the company and the public are interdependent, and that before such a charge as this can be made it must be ascertained where the rights of one end and those of the other begin. Corporation Counsel Hally, for the city, maintains that the municipality has the right to fix any rental that it sees fit. Attorney Fred A. Baker, acting for the company, states that this is one of the most important cases ever presented, because of the principle of interdependence which the court must decide upon.

City Counsel Hally has demanded that the Lake Shore & Michigan Southern Railroad complete its work of eliminating the crossing at Beaubien Street, Detroit, so that the street railway can finish its subway and begin to operate its cars in the regular course. For some time it has been making a detour on temporary track.

Sand Springs Interurban Railway Placed in Operation.—The Sand Springs Interurban Railway was placed in operation on May 14, 1911, between Sand Springs and Tulsa, Okla., a distance of about 6 miles. The road is being operated with a McKeen motor car, described elsewhere in this issue. It is proposed to extend the line to Collinsville and Oologah to connect with the Iron Mountain Railroad.

Report on Pennsylvania Railroad Terminal Improvements in Philadelphia.—It has been announced that the

board of engineers which has been considering the question of the improvement of the Broad Street Station of the Pennsylvania Railroad in Philadelphia, Pa., and the electrification of the suburban lines of the company out of that city has completed its work and will present its report to the directors of the company within a few days.

Complaint Against Schenectady Railway Closed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of residents of Rexford Flats, Saratoga County, and Alplaus, Schenectady County, against the Schenectady (N. Y.) Railway. The complaint asks for increased passenger service and improvement of waiting rooms. The company has satisfied the complaint without the necessity of further formal proceedings on the part of the commission.

Annual Convention of the American Society of Civil Engineers.—The forty-third annual convention of the American Society of Civil Engineers will be held at Chattanooga, Tenn., from June 13 to 16, 1911. The headquarters of the society will be at the Hotel Patten. There will be an informal reception at the Hotel Patten on the evening of June 12. The following days will be given over to executive sessions. The committee of arrangements of the board of directors is composed of Hunter McDonald, chairman; William E. Belknap and Charles Warren Hunt.

Meeting of New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club was to be held at the American House, Boston, Mass., on May 25, 1911. Dinner was to be served at 6:30 p. m. The regular business meeting was set for 8 p. m., after which there were to be two addresses. Walter M. Denman, designing and consulting engineer, Springfield, Mass., was to deliver an address on "Concrete Bridges for Electric Railways," illustrated by the aid of a stereopticon. A. A. Hale, engineer of the Griffin Wheel Company, Boston, Mass., was to deliver an address, "Chilled Iron Car Wheels and Their Relation to Service Conditions."

Professor Bemis Engaged for Toledo Appraisal.—Prof. Edward W. Bemis, New York, who had much to do with the valuation of the Cleveland Railway property under the late Mayor Tom L. Johnson, has been employed to represent the city of Toledo, Ohio, in appraising the property of the Toledo Railways & Light Company for the negotiators, Mayor Brand Whitlock and President Albion E. Lang, of the company. In accepting the appointment Professor Bemis stated that he would begin the work on May 20, 1911. It is understood that he is to receive \$50 a day and his expenses for the service. On the evening of May 15, 1911, the City Council adopted a resolution appropriating \$8,000 for the expenses of the appraisal. The members of the administration are anxious to complete the appraisal so that negotiations on the question of fare may proceed.

Public Service Railway Employees' Smoker.—The West Hoboken Social Club, which is composed of employees of the West Hoboken division of the Public Service Railway, Newark, N. J., gave a smoker in the clubroom of the West Hoboken carhouse on Friday evening, May 19. The program for the evening consisted of several vaudeville acts, followed by five boxing exhibitions. Both employees of the company and outside talent participated in the entertainment. During the course of the evening Newton W. Bolen, superintendent of transportation of the company, addressed the men. The smoker lasted from 8:30 p. m. until midnight so as to permit as many men as possible to attend. More than 300 men from the various divisions of the company were present. This was the last of the entertainments which are held at this carhouse every second month during the winter.

The Gould Policy.—In a letter addressed to the editor of the *Landmark*, Norfolk, Va., to correct a statement made by that paper in regard to the proposed bonds to be issued in connection with the financing of the merger of the electric railway and light properties in Richmond and Norfolk, Frank J. Gould, New York, N. Y., chairman of the board of directors of the Virginia Railway & Power Company, Richmond, Va., said: "In becoming financially interested in the traction development of your city and vicinity, it will be the object of the Virginia Railway & Power Company, after the merger with the Norfolk Company, to

continue upon the same basis of operation that we have established in Richmond. Our policy, as you probably already know, is to eliminate politics from the operation of the company entirely and give to the public the best service that it possibly can. I, personally, consider the elimination of politics from public service corporations as one of the essential things to serve the public."

Report of Congress of Technology.—So many inquiries have been addressed to the officers of the Massachusetts Institute of Technology asking if the proceedings of the recent Congress of Technology are to be published that tentative arrangements have been made with the McGraw-Hill Book Company, New York, N. Y., to bring out a volume if sufficient interest is shown by those who desire such a publication. This volume would include papers and abstracts of the six sections of the recent congress, somewhat condensed and arranged for the greatest usefulness as a reference book. It would be well printed, in standard 6 in. x 9 in. size, bound in suitable cloth binding and contain approximately 500 pages. The papers were some seventy in number and embraced a wide variety of topics of scientific interest. The book would be issued in cloth at \$3 net per copy. Orders in advance of publication will be accepted at \$2.50 net, prepaid, per copy. The committee on publication desires remittances with orders, but if the immediate response is not sufficient to warrant the undertaking, all remittances will be refunded promptly. Orders should be addressed to Walter B. Snow, 170 Summer Street, Boston, Mass., and checks should be made payable to him.

Final Conferences on New York Subway Proposals.—The committee of the Board of Estimate and Apportionment of New York, of which Borough President McAneny of Manhattan is chairman, and the members of the Public Service Commission of the First District of New York held another conference on the two pending subway offers on the evening of May 22, 1911, and the two bodies on May 22, 1911, were prepared to have brief final conferences with President Williams, of the Brooklyn Rapid Transit Company, and President Shonts, of the Interborough Rapid Transit Company. These conferences are to be sought to settle one or two points developed in the talks between the commission and the committee of which Mr. McAneny is chairman. On behalf of the committee it was asserted that suggestions to reopen the negotiations would not be allowed to delay the committee's report, which will contain a definite recommendation of the course which the committee believes the city should follow in the subway matter, together with an analysis of the evidence supporting the recommendation. Statements containing an analysis of the financial aspects of the matter were issued on May 22, 1911, by both sides.

LEGISLATION AFFECTING ELECTRIC RAILWAYS CONNECTICUT

The judiciary committee held a long session on May 17, 1911, to consider the utilities question. The decisions arrived at were not made public but it was understood that a majority will report in favor of two separate commissions. It is said that the report will advocate an increase of the powers of the Railroad Commission, giving it the authority to enforce its recommendations as to rates and service. The committee will also report in favor of another commission, to be appointed by the Governor, to consist of three members at \$3,000 each. It is said that the recommendation will be to give this commission practically the same power as that given to the railroad board as to rates and service, the commission to have the power to deal with all other public service corporations. It is said that the minority will report the so-called business men's measure somewhat modified. It will recommend abolishing the Railroad Commission, and will advocate a new commission of three members to take both railroads and other public service concerns under its control.

DELAWARE

The employers' liability commission to investigate the employers' liability act best suited to the requirements of Delaware, including the regulation of the employment of women and children, has been named as follows: T. Allen

Hilles and Sylvester D. Townsend, Jr., appointed by Governor Pennewill; Arthur Jennings and Thomas J. Flynn, appointed by President Monagan, of the State Senate, and Alfred B. Moore and James E. Hoffecker, appointed by Speaker Campbell of the House. The commission is to present its recommendations to the next General Assembly.

MASSACHUSETTS

The Senate has rejected House Bill 1360, providing for a determination of the value of shares of stock of consolidated railroads and street railways. Ten bills relating to the construction of additional subways and tunnels in Boston have been referred to the committees on metropolitan affairs and street railways, sitting jointly, together with the subject of future relations of the Boston Elevated Railway and West End Street Railway. A plan is under consideration by which the West End system would be leased to the Boston Elevated Railway for fifty years at a rate of 7½ per cent on its stock. It is estimated that on such a lease at the end of the tenth year the financing of the West End Street Railway can be handled at a saving of \$60,000 per year above what would have to be paid in case of actual consolidation. The extension of the lease provides a way out of the threatened engineering complications of two separate systems, and is a compromise planned to meet the objections of those opposing actual consolidation of the properties. Stone & Webster have estimated that the cost of supplying power to separate systems would be \$500,000 per year greater by 1918 than if the present single control is maintained. The Boston Elevated Railway interests point out that the most economical power plant developments will be possible under the proposed lease. The only opposition to the lease appears to come from the so-called Mead committee of the West End Street Railway stockholders, which demands 8 per cent dividends as a condition of the lease.

The bill to limit the hours of street railway employees to nine hours in eleven hours has been ordered to a third reading in the House. The question of constitutionality has been raised regarding it by Representative Ellis, of Newton, who pointed out that the recent decision of the Massachusetts Supreme Court on the eight-hour bill that the Legislature lacks the power to limit the hours of men in private employment applies equally to the street railway bill. Representative Underhill, of Somerville, condemned the bill as a political measure, stating that street railway employees will awake to its real meaning when they find that it takes \$2 per week out of their individual pockets. Sub-committees have been appointed by the joint committee on railroads and metropolitan affairs to draft bills to grant a certificate of exigency to the Boston & Eastern Electric Railroad and to authorize the New York, New Haven & Hartford Railroad to build a tunnel under Boston Harbor and to acquire the Boston, Revere Beach & Lynn Railroad. The passage of the latter bill will mean the beginning of steam railroad electrification in the Boston district, with the partial abolition of the steam locomotive between Readville and Beverly. It is understood that the committee will oppose the passage of any specific electrification bill, although no report has as yet been made upon any of the measures under consideration. The bill authorizing the Berkshire Street Railway Company to sell electricity to railroad corporations operating trains in the Hoosac Tunnel has been passed to be enacted. The Senate has accepted the reference to the next Legislature of the House bill 769 regulating street railway fares in Weymouth, as advised by the committee on street railways.

OHIO

Some of the more important electric railway measures enacted by the Legislature, which will soon adjourn, follow: Giving cities power to require electric railways to raise their tracks where parallel steam railroads are required to do so; authorizing street and interurban railways to borrow money without regard to capital stock; authorizing lease by councils of subway rights in streets for underground railways; making the receiving company liable for damages to freight and express shipments; making it obligatory upon steam and electric railways to keep their rights of way clear of weeds; requiring street and interurban railways to sprinkle their rights of way within municipalities.

Financial and Corporate

New York Stock and Money Markets

May 22, 1911.

After the marked activity immediately following the Standard Oil decision, transactions on the New York Exchange decreased in volume, although the advanced prices are well sustained. A wide range of securities continues to be traded in. The situation is improved as the future policy of many enterprises can now be planned more definitely and in consequence public confidence is slowly returning. The recent briskness has caused little change in money rates, although greater demand has resulted from the increased trading. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{1}{2}$ per cent; ninety days, $2\frac{3}{4}$ @ 3 per cent.

Other Markets

The elevated issues were in good demand on the Chicago market during the week and prices have improved. Activity has been caused by the probability of the merger. Northwestern was the most active of the elevated offerings in to-day's trading. Passing of the preferred dividend of the Kansas City Railway & Light Company caused a drop in this issue, but a recovery has been made.

Trading in Philadelphia has been irregular. Traction have not been notably active.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 16.	May 22.
American Light & Traction Company (common).....	a292	a292
American Light & Traction Company (preferred).....	a107	a107
American Railways Company.....	a44	a44½
Aurora, Elgin & Chicago Railroad (common).....	44	a40
Aurora, Elgin & Chicago Railroad (preferred).....	86	a86
Boston Elevated Railway.....	a128	a128
Boston Suburban Electric Companies (common).....	a15	a15
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a10	10
Boston & Worcester Electric Companies (preferred).....	a49	a49½
Brooklyn Rapid Transit Company.....	80¾	80¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	85¾	86¾
Capital Traction Company, Washington.....	128	128
Chicago City Railway.....	a195	188
Chicago & Oak Park Elevated Railroad (common).....	2	2
Chicago & Oak Park Elevated Railroad (preferred).....	6	6
Chicago Railways, ptcptg., ctf. 1.....	a85	a85
Chicago Railways, ptcptg., ctf. 2.....	a21½	a22½
Chicago Railways, ptcptg., ctf. 3.....	a8	a9
Chicago Railways, ptcptg., ctf. 4.....	a5½	a5½
Cincinnati Street Railway.....	a131	*131
Cleveland Railway.....	97	a98
Columbus Railway (common).....	a96	*96
Columbus Railway (preferred).....	a101	a100½
Consolidated Traction of New Jersey.....	a77	a77
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Dayton Street Railway (common).....	a30	*30
Dayton Street Railway (preferred).....	a100	*100
Detroit United Railway.....	a70¾	72
General Electric Company.....	160	160½
Georgia Railway & Electric Company (common).....	a136	136
Georgia Railway & Electric Company (preferred).....	a92	95
Interborough Metropolitan Company (common).....	183¼	183¼
Interborough Metropolitan Company (preferred).....	52¼	53
Interborough Metropolitan Company (4½s).....	79½	79½
Kansas City Railway & Light Company (common).....	a20	a19
Kansas City Railway & Light Company (preferred).....	a66	a25
Manhattan Railway.....	139	137½
Massachusetts Electric Companies (common).....	a19	a20¾
Massachusetts Electric Companies (preferred).....	a89	a89¾
Metropolitan West Side, Chicago (common).....	a24	24
Metropolitan West Side, Chicago (preferred).....	a69	a71
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	110	*110
North American Company.....	73¾	76
Northern Ohio Light & Traction Company.....	a26	46
Northwestern Elevated Railroad (common).....	23	27
Northwestern Elevated Railroad (preferred).....	63	67
Philadelphia Company, Pittsburgh (common).....	a56¾	a57¼
Philadelphia Company, Pittsburgh (preferred).....	a43	a43¾
Philadelphia Rapid Transit Company.....	a18¾	a18¾
Philadelphia Traction Company.....	a83	a83½
Public Service Corporation, 5% col. notes (1913).....	a100¾	a101
Public Service Corporation, cts.....	a107	107
Seattle Electric Company (common).....	a109½	a108½
Seattle Electric Company (preferred).....	100	a100½
South Side Elevated Railroad (Chicago).....	a73	a75
Third Avenue Railroad, New York.....	11¼	12¾
Toledo Railways & Light Company.....	a8	a10
Twin City Rapid Transit, Minneapolis (common).....	a109	a110
Union Traction Company, Philadelphia.....	a47	a46½
United Rys. & Electric Company, Baltimore.....	a18¾	a18¾
United Rys. Inv. Co. (common).....	42	41½
United Rys. Inv. Co. (preferred).....	72¾	72
Washington Ry. & Electric Company (common).....	a34½	a34¾
Washington Ry. & Electric Company (preferred).....	a87½	a90
West End Street Railway, Boston (common).....	a90	a91
West End Street Railway, Boston (preferred).....	a103½	a103½
Westinghouse Elec. & Mfg. Co.....	72¾	74
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a117	117

a Asked. *Last sale.

Terms of Merger of Richmond, Portsmouth and Norfolk Properties

The terms of the agreement for the merger of the Virginia Railway & Power Company, Richmond, Va., and the Norfolk & Portsmouth Traction Company, Norfolk, Va., to which reference was made in the ELECTRIC RAILWAY JOURNAL of April 29, 1911, page 766, were made public on May 22, 1911. The merger is to go into effect on July 1, 1911, and on that day the corporate existence of the Norfolk & Portsmouth Traction Company is to terminate and all of its property be formally vested with the Virginia Railway & Power Company.

The Virginia Railway & Power Company as at present organized has outstanding \$12,150,500 par value of capital stock, of which \$4,700,000 is preferred and \$7,450,500 common stock. The Norfolk & Portsmouth Traction Company has outstanding \$6,000,000 par value of stock, of which \$3,000,000 is common stock and \$3,000,000 is preferred stock. The capital stock of the merged company is to be \$20,000,000, of which \$8,000,000 is to be preferred stock and \$12,000,000 common stock. Prior to Jan. 1, 1914, the preferred stock is to draw non-cumulative dividends of 5 per cent per annum and after Jan. 1, 1914, the preferred stock is to draw non-cumulative dividends at the rate of 6 per cent per annum.

The present \$4,700,000 of preferred stock of the Virginia Railway & Power Company and the present \$7,450,500 of common stock is to continue outstanding without change except that the certificates for the stock are to be exchanged for new certificates which are to state the capitalization of the merged company. The stock of the Norfolk & Portsmouth Traction Company is to be exchanged for the stock of the Virginia Railway & Power Company on the following basis: In exchange for the present \$3,000,000 of outstanding preferred stock of the Norfolk & Portsmouth Traction Company preferred stock of the Virginia Railway & Power Company is to be issued share for share. In exchange for the present \$3,000,000 of outstanding common stock of the Norfolk & Portsmouth Traction Company common stock of the Virginia Railway & Power Company to the amount of \$4,500,000 is to be issued on the basis of one and one-half shares of the stock of the Virginia Railway & Power Company for one share of the common stock of the Norfolk & Portsmouth Traction Company. The remaining 3000 shares of preferred stock of the Virginia Railway & Power Company and the 495 shares of common stock are to be disposed of at the discretion of the directors.

The board of directors of the company is to consist of fourteen directors and the principal officers of the company are to be a chairman of the board, a president, three vice-presidents, a general counsel, a secretary, a treasurer, two assistant secretaries and two assistant treasurers. The officers of the company are: Frank J. Gould, chairman of the board of directors; William Northrop, Richmond, president; Fritz Sitterding, Richmond, Henry W. Anderson, Richmond, and R. Lancaster Williams, Baltimore, vice-presidents; Henry W. Anderson, general counsel; Guy Phillips, New York, secretary and treasurer; George B. Williams, Richmond, assistant secretary and assistant treasurer; W. J. Kehl, Norfolk, assistant secretary and treasurer; Frank J. Gould, William Northrop, Fritz Sitterding, Henry W. Anderson, R. Lancaster Williams, Percy M. Chandler, Guy Phillips, Nathaniel A. Campbell, George H. Taylor, Frank O. Briggs, F. W. Roebing, Jr., Caldwell Hardy, Fergus Reid and James L. Sellman, directors.

Proposed Merger of New Orleans Railway & Light Company and the American Cities Railway & Light Company

An agreement has been entered into by a number of the large stockholders of the New Orleans Railway & Light Company and Bertron, Griscom & Jenks for the organization of a company to acquire at least two-thirds of the preferred and common stock of the New Orleans Railway & Light Company and the stocks of the following named companies now owned by the American Cities Railway & Light Company: Birmingham Railway, Light & Power Company; Memphis Street Railway, Little Rock Railway & Electric

Company, Knoxville Railway & Light Company, Houston Lighting & Power Company.

The plan set forth in this agreement contemplates that the new company will issue in payment for the preferred stock of the New Orleans Railway & Light Company its 6 per cent cumulative preferred stock and common stock at the rate of \$83 1/3 par value of its preferred stock and \$16 2/3 par value of its common stock for each share of preferred stock of the New Orleans Railway & Light Company, and at the rate of \$35 par value of its said preferred stock and \$25 par value of its common stock for each share of common stock of the New Orleans Railway & Light Company. Should all of the stockholders of the New Orleans Railway & Light Company deposit their stock under this agreement, which will require \$15,333,333 of 6 per cent cumulative preferred stock of the new company and \$6,666,666 par value of common stock of the new company, the new company will have outstanding capitalization as follows: \$10,000,000 eight-year collateral trust 5 per cent bonds, \$21,810,083 of 6 per cent cumulative preferred stock, and \$16,643,416 common stock.

The preferred and common stock issued over and above that reserved for exchange for the preferred and common stock of the New Orleans Railway & Light Company will be issued for the acquisition from the American Cities Railway & Light Company of the above-mentioned subsidiary companies, together with the sum of approximately \$1,500,000, to be used by the new company for working capital. The collateral trust bonds will bear the date July 1, 1911, or thereabouts, maturing eight years from date, and 25 per cent, or \$2,500,000, will be paid off at par at the expiration of five years from date of bonds by lot. The bonds will bear interest at 5 per cent for the first six years and 6 per cent for the seventh and eighth years, and will be secured by pledge of all stocks to be acquired by the new company. The bonds will be redeemable as a whole on any interest payment date at par and interest. The agreement is to be declared effective within forty-five days from May 15, 1911. Under this plan the present preferred stockholders of the New Orleans Railway & Light Company will receive the same dividend return and \$16 2/3 of common stock.

Ford, Bacon & Davis, New York, N. Y., who for a number of years have been in charge of the operation of the American Cities Railway & Light Company properties and who are familiar with the operations of the property of the New Orleans Railway & Light Company, will, it is understood, still continue their large interests in the new company with direct charge of its engineering and operation. The shares of stock of the New Orleans Railway & Light Company held in the United States are to be deposited on or before June 15, 1911, with the Hibernia Bank & Trust Company and the Whitney National Bank, of New Orleans, or at the office of the New York Trust Company, New York City.

Official statements in regard to the merger have been made by S. R. Bertron, of Bertron, Griscom & Jenks, who is a director of the New Orleans Railway & Light Company, and by J. K. Newman, New Orleans, La., who is president of the American Cities Railway & Light Company. Mr. Bertron said:

"It came to my attention through Ford, Bacon & Davis, engineers for the American Cities Railway & Light Company, that Isadore Newman & Son were considering, for private reasons, the sale of their holdings in the American Cities Railway & Light Company, provided a like opportunity should be offered to all other stockholders. Realizing the strength attained by a combination of a number of valuable non-competing properties of this character it occurred to me that it might be desirable to acquire the subsidiary companies owned by the American Cities Railway & Light Company for a merger of interests with the preferred and common stocks of the New Orleans Railway & Light Company. After extended negotiations we arrived at what seems a fair basis, and I came at once to New Orleans to discuss the situation further with the local interests."

Mr. Newman said:

"For reasons of a purely personal character my firm concluded that if a satisfactory offer was made we would dispose of our interest in the American Cities Railway & Light Company, provided the same offer was given to all the other stockholders. This has been known to our asso-

ciates, Ford, Bacon & Davis, who, however, desire to continue their investment in Southern street railway and light companies. They, with Bertron, Griscom & Jenks, conceived the idea of forming a holding company, which would acquire the assets of the American Cities Railway & Light Company and the stocks of the New Orleans Railway & Light Company. With this in view a plan is being prepared, and while no proposition has been made to the American Cities Railway & Light Company, it is the intention of the parties to make an offer, the terms of which have been tentatively discussed and meet with our preliminary approval as individual stockholders."

Elevated Railroad Merger in Chicago

Henry A. Blair returned to Chicago on May 20, 1911, and stated that he had completed arrangements whereby the National City Bank of New York had agreed to furnish the money needed in case his offer to the stockholders of the various elevated railroads is accepted.

It was expected that a meeting of the directors of the Metropolitan West Side Elevated Railway would be held on May 22, 1911, formally to receive Mr. Blair's offer, and a meeting of the directors of the South Side Elevated Railroad for a similar purpose on May 23, 1911. The terms for the Northwestern Elevated Railroad, which cover the loop which it owns, and the lines of the Chicago & Oak Park Elevated Company are acceptable, the promoters of the merger plan being largely stockholders of the Northwestern Elevated Railroad.

It is understood that the \$30,000,000 notes to be issued by the proposed holding corporation will bear 4½ per cent. They are to run for three years, and have been underwritten by Harris, Forbes & Company. The proceeds of these notes will be used to refund the Northwestern Elevated Railroad's 4 per cent bonds when they fall due next September, and for other corporate purposes.

Citizens' Railway & Light Company, Ft. Worth, Tex.—

John W. Davis has been appointed receiver of the Citizens' Railway & Light Company by Judge Buck in the Forty-eighth District Court at Ft. Worth, Tex., on application of the Arlington Heights Realty Company.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—

John W. Coldsberry, supervising judge of the district at Columbus, Ohio, has denied the request of John G. Webb and others to replace E. B. Kinkead as receiver of the Columbus, Delaware & Marion Railway. Judge Babst, Marion, has not yet rendered a decision on the case before him as to the appointment of a receiver under an old petition filed in his court while another judge, now deceased, was presiding.

Kansas City Railway & Light Company, Kansas City, Mo.—

The Kansas City Railway & Light Company has passed the quarterly dividend due on June 1, 1911, on its preferred stock. The last disbursement was 1¼ per cent. R. J. Dunham, chairman of the board of directors, said: "The dividend has not been passed because of reduced earnings, but because the company wishes to use its surplus earnings over and above interest charges for other corporate purposes, constructions, improvements, etc. The surplus earnings for the ten months ended March 31, 1911, over and above taxes and interest, were \$793,305.92, and this was after exceptionally large charges to operating expenses for maintenance, exceeding by \$207,000 the maintenance charges of the previous year."

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—

John R. Graham, president of the Bangor Railway & Electric Company and the Lewiston, Augusta & Waterville Street Railway has concluded negotiations for the purchase of the property of the Freeport Light & Power Company, at Freeport, Me. The purchase carries with it the rights of the company which is operating in Freeport and Yarmouth, Me. It has been selling power to the Portland & Brunswick Street Railway, which was recently bought by the Lewiston, Augusta & Waterville Street Railway.

Meridian Light & Railway Company, Meridian, Miss.—Henry L. Doherty & Company, New York, N. Y., are offering at 91½ and interest the unsold part of \$150,000 of first mortgage, 5 per cent, 40-year gold bonds, part of the total issue of \$750,000, of which \$42,500 is sinking fund.

New York, New Haven & Hartford Railroad.—Francis T. Maxwell, Rockville, Conn., and Edward T. Milligan, Hartford, Conn., have been elected directors of the New York, New Haven & Hartford Railroad to succeed A. S. May and E. A. Clark, temporary members of the board.

Northern Electric Railway, Chico, Cal.—The Northern Electric Railway has authorized an issue of \$2,000,000 of 6 per cent gold notes to run for two or three years at the option of the company, as secured by pledge of first and consolidated 5 per cent gold bonds in 1907 and the personal guarantee of E. R. Lillenthal, E. J. de Sabla, Jr.; Louis Sloss and W. P. Hammon, who are stockholders of the company.

Ocean Shore Railway, San Francisco, Cal.—The Ocean Shore Railway, which was recently sold to the bondholders, is reported to have passed into the control of Speyer & Company, New York. According to the report the arrangement under which the change was made was completed by S. W. Reynolds, Boston, a representative of Speyer & Company. It is announced that the following improvements will be made: Construction of \$200,000 depot and terminus on Eleventh Street, between Market and Mission Streets; electrification of the system, work to begin as soon as possible; construction of new stations, switches and bridges along the line; extension of the line from Tunitas Glen, San Mateo County, the present southern terminus, to Santa Cruz; operation of four daily passenger trains from San Francisco and from Tunitas Glen, and two daily freight trains to and from this city.

Otsego & Herkimer Railroad, Oneonta, N. Y.—The Public Service Commission of the Second District of New York has authorized the Otsego & Herkimer Railroad to execute and issue a first mortgage upon all the property, rights and franchises of the corporation, to secure the payment of thirty-year 5 per cent bonds, to an aggregate amount hereafter to be determined. The company is authorized to issue its common capital stock to the amount of \$500,000 par value and its thirty-year 5 per cent bonds to the amount of \$400,000 par value, the proceeds to be used to pay and discharge a judgment now owned by the Trust Company of America, recovered by the Rochester Trust Company upon the foreclosure of certain receiver's certificates issued by the receiver of the Oneonta, Cooperstown & Richfield Springs Railroad, which judgment is a lien upon the railroad property; to pay a certain claim of the General Electric Company which is a lien upon the property, and to acquire from Joseph A. Starrett a railroad property now operated by the Otsego & Herkimer Railroad, purchased by Mr. Starrett on foreclosure sale, excepting, however, from the property so purchased by Mr. Starrett the power plant which has been transferred to the Hartwick Power Company. None of the stock and bonds is to be sold or otherwise disposed of at less than par, but may be used at the discretion of the board of directors in making payments of the judgment and liens with either stock or bonds. As stated in the *ELECTRIC RAILWAY JOURNAL* of May 20, 1911, page 893, the application of the company in this connection has been before the commission for two years owing to the principles involved.

Parkersburg & Ohio Valley Electric Railway, Parkersburg, W. Va.—In the United States Circuit Court at Parkersburg on May 17, 1911, Judge Dayton appointed C. L. Williams receiver of the Parkersburg & Ohio Valley Electric Railway, on motion of J. M. Jackson, who owns \$52,000 of first mortgage bonds of the company.

Philadelphia (Pa.) Railways.—The Philadelphia Railways has been incorporated with a capital stock of \$400,000 to succeed the Southwestern Street Railway, which was sold under foreclosure on April 21, 1911, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, page 893. The officers of the Philadelphia Railways are: Isaac H. Silverman, president; Alvin W. From, secretary; Benjamin Wolfe, treasurer.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—Lee, Higginson & Company, Boston, Mass., who recently purchased \$150,000 of the first and

refunding mortgage 5 per cent bonds of the Terre Haute, Indianapolis & Eastern Traction Company, due April 1, 1915, are offering the issue for sale at 96 and interest. This makes \$6,300,000 of the issue outstanding.

Western Ohio Railroad, Lima, Ohio.—A statement has been issued by the managers of the first mortgage bond and pooling agreement, requesting holders of the bonds of the Western Ohio Railroad to extend the present deposit agreement, which expires on June 1, 1911, for another year, subject to all of the terms of the old agreement.

Winnipeg (Man.) Electric Railway.—A quarterly dividend of 3 per cent has been declared on the \$6,000,000 of stock of the Winnipeg Electric Railway. The dividend is payable July 1, 1911, and compares with 2½ per cent paid quarterly for several years past.

Dividends Declared

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1¼ per cent.

Brooklyn (N. Y.) Union Elevated Railroad, 2½ per cent, preferred; 2½ per cent, common.

Grand Rapids (Mich.) Railway, quarterly, 1 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, ¾ of 1 per cent.

Northern Texas Electric Company, Ft. Worth, Tex., quarterly, 1½ per cent, common.

Pensacola (Fla.) Electric Company, 3 per cent, preferred.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BROCKTON & PLYMOUTH STREET RAILWAY.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Mar. '11	\$7,303	\$5,909	\$1,394	\$1,564	†\$170
1 " " '10	7,282	5,790	1,493	1,795	†302
12 " " '11	120,067	83,369	36,698	19,489	17,209
12 " " '10	130,144	94,121	36,023	20,822	15,201

CHATTANOOGA RAILWAY & LIGHT COMPANY.

1 m., Apr. '11	\$75,114	*\$43,042	\$32,072	\$20,012	\$12,060
1 " " '10	70,255	*41,806	28,449	18,180	10,269
4 " " '11	290,307	*167,844	122,463	77,836	44,627
4 " " '10	264,904	*161,748	103,156	72,136	31,020

EAST ST. LOUIS & SUBURBAN COMPANY.

1 m., Apr. '11	\$178,507	*\$106,155	\$72,352	\$45,433	\$26,919
1 " " '10	171,640	*100,943	70,697	45,151	25,546
4 " " '11	712,803	*413,419	299,384	181,724	117,660
4 " " '10	735,321	*409,794	325,527	180,702	144,825

GRAND RAPIDS RAILWAY.

1 m., Apr. '11	\$89,967	*\$54,348	\$35,619	\$15,038	\$20,581
1 " " '10	86,632	*48,732	37,900	14,913	22,987
4 " " '11	353,576	*202,754	147,822	60,326	87,496
4 " " '10	337,663	*189,848	147,815	61,015	86,800

JACKSONVILLE ELECTRIC COMPANY.

1 m., Mar. '11	\$51,901	\$28,376	\$23,524	\$10,450	\$13,074
1 " " '10	52,558	26,974	25,584	9,469	16,115
12 " " '11	584,592	319,494	265,098	116,039	149,059
12 " " '10	514,129	275,060	239,069	112,350	126,719

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.

1 m., Apr. '11	\$38,736	*\$25,150	\$13,586	\$13,340	\$246
1 " " '10	37,883	*24,721	13,162	13,932	†770
10 " " '11	435,013	*276,699	158,314	131,665	26,649
10 " " '10	433,552	*257,402	176,150	145,045	31,105

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

1 m., Mar. '11	\$397,340	\$221,315	\$176,025	\$119,946	\$56,529
1 " " '10	377,004	206,141	170,862	111,626	59,236
3 " " '11	1,197,793	641,310	556,482	354,621	201,861
3 " " '10	1,117,684	614,078	503,605	329,487	174,118

MILWAUKEE, LIGHT, HEAT & TRACTION COMPANY.

1 m., Mar. '11	\$119,287	\$39,493	\$79,793	\$68,776	\$11,018
1 " " '10	117,000	34,829	82,171	67,483	14,688
3 " " '11	357,372	111,382	245,990	206,248	39,742
3 " " '10	339,664	102,779	236,885	201,654	35,231

PENSACOLA ELECTRIC COMPANY.

1 m., Mar. '11	\$22,841	\$13,986	\$8,855	\$6,085	\$2,771
1 " " '10	21,536	12,649	8,888	4,913	3,974
12 " " '11	278,677	163,685	114,992	64,074	50,918
12 " " '10	250,741	144,606	106,136	54,041	52,094

PORTLAND RAILWAY, LIGHT & POWER COMPANY.

1 m., Apr. '11	\$526,475	*\$246,045	\$280,430	\$121,231	\$159,199
1 " " '10	440,560	*207,119	233,441	113,589	119,852
4 " " '11	2,032,114	*998,015	1,034,099	491,506	542,593
4 " " '10	1,700,298	*811,216	889,082	448,044	441,038

PUGET SOUND ELECTRIC RAILWAY.

1 m., Mar. '11	\$142,669	\$105,414	\$37,255	\$51,777	†\$15,021
1 " " '10	157,779	125,178	32,601	50,607	†18,006
12 " " '11	1,898,978	1,251,647	647,330	610,610	36,720
12 " " '10	1,912,138	1,290,038	622,100	586,833	35,268

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.

1 m., Apr. '11	\$84,700	*\$54,159	\$30,541	\$19,693	\$10,848
1 " " '10	77,990	*49,664	28,326	18,250	10,076
4 " " '11	346,542	*208,544	137,998	77,642	60,356
4 " " '10	329,028	*198,389	130,639	72,276	58,363

Traffic and Transportation

San Francisco's No-Seat-No-Fare Ordinance

The no-seat-no-fare ordinance introduced in the Council of San Francisco on April 24, 1911, by Supervisor Walsh and published in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 856, came up for consideration recently before the Council. Thornwell Mullally, assistant to the president of the United Railroads, protested against the ordinance, and after considerable deliberation the matter went over for further consideration. During the discussion of the ordinance a recommendation was made by Supervisor Murdock that Bion J. Arnold should be engaged to report on street railway conditions in San Francisco with a special view to suggesting changes to alleviate the conditions which prompted Mr. Walsh to introduce his no-seat-no-fare measure. The members of the utility committee of the Council were favorably impressed with Mr. Murdock's resolution, and it was decided to inquire under what terms Mr. Arnold would prepare a report for the Council.

Mr. Mullally referred in his remarks to the unjustness, unreasonableness and consequent illegality of the proposed ordinance. He attempted to show, by citing individual cases, that the service would be hampered rather than improved by the passage of the measure, and that it would work a hardship and inconvenience alike upon the company and the traveling public. Mr. Mullally pointed out that the inconvenience of waiting for a car in which there was a vacant seat would be greater than that of standing in the first car that came along, and added that this imposition would deter many persons from visiting the city. In conclusion, he asked that the board defer action until such time as the company had been able to get all its new cars in operation.

Reduction in School Fares in Shreveport.—The Shreveport (La.) Traction Company has decided to reduce the fare over its lines to school children from 3 cents to 2½ cents.

Accidents in Pennsylvania in March.—Fifteen persons were killed on the street railways in Pennsylvania during March and 309 were injured. Of the number killed two were passengers and two were trespassers.

Indiana Road Considering Fare Increase.—The Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has under consideration a plan to increase its passenger rates from 1½ cents a mile to 2 cents a mile.

Takes Lease on Space for Interurban Station.—The Ohio Electric Railway has leased the east half of the ground floor of the new Peter E. Schwab Building, at Hamilton, Ohio, for an interurban station. The lease runs for five years from June 1, 1911.

Mail Service Extended on Evansville Line.—H. M. Swetnam, chief clerk of the Railway Mail Service, with headquarters at Louisville, Ky., is investigating the question of extending the "closed pouch" service on the Evansville (Ind.) Railways from Rockport to Grand View.

Increase in Wages in Berlin, Ont.—The Berlin & Waterloo Street Railway has increased the wages of its employees 1 cent an hour. The new schedule follows: First year, 15 cents per hour; second year, 17 cents; third year, 19 cents; fourth year, 20 cents.

Auto-Bus Line in Indianapolis.—A company has been organized in Indianapolis with a capital of \$150,000 to put in service an auto-bus line on Meridian Street in Indianapolis. The fare will be placed at 5 cents and the buses will compete with the Pennsylvania and Illinois Street lines of the Indianapolis Traction & Terminal Company. The cars will be run from 6:30 a. m. to 10:30 p. m. The president of the company is James Eaglesfield.

Through Service Between St. Joseph, Mich., and Goshen, Ind.—Through service has been established between St. Joseph, Mich., and Goshen, Ind., over the lines of the Southern Michigan Railway and the Northern Indiana Railway via South Bend. By extending the service to Peru over the Winona Interurban Railway and from Peru to Indianapolis over the lines of the Indiana Union Traction

Company a through route of 225 miles from Indianapolis to St. Joseph could be established.

Special Car from Louisville to Meeting of C. E. R. A.—A special car will probably be run through from Louisville, Ky., to St. Joseph, Mich., at the time of the annual convention of the Central Electric Railway Association, which officers of the Louisville & Southern Indiana Traction Company, Louisville & Northern Railway & Lighting Company and other companies plan to attend. M. J. Insull, president of the Louisville & Northern Railway & Light Company, and H. H. Buckman, master mechanic of that company, and chairman of the standardization committee of the association, plan to attend the meeting.

Toledo & Indiana Railway Employees Plead Guilty to Charge of Larceny.—Lawrence M. Fisher, assistant agent of the Toledo & Indiana Railway at Delta, Ohio; Harry Guthrie, H. A. McCormick and Walter Bush, conductors, were arrested in Toledo recently and taken to Wauseon for trial, where they entered a plea of guilty to the charge of larceny. Bush was fined the costs, but the others were each given a fine of \$100 and sentenced to serve three months in the Fulton County Jail. It is said that the conductors and the assistant agent had an understanding whereby uncanceled tickets were to be returned to the latter and sold again.

Car Rowdy Commits Murder.—To the history of previous cases of rowdyism on street cars with their record of serious maltreatment of employees and passengers there was added on the evening of May 17, 1911, in New York, a case which for open contempt alike of the rules of a street railway and of ordinances and statutes and in its appalling consequences was certainly very terrible. A colored man who was smoking a cigarette on the platform of a car on the Sixth Avenue elevated line of the Interborough Rapid Transit Company ran amuck when remonstrated with first by the conductor and then by a passenger for smoking, and killed two men and injured several persons, one a little girl.

Fare Changes of Western New York & Pennsylvania Traction Company.—The Western New York & Pennsylvania Traction Company, Olean, N. Y., has filed with the Public Service Commission of the Second District of New York, to become effective on June 7, 1911, the following changes in fare: Local one-way fare in both directions between Carrollton and Killbuck, 14 cents, an advance of 7 cents; local round-trip fare between Salamanca and Little Valley, 25 cents, a reduction of 31 cents. Ticket books containing seventy-five coupons of a face value of 7 cents each for local transportation will be sold for \$5 per book, a reduction of 25 cents, and ticket books containing fifteen coupons of a face value of 7 cents each will be sold for \$1 per book, a reduction of 5 cents.

Through Service to Be Established Between Cleveland and Detroit.—Arrangements have been completed by the Lake Shore Electric Railway and the Detroit United Railway for a through service between Cleveland and Detroit by way of Toledo. The tracks of the Detroit, Monroe & Toledo Short Line will be used between Detroit and Toledo and those of the Lake Shore Electric Railway between Toledo and Cleveland. Trains will stop at the Toledo union station, but there will be no change at that point. F. W. Coen, general manager of the Lake Shore Electric Railway, states that trains will be started from Cleveland every two hours. The running time between the terminals will be six hours.

Fare Action Against Westchester Street Railroad.—The Public Service Commission of the Second District of New York has directed its counsel to commence an action in the Supreme Court against the Westchester Street Railroad to prevent by mandamus or injunction the collection of a 10-cent fare for passengers riding on its cars in either direction between the Bronx River in White Plains and any point on its line in Mamaroneck, contrary to the terms of a franchise granted by Mamaroneck on Oct. 25, 1899, to the Tarrytown, White Plains & Mamaroneck Railway and accepted by the company. The obligation of the franchise has devolved upon the Westchester Street Railroad, which took title to and is operating a large part of the lines, property and equipment of the Tarrytown, White Plains & Mamaroneck Railway.

Checking Baggage on the Spokane & Inland Empire Railroad.—The traffic department of the Spokane & Inland Empire Railroad, Spokane, Wash., on May 22, 1911, instituted a system of checking baggage from hotels and residences in Spokane in connection with the Pacific Transfer Company to all points on the electric railway. The announcement of this service made the following statement: "When proper transportation is presented by passenger, either at terminal baggage room or to an agent of the Pacific Transfer Company, duplicate checks will be issued and baggage delivered at our station checked through to destination without further trouble to passenger. This business will be handled under baggage checks, form 'Special,' and excess charges will be covered by C. O. D. checks, to be collected at destination."

Buffalo & Lake Erie Traction Company Fares.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has announced that hereafter it will sell books containing forty-six one-way coupons good for the transportation of pupils between the ages of five years and eighteen years attending school in both directions between Buffalo city line and local stations at the following rates per book: Angola, \$5.50; Athol Springs, \$3.15; Blasdell, \$2.40; Bay View, \$2.90; Clover Bank, \$3.50; Derby, \$4.75; Dunkirk, \$10; Franham, \$6.40; Hamburg-on-Lake, \$3.30; Idlewood, \$4.05; Irving, \$7; Lake View, \$4; North Evans, \$4.50; Silver Creek, \$7.60; Wanakah, \$3.50; Weyer, \$3.75. No school commutation fares have been in effect heretofore on the lines of the company. The coupons in the new books are for use on school days only and must be used forty-five days from the date of the sale.

Complaint About Fare on Rochester & Eastern Rapid Railway.—The Public Service Commission of the Second District of New York has received a complaint from residents of Pittsford, Monroe County, stating that in June, 1910, they addressed a request to the Rochester & Eastern Rapid Railway asking for the restoration of commutation rates on that road and that the company has not taken any action on such request. These rates were withdrawn about three years ago, and complainants claim that the present rates are in excess per mile of those charged commuters on any other road of its class entering Rochester. They also claim that the rate per mile charged by this company is practically the same for long distances as for shorter ones, whereas the other roads give a lower average rate per mile for longer distances. The commission has served the complaint upon the company.

Court Decision in Westwood Fare Case.—The full bench of the Massachusetts Supreme Court has held that the Selectmen of Westwood were entitled to a mandatory injunction against the Dedham & Franklin Street Railway, successor to the Norfolk Western Street Railway, to compel it to comply with the terms of an original grant of location in the town requiring a 5-cent fare for any trip within or from the town to Medfield or Dedham, the termini of the line. The location and terms were accepted before the general street railway statute as to the granting of locations, and the court holds that it is binding even though, with the increased fare in force, the old road has been constantly facing a deficit, though economically operated. The road changed from the 5-cent fare at first in January, 1908, when it charged two 5-cent fares between Westwood and either terminus. In March, 1909, it changed to 10 cents and in June of that year to 6 cents as the unit.

Report in Regard to Service Between Newark and Upper Montclair.—In the determination of a complaint filed by residents of Upper Montclair regarding the service furnished by the Public Service Railway on its Valley road line, the Board of Public Utility Commissioners of New Jersey has handed down a memorandum making several recommendations to the company for the betterment of the service. The board, however, found that it would not be feasible to carry into effect all the suggestions made by the complainants. The board was requested to ascertain if it would not be feasible for the company to run Valley road cars during the rush hours direct between Newark and the terminal point without change at intervals of not more than thirty minutes. Cars are run on a 10-minute schedule during rush hours and on 12 and 15-minute schedules when travel is lighter. In the judgment of the board the number of cars provided is reasonably adequate for present traffic.

Personal Mention

Mr. Richard Darrow has been appointed superintendent of transportation of the Iowa & Illinois Railway, Davenport, Ia.

Mr. J. A. Durham, formerly superintendent of transportation of the Denison & Sherman Railway, Denison, Tex., has been appointed superintendent of transportation of the Citizens' Railway, Waco, Tex.

Mr. Arthur G. Jack, who has been superintendent of the Southern Pennsylvania Traction Company, Chester, Pa., for a number of years, has been appointed general claim agent of the Wilmington & Philadelphia Traction Company.

Mr. S. W. Greenland has been appointed purchasing agent of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind. For the last four years Mr. Greenland has been connected with the Columbus Railway, Light & Power Company, Columbus, Miss., as secretary, treasurer and general manager.

Prof. Henry C. Adams has resigned as head of the Bureau of Statistics and Accounts of the Interstate Commerce Commission, Washington, D. C. In his place the commission has appointed Mr. Charles A. Lutz, now chief examiner of accounts, to take charge of the work in the division of carriers accounts, and Mr. William J. Meyers, now statistician, to take charge of the division of statistics.

Mr. F. J. De Lisle has been appointed superintendent of the interurban lines of the East St. Louis & Suburban Railway, East St. Louis, Ill., and the Alton, Granite & St. Louis Traction Company, the interurban lines of these companies having been consolidated with headquarters at Granite City. Mr. De Lisle has as his assistants Mr. Edward Johnson and Mr. F. A. Campbell, both of whom were connected with the lines which have been merged.

Mr. A. P. Lewis, for the last four years assistant engineer of the Chicago (Ill.) City Railway, has been appointed superintendent of power and shops of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, effective on June 1, 1911. Mr. Lewis was graduated from South Carolina Agricultural and Mechanical College, Clemson, S. C., in 1900 and for one year was in charge of the electrical laboratory and lighting and power plant of the college. In 1902 he became connected with the test department of the General Electric Company at Schenectady, N. Y., and in 1903 was engaged on construction work for the company. From 1904 to 1907 he was connected with the engineering department at the Chicago offices of the General Electric Company. In the fall of 1907 he resigned to join the engineering staff of the Chicago City Railway as an assistant engineer and since that time during the rehabilitation period he has been engaged in erecting substations and other power work of this company.

Mr. C. A. Cahill, whose appointment as chief engineer of power plants of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to succeed Mr. C. J. Davidson, resigned, was announced in the *ELECTRIC RAILWAY JOURNAL* of May 20, 1911, was born in New Hampshire and educated in the common schools and high schools in New England. He served an apprenticeship with a firm in Providence, R. I., to become a machinist, and after completing his work with this company he went West, where he served various engine builders. Mr. Cahill entered upon his street railway career on March 15, 1898, as chief engineer of the Sioux City (Ia.) Traction Company. He became connected with the Milwaukee Electric Railway & Light Company in November, 1900, as assistant chief engineer of power plants, and has been connected with the company continuously since that time, his work extending to the operation and construction of the various power plants and substations of the company.

Mr. John H. Sullivan, manager of the Memphis Demurrage & Storage Association, has been elected president of the Lake View Traction Company, Memphis, Tenn., to succeed Mr. R. F. Tate. Mr. Sullivan was born in Ireland in 1848, and entered railway work in 1862. He has served successively with the Hannibal & St. Joseph Railroad as clerk and chief clerk, as superintendent of the Minneapolis

& Dakota division of the Northern Pacific Railroad; superintendent of the Missouri, Kansas & Texas Railway; superintendent of the Northern Division of the St. Paul, Minneapolis & Manitoba Railway; superintendent of transportation of the Northern Pacific Railway; superintendent of the Arkansas Division of the Kansas City, Springfield & Memphis Railway, and from September, 1886, to December 1, 1900, he was superintendent of the Kansas City, Memphis & Birmingham Railway and the Eastern Division of the Kansas City, Fort Scott & Memphis Railway. In June, 1904, he was appointed manager of the Memphis Car Service Association.

Mr. J. N. Shannahan, vice-president and general manager of the Washington, Baltimore & Annapolis Electric Railway, has resigned from that position to take effect July 1, when he will assume the duties of railway manager of the operating department of J. G. White & Company, Inc., New York. Mr. Shannahan has achieved an enviable reputation as railway manager and has also taken a prominent part in association activities during his connection with electric railway work. He is a native of Troy, N. Y., where he was born in 1872. He was graduated from the Rensselaer Polytechnic Institute in 1894 as civil engineer. After a short connection with the Watervliet Arsenal of the government he entered the service of the New York Central & Hudson River Railroad in the signal department, and on July 1, 1895, was appointed inspector of signals on the western division of that company. In 1899 he accepted the position of chief engineer of the Fonda, Johnstown & Gloversville Railroad and in 1903 was made general superintendent of the company, with jurisdiction over the company's steam and electric properties. At the same time he was general manager of the Edison Electric Light & Power Company at Amsterdam, N. Y. In 1904 he was also elected president of the Adirondack Lakes Traction Company. On July 1, 1907, he severed all of these business connections to become vice-president and general manager of the Washington, Baltimore & Annapolis Electric Railway. While connected with the New York State properties Mr. Shannahan was elected president of the Street Railway Association of the State of New York and occupied this office during the year 1906-1907. During the years of 1907-08 and 1908-09 he served as chairman of the committee on interurban rules of the American Electric Railway Transportation & Traffic Association, and at the last annual meeting was elected first vice-president of that organization.

OBITUARY

Ralph Cranmer, a designing engineer with the Public Service Commission for the First District of New York, died on May 18, 1911. Mr. Cranmer was born in Tuckerton, N. J., on July 27, 1866. He was graduated from Lafayette College with the degree of C. E., in June, 1888. He was one of the first men appointed to the designing department of the Rapid Transit Commission, and when the Public Service Commission began work in July, 1907, he entered its employ as assistant engineer. Last year he was appointed designing engineer. Mr. Cranmer did a great deal of work on the plans for the new subways.

The Public Service Social Club of the Passaic Division of the Public Service Railway expressed appreciation of their veteran superintendent, George Stone, who has just recovered from a severe illness, by tendering him a very sumptuous dinner at Crawford's in Paterson, N. J., on the evening of May 10. Nearly 150 men representing all departments, but mostly composed of motormen and conductors, were in attendance. One of the features of the affair was the presentation of a handsome floral horseshoe to Mr. Stone. Messrs. Bolen, Brown, Graham and Baurhenn represented the general railway offices, while Colonel Rogers and Theodore Bunker represented the gas and electric department. The Trainmen's Social Club of Public Service Railway, gave a smoker at the Camden headquarters on May 12, which was attended by nearly 300 employees. Several good acts of vaudeville together with musical numbers comprised the program. Messrs. Bolen, Brown and Bailey made speeches, as did also several of the employees of the company who have long been in its service.

Construction News

Construction News Notes are classified under each head-alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Moodus & East Hampton Electric Railroad, Moodus, Conn.—Incorporated in Connecticut to build an electric railway to connect Moodus, East Hampton and Marlboro Mills. E. W. Crocker, Moodus, is interested. [E. R. J., Jan. 14, '11.]

***Interurban Construction Company, Hastings, Minn.**—Incorporated in Minnesota to build an electric railway from the Twin Cities to Lake City. Capital stock, \$100,000. Incorporators: A. T. Stebins, Rochester; Albert Schaller, Hastings, and Edward Feldhauser, St. Paul.

***Manhattan Bridge Service Company, Albany, N. Y.**—Incorporated in New York to build a 2-mile electric railway from Manhattan Plaza to Fulton Street and Flatbush Avenue extension in Albany. Capital stock, \$25,000.

Willamette & Molalla Valley Railway, Canby, Ore.—Incorporated in Oregon to build a 12½-mile electric railway from the Willamette River up the Molalla Valley to Canby. Capital stock, \$250,000. W. J. Lee, Canby, general manager. [E. R. J., May 6, '11.]

***Philadelphia Railways, Philadelphia, Pa.**—Chartered in Pennsylvania to succeed the Southwestern Street Railway, which was sold under foreclosure on April 21, 1911, as noted in the ELECTRIC RAILWAY JOURNAL of April 29, 1911. Capital stock, \$400,000. Officers: Isaac H. Silverman, president; Benjamin Wolf, treasurer, and Alvin W. From, secretary. Headquarters: 605 Land Title Building, Philadelphia.

***Mineral Heights Traction Company, Greenville, Tex.**—Incorporated in Texas to build an electric railway from Mineral Heights to Greenville, a distance of 2 miles, to connect with the electric railways in Greenville. Work has been begun securing right-of-way. Capital stock, \$17,500. Officers: A. R. Nicholson, president; J. E. Morris, vice-president; J. W. Castleberry, secretary, and A. W. DeFee, treasurer.

***Henrico & Chesterfield Railroad, Richmond, Va.**—Chartered in Virginia to build a 6-mile electric railway from Ridge Church, Henrico County, to Bon Air, Chesterfield County, and cross the Southampton Bridge at the Country Club. Maximum capital stock authorized, \$50,000. Minimum capital stock authorized, \$20,000. Officers: Thomas S. Winston, president; W. O. Burton, vice-president; William C. Schmidt, secretary and treasurer; George Bryan, John B. Badenoch and M. G. Wright, all of Richmond. Headquarters, Richmond.

FRANCHISES

Gadsden, Ala.—The Tidewater Development Company has received from the City Council a franchise to build its railway over certain streets in Gadsden. The line is to extend between Gadsden and Birmingham.

Chico, Cal.—The Northern Electric Railway has received a fifty-year franchise from the Board of City Trustees to build a double-track line over Main Street its entire length within the city limits.

Riverside, Cal.—The Pacific Electric Railway, Los Angeles, has asked the City Council for a franchise to build its tracks over the right-of-way for the Magnolia Avenue extension in Riverside.

Oak Park, Ill.—The Chicago & Oak Park Elevated Railroad, Chicago, has received a franchise from the Village Council to build its tracks north and south through Oak Park.

***Keokuk, Ia.**—The Stone & Webster Company has asked the Council for an electric railway franchise in Keokuk.

***Perry, Ia.**—C. D. Jones and associates have asked the Council for a franchise for an electric railway in Perry.

Shelbyville, Ky.—The Louisville & Interurban Railway has received a ninety-nine-year franchise from the Board of Directors to build its tracks over certain streets in Shelbyville.

Sioux City, Ia.—The Sioux City, Crystal Lake & Homer Railway, Sioux City, has asked the City Council for another franchise to extend its railway through Sioux City.

Houghton, Mich.—The Houghton County Traction Company has received a franchise from the Common Council to improve its tracks on Quincy Street, in Houghton.

Asheville, N. C.—The Asheville Electric Company has asked the Board of Aldermen for a franchise to extend its lines in Asheville.

Amityville, N. Y.—The Babylon Railroad, a subsidiary line of the South Shore Traction Company, has asked the Board of Trustees for a new franchise to operate its railway through Green Street in Amityville.

Corning, N. Y.—The Corning & Painted Post Street Railway, Corning, will ask the Common Council for a franchise to extend its tracks in Corning to North Corning.

Irwin, Pa.—The Westmoreland County Railway, Pittsburgh, has asked the City Council for a franchise to build its tracks over certain streets in Irwin. The company's line now ends at the foot of Pennsylvania Avenue. If given the franchise the company will build an iron bridge across the ravine at a cost of \$20,000. It is expected to extend this line to North Irwin.

Pittsburgh, Pa.—The Pittsburgh Railways has received several franchises from the City Council to extend its tracks on Diamond Street from Smithfield to Wood Street, and to connect its tracks near the end of Butler Street with the tracks on Aspinwall Bridge in Pittsburgh.

Cleburne, Tex.—The Cleburne Street Railway has received a franchise from the City Council to build its tracks on North Main Street, in Cleburne.

Cleburne, Tex.—The Ft. Worth, Cleburne & Dallas Railway has received a franchise from the City Council to build its tracks on Collinson Street and North Main Street, in Cleburne. H. M. Hyatt, Kansas City, Mo., is interested. [E. R. J., Aug. 7, '09.]

Centerville, Utah.—The Utah Light & Railway Company, Salt Lake City, has received a franchise from the County Commissioners to build its tracks from North Salt Lake City through Bountiful to Centerville.

Blaine, Wash.—The Nooksack Valley Traction Company, Bellingham, has asked the City Council for a railway franchise through Blaine. It will connect Bellingham, Sumas, Ferndale, Lyden and Blaine. [E. R. J., April 22, '11.]

Olympia, Wash.—The Olympia Light & Power Company has received a fifty-year franchise from the Council to extend its tracks in the western part of Olympia.

Seattle, Wash.—George W. White and associates have received a fifty-year franchise from the County Commissioners to build a 4-mile line from Seattle to Lake Burien. [E. R. J., April 1, '11.]

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has asked the Common Council for a franchise to build a crosstown line on one of the streets from Seventeenth Street to Twenty-first Street, in Milwaukee.

TRACK AND ROADWAY

Alberta Electric Railway, Calgary, Alta.—A bill has passed through the Provincial Parliament granting a charter to this company, which was recently chartered by the Dominion Parliament. Work will be begun at once on the line which is to connect Banff, Medicine Hat, Lethbridge and Calgary. The first section to be built will be from Calgary to Banff. [E. R. J., April 8, '11.]

Little Rock Railway & Electric Company, Little Rock, Ark.—This company is now reconstructing and paving two miles of track, using Lorain Steel Company's section 72-331, in Little Rock.

***Sierra County Railroad, Sacramento, Cal.**—A company has been formed to insure the construction of this proposed railway to connect the towns of Sierra, Wyandotte, Bangor and Nord.

Northern Electric Railway, San Francisco, Cal.—This company advises that its joint railway and highway bridge across the Sacramento River at M Street in Sacramento connecting counties of Sacramento and Yolo is nearing

completion. The contract for electrical machinery has been awarded to the Westinghouse Electric & Manufacturing Company, and the erection contract has been awarded to the Duncanson Hareless Construction Company, Chronical Building, San Francisco. The American Bridge Company has the contract for the steel work and the foundation work is being done by the Missouri Valley Bridge & Iron Company.

Colorado Interurban Railroad, Denver, Col.—At a meeting of the directors of this company on May 13 a \$6,000,000 bond issue was authorized. The company was recently incorporated with \$6,000,000 to build an electric railway from Denver to Greeley with a branch from Fort Lupton to Longmont and ultimately to Estes Park. Construction will begin within ninety days. Officers: Irving Hale, president; Eben N. Reaser, first vice-president; D. E. Young, second vice-president; O. L. Storrs, secretary; E. E. Armour, treasurer, and Charles H. Pierce, general counsel. [E. R. J., May 13, 1911.]

Belleville & Western Railway, Belleville, Ill.—This company advises that it has completed grading and bridging about 7 miles of its line to connect Millstadt, Smithton, Hecker and Red Bend. It expects to extend this railway to Murphysboro, a distance of 70 miles. The company will furnish power for lighting purposes. Capital stock authorized, \$2,500. Capital stock issued, \$2,500. Officers: B. A. Gundlack, Belleville, president and general manager; John D. Vogt, Belleville, vice-president; Victor J. Adams, Coulterville, secretary, and T. W. Hofsemmer, Belleville, treasurer. [E. R. J., March 4, '11.]

Carmi-Fairfield Traction Company, Burnt Prairie, Ill.—This company advises that construction will begin when it has financed its proposition to build its proposed 25-mile electric railway to connect Carmi, Burnt Prairie and Fairfield. Its power house and repair shops will be located at Burnt Prairie. The company will furnish power for lighting purposes. Officers: G. H. Brown, Burnt Prairie, president; J. R. Morrison, Burnt Prairie, vice-president; J. A. Vaughan, Burnt Prairie, secretary, and Mark Wymond, 114 East St. Louis, Chicago, Ill., chief engineer. [E. R. J., Sept. 25, '10.]

Chicago (Ill.) Railways.—The Lorain Steel Company has been awarded the contract for 10,000 tons of girder rails. The contract for 5000 tons of girder rails has been let to the Pennsylvania Steel Company.

Metropolitan West Side Elevated Railway, Chicago, Ill.—A double-track surface extension of the Garfield Park line of this road will be built over the 100-ft. right of way of the Aurora, Elgin & Chicago Railway from Fifty-second Avenue to Desplaines Avenue near the western city limits of Chicago. Joint service by these two roads is now operated over the double-track line of the Aurora, Elgin & Chicago, but two more tracks will be built at once on the same right of way. This connection will require 7 miles of new track, which will be laid with 80-lb. rails and be built for heavy, fast service under third-rail operation. The new work will also require the construction of three new stations, which will be of the island platform type, and the remodeling of several other stations. On completion of the two new tracks the Metropolitan will occupy the two to the north and the Aurora, Elgin & Chicago the two to the south. These tracks, as now, will be fed from the west end by the Aurora, Elgin & Chicago substation at Maywood and from the east end by the Metropolitan rotary-converter and battery station at Forty-sixth Avenue. It is quite probable that the Metropolitan will install 2,000,000 circ.-mil. additional feeder capacity from Forty-sixth Avenue to connect with the working conductor of the new line.

Illinois Light & Traction Company, Streator, Ill.—This company will rebuild about 5 miles of its track in the city of Streator.

Toledo, Defiance & Ft. Wayne Electric Railway, Ft. Wayne, Ind.—This company has begun grading for its proposed electric railway to connect Ft. Wayne, Defiance, Harlan, Hicksville, Maysville and Bryan, Ohio. Five bridges have been constructed and five more will be built. Elmer Zeist, Philadelphia, has the contract for building the large bridges. It is said that financial backing has been secured.

When completed this railway will give a direct interurban line between Ft. Wayne and Cleveland and Sandusky, Ohio.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Plans are being considered by this company for an extension from Clinton to Fairview Park. It is believed that the line will be built this year.

Southeastern Interurban Railway, Vincennes, Ind.—It is reported that plans are being made by this company for building an electric railway from Vincennes to Jasper and ultimately to West Baden. George B. Hazleton, Vincennes, president. [E. R. J., April 8, '11.]

Louisville (Ky.) Railway.—This company has been conferring with the engineers of Louisville and representatives of a steam line in Louisville with reference to the construction of viaducts or underpasses at Market Street, Bank Street and Portland Avenue where those streets, which carry car lines, are crossed by the Kentucky & Indiana Terminal Railroad, a belt line. The Board of Public Works, Louisville, is endeavoring to eliminate as many grade crossings as possible, and the officials of the roads interested have intimated that they are willing to make the necessary expenditures. The cost of the work outlined will be about \$400,000.

Western Kentucky Electric Railways, Owensboro, Ky.—This company has been organized with a capital of \$2,000,000 to build an electric railway to connect Owensboro, Madison, Calhoun, Utica and Henderson. This means that a line from Evansville to Henderson across the river will be constructed. About \$25,000 of stock has been subscribed and this will be used in having surveys and estimates made. E. F. Wheaton, Owensboro, is interested. [E. R. J., May 13, '11.]

Frederick (Md.) Railroad.—This company has applied to the Public Service Commission for authority to issue \$156,000 of 5 per cent bonds to make improvements and extensions.

***Bath, Me.**—Plans are being considered by citizens of Bath for the construction of an electric railway from Bath to Popham Beach, a distance of 12 miles, to connect at Bath with the Lewiston, Augusta & Waterville Railway and afford a direct electric line access to the ocean from Bath, Brunswick, Lisbon, Lewiston and Auburn.

Aroostook Valley Railroad Company, Presque Isle, Me.—It is announced that construction will begin on the branch of this railway to Caribou as soon as the charter granted by the Legislature becomes effective, which will be June 29.

Minneapolis Northern Suburban Railway, Minneapolis, Minn.—At a recent meeting \$30,000 of stock was subscribed by the citizens of Amoka, and work will be begun soon constructing this line to connect Minneapolis, Amoka, Onaway, Fridley and Little Falls. W. J. Whitcomb, Minneapolis, president, and H. A. Pathey, Minneapolis, vice-president. [E. R. J., May 20, '11.]

East St. Louis, Columbia & Waterloo Railway, St. Louis, Mo.—This company advises that 3000 ft. of track has been constructed in East St. Louis, but owing to complications concerning right-of-way there is an indefinite delay in the work. The line will be 22 miles long and will connect St. Louis, East St. Louis, Columbia, Dupo, Prairie du Pont, Bixley and Waterloo. The power will be purchased from the East St. Louis & Suburban Railway. Headquarters: 610 Laclede Building, St. Louis, Mo. Capital stock authorized, \$750,000; capital stock issued, \$10,000; bonds authorized, \$750,000. Officers: E. H. Courades, 314 Fourth Street, St. Louis, president; E. F. Schoenig, Columbia, Ill., vice-president; W. F. Gould, secretary; G. C. Boyne, treasurer, and Baxter L. Brown, 610 Laclede Building, St. Louis, Mo., chief engineer. [E. R. J., Jan. 8, '10.]

Jersey Central Traction Company, Keyport, N. J.—Plans are being considered by this company for building an extension from Red Bank to Long Branch via Little Silver, Port-au-Peck and Branchport.

Corning & Painted Post Street Railway, Corning, N. Y.—This company plans to spend about \$400,000 in the near future on improvements to its line. The tracks will be extended in Corning, and Main Street will be double tracked.

Elmira Water, Light & Railroad Company, Elmira, N. Y.

—This company will rebuild 1 mile of track in Watkins and Montour Falls, replacing 60-lb. rails with 75-lb. rails, during the next few weeks.

Hornell (N. Y.) Traction Company.—This company will rebuild several of its lines in Hornell.

Rochester (N. Y.) Traction Company.—The Carnegie Steel Company has sold to this company about 20,000 steel ties.

Geneva & Auburn Railway, Seneca Falls, N. Y.—About \$45,000 will be spent by this company extending its tracks and reconstructing some of its lines with 80-lb. rails in Seneca Falls. Work has been begun.

Fargo & Moorland Street Railway, Fargo, N. D.—This company will place contracts during the next four weeks for building a steel lift bridge 60 ft. long with approaches 150 ft. x 400 ft. Plans will be ready about June 1.

Grand Forks (N. D.) Street Railway.—During the next five weeks this company will award contracts for building about a mile of new track in Grand Forks. J. Roycraft, general manager.

Cleveland (Ohio) Electric Railways.—The Carnegie Steel Company has received an order from this company for 20,000 steel ties.

Columbus (Ohio) Traction Company.—This company has ordered 20,000 steel ties from the Carnegie Steel Company.

Sand Springs Interurban Railway, Tulsa, Okla.—It is reported that this company has completed and placed in operation its 6-mile electric railway from Sand Springs to Tulsa. Right of way has been secured and work will begin immediately on an extension to Collinsville to connect with the Missouri Pacific's Iron Mountain division. Charles Page, president. [E. R. J., May 13, '11.]

Lehigh Valley Transit Company, Allentown, Pa.—Construction has been begun by this company on its 2½-mile extension to Perkasio. Three large bridges will be built, a trestle from Perkasio Park and a tunnel for cars only under the railroad at about Walnut Street, Perkasio.

Cleveland & Erie Railway, Girard, Pa.—This company is ballasting with gravel 6 miles of its track between Erie city limits and Swanville.

***Myton, Utah.**—Plans are being considered for building an 80-mile electric railway to connect Colton, Theodore, Myton and Roosevelt.

Utah Light & Railway Company, Salt Lake City, Utah.—Work has been begun by this company on an extension of its West Temple Street line in Salt Lake City.

Buckhannon, Weston & Glenville Electric Railway, Buckhannon, Va.—This company advises that it is only partially organized. Surveys have not yet been made. The following officers have been elected: L. H. Morrison, president; J. G. Hall, vice-president, and Harvey Gaston, secretary. [E. R. J., Sept. 17, '10.]

Chehalis & Cowlitz Railroad, Chehalis, Wash.—This company advises that it will build this year about 20 miles of its railway to extend through farming, timber and coal territory south and east of Chehalis. The company is yet undecided as to the use of electricity or steam as motive power. It will purchase power if electricity is used. Capital stock, authorized, \$300,000. Bonds, authorized, \$300,000. Officers: H. C. Coffman, Chehalis, president and secretary; George A. Robinson, vice-president, and R. F. Smithwick, chief engineer. [E. R. J., May 13, '11.]

Washington-Oregon Corporation, Vancouver, Wash.—This company has just placed an order for approximately 75 tons of steel to be used in Vancouver on Main Street from Twelfth Street to Twenty-sixth Street, which is to be improved by bitulithic pavement.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—Plans are being considered by this company for an extension to Rothschild. Allen T. Russell, Chicago, general manager. [E. R. J., Feb. 11, '11.]

Wausau (Wis.) Street Railway.—Over \$50,000 will be expended by this company during the summer in improvements. Among the disbursements will be the double-tracking of Main Street in Wausau, building a large loop and erecting a new amusement pavilion at Rothschild.

SHOPS AND BUILDINGS

Oakland, Antioch & Eastern Railway, Oakland, Cal.—It is said that this company plans to purchase property at Fortieth Avenue and Shafter Avenue, in Oakland, on which it will build a terminal depot.

Vallejo & Northern Railway, Vallejo, Cal.—This company is considering plans to build a depot and warehouses in Vallejo.

Connecticut Company, New Haven, Conn.—This company has completed and placed in service its new carhouse on King's Avenue, in Middletown.

Metropolitan West Side Elevated Railway, Chicago, Ill.—This company is considering plans for the construction of three new stations which will be of the island platform type, and the remodeling of several other stations in Chicago.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company will build a new car house at once in Ft. Wayne. Other improvements are being planned on which work is to be begun soon.

Tri-City Railway & Light Company, Davenport, Ia.—It is reported that this company will begin at once the construction of its new carhouse and repair shops on Fifth Avenue and Thirty-sixth Street, in Davenport.

Ft. Dodge, Des Moines & Southern Railroad, Ft. Dodge, Ia.—It is reported that this company will soon build a new interurban station in Ft. Dodge.

Vicksburg (Miss.) Traction Company.—This company is now building a new carhouse east of the old one in Vicksburg.

Grand Forks (N. D.) Street Railway.—During the next five weeks this company expects to build a new carhouse in Grand Forks.

Electric Package Company, Cleveland, Ohio.—Willard Hirsh, architect, has awarded a contract for the construction of a new reinforced concrete and brick building for this company to the George B. McMillan Company. The building will be located just east of the present depot and will be 287 ft. long. The basement will be used for the accommodation of express and auto truck delivery and approach being made from either end of the building. It is to be completed within three months.

POWER HOUSES AND SUBSTATIONS

Little Rock Railway & Electric Company, Little Rock, Ark.—This company expects to install during the next few weeks a new intake and condensing system. D. A. Hegarty, Little Rock, general manager.

Connecticut Company, New Haven, Conn.—Work has been begun by this company on 39-ft. additions to its Buckland and Rockville substations, and as soon as the necessary machinery is installed the power for both the local and interurban lines will be furnished by the Commerce Street power house in Hartford. A 300-kw converter will be placed in the addition to the Buckland substation, while a 400-kw turbine has already been set up in the Commerce Street power house.

Interborough Rapid Transit Company, New York, N. Y.—This company has purchased the entire block bounded by 147th Street and 148th Street, Lenox Avenue and the Harlem River, in New York. This site abuts the property already belonging to this company, where its power house and yards for the storage of cars are located.

Washington Water Power Company, Spokane, Wash.—This company has ordered from the General Electric Company two three-phase generators of the horizontal type with a capacity of 13,000 kva. Four of these generators will eventually be installed at this plant. They are to be driven by I. P. Morris horizontal twin turbines, operating under a head of 170 ft.

Washington-Oregon Corporation, Vancouver, Wash.—This company has purchased one 400-kw motor generator set from the Westinghouse Electric & Manufacturing Company, and three 200-kw transformers, 11,000-2300-volt, from the General Electric Company.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—The contract for furnishing and installing a 1500-hp turbine for this company has been awarded to General Electric Company.

Manufactures & Supplies

ROLLING STOCK

Grand Forks (N. D.) Street Railway is considering the purchase of two cars.

Maysville (Ky.) Public Service Company is said to be in the market for several convertible cars.

Tide Water Power Company, Wilmington, N. C., has built three 50-ft. suburban cars at its shops.

Pensacola (Fla.) Electric Company expects to purchase soon four single-truck, double-end, semi-convertible cars.

Columbia Railway, Gas & Electric Company, Columbia, S. C., will order six cars through J. G. White & Company, New York, N. Y.

Jersey Central Traction Company, Keyport, N. J., has ordered ten No. 27-G-E-1 trucks, without wheels, from The J. G. Brill Company.

Memphis (Tenn.) Street Railway has ordered two 4000-gal. pneumatic sprinklers from the McGuire-Cummings Manufacturing Company.

Public Service Railway, Newark, N. J., has ordered two Simplex self-clearing trail dump cars from the Simplex Self-Clearing Car Company.

Boston (Mass.) Elevated Railway has ordered forty double Westinghouse-300 motor equipments for the subway cars now being built by the Standard Steel Car Company.

Walla Walla (Wash.) Valley Railway has ordered two Brill 27-E1 trucks with rolled-steel wheels and four Brill 27-G1 trucks without wheels from the Danville Car Company.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., has placed an order for two double-truck cars with the McGuire-Cummings Manufacturing Company.

New York, New Haven & Hartford Railroad, New Haven, Conn., is reported to have ordered fifteen electric locomotives from the Westinghouse Electric & Manufacturing Company.

Sand Spring Interurban Railway, Tulsa, Okla., has just received a 70-ft. gasoline motor car from the McKee Motor Car Company, and has ordered a second car of the same type.

Chicago, Aurora & DeKalb Railroad, Aurora, Ill., has purchased one express and baggage car from the McGuire-Cummings Manufacturing Company, equipped with Allis-Chalmers motors and Taylor triple M.C.B. electric trucks.

British Columbia Electric Railway, Vancouver, B. C., has ordered from the Westinghouse Electric & Manufacturing Company two 45-ton locomotives with quadruple equipments of No. 301 interpole railway motors and automatic unit switch control.

Oakland (Cal.) Traction Company has specified the following details for the sixty California-type, double-end open and closed prepayment cars being built by the St. Louis Car Company:

Seating capacity	48	Car trimmings	bronze
Weight (car body) ..	16,000 lb.	Control	double G.E.-K36
Bolster centers, length ..	23 ft.	Curtain fixtures ..	C. S. Co.
Length of body	35 ft. 2 in.	Curtain material ..	Pansasote
Over vestibule	47 ft. 6 in.	Fenders	Eclipse
Width over sills	8 ft. 10 in.	Gears and pinions ..	G.E.
Over all	9 ft. 1½ in.	Gongs	New Departure
Height, rail to sills	30 in.	Hand brakes	St. L.
Sill to trolley base ..	9 ft. 3 in.	Headlights	Mosher
Body	wood	Journal boxes	Brill
Interior trim	mahogany	Motors	G.E. 210-E2
Headlining	3-ply mahogany	Paint	Lowe, S.-W. P.
Roof	turtle back	Registers	Ohmer
Air brakes	G.E.	Sanders	St. L.
Axles	Brill	Trucks	Brill 39-E
Bumpers	8-in. channel	Ventilators	Star
Cables	G.E.	Wheels	21 in. & 33 in.

Ohio Electric Railway, Cincinnati, Ohio, which was noted in the *ELECTRIC RAILWAY JOURNAL* of March 11, 1911, as having ordered nine combination passenger, smoking and

baggage cars from the Cincinnati Car Company, has specified the following details for these cars:

Seating capacity.....	58	Couplers	Tomlinson
Bolster centers.....	38 ft. 6 in.	Curtain fix....	Forsythe No. 88
Length of body.....	60 ft. 2 in.	Curtain material...	Pantasote
Width over sills...8 ft. 8½ in.		Fenders.....	loco. pilot
Over all	9 ft.	Gongs...two 14-in. foot gongs	
Height, rail to sills.....	45 in.	Hand brakes	Peacock
Sill to trolley base...9 ft. 6 in.		Heaters	Peter Smith
Body	wood	Headlights,	
Interior trim	mahogany	G.E. Arc. U. S. Inc	
Headlining....	poplar veneer	Motors	inside
Roof	Monitor deck	Sanders	De France
Underframe	composite	Sash fixtures	Dayton
Air brakes.....	West. Aut.	Seats	H. & K.
Bumpers,		Seating material,	
Hedley anti-climber		plush & leather	
Car trimmings.....	bronze	Step treads	Mason
Control,		Trolley catchers....	Knutson
unit switch, hand operated		Trucks.....	Taylor M.C.B.

TRADE NOTES

Lang Retrieving Trolley Company, Petaluma, Cal., has moved its headquarters to the Exchange Bank Building, Santa Rosa, Cal.

Adams & Westlake Company, Chicago, Ill., is reported to have purchased a site for a plant which it proposes to build at Philadelphia, Pa.

Forsyth Brothers Company, Chicago, Ill., has moved its general offices from 213 Institute Place, Chicago, to the McCormick Building.

Niles-Bement-Pond Company, New York, N. Y., has removed its warehouse from 30-31 West Street to Hudson Street and Van Dam Street, New York.

C. O. Mailloux and C. E. Knox, New York, N. Y., consulting engineers, have removed their offices to the West Street Building, 90 West Street, New York.

National Railway Instruction Bureau, East St. Louis, Ill., has been incorporated to train transportation employees. The incorporators are: Edward A. Wessel, Alphons A. Wessel and Parks E. Ashlock.

Eureka Steel Company, Pittsburgh, Pa., which has just placed its new plant in operation, is planning to increase its capital from \$25,000 to \$250,000, and will build an additional open-hearth furnace, a blooming mill and a bar mill.

Lafayette Electric & Manufacturing Company, Lafayette, Ind., has acquired by purchase the plant and equipment of the Sterling Electric Works, Lafayette, Ind., and will continue the manufacture and sale of Sterling telephones for train dispatching and other railway electrical supplies.

Transportation Utilities Company, New York, N. Y., which was organized recently to represent directly the Acme Supply Company and the General Railway Supply Company, Chicago, Ill., has appointed Rueben C. Hallett to the sales staff of the company, with headquarters at 30 Church Street, New York.

Southern Railway Supply Company, St. Louis, Mo., has opened a branch office at 1219 Long Building, Kansas City, Mo., and another at Nashville, Tenn. C. E. Achoff, formerly the southeastern representative of the Matthews Carrier Company, is manager of the Kansas City office, and J. H. Early is manager of the Nashville branch.

Philadelphia Locomotive Works, Philadelphia, Pa., has prepared a petition for a charter to be presented to Governor Tener on June 7. The applicants for the charter are Rudolph Ellis, president of the Fidelity Trust Company; Charles S. W. Packard, Eckley B. Coxe, Jr., Alfred C. Harrison and Herman Dercum. It is reported that this is the first step in the plan for reorganizing the Baldwin Locomotive Works.

Falkenau Electrical Construction Company, Chicago, Ill., has received the general contract from the Merchants' Light & Power Company, Ogden, Utah, for the complete installation and construction of the lighting and power system in Ogden. H. A. Strauss, consulting engineer, has prepared plans and specifications for this system and is now engaged in making the necessary purchases at the Chicago office in the Stock Exchange Building.

Edward H. Chapin, vice-president of the National Car Wheel Company, Pittsburgh, Pa., will move his private office at 90 West Street, New York, N. Y., on June 1, 1911, to Rochester, N. Y. There will be no change in the uptown office of the company, which will be maintained at 556 West Thirty-fourth Street, New York, as formerly. The Chapin family were long identified with the Rochester Car Wheel Works, now the Rochester works of the National Car Wheel Company, so that it is very natural for Mr. Chapin to make his headquarters at this branch of the company's works. It also enables him to reach any portion of a very wide territory by a night's ride. He will continue to look out for the interests of his customers in the neighborhood of New York City as well as in central New York and elsewhere by frequent visits.

Kerr Turbine Company, Wellsville, N. Y., has just been reorganized and \$125,000 new capital added. The stock interests of the company are now controlled by F. P. Merrill, Hornell, N. Y., and P. B. Hanks, Wellsville, who, as trustees, have directed the affairs of the company for the past two and a half years. Mr. Kerr is no longer with the company, his position as chief engineer now being filled by J. L. Moore, formerly a designer with the Westinghouse Electric & Manufacturing Company and later in the engineering department of the Atchison, Topeka & Santa Fé Railroad. The present plant will be materially enlarged and a new machine shop is already in course of erection. It is the intention of the new company to incorporate into the Kerr turbine changes in design based upon two years' experiments and which, it is claimed, will improve the steam economy on all sizes from 15 per cent to 20 per cent.

Oshkosh Manufacturing Company, Oshkosh, Wis., has been formed to succeed the Oshkosh Logging Tool Company, the A. Sanford Logging Tool Company and the Oshkosh Tool Manufacturing Company. The A. Sanford Tool Company began business in a small shop in 1853, and at that time it had the field virtually to itself. Shortly afterward Elmer Leach became connected with the company, but resigned in 1885 to organize with C. Nygaard, the present general superintendent of the plant, the Oshkosh Logging Tool Company. While the A. Sanford Logging Tool Company made almost entirely labor-saving tools and devices for lumbermen, the Oshkosh Logging Tool Company made more of a specialty of time, money and labor-saving devices for telephone, telegraph, railroad lines and contractors. The company recently completed a new factory, which is equipped with special machinery, some of which was designed by the company's own men.

Pullman Company, Chicago, Ill., at a meeting of the board of directors on May 18, 1911, elected as chairman of the board Robert Todd Lincoln, who resigned as president the same day. John Sumner Runnells, vice-president and general manager of the company, was elected president. Charles S. Sweet, who has been assistant to Mr. Lincoln, was elected assistant to Mr. Runnells. Mr. Lincoln, who is retiring from active office on account of ill health, is sixty-eight years old. He was born Aug. 1, 1843, at Springfield, Ill. During the Civil War he served as captain on the staff of General Grant, and was admitted to the bar in 1867 at Chicago. From 1881 to 1885 he was Secretary of War in the cabinets of Presidents Garfield and Arthur, and from 1889 to 1893 was United States Minister to Great Britain. During the life of George M. Pullman, founder of the company, Mr. Lincoln was his special counsel, and on Mr. Pullman's death in 1897 he was made president. Mr. Runnells has been general counsel of the Pullman Company since 1887, and has been vice-president since 1905. He is also senior member of the law firm of Runnells, Burry & Johnstone, and is a director of the Merchants' Loan & Trust Company, the Pullman Trust & Savings Bank, and the Roseland Savings Bank. He was born in Effingham, N. H., July 30, 1844, and was graduated from Amherst College in 1865, and after studying law at Dover, N. H., removed to Iowa and became private secretary to the Governor of that State.

ADVERTISING LITERATURE

Electric Railway Equipment Company, Cincinnati, Ohio, is mailing Bulletin A, which illustrates its various designs of ornamental street lamp posts, mast arms and brackets.

Trussed Concrete Steel Company, Detroit, Mich., has issued the sixth edition of its Hy-Rib handbook for 1911. It contains more than thirty pages of additional illustrations, details and specifications over all previous issues. The book is subdivided for convenience of the reader into various sections, such as that of general data on Hy-Rib, applications to floors and roofs, to walls and sidings, partitions, ceilings and furring; building construction in general, special tools and clips for Hy-Rib, etc.

American Steel & Wire Company, Chicago, Ill., has published a 200-page cloth-bound book in four parts, entitled "Rail Bonds and Appliances." This publication is probably the most elaborate ever issued on this important subject. Part I treats of the functions of rail bonds, the conditions under which they should be used and the appliances required to install them. Many tables are included relating to such subjects as contact resistances of stud terminals, resistances and conductivities of steel rails, resistances of bonded joints, voltage drop, etc. Among other interesting features in this section is a suggestion that the size of bonds should be graduated, the larger ones being placed near the power house just as the overhead feeder system is varied in accordance with the amount of current carried. Part II is devoted exclusively to rail bonds of all types as applied to the head, web and flange of rails. Part III treats in detail such bonding tools and appliances as drills, compressors, bond testers and hand tools. Part IV is a miscellany which comprises notes on electricity, a large number of wire and wiring formulas, overhead line and underground cable specialties, tables on and profiles of T-rails; also miscellaneous engineering data on measures, weights and volumes, metric conversion tables, etc.

NEW PUBLICATIONS

Municipal Franchises, Vol. II—Transportation Franchises, Taxation and Control of Public Utilities, by Delos F. Wilcox, Ph. D., chief of the Bureau of Franchises, Public Service Commission, First District, New York. Engineering News Publishing Company, New York, 1911. Price, \$5.

Of the 885 pages in this volume, 592 are taken up with a discussion of street and interurban railway franchises. These 592 pages contain an introduction presenting the author's views of the principles upon which a franchise should be based, an outline of what he calls a model franchise, and then extended abstracts with comments of existing franchises in various cities. The Chicago and Cleveland franchises represent in his opinion the high water mark thus far attained in franchise granting in the United States, although he believes that they possess some weaknesses, and from the author's remarks on the Philadelphia franchise we should believe that he considered it the other extreme.

Dr. Wilcox says that at first thought perpetual franchise and crowded cars seem especially good for investors, but he believes that in the long run "the ultimate interests of the public, of the employees and of the investors seem to converge upon the principle that the money wisely used in the construction and development of street railway systems should receive a constant and a fair return from the enterprise, but nothing more." In his chapter on a model street railway franchise, he admits that a model franchise is about as difficult to draft as an average man is hard to find, but he lays down certain general principles which he believes should be followed. One of these is the adoption of the monopoly feature, but the grant should be subject to the right of the city to require readjustment of tracks and change in grade or extensions, under some limitation, such as that the reasonableness of the extension orders are to be determined by a competent body, so that the company will be protected against unreasonable exactions. There should be provision for the joint use of city tracks by interurban lines. The franchise should be indeterminate, because perpetual franchises "lie outside the pale of reasonable controversy," and the short term franchise "has had bad results." There should be some provision, however, by which the physical property of the company shall be purchased either by the city or by another company authorized by the city to take it over in case the franchise is revoked. Indeterminate franchises without such provision are in existence and are called "tenures during good behavior," but Dr. Wilcox says that the penalty

for forfeiture without compensation "is so drastic that the behavior has to become very bad indeed before any community will punish it." In case of such purchase a company should have a bonus of from 10 to 20 per cent on the actual value of the physical property if the purchase is affected soon after the date of grant, but the amount of the bonus should gradually diminish until it disappears entirely, say, fifteen or twenty years from the date of the grant. The city should reserve the right to exercise control over equipment and service, and under the new dispensation the seating capacity of the cars, at least outside the rush hours, should equal the number of persons desiring to ride. The city should have power to require the cars to be clean and properly ventilated, heated and lighted and provided with approved safety appliances. The final control of the operation should be with the city and it should have power to require such change in the operation by the railway company as will best preserve the interests of the entire public. If paving and cleaning the streets are required, the work should be done by the city and any cost to be levied against the company should be in the form of special tax, but the company can very properly be required to sprinkle the tracks and should care for the shoveling of snow from its tracks. The city should be indemnified for damages resulting from the exercise by the company of its franchises, but the company should not be allowed to settle damage claims out of court. A uniform fare should be charged and cars should be so routed as to avoid the necessity of transferring as much as possible, as this is expensive to the company and inconvenient to the passengers. If tickets are sold at a less rate than the cash fare, they should be purchasable in small amounts from conductors. Reduced fares during the rush hours are not desirable and free service should be abolished except to employees of the company. The city should pass on mail contracts and on any freight business undertaken by the company. All affairs of the company should be open to inspection by the city or to groups of citizens who can give good reason for their action. In the ideal franchise the capitalization should be only the actual original investment in the property, plus new capital for additions and betterments. There should be no allowance for good will or development expenses, because it is a monopoly service which is involved. In renewal franchises where no satisfactory figures of original investments are available, a special valuation should be made based on cost of reproduction, less depreciation. In disposing of the net earnings, the author sees no excuse for a higher rate of return than 5 per cent or 6 per cent on the capital actually invested in the business. He thinks that probably 5 per cent is high enough. The company should not expect the city to guarantee this rate, but it should have assurance that the city will refrain from exacting such compensation or fixing such rates as will make it impossible for the company to earn this return. These briefly are the main points in the model franchise proposed by Dr. Wilcox.

Following chapters relate to street railway franchises in New York, Chicago, Cleveland; to franchises that are perpetual, indeterminate, exclusive, granted for compensation or for specified low fares; to franchises for elevated railways, subways and interurban railways; to franchises for bridges, railroad terminals, ferries and omnibuses. In Part IV the taxation and control of public utilities are discussed in eight chapters, of which, one is on municipal ownership. The appendix contains the Minneapolis gas settlement ordinances which have been passed since the publication of Vol. I.

Three-Phase Transmission. By W. Brew. New York: D. Van Nostrand Company. 178 pages, including index; illustrated. Price \$2.

The author of this work is an Englishman who is familiar, however, with American high-tension practice. His calculations and other data are therefore available for the American engineer in large measure. After a brief introduction on the financial aspect of power transmission, Mr. Brew considers in turn the subject of transmission losses, working pressure, devices for the mechanical and electrical control of trunk mains, impedance, pressure rise and harmonics, earthing and triple-frequency current, lightning protection, poles and fittings, etc. A part of the appendix is devoted to line calculations and comparisons of a.c. transmission systems.

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CONTENTS.

The Referendum in Rapid Transit Franchises.....	941
Reinforced Concrete Poles.....	941
Chicago Elevated Consolidation.....	942
Central Power Stations for Railroads.....	942
The Ventilation of Turbo-Generators.....	942
The Training of Electric Railway Engineers.....	943
The Storage Battery Car in New York.....	944
Electrical Features of the Pennsylvania Tunnels.....	945
The Standardization of City Rules.....	945
System of the Havana Electric Railway Company.....	946
Parma Single-Phase Railway.....	951
New Sand Drying Plant at St. Louis.....	953
Electrical Features of the New York Tunnel Extension of the Pennsylvania Railroad.....	955
Single-Phase Electrification in Southern France.....	962
Meeting of New England Street Railway Club.....	962
Recommendations of Committee on City Rules.....	963
Convention of the Pacific Claim Agents' Association.....	967
Central Power Plants and Electricity Supply for Trunk Lines.....	967
Papers at the National Electric Light Association Convention.....	973
Metropolitan Street Railway Reorganization Plan.....	976
Southern Pacific Company Entertains A. I. E. E.....	978
Solid Steel Wheels in Brooklyn.....	979
Convention of National Electric Light Association.....	980
Aeroplanes at Street Railway Parks.....	980
Four-Wheel Drive Storage Battery Car.....	981
A Braking Controller Effective in Backward Running.....	982
Gasoline Section Repair Car.....	983
Motor Tower Wagons for the Union Railway, New York.....	984
London Letter.....	986
News of Electric Railways.....	987
Financial and Corporate.....	990
Traffic and Transportation.....	993
Personal Mention.....	995
Construction News.....	996
Manufactures and Supplies.....	999

The Referendum in Rapid Transit Franchises

Although the responsibility for reaching a final decision among the several rapid transit plans now proposed for the city of New York rests primarily upon the Board of Estimate and Apportionment of that city, the average visitor to New York would have good ground for assuming that the question was to be settled by popular vote. During the past two or three weeks each of the two companies whose proposals are being carefully considered by the board has gone to considerable expense in advertising through the newspapers and otherwise the advantages of its particular plan and of explaining the deficiencies, so far as the public is concerned, of the proposal of its competitor. Presumably the same arguments have been presented in detail and at length before the city officials by whom, under the charter of the city, the selection must be made. But each company has recognized as well the power of public opinion, and by maps, cartoons and arguments has been conducting a series of lessons for the education of the community on rapid transit subjects, but especially to demonstrate the merits of its particular proposal. It is refreshing to find in at least one city in this country a rapid transit proposition which appears intrinsically desirable. The expectations of Mayor Gaynor, quoted in this paper a month ago, that a decision would be reached within a week, have not been fulfilled, but the verdict cannot now be long postponed. Undoubtedly, in reaching its conclusions, the board will pay considerable regard to the public sentiment which has been awakened and enlightened by these announcements.

Reinforced Concrete Poles

Like the concrete tie, reinforced concrete poles of many types have been designed and a few have been installed in different parts of the country, but in spite of the claims of low cost, great strength and long life made for them they are not coming into use very rapidly. Where it is possible to mold concrete poles in yards and transport them over good roads to the place where they are to be installed, the first cost can be kept down to a moderate figure, but the smaller sizes cost proportionately more than the larger sizes, while the opposite is true in the case of wooden poles. Their life is problematical as yet, although the life of other reinforced concrete structures has usually been taken as the basis for estimates which vary from thirty years to an indefinite period. In some localities where the soil is permeated with alkali and other salts concrete structures buried in the ground have shown signs of disintegration, and if such action should take place at the base of a concrete pole it would be as destructive as rot in the case of wooden poles. Experience has shown that a very rich mixture of concrete is neces-

sary to prevent disintegration due to the deflection of the top under wind loads. One disadvantage which does not seem to have been overcome in any of the types of concrete poles yet developed is the difficulty of securely attaching extra cross-arms, telephone and postal boxes, fire alarms and similar devices to the poles. This is an important detail in poles intended for use in city streets. At present prices of wooden poles, unsightly and short-lived as they are, the use of concrete poles will be limited to experiments in a few localities. Those that have been put in during the past two or three years are standing up satisfactorily under all sorts of weather conditions, and in a few years more they should demonstrate their probable life and cost of maintenance with reasonable certainty. Improvements in design will no doubt reduce the first cost somewhat in the future, and if the life proves to be what is expected the present low cost of wooden poles will not prevent the extended use of a more economical substitute.

Chicago Elevated Consolidation

The long-discussed possibilities for economies and the improvement of service through a consolidation of the Chicago elevated systems are in a fair way to be realized. Final announcement has been made that capital for the purchase of the stocks of the various roads has been provided and that the directorates of three of the companies have agreed upon the terms. The consolidated road will have 1200 cars and about 175 miles of track covering the downtown district of Chicago and radiating to all the important sections of the city. There has been no competition between the elevated systems because they serve different districts. There is severe competition, however, between the elevated and surface roads, and the situation has been considered by many to forecast the final unification of all lines of urban transportation in the city. The consolidated resources of the combined companies represented by the new Chicago Elevated Railways Company will make it possible to effect needed improvements and desired extensions that should result in increased revenue and operating economy. Since the completion of the rehabilitation of the surface systems and the establishment of through routes and the exchange of transfers, the people of Chicago have increased their agitation for the "one city, one fare" plan of operation. While a combination of the elevated roads admittedly will improve operation, it is another question to introduce universal through routes of elevated trains and 20-mile rapid transit trips for a single fare of five cents. It will not be unreasonable for the consolidated elevated property to refrain from further extension of the present long rides for a single fare. The solution of the problem of extension of the service with adequate revenue for the longer hauls will be interesting.

The Ventilation of Turbo-Generators

The adequate ventilation of compact high-speed turbo-generators presents many difficulties which never had to be taken into account in the design or operation of engine-driven units of much larger bulk but smaller capacity. A slow-speed multipolar generator has a large area for radiating heat and its fan action induces a free flow of air through the large openings which are allowed in the design. With a turbo-generator, however, running at from 1500 r.p.m. to 2000 r.p.m. the cooling air must be forced through restricted passages at very high ve-

locities, which in itself generates heat due to skin friction. The internal losses in a large generator may amount to several hundred kilowatts, all of which is converted into heat and must be absorbed and carried off by the ventilating air. As air has a low specific heat, this process of radiation and absorption is inefficient at best. Some idea of the difficulty of the problem is gained from the statement made in a paper by R. B. Williamson, presented this week at the convention of the National Electric Light Association and abstracted elsewhere in this issue, that at times the weight of the air which must be passed through the generator is greater than the weight of the steam passing through the turbine. A 5000-kva generator requires approximately 28,000 cu. ft., or 2270 lb., of air per minute for proper ventilation. In view of the enormous volume of air which must be passed through a generator of this or larger size, thorough filtration is most important. One large generating station is now being equipped with an air-washing apparatus similar to that installed in hospitals and public buildings, and all the foreign matter in the air used for ventilating the turbines will be removed before the air is allowed to pass through the turbines. For small units the cloth filters described by Mr. Williamson have been found satisfactory where they have been used.

Central Power Stations for Railroads

In one of the papers read at the National Electric Light Convention this week Mr. Darlington refers to a probable development in power transmission which is attracting a great deal of attention now from power transmission engineers. This is the economy which would result from the establishment at different strategic points of power stations so large as to be able to supply all of the energy needed within a radius of 100 miles or so, not only for industrial purposes, but also for electric railroad service. Up to the present a power station designed exclusively for railroad work has seemed the indispensable adjunct to every steam railroad electrification, and this fact has undoubtedly had its weight as a deterring influence in decisions relating to the adoption of electricity as a motive power. But, as Mr. Darlington states, there is no more reason why a railroad company should generate its own power than why it should mine its own coal, or than why each large consumer of electricity in a city should have an isolated plant. Improvements in the art of electric power transmission have been so notable during the past few years that the plan of establishing three or four power stations to supply all of the energy needed in large amounts in Illinois, or the electrical connection of New York and Philadelphia with the anthracite coal fields, seems no longer so chimerical as it would have been called a few years ago. It has come nearer reality not only through the development of electric transmission practice but also through that of power generation, because those power stations which are equipped with the large units of to-day are developing energy at a surprisingly low cost for labor and fuel. According to Mr. Darlington, the possibilities in the central generation of power are so great that an argument for electrification of many steam lines can now be based purely on economy of operation. Such a condition should exercise enormous influence on the extent of railroad electrification to be undertaken in the future. A common power station for the steam railroads entering Chicago would seem particularly desirable.

THE TRAINING OF ELECTRIC RAILWAY ENGINEERS.

This is the season at which electric railway companies are arranging to take on technical graduates to work into their business and those about to become technical graduates are looking earnestly around for available situations. To tell the truth, the railways are a little uncertain as to just what they need in the way of technical training for their employees, and the neophytes are wondering in how far their training will serve them in good stead when it comes to the grim rub of every-day work. Now, a young man wrenched out of his academic environment and dropped into the middle of electric railway work finds things passing strange to his somewhat untrained vision. There are not lessons to be learned but things to be done, and instead of examinations he finds decisions which must be made quickly and accurately and followed up assiduously in order to obtain results. What kind of training will stand him in the best stead and be of the most service to those who are employing him?

Electric railway engineering is not very closely allied in its requirements to the ordinary electrical engineering courses of the schools. It requires far more mechanical engineering as a basis for future success than does any other branch allied to electrical engineering, and of electrical engineering itself railway engineering requires only a certain portion for its practical uses, namely, that portion which has to do with the generation and transmission of power under comparatively limiting conditions. On the other hand, the mechanical engineering requirements are somewhat strenuous and a knowledge of civil engineering does not come amiss. In a general way, therefore, the electric railway engineer needs a somewhat different course from the man who is planning to engage in either electrical or mechanical engineering in a more generalized way. This difference in requirements is not often taken into account in the schools, nor is there generally adequate opportunity for electives in sufficient amount to enable the student to specialize in this particular way. Perhaps it is not desirable that he should so specialize, yet the field of electric transportation is a growing one and unless all the signs of the times are fallacious the next generation will see some tremendous work done in the application of electric railroading.

If the time for preparation at his disposal is ample, it would probably be best for the young electric railway engineer to take the full course in either electrical engineering or mechanical engineering, and then a post-graduate course designed to supplement what was lacking of electric railway engineering in each. Such a plan would have the additional advantage that it would give the student wider opportunities for useful work after graduation. But, assuming that the time which the electric railway engineer can spend at the university is limited, he would naturally prefer to take up those special studies which pertain directly to his chosen field rather than those which belong to other special branches of engineering. Under these circumstances it is safe to say that thorough instruction in the general principles of mechanical engineering is a necessity and the generation and transmission of electricity needs a somewhat disproportionately large amount of his time. The railway engineer ought, too, to have a firm grip on the principles of civil engineering as applied to railway work and the theory of railway locations.

This he cannot generally get in the engineering courses as now arranged, since his time is taken up with somewhat intricate and irrelevant work in both mechanical and electrical engineering. If the schools are to do their best for their graduates who are to enter the great field of electric transportation they should make room for studies leading toward the technical railway work of civil engineering. This is perhaps the greatest single need in the training of the young man for this particular field of activity. He should also possess a knowledge of at least the principles of accounting and for his own sake should have such knowledge of rhetoric and English composition as will enable him to express himself orally and in writing so as to make his thoughts intelligible to others. These two subjects are often neglected and are extremely necessary if the electric railway engineer aspires to any administrative work. As it is, the railways, which are always looking for clever and capable beginners, have to take their chances on the preliminary training and select men from the various engineering courses and even from the academic courses and break them in to the particular requirements of the railway work. As a matter of fact, the men who "make good" come in uncertain proportions from all these sources.

Of course no amount of engineering or other training will make a first-class executive. Like poets, efficient executives are born, not made. They either have that mental grasp that enables them to take hold and do things or they lack it. A thoroughly first-class man without more technical training than he gets in the academic courses of instruction may in a few years find himself superintendent of a big railway company and his classmates who followed the engineering courses working under him, or the exact reverse may be the case.

Sometimes we are tempted to think that a too exclusive technical training narrows one's vision or at least leads one to look in particular directions instead of attaining a generalized viewpoint. Until there is deliberate and somewhat practical training directed particularly toward electric transportation the railway company on the lookout for good men will have to take its chances as it does to-day, and in these circumstances it cannot afford to exclude any promising material even if the applicant's purely technical training seems at first inadequate. The young man who has learned to use his mind with facility on new problems is quite as likely to make his mark as one who has acquired deftness in particular problems, unless he is to work in a very contracted field of effort. Initiative and resourcefulness are the two most valuable mental assets in the field of railway engineering and management. If one looks over the field of successful and brilliant railway men he will find that some of them have risen from the ranks, others have received training in particular specialties, and still others have had only the general mental training which the well-educated young man of this generation has at his command. Perhaps the best thing at present is for the railways to take in for their particular training the best natural material that they can find, irrespective of particular educational lines. This material will sort itself soon enough, and the capable men will drop into the important positions. But we believe that there is still much important work that can be done in the schools toward picking out as it were the capable men before graduation and giving them an opportunity to acquire training which will be particularly useful in the electric railway field. If the schools and the electric

railway companies which happen naturally to be in touch with them would get together with the view of sorting out the men with a bent for railway work and would give to them a practical grip on current railway problems, the situation would be much simpler than it generally is, and this we think is the line of co-operation which will eventually do the greatest good.

THE STORAGE BATTERY CAR IN NEW YORK

The news that the Third Avenue Railroad, New York, has ordered thirty-five storage battery cars in addition to the thirty which have been in service for the past year must be gratifying to all who have deplored the survival of horse car lines in the chief city of the nation. This result does not mean that the crosstown line problem in New York necessarily has been solved. Under the present conditions of slow speed, light traffic and high labor cost, the crosstown transportation situation is far from a cheerful one at present, nor does the future hold forth any very great amount of encouragement for financial success. Nevertheless a beginning has been made of the retirement of the horse car, with which no improvement was possible. A short account of the situation may be of interest.

On the 110 miles of track not equipped with the underground conduit in the borough of Manhattan, 9.6 miles on the Third Avenue Railroad are now operated with storage battery cars and there will be about 12 miles after the delivery of the new cars. It is needless to detail here the reasons why it has been financially impracticable to equip these routes with the conduit system. It suffices to say that many of these lines which were essential to the public in the days of ferry traffic have lost their importance and can rely now only upon a limited short-haul business and on such additional traffic as comes to them through transfers with the longitudinal lines. The disintegration of the surface railway system in the borough of Manhattan has deprived most of these lines of the latter traffic to a large extent and has left their prospects more hopeless than ever. The only way out of the difficulty was to find a self-contained car whose operating and maintenance costs would be less and whose traffic possibilities would be greater than those of the horse cars. The Third Avenue Railroad, which was operating some of these properties, therefore determined to conduct experiments with both gasoline-electric and storage battery cars. The gasoline-electric car was placed in service November, 1909, and the first storage battery car in March, 1910. It was soon apparent that under the conditions which prevailed in New York the storage battery car had many advantages in its favor. Current was obtainable at very low rates because the batteries were charged during periods of low load, there was no expense for charging station labor, and the current consumption of the cars was very small. The one great obstacle which made the company hesitate to install the self-contained electric cars on a large scale was lack of knowledge of the maintenance costs and life of a traction battery. However, an enterprising manufacturer of storage batteries made a satisfactory mileage maintenance guarantee on his batteries and the railway company built and placed in operation thirty storage battery cars. The maintenance costs of these equipments have proved so low that still lower figures were submitted for the thirty-five additional car equipments which have just been ordered. The railroad company stands on pretty safe ground

inasmuch as the manufacturer guarantees that during five years he will replace any batteries that fail to give at least 75 per cent of their original rating. Under these circumstances the Third Avenue Railroad management have not found it necessary to make any allowance for battery depreciation.

Some idea of the comparative status of the gasoline-electric car and the storage battery car under the operating conditions on the horse car routes in New York may be obtained from the fact that the guaranteed maintenance charge of the batteries plus the cost of electrical energy was actually less per car mile, even in the first contract, than the cost of gasoline alone. In addition to this it was plain that the maintenance of the gasoline-electric car would be greater, owing to the fact that it carried a gasoline-electric set in addition to a motor and control equipment which was similar to that on the storage battery cars.

The storage batteries have given none of the operating troubles which were anticipated by some. They have proved just as efficient in the coldest winter days as in summer, and their radius of action has not been diminished materially after a year's regular service. In one case an equipment was run for more than 114 miles on a single charge, after it had previously been operated for more than 12,000 car miles. The most striking feature about the experiences with these cars is that the troubles which did arise came from an entirely unexpected quarter, namely the transmission chain. The old adage that a chain is no stronger than its weakest link proved to be literally true, because the wear of the sprockets caused an unbalanced riding of the chains and eventually the links wore out. It seems rather strange that chains which had proved so satisfactory in automobile work should fail to meet the demands of the lightest street railway service, but it is evident that they were not suited for running conditions which require eight to ten stops per mile. To eliminate future transmission troubles the new and old cars will have miniature railway gearing which will be arranged to give practically the same speed reduction as the chain. It is anticipated that the efficiency of the gearing will not be materially different from that of a new chain.

Not only has the storage battery car proved an engineering success, but it is fulfilling in a large measure the hope that it would result in increased business. On the One Hundred and Tenth Street line for instance, only one horse car was operated in April, 1910, it making 1470 car miles. In April, 1911, three to five storage battery cars were operated for 15,716 car miles. It is hardly necessary to point out that this increase in mileage shows that the public has appreciated the improvement in transportation facilities.

To summarize the situation, the results with self-contained electric cars on the Third Avenue Railroad system indicate that there is a field for storage batteries on city lines and short suburban extensions, where the travel is too light to justify the installation of overhead lines and trolley feeders but where it is possible to buy electrical energy at very low prices. It has also been suggested that storage battery cars could be used on standard lines to help out in rush hour service, provided the cars were charged before the peak loads came on the power station. On the other hand, the gasoline-electric car appears to be much better suited for operation over suburban and inter-urban lines where appreciable grades must be surmounted and where reasonably high speeds are desirable.

ELECTRICAL FEATURES OF THE PENNSYLVANIA TUNNELS.

Aside from the fair statement of the reasons for adopting direct current for the Pennsylvania tunnels in New York City, perhaps the most interesting part of the paper by George Gibbs, which is printed in abstract elsewhere in this issue, is the discussion of the power-generating equipment. From one standpoint the combined Pennsylvania and Long Island Railroad electric zones seemed to warrant two power stations, each located approximately in the load center of its own system. The load center of the Long Island Railroad electric lines is close to Jamaica, L. I., while the load center of the Pennsylvania Railroad service is near the North River. Two stations, each of 23,000 kw capacity, would have provided sufficient power for both roads, and in an emergency one station could have handled the entire load, which now reaches a maximum of 26,000 kw. It is worthy of note that instead of dividing the generating equipment into two stations of moderate size and widely separated from each other all of the current is being generated in one station in Long Island City, admirably located as regards water and coal-handling facilities and close to the load center of the combined systems. Reliance is being placed on this one station to furnish all the current for operating 254 miles of track. Economy of regular operation, in the opinion of the engineers who are responsible for this plan, more than offset the remote liability of complete shut-down of the station.

That this plan is fully justified is shown by the operating records of two of the other heavy electric traction systems entering New York City. The New York Central built two power stations for its electric zone, one at Port Morris near the load center of the Harlem division and one at Yonkers near the load center of the Hudson River division. As the electrical equipment of the main line north of Yonkers has been delayed because of local conditions, the Yonkers station has had little to do, but the Port Morris station has never had to be shut down on account of an accident or failure of the machinery. The New Haven power station at Cos Cob is now being more than doubled in size to supply the Harlem River division, the New York, Westchester & Boston and to provide for future extensions of the electric zone east of Stamford. In six months of 1909 the total train delays due to failure in the Cos Cob power house were only 54 minutes, a record which would hardly justify duplication for emergency service only.

The precautions which have been taken against accidents, fires and electrical disturbances in the river tunnels are very elaborate. The bench wall construction insures only small damage to cars from derailments and provides a safe and convenient exit for passengers on a train which might be wrecked or stalled. No wooden cars of any kind are allowed in the tunnels; even the private cars of railroad officials are side-tracked at Harrison. The third-rail is sectionalized every 1500 ft. and switches are installed at intervals of about 800 ft. and by means of these switches the circuit breakers controlling the adjoining sections of third-rail may be opened instantly and all current cut off except in the lighting and signal circuits. These switches can be used by repair gangs as well as in emergencies, thereby insuring the safety of trackmen.

THE STANDARDIZATION OF CITY RULES

It is sincerely to be hoped that the membership of the American Electric Railway Association will co-operate seriously during the next two or three weeks with the committee appointed by the Transportation & Traffic Association to revise the existing code of city rules. It is almost needless at this time and in this place to emphasize the desirability of having such a standard code.

The preliminary draft of the changes recommended by the committee on city rules is being sent out by the secretary of the association this week and is accompanied by a request that the member companies express their agreement with or dissent from each proposed change. If this request receives a prompt response, either favorable or unfavorable, the committee will be able to be guided by these suggestions and can compile a report which should be acceptable to the membership at large. If not, the committee will be in the dark as to the wishes of the members and the chances will be very strong that no definite action will be taken in October.

A revision of the operating rules is a subject which is far better adapted to consideration by letter ballot and letter criticism than it is to discussion in an open meeting. In the first place, it is very difficult for anyone in the hurry and bustle of an open meeting to draft or even carefully to consider the best wording for a rule. In the second place, the number of companies which are likely to be represented in such a meeting by transportation officials who are fully conversant with the requirements of the rules is apt to be a comparatively small proportion of the total membership of the association. But there is no reason why the manager of each member company, the smallest as well as the largest, cannot examine the proposed code critically at his home and then express his opinion about it in writing, clearly and definitely. If the experience of last year with the plan of letter criticism of the rules is repeated this year, the result will be unfortunate. Although some 355 circulars requesting criticisms were sent out by the 1910 committee on city rules, the number of replies received by letter amounted to only a few over sixty; the maximum number of those voting at the meeting at which these rules were considered was fifty, and the verdicts of the majority at the meeting in most of the cases were just the opposite of those expressed in the letter ballot. It is easy to understand that under such circumstances a committee appointed to carry out such an important work as the revision of the code of city rules might very easily become discouraged.

The point which we wish to make is that the most important work of the member companies, so far as the city rules are concerned, is not so much to be in attendance at the convention next October in Atlantic City, at which action will be taken on the code, as it is now promptly to reply to the request of the committee. If a large and representative expression of opinion is received by the committee during the next two or three weeks favorable to the rules, it is safe to say that their acceptance will be reaffirmed at Atlantic City and a standard code of city rules will become a reality. If the opinion expressed by letter ballot during the next two or three weeks is decidedly opposed to the proposed amendments, the committee has ample time to revise the code and still have a fair assurance that such changes will receive indorsement at the convention in October.

SHOPS, ROLLING STOCK AND OPERATING PRACTICE OF THE HAVANA ELECTRIC RAILWAY COMPANY

BY F. W. HILD, FORMERLY ASSISTANT GENERAL MANAGER AND CHIEF ENGINEER OF THE COMPANY AND NOW GENERAL MANAGER OF THE PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

In the issue of the *ELECTRIC RAILWAY JOURNAL* for June 3 the writer described the reorganization, track and power generating system of the Havana Electric Railway and gave some particulars of the practice of the company in operating single truck cars. An account of the other principal features of the system follows:

SHOPS AND ROLLING STOCK

The shops, the largest carhouse and the offices of the company are located on the block bounded by Eighteenth, Twentieth, Ninth and Eleventh Streets, Vedado. In the early days of the electrification of the system a large brick and steel building of the standard factory type of ten years ago was erected to become the shops and storeroom. Later in 1906 all the remaining area of the block was utilized by a one-story rein-

266 passenger cars.

1 parlor car.

1 observation car.

2 express cars.

70 freight cars.

9 electric locomotives.

1 tower car.

1 electric crane car.

5 tower repair wagons

2 machinery floats.

11 carts and wagons.

Instead of a multitude of types of cars, the Havana Electric Railway Company, unlike most tramway systems, has but one type of passenger car for regular service, and except for a few minor details all the cars and their equipments are alike. All the track rolling stock have identical single trucks, McGuire-Cummings A-6, and all the powered cars, except two freight motors, have identical electrical equipment (GE-52 motors). All of which makes for simplicity and convenience.

The passenger cars are the semi-convertible single-truck type, 22 ft. between the corner posts and 30 ft. over the platforms. Each car seats 32 people, has 16 rattan reversible double cross seats, arranged for center aisle. In the newer cars the last two seats at each end are placed lengthwise so as to afford freer space at the doors. The body is made of native hard woods, including mahogany, majagua, sabicú, ocuje, ácana and cedar, all splendid woods. The trucks are McGuire A-6. The



Havana Electric Railway—Exterior of Main Car House

forced concrete extension for carhouse purposes, and in 1908 a second story was added to a part of this extension and became the company's offices.

The shops are well equipped with machine tools and include also a Devine-Passburg vacuum drying and impregnating machine. The shop annex, which is just across the street from the main shop and is devoted to woodworking, contains a quite complete set of woodworking machinery. The company builds its own car bodies and manufactures many of the supply repair parts for the cars, including field coils, some armature coils, etc. A card system wherein is recorded the mileage of the cars and the constituent parts has proved a valuable help in selecting supply materials and suggesting improvements in details of the construction. As the policy of the management is to keep the cars in fresh, clean, presentable condition, all the cars are brought into the shops according to a schedule and are repainted and revarnished or overhauled as the case may be. Under the conditions of sun and rains in Havana it is found necessary to revarnish the cars every eight months and to repaint them every three years. The Northern woods of which the first consignment of 110 cars were built succumbed very rapidly to the ravages of an insect called the "comejen," so that most of these have been rebuilt of native hard woods.

The following is the list of the company's rolling stock:

original cast-iron wheels which came with them are being rapidly replaced by Schoen pressed-steel wheels. Two GE-52 (25-hp) motors with K-9 controllers form the electrical equipment. International registers, Parmenter fenders, Wood gates, Ackley brakes, American Brake Shoe & Foundry brake-shoes and Electric Service Supplies Company's automotoneers are parts of the standard equipment. The shops build the bodies and assemble, paint and finish the cars. As all of the routes are loop lines all the later cars are built with single-end control. Each passenger car finished weighs about 8 tons.

The observation car is of open construction. The ribs, posts and roof beams are made of ordinary pipe, the hardwood seats and ornamental ironwork forming the sides. The floor is inclined so that the polished seats rise toward the rear just as in the gasoline sightseeing "rubberneck" automobiles so common in the large cities of the States. The car has proved to be very profitable.

Five of the electric locomotives are of box construction with truck and motor equipment identical with the passenger car equipment. Two have two GE-73 (75-hp) motors with K-6 controllers each, but are otherwise the same as the other five locomotives. The two remaining locomotives, which were built in 1910, are double-truck four-motor (GE-52) outfits, with open flat bodies except for a small canopy at each end

for the protection of the crew against sun and rain. The double trucks are made up of McGuire A-6 single trucks and embody ample flexibility and strength. Tomlinson automatic couplers with radial drawbar, safety chains to supplement the couplers and Ackley adjustable brakes form part of the equipment.

The freight cars are all single truck, and include box cars, flat cars, gondolas, bottom-dumping cars for coal and ashes, and steel side-dumping cars. The last named is perhaps worthy of more than mere mention. The subframe is made of I-beams, angles and channels, and upon the ends and center are placed the ways upon which the bodies rock. The ways are of plate girder construction. Each car has two V-shaped steel bodies which can be tilted to one side or the other by rolling or rocking them on the ways or guides. The bodies are made up of steel plates reinforced by angles, and to the ends of the bodies are riveted the rockers, which are malleable iron. The rockers have round protuberances, regularly spaced on the perimeter of each rocker. These as the bodies tilt or rock fit into holes punched in the ways just as the teeth of a pinion fit into a rack. Each body has 6 cu. yd. capacity, making 12 cu. yd. per car. This is equivalent to 8½ tons of coal or cinders; but when heavier materials, such as granite paving block or sand or broken stone, are to be transported a removable false bottom made of wood is provided which limits the weight of the load to the desired amount and also keeps the center of gravity high enough to permit ready tilting.

couplers, Ackley hand brakes and safety chains to supplement the couplers.

A new lot of 24 steel gondolas and flat cars is under construction in the shops. These will have structural steel under-



Havana Electric Railway—Truck Shop

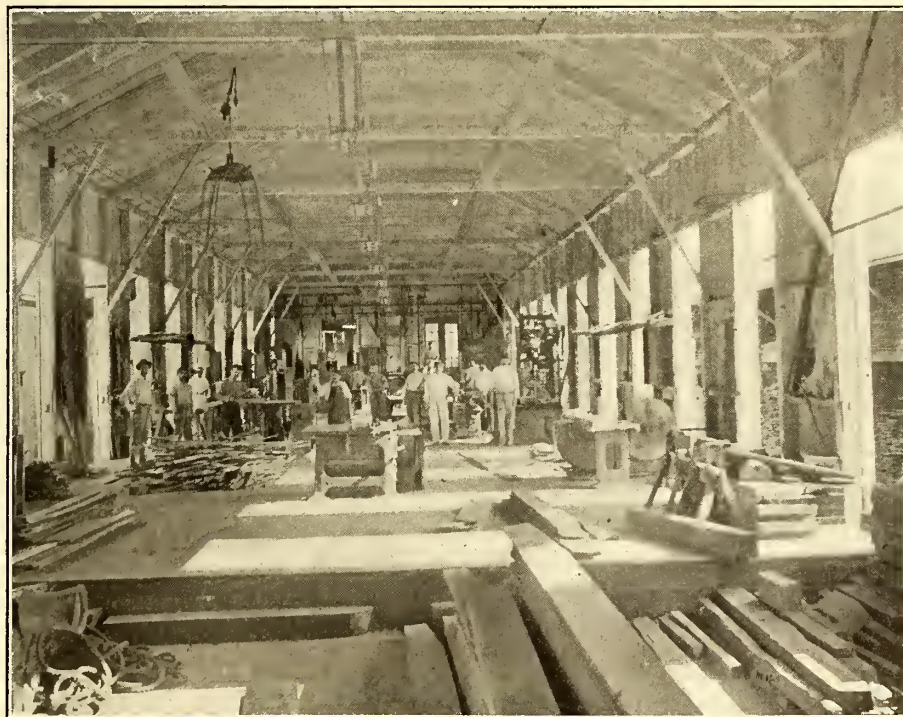
frames and hardwood floors, all carried on McGuire A-6 trucks and with accessories the same as the steel side-dumping cars.

The extremely shallow and narrow grooves of the track rail and the numerous sharp curves have proved so hard on the chilled cast-iron wheels which originally came with the trucks as to make necessary their replacement by pressed-steel wheels, which have proved to be very satisfactory.

Four Trenton tower wagons, mule-drawn, and one electric automobile tower truck are the rolling stock needed for the overhead wire repairs. The tower truck consists of 2-ton chassis with Exide battery and G. E. motor furnished by the General Vehicle Company. The tower, which is in three sections, and the body for this were built in the company's shops. The three-section tower when telescoped is sufficiently low to permit the automobile truck to enter and maneuver in any of the streets of the city. The two-section tower wagons, while they can pass wherever the company's tracks are laid, are often hindered by projecting iron curtain rods, which are common in the retail shopping streets of Havana.

CARHOUSES

Dispatching stations are located at the termini of the lines in Vedado, Jesús del Monte, Cerro, Principe and Universidad; and the



Havana Electric Railway—Woodworking Shop

The loaded bodies can be dumped and emptied by one man, the bodies returning automatically to the loading position. Rocking brackets and safety chains keep the bodies in position while in transit. Each car has Tomlinson automatic radial

first four together with La Puntilla are also storage houses, making five in all. Universidad is a dispatching station, but has space for six cars. Except Universidad, all the stations have transfer tables and inspection pits, and at all

of them minor repairs are made, the cars cleaned nightly and lubricated. Two "mecánicos" at each station, one on the day shift, the other on the night shift, are in charge of the repair men and the cleaners. Each cleaner is required to wash and clean thoroughly five cars on his turn of duty. A fixed number of extra supply parts, such as registers, fenders, field

CAR OPERATION

All the routes are loop lines. Beginning at the five outlying districts, Vedado, Universidad and the cemetery, Principe, Cerro and Jesús del Monte, all but five of the twenty lines lead to the city into two main downtown loops, one known as the Aduana or elevated route, the other as Muelle de Luz or



Havana Electric Railway—Wharf and Elevated Railway Used by Electric Cars

coils, armatures, etc., are kept at each station, but the great majority of the repairs are made at the shops. Each station is provided with several testing thermometers, which are used to ascertain the temperature rise of the field coils and armatures of the motors. A schedule is worked out so that every car is thus tested about every third or fourth day, and when

ferry route. Four of the other routes are crosstown, and join Vedado, the cemetery and Malecón with Cerro and Jesús del Monte. These crosstown routes go south on Galiano Street and north on Belascoain Street, intersecting all the other lines, the intersections being all the transfer points required by the concessions. The remaining route extends from Ve-



Havana Electric Railway—One of the Large Plazas in Havana

the thermometer reads 75 deg. C. the car and its service undergo special examination and investigation. When the thermometer readings attain 85 deg. C. or more and the examination at the carhouse does not reveal the apparent cause the car is sent to the shops, where the trouble is usually located and remedied.

dedo at the boundary limits of Havana to the town of Marianao, a fine suburb of about 10,000 population, distant some 6½ km (about 4 miles) from Vedado. This line is essentially a suburban line, and serves Camp Columbia, the headquarters of the Cuban army, and several other very rapidly growing communities.

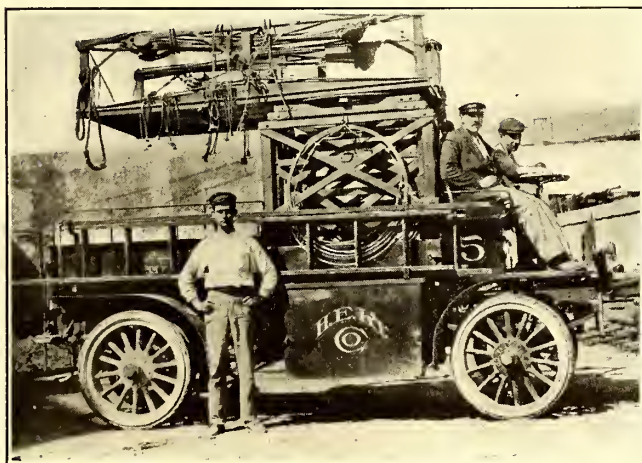
The frequent car service calls for a rather large force of inspectors, whose duties also include register checking. They are to be found everywhere. When a tie-up occurs an inspector appears promptly on the scene, and with the aid of the tower wagon crews quickly straightens out the tangle.

The average schedule speed is about $7\frac{1}{2}$ m.p.h., and ranges from a limit of 6 m.p.h. in the narrow streets to a permissible 24 m.p.h. along the two private right-of-way stretches in Vedado and Principe.

The street car travel in Havana is affected by a number of conditions. The great frequency of the service has promoted a considerable pleasure travel and also what for want of a better term may be called "convenience travel." This last is that due largely to the shoppers who put off until to-morrow the trip which to-day threatens to become inconvenient. In Havana this class of travel is quite large and is not confined to the shoppers, but includes also many who have rather more pressing business to justify the travel; but the customs of the people, the "mañana" habit, readily permit of postponements which would drive a "hustler" in the North frantic. For these reasons, when it rains or when the weather becomes disagreeable to the Cuban the receipts at once fall markedly; on the other hand, the receipts always reflect by the increased travel the influence of pay days.

The peak service requirements are not so pronounced as in the cities of similar size in the States. Still, additional service is given during the midday to facilitate the considerable number who go home to lunch, or "breakfast," as it is called in Havana, while in the late afternoon and early evening a much larger peak is felt. The average weekly traffic curve shows the highest point on Sunday, descending daily until Friday, which is usually the lowest point on the curve, and then rising abruptly on Saturday. The average monthly curve, which, of course, reproduces the weekly curves, finds the highest points on the Sunday nearest the first of the month, and then the succeeding weekly curves descend quite regularly to the end of the month. The yearly curve, taking into account the different number of days in the various months, shows a small peak in December with another lesser peak in July and August. The deepest depression is usually in September and October, the hurricane months. Neither the peaks nor the valleys, however, are very marked, the curve being quite flat with a constantly rising tendency toward the end of the year due primarily to the natural increase in travel.

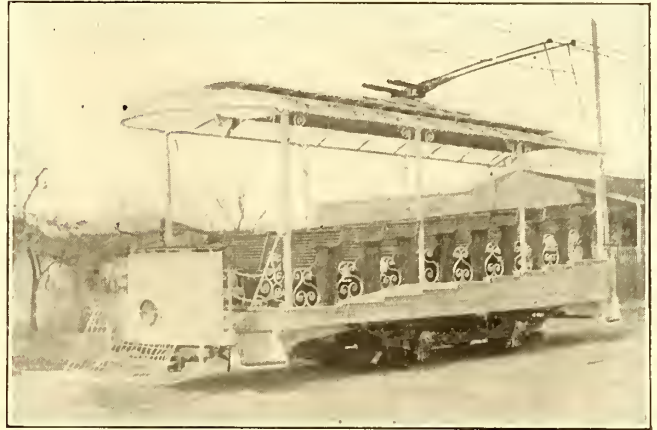
The traffic movement in Havana is the subject of constant



Havana Electric Railway—Electric Automobile Tower Wagon

study, in which the data gathered by the inspectors are very helpful. A great number of schedules have been worked out to fit almost every condition. The superintendent of traffic notifies the dispatchers daily of the schedule which is to go into effect. Special events have special schedules. Thus, long in advance of carnival, which usually lasts throughout Lent, a complete set of schedules is figured out with reference to the

style and duration of the daily carnival entertainments. On All Souls' Day and All Saints' Day, Nov. 1 and 2, when all Havana visits its only cemetery, the service receives a good test. The ordinary service past the cemetery averages 30 cars per hour, but on the two days mentioned the service increases to a maximum of 120 cars per hour for a number of hours. Baseball is a very popular game in Havana and crowds of 12,000 are not unusual. The grounds are on the Principe line, near the terminus, and on such occasions the crowds freely



Havana Electric Railway—Observation Car

violate the municipal regulation limiting the total number of passengers to 40 (32 seated and 8 on the rear platform). In checking up the conductors when handling such crowds, the register inspector counts the number of passengers on the car before it gets away from the grounds and the conductor certifies to the count by his punch on the inspector's report.

Rates of fare are 5 cents in United States currency or 7 cents in Spanish silver. On the cars which leave the termini after midnight and until 4:30 a. m. the fare is doubled. The rates of exchange of Spanish silver to American gold fluctuate nowadays from 1.10 to 1.15, but during the first intervention, when the concession was granted, it was 1.40. Many passengers to-day pay in Spanish silver and the difference is kept by the conductors, who make all returns in United States coin.

Havana people are so accustomed to traffic conditions engendered by the narrow streets that accidents because of the cars are relatively very few. The laws hold the drivers of the vehicles responsible, so that when a car and a wagon come into collision the motorman and the driver dismount and after a wordy argument the cart driver usually, in the minor cases, pays the motorman an amount to cover the damages to the car. This the motorman turns into the company. Of course the majority of the cases go to the courts.

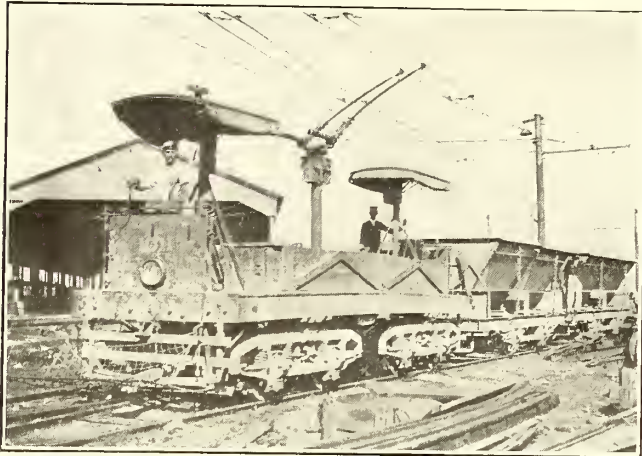
The freight traffic of the company until lately was handled mostly by the Insular Railway. Standard freight cars of the other roads are taken and returned by the Insular motors at the junction of the Insular tracks and the Havana Central Railroad tracks in Marianao. The commodities handled are mostly cement from a large cement factory on the Insular Railway and broken stone from a quarry on the Havana Central Railroad. Recently, however, the Havana Electric Railway Company entered into contract with the contractors for the paving of Havana to haul some 400,000 tons of paving materials. For this purpose the steel side-dumping cars are proving very useful.

STAGE LINES

The company owns some 1500 mules and 180 stages with which it operates a stage service in the city and into the surrounding country. Some of the routes supplement to some extent the car lines, but for the most part they serve districts not reached by the cars. Dispatching depots are used similar to the street-car method. The stage lines well serve the purpose of determining the traffic possibilities of new territory and of helping to keep a good hold on the transportation situation of the city and suburbs.

The stages are of two sizes and seat from 10 to 14 passengers. Two, three and four-mule teams, depending on the distance and route, are used to haul the stages. The mules are mostly the small, tough, sturdy Mexican burro.

Fares range from 3 cents up in Spanish silver, which is worth from 10 per cent to 15 per cent less than United States currency. The method of insuring proper returns is unique. Each route has a certain fixed earning value per trip, and

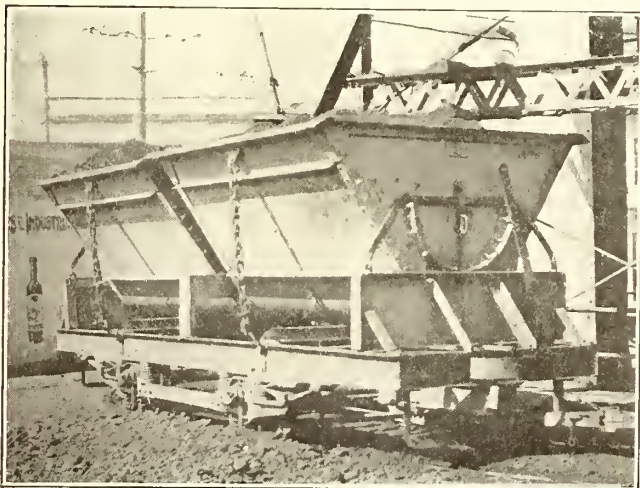


Havana Electric Railway—Locomotive and Dump Cars

this varies with the weather, the day of the month and the period of the year. The driver is required to turn in to his dispatcher at the end of each day as a minimum an amount of money which corresponds to the number of trips he has made and is based on the above. Needless to say more than the minimum is not often turned in. Nevertheless the arrangement has worked out satisfactorily to the men and the company. The drivers are paid regularly at the rate of \$35 United States currency per month.

GENERAL

The offices of the company are in the upper floor of the Vedado carhouse and shops structure. They are commodious, well ventilated, well lighted and well equipped. They include the administrative offices, the traffic offices, the accounting department, the legal and the engineering departments. Except for the recent selection of the turbine and electrical machinery,



Havana Electric Railway—Steel Side Dumping Car

which was made in the Cleveland office of the president of the company, all the engineering and the purchases have been conducted from Havana.

In the same structure is the stores department. Owing to the time required in making and receiving foreign purchases a very large stock of material is necessarily carried. A card system of records with continuous inventory and a schedule of minimum stock to be carried makes this department a

rather smooth-working institution. Owing to the competition of the European manufacturers, materials and supplies can be purchased at prices much lower than those usually quoted in the States. Nevertheless, the Cuban protective duties bring up the ultimate costs to figures much higher than those enjoyed by the companies in the States.

Havana, besides being the cleanest, is one of the most orderly cities in the world, the police records showing a remarkably low percentage of crime. Perhaps the fear or respect that the strong arm of the old Spanish monarchical authority instilled in the Cuban mind is partly responsible, but it is more likely due to the natural courtesy and orderliness of the people. Intoxication among the Latins is almost unknown; and it must be regretfully admitted that the only drunken persons seen are Americans or other Anglo-Saxons.

The 1750 employees of the Havana Electric Railway Company are recruited almost all from the ranks of the Cubans and the Spaniards, the latter in small minority. They well exemplify the attractive traits in their countrymen. To quote from one of the published guides to Havana:

"Conductors in Havana street cars are invariably courteous. 'Step lively!' and 'Forward, please!' are expressions omitted from their vocabulary. Formerly every one of them on receiving a fare made the little gesture of thanks usual in Cuba—a quick movement of the hand toward the passenger, sometimes accompanied by the spoken word 'gracias.' Unfortunately Havana is growing too Americanized to retain all her Latin politeness, but there are still some conductors who observe the pleasing formality. If all seats are occupied it is customary to inform ladies who desire to board the car of that fact. If one nevertheless persists in doing so, some gentleman will invariably give her his place. Most conductors speak at least a little English. All of them will do their utmost to understand a passenger's Spanish."

Motormen and conductors are uniformed in very light-colored neat linen suits and linen caps; the inspectors wear white drill suits and caps. All make a very attractive appearance and it is seldom necessary to discipline them for lack of neatness.

An interesting feature in the disciplining of the employees is the jury system which has been in effect since October, 1907. Two of the oldest and most reliable employees are selected by the management to act on this jury for four months each. Usually they are a conductor and a motorman. They hear the majority of the minor cases and pass judgment upon the offenders. A schedule establishes the discipline to be visited upon the latter. This system has worked out very well, the judgments of the jury having proved to be scarcely without exception very fair-minded and equitable.

An employees' benefit society fostered and encouraged by the company claims over 1000 employees in its membership. This has done valuable work, not only in the usual relief in cases of illness or death, but also to rescue the men from the hands of the usurers who formerly exploited them.

OFFICERS

The officers of the company are: Warren Bicknell, of Cleveland, Ohio, president; D. T. Davis, of New York, first vice-president; Frank Steinhart, of Havana, second vice-president and general manager; Antonio San Miguel, of Havana, third vice-president; C. W. Ricker, of Havana, chief engineer; H. Kraemer, of New York, treasurer.

ALPHABETICAL LIST OF EXPENSE ITEMS

Walter Shroyer, secretary and treasurer Central Electric Accounting Conference, has sent circular letters to electric railways calling attention to the fact that the second edition of the alphabetical list of items of expense in the operation of electric railways, published by the conference, will be exhausted soon and that in all probability another edition will not be printed. Orders for copies should be placed at once with Mr. Shroyer, who is the auditor of the Indiana Union Traction Company, Anderson, Ind. The cost is \$1 for three copies.

PARMA SINGLE-PHASE RAILWAY

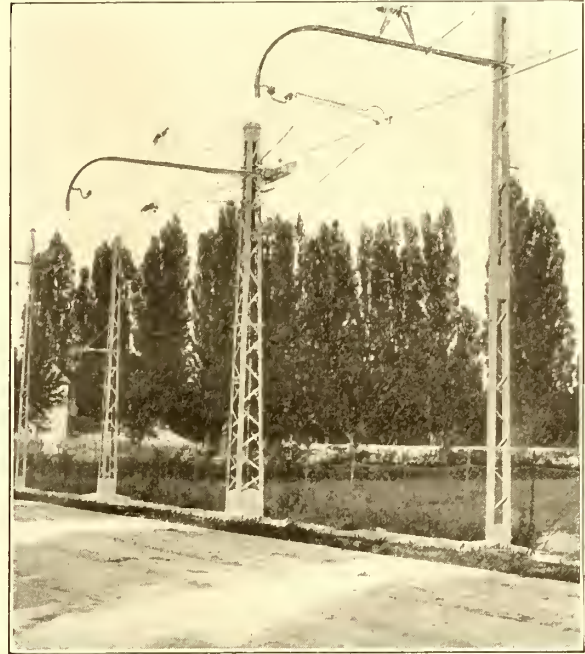
The provincial government of Parma, Italy, has been operating since May, 1910, a single-phase railway system, consisting of 14.5 km (9 miles) of city track and 39 km (24.2 miles) of suburban track. A preliminary article on the equipment of this line was published in the *ELECTRIC RAILWAY JOURNAL* for Nov. 20, 1909, on page 1061. The following additional particulars

apart with the main or upper catenary having a sag of 1.5 m (4 ft. 11 in.). The auxiliary catenary is suspended from the main catenary at intervals of 16 m (52 ft. 6 in.) and the contact wire in turn is carried at intervals of 8 m (26 ft. 3 in.) from the auxiliary catenary. The copper contact wire is kept at a tension of 300 kg (660 lb.) by automatic counterweights placed every 1500 m (4925 ft.).

The poles on the suburban sections are of chestnut. In the



Parma Single-Phase Railway—Lattice Pole and Curved Bracket Construction in the City



Parma Single-Phase Railway—Bracket on Second Pole from Left to Trip Collector, from 400-Volts to 4000-Volts

are based on an article by Arnold Derrer in a recent number of the *Elektrische Kraftbetriebe und Bahnen*.

The track construction consists of grooved rails weighing 42 kg per meter (84 lb. per yard) in the city and of T-rails weighing 21 kg per meter (42 lb. per yard) in the suburbs. The average clearance between the trolley line and the head of

city limits lattice-steel and tubular poles are used in addition to rosettes on houses. All metal in the line is connected to the running rails by a galvanized iron wire. These running rails are grounded every 1500 m (4925 ft.) to buried plates which are immersed in water. Double porcelain insulators are used throughout to insulate the line from the ground. In back



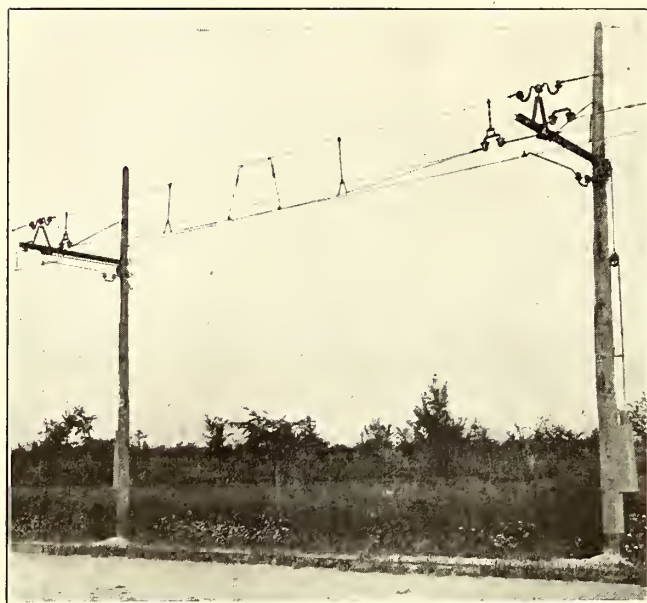
Parma Single-Phase Railway—A Standard Train of One Motor Car and Three Trailers Operated Within the City of Parma, Italy

the rails on the suburban section was specified at 6 m (19 ft. 8 in.) but in one case it is as low as 4.1 m (13 ft. 5 in.). The most severe grade on the suburban section is $3\frac{1}{2}$ per cent and on the city section 4.6 per cent. The sharpest curve is of 40 m (131 ft. 4 in.) radius. The maximum operating speed is 40 km an hour (24.8 m.p.h.).

The suburban line construction consists of the Siemens-Schuckert double catenary design with automatic tension take-up devices. The poles on this section are set 64 m (210 ft.)

of every station there is set a line-breaker which is bridged by a shunt circuit and horn-type switch. The horn switches are operated from the ground with insulated rods. Lightning protection devices are installed on the line at all stopping places. Some arresters are of the ordinary horn type and are placed in circuit between the trolley and ground; others are narrow-gap horn arresters which are connected to the trolley circuit, through a resistance. Each station is illuminated with 110-volt current from a 1-kva transformer.

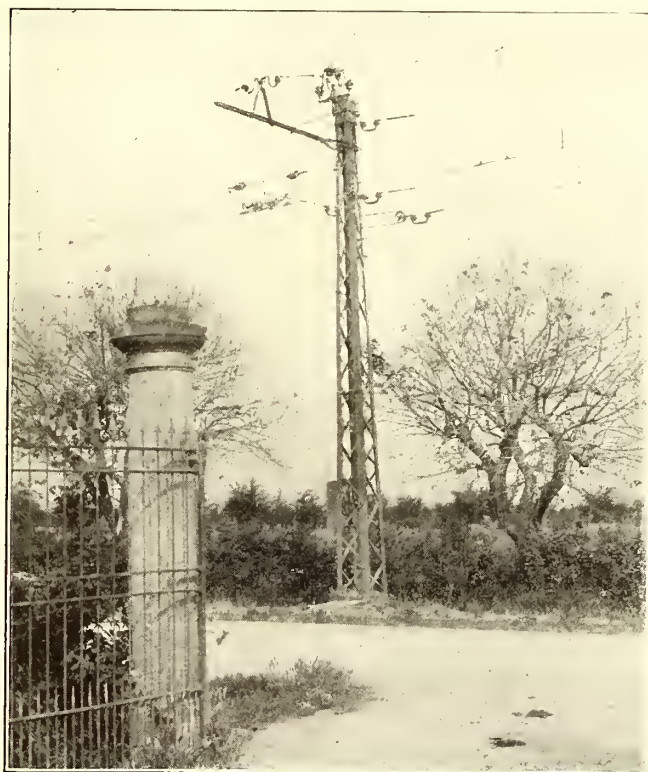
The transition from the 4000-volt single-phase suburban potential to the 400-volt, single-phase city potential is effected through the medium of a dead running piece 16 m (52 ft. 8 in.) long which is placed between two 4000-volt circuit breakers. The middle of the dead section has a tripping piece which



Parma Single-Phase Railway—Automatic Tension Take-Up Weights on the Poles

effects the change-over of the car circuits. It is at this place also that the catenary construction is replaced by the ordinary form of line suspension.

The rolling stock for the suburban lines consists of ten



Parma Single-Phase Railway—Line Circuit Breaker at Gajano

motor cars, each car having a total of twenty-eight seats in two compartments and one freight compartment. Each platform has standing room for ten passengers. There are also eleven trailers, one having twenty-four seats, four with twenty-eight seats and six with thirty-six seats. There are also

eighteen freight trailers. A standard train consists of one motor car and three trailers. The trucks are of the Boeker maximum traction type with 900-mm (35.4-in.) driving wheels and 600-mm (23.6-in.) ponies. The motor cars are 11.42 m (37 ft. 5 in.) long over the buffers.

Each motor car carries two 70-hp motors, a transformer motor compressor, reverser, oil and hand switches, safety devices, electric heaters, etc. All high-tension devices are placed in a separate chamber which cannot be opened until the pantograph collector has been lowered. The pantograph collectors are furnished with two contact pieces; the collector is maintained under tension against the trolley in such wise that it will sink as soon as the air is cut off. All cars are equipped with hand and air brakes.

Means are provided whereby the motorman himself carries out the necessary switching operations in passing from the high-tension to the low-tension section, but, in any event, damage will be prevented by safety devices which will prevent high-tension current from getting into the low-tension circuits. Human operation is desirable because otherwise the brushing of a passing vehicle as high as the roof of a car could operate the lever which changes the pantograph collector from the high-tension to the low-tension circuit connections. The automatic operation of this roof lever serves for the change from low tension to high tension.

The controller differs from the ordinary d.c. type in that each one has two separate groups of contactors and magnetic blow-outs for the step control and the accompanying interruptions of the circuit. The transformers have taps for the following potentials: 183 volts, 217 volts, 250 volts, 284 volts, 317 volts and 350 volts.

The motors are of the six-pole type with compensated armature winding and auxiliary excitation. A separate exciter winding is installed for each direction of running. The latter feature does not involve extra copper because the exciter circuits also help in equalizing the armature reaction. The compensating winding tends to suppress brush sparking.

All of the electrical and mechanical equipment was furnished by the Italian Siemens-Schuckert Company.

ELECTRIFICATION OF SWISS RAILWAYS

The Swiss Federal Railways, which some time ago decided to introduce electric traction on all their lines, are gradually obtaining concessions for the necessary water-power. They have already acquired several in the region of the Simplon, in the cantons of Uri and Ticino, and elsewhere, and now have concluded an agreement with the authorities of the canton of Valais. By this agreement they obtain the right to utilize the power of the waters of the Rhône between Fiesch and Mörel. On the Gotthard line about 10 miles of water conduits have been built between Arolla and Bellinzona, preparatory to the electrification of this line from Lucerne to Chiasso. It is calculated that between 25,000 hp and 30,000 hp will be obtainable from these works alone. The concessions for utilizing the water-power on both sides of the Gotthard Pass, in the cantons of Uri and Ticino, have also been secured. It is estimated that when the Valais works are ready the minimum yield of power will be 15,500 hp.

CAR WIRING METHODS IN DENVER

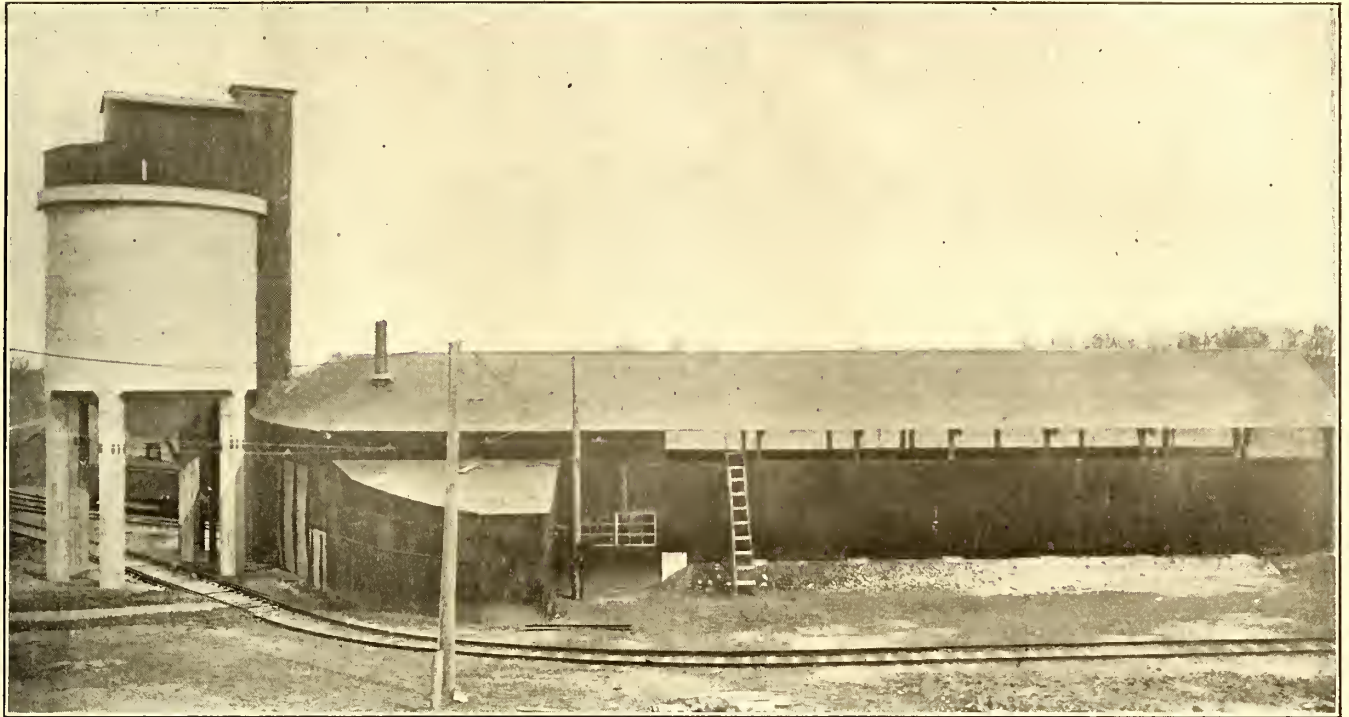
The Denver City Tramway is revising its car wiring methods. The main cable is now being carried above the car floor at the side of the car in wood boxing, compounded on the inside, and cars being cleaned by compressed air to avoid the penetration of moisture. All cables in the future will be of individual flame-proofed wires and the covering on the entire cable will also be flame-proofed. Where the leads to motor and resistances pass under the car framing they are supported on porcelain or composition insulators and the bottom of the car framing is protected by sheet iron.

The connection board under the car is provided with as-

bestos wood facing and barriers and is backed by sheet metal. The rheostats have sheet metal protection. Light and heater circuit wiring is of "slow-burning" wire except that in the light wiring overhead ordinary rubber-covered wire is used with a special grooved hard-wood molding with grooves spaced

NEW SAND-DRYING PLANT AT ST. LOUIS

The United Railways Company of St. Louis has just completed the construction of the sand-drying plant which is shown in the accompanying engravings. The company uses about



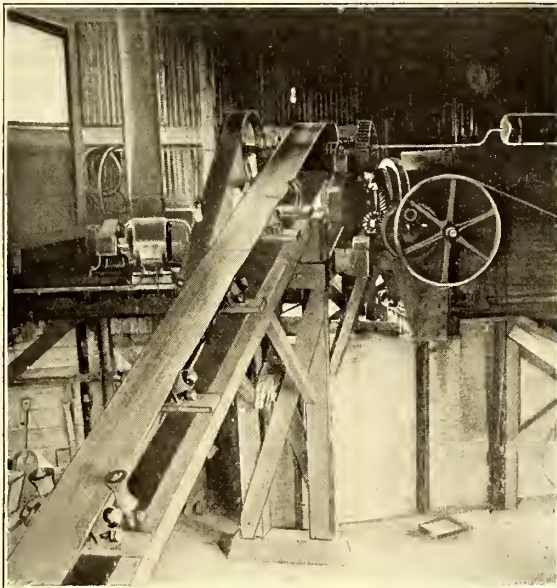
St. Louis Sand-Drying Plant—Exterior View

so as to take strap hangers, receptacles and molding supporting screws, the molding being run down the center of cars and backed by the maple ceiling board. There are no wire joints in this molding.

The light and heater circuit fuses are mounted on asbestos wood panels on the front platforms, where, owing to design of cars, they are inaccessible to the general public. In other

6000 cu. yd. of sand, corresponding to about 162,000 cu. ft., per year. During the winter, at the period of maximum demand, about 1200 cu. ft. per day is required. The sand is Mississippi River bar sand and contains, when it arrives at the plant, about 5 per cent of moisture and quite a large proportion of gravel.

The course of the sand at the dryer can be followed from the cross-section of the sand-drying plant published on the next



Feeding End of Rotary Dryer



Belt Conveyor Leading to Wet Sand Pit

portions of car wiring, where necessary, flexible tubing protection is used.

This improvement in car wiring was largely brought about by the desire to eliminate all possible fire hazards from the new sprinklered storage car house just constructed at Thirteenth and Arapahoe Streets.

page. It will be seen that the wet sand is dumped by gravity from the steam railroad cars directly into a concrete wet sand pit. An apron conveyor takes this wet sand from the bottom of the storage pit and dumps it onto a belt conveyor which travels at a speed of 300 ft. per minute and discharges the sand into a rotary dryer. The dryer turns at a speed of 10 r.p.m. and

ELECTRICAL FEATURES OF THE NEW YORK TUNNEL EXTENSION OF THE PENNSYLVANIA RAILROAD *

BY GEORGE GIBBS, CHIEF ENGINEER ELECTRIC TRACTION PENNSYLVANIA RAILROAD

The writer in his capacity as chief engineer of electric traction and terminal construction for the Pennsylvania Railroad had charge of the design and construction of the terminal station building on Manhattan Island and all of the details of electrical equipment in the tunnel and approaches and in the station proper. The total length of the New York tunnel extension from the Manhattan transfer, east of Newark, N. J., to the east end of Sunnyside yard, on Long Island, is 13.31 miles. The total length of the main and yard tracks is 94.52 miles, all of which have been equipped for electric operation.

Regular train service of the Long Island Railroad in and out of the new terminal station was begun on Sept. 8, 1910, and the Pennsylvania Railroad train service was begun on Nov. 27, 1910. The initial service of the Long Island Railroad consisted of 200 trains in and out each day, and the Pennsylvania Railroad started with 150 trains in and out each day. The summer schedules for 1911 will require 200 trains on the Pennsylvania Railroad and 250 trains on the Long Island Railroad. All of the Pennsylvania Railroad trains are handled in and out of the station by electric locomotives, of which thirty-three are in service. The Long Island trains are made up of multiple-unit cars. The maximum capacity of all the approach tunnels under the rivers is estimated at 156 trains per hour, and sufficient track room has been provided in the station to accommodate this number of trains with an allowance for standing and switching of from five to twenty minutes.

TUNNELS

The total length of the single-track tunnels is 15.54 miles. The tubes under the rivers have a total length of 12.02 miles. They are 19 ft. inside diameter, which provides a minimum clearance from the car roof to the crown of 1 ft. 9 in. This provides for the possible use of an overhead electric conductor for traction should developments in the art require it at a later date. A cross-section of one of the river tunnels showing the car clearance and the location of signals, ducts, etc., is reproduced.

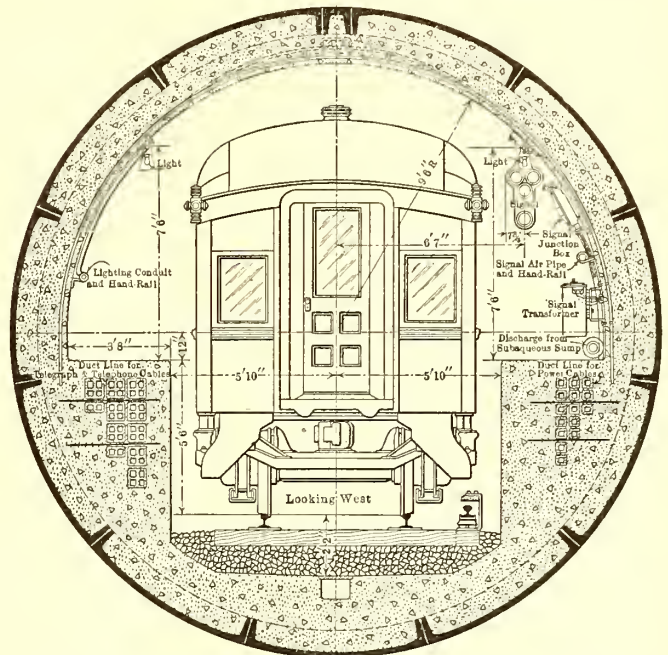
Satisfactory ventilation for the tunnels was considered to be of great importance. Two general conditions were provided for: first, purity of the air in normal operation, and, second, requisite ventilation for an indefinite period in case of stoppage of trains in the tunnel from accident or other cause. It was thought, and afterward verified by trial, that the piston action of the trains when in motion would be an effective means of changing the air, as each tube contains only one track, and is isolated from the adjoining tube and open at each end to the free air. A special ventilating system, therefore, is needed only to provide air to a stalled train in an emergency, or to dissipate smoke and fumes from an electric arc, the possibility of which conditions was thought of sufficient importance to warrant the installation of a very extensive forced-draft ventilating plant. It was determined that the air in the cars should not be allowed to contain more than eight parts of carbon dioxide per 10,000, requiring 30 cu. ft. of fresh air per minute to each passenger. To insure this quantity of fresh air in the cars it was thought advisable to furnish more, namely, 50 cu. ft. per passenger per minute in the tunnels, and the fan equipment was designed to meet this requirement, having due regard to emergency conditions and the occasional irregular spacing of trains. The quantity of air required per section of tunnel on this basis is about 60,000 cu. ft. per minute, which will completely change the contents of the tubes three times per hour.

For producing the requisite ventilation by pressure a forced-draft system was adopted in which a constant and uniform

current of air is induced in the tunnel by forcing, in the direction of the traffic, the required volume of air into the portal. A divided nozzle, in the form of a tapering flue, is placed on each benchwall for this purpose. The arrangement of tunnels and shaft openings required in all fourteen sets of ventilating apparatus at different points, with a total capacity of 1,119,000 cu. ft. per minute. In two cases exhausting instead of pressure blowers were used; these are for the purpose of causing a return current of air at the west ends of the crosstown tunnels, where they merge into three-track tunnels approaching the passenger station, the object being to prevent blowing air from the tunnels under and into the station building.

The blowers are of the multi-vane "Sirocco" type, belt-driven from induction-type electric motors, and the speed of the fan can be adjusted by cone pulleys from normal to 70 per cent or 40 per cent of normal, as required.

From tests made in the tunnels, with and without the fans running, it is apparent that, under normal conditions, the piston action of the trains can be relied on to give satisfactory ventilation. Records show that in the East River tunnels the air is changed every forty minutes by the passage of trains



Pennsylvania Tunnel—Cross-Section Showing the Location of Signals

during non-rush hours, and every fifteen minutes during rush hours.

The average velocity of the air in the East River tunnels due to the action of the fans alone is about 8 m.p.h. This is increased by the passage of trains to more than 30 m.p.h., the latter figure, of course, depending on the number of cars in the train and the speed. It is evident, therefore, that in regular operation the fans need not be run, and provision has been made to start and stop them, as required, from two central points, the power house for the East River tunnels and the service plant for the North River tunnels.

TUNNEL-ALARM SYSTEM

The tunnels are equipped with a special safety device which has two functions, one to cut off the current in a given section of the third-rail and the other to send a fire-alarm call. The system consists of a series of alarm boxes, set about 800 ft. apart. Each box is numbered and contains two levers, colored blue and red respectively. The blue lever is marked "Power," and when pulled trips the circuit breakers controlling the third-rail section adjacent to the box, thus cutting off the power and at the same time sending a call of two rounds of the alarm-box number. The red lever is marked "Fire," and when pulled performs the same function as the power lever, but sends in two additional rounds of the box number.

*Abstracted from a paper entitled "The New York Tunnel Extension of the Pennsylvania Railroad. Station Construction, Road, Track, Yard Equipment, Electric Traction and Locomotives," to be presented before the American Society of Civil Engineers, Oct. 18, 1911, and printed in the *Proceedings* for May, 1911, page 636.

In case of a partial short-circuit on a car or at the third-rail, which may maintain an arc, or in case it is desired to work around defective apparatus under a standing train, the current may be cut off from the third-rail of the section by pulling the "Power" lever. In case of a serious fire or other emergency the "Fire" lever may be pulled, and then the railroad fire department at the station and the emergency crews will respond.

TRACK

The track standards adopted were in general those of the Pennsylvania Railroad. In the tunnel it was desired to adapt the track to high-speed running, with a minimum of vibration of the track or tunnel structure, and to reduce noise as far as practicable; also to permit of ease of renewal without disturbance of the tunnel concrete lining. For these reasons it was decided to adopt ballasted track rather than any special form built into the tunnel structure.

The rail is 100 lb. per yard and is of the new "Pennsylvania" section and of open-hearth steel. The joint angle-bars are of the six-hole type, with an extended flange below the rail base. The base has also a special cross-section providing space for copper bonds between rail and splice. The ties are of black

specially rammed the filling and using rod reinforcement or bridging in the concrete.

The track was first laid complete with its fastenings to the tie-blocks, and then raised and leveled with great care to the proper grade and alignment by hanging the structure from a timber bridging carried on the station platforms; the concrete mixture was then poured, tamped and allowed to set; then the bridging was removed. The cost of this track complete under the special conditions obtaining in this place was \$6.27 per linear foot for the base and \$2.67 per linear foot for the tie-blocks and fastenings, making a total cost of \$8.94 per linear foot.

Each fifth tie in the ballasted track is used at one end as a seat for the third-rail insulator and for the bracket to support its covering; therefore, they were longer than the standard ties, or 9 ft. 3 in. All frogs and switches are according to the Pennsylvania Railroad standards. In the station yard all frogs and crossings have hardened manganese steel points.

ELECTRIC POWER SYSTEM

The electric power requirements include power for traction and for auxiliary purposes, including signals, lighting the sta-



Pennsylvania Tunnel—View in Terminal Station Yard

gum and yellow pine, creosoted, the minimum dimensions being 8 in. face, 7 in. thick and 18 ties to the rail length of 33 ft. All track is tie-plated with special rolled-steel plates 7 in. x 13 in. and $\frac{5}{8}$ in. thick. Under each plate is placed a pad of compressed hair-felt $\frac{1}{2}$ in. thick, the tie being tapped out to receive the pad. The rail is secured to the tie through the plate by two 1-in. lag-screws, each bearing on the rail flange and shoulder of the plate. The ballast is of trap rock screened through $1\frac{1}{2}$ -in. mesh and laid for a depth of 12 in. under the ties.

CONCRETE-BASE TRACK

For the track under the station building and adjacent to the passenger platforms it was desired to provide a form of construction which would present a smooth surface and could readily be kept clean. This was especially desirable where cars stand and drip oil and water on the track structure, and at places where rubbish may be thrown on the tracks by passengers. In general, the concrete surface was laid on the rock of the sub-grade, but in places where the sub-grade consisted of loose rock back-filling, crossed by drains and subways, it was necessary to secure uniformity for the concrete base by

tion, tunnels and yards, the operation of motors for various purposes about the station and for the ventilation and drainage of the tunnels and yard; also, for secondary purposes, in charging car batteries as well as batteries for the telephone and telegraph system and baggage trucks.

As the use of a tunnel entrance into New York City was predicated upon the use of electric traction, a statement of the conditions to be met and of the investigations leading up to the determination of a proper system and a description of its general characteristics will be of interest. In 1902, when the terminal work was commenced, there were few practical examples of heavy electric traction in existence, and none of the magnitude and complexity of the proposed terminal operation. As it was realized that much experimental work would be necessary to perfect the details, a complete program to this end was laid out some years in advance of the time when the actual installation of apparatus would be required.

Electrification of a portion of the Long Island Railroad was begun as a separate matter at about the same time, the system adopted being the so-called "third-rail" or "direct-current." This system was practically the only one in a sufficiently ad-

vanced state of development to warrant its adoption for heavy work at the date in question. The single-phase, alternating-current system was offered later as a possible advance in the art and was adopted on important work, notably the New York, New Haven & Hartford Railroad from its New York connection to Stamford, Conn. This development, therefore, demanded an investigation of the relative merits of the two systems for the New York terminal, and to this end a systematic plan was formulated for investigating the practical behavior of the two systems, and, in order to try out certain features of the single-phase system in its application to the tunnel conditions, an experimental line 5 miles in length was constructed on a branch of the Long Island Railroad. On this line an equivalent of a tunnel section was installed and equipped with a high-tension overhead conductor, various contact devices designed for sparkless collection of current were tried, and a multiple-unit motor-car equipment and a special type of a.c. locomotive were tested. The test car and locomotive, as well as much other apparatus, were kindly supplied by the Westinghouse Electric & Manufacturing Company.

The results of the tests cannot be given here in detail, but they were reassuring in some respects and disappointing in others. In the main they demonstrated the need of considerable further experimental work to adapt the system to the tunnel and yard conditions. The final recommendation was for the adoption of the direct-current system, interchangeable with that used on the Long Island Railroad, for the following main and important reasons:

First, reliability, from the start; second, freedom from complication in interchange with the Long Island traction system and the Newark rapid transit line through the Hudson & Manhattan tubes into Church Street, New York, and third, less expenditure involved at present and for some time to come. The above reasons, it should be remembered, apply only to this special installation. No broad generalization is intended for other traction projects, where local conditions must govern.

LOAD CONDITIONS

The load conditions include both traction and auxiliary power, and, in case of traction power, the requirements for the Long Island Railroad. Considering all these requirements, the load center was at a point adjoining the railway lines in Long Island City and not far from the water front of the East River. It was first proposed to establish two power houses, each to relay the other, under which plan the location of one house would fall on the New York side of the Hudson River and the other at a point not far from Jamaica. Neither of these locations was altogether suitable on account of difficulty in procuring the site in the first mentioned place and the absence of water for condensing purposes in the other. Furthermore, it was found that in dividing the load between two plants the call on neither one would be sufficient to give reasonable economy in operation; the relaying feature, therefore, of the two power houses, in the case of the disablement of one of them, was the only important point in favor of such a plan. Experience has shown that a properly designed plant, provided with suitable safeguards against a general breakdown from an accident to a part of the machinery, and with duplicate cable connections to the outside, can be depended on to furnish an uninterrupted supply of power, except for very infrequent and short interruptions, in which cases power supply can be restored in less time than it would take to obtain full relief from a second plant, especially where both are only of moderate size. Furthermore, in a great electric traction center such as the city of New York it is possible to establish emergency connections with other power plants. In view of these considerations, therefore, it was determined to establish only one power house for present operation and to equip it to supply power for both traction and auxiliary purposes.

EMERGENCY SUPPLY OF POWER

For an emergency supply of power for traction it has been arranged to connect the general traction system at three different points with the power plants of three companies, namely, the Public Service Corporation in New Jersey, the Hudson &

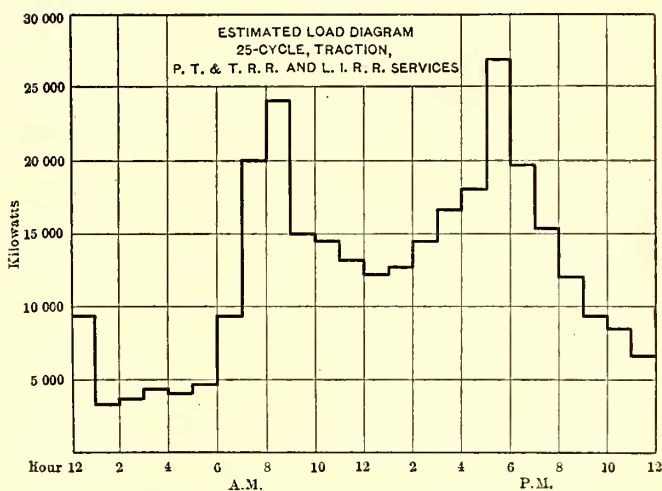
Manhattan Railroad Company in New York and the New York & Queens County Railway in Long Island City.

As an emergency supply for auxiliary power purposes the service plant adjoining the terminal station is equipped with generating apparatus capable of supplying all the auxiliary power required for the entire system. The combined traction load conditions are shown in the accompanying curve, and the central power plant has been designed to care for these loads with sufficient reserve for ordinary emergencies and a limited amount of spare capacity in the building for growth of traffic; but it has not been designed to take care of a general extension of the electric traction system to other Pennsylvania lines. When such extensions are made additions can be made to the present power house building, or, preferably, a new power house can be erected on the New Jersey side.

LONG ISLAND CITY POWER HOUSE

The Long Island City power house is on the East River, in Long Island City, a location nearly central to the present load conditions, close to the tunnel lines, and requiring only short cable connections to the tunnels and thence over the terminal division.

The building of this plant was undertaken some years prior to the completion of the tunnel system in order to care for the electrified lines of the Long Island Railroad into Brooklyn, following the completion of the Atlantic Avenue improvement of that road, and power from it for this operation has been furnished since 1905. Recently additional equipment has been added for the tunnel operation.



Pennsylvania Tunnel—Load Diagram

The present equipment consists of thirty-two boilers, each of 564 hp, sixteen on each floor, of Babcock & Wilcox water-tube type, built for a working pressure of 200 lb. per square inch and fitted with superheaters for 150 deg. of superheat and mechanical stokers. At the rear of the boilers are placed the economizers, one for each two batteries of boilers. Westinghouse-Parsons steam turbines drive directly the three-phase, a.c., 11,000-volt, 25-cycle, revolving-field generators. The equipment initially installed to operate the Long Island Railroad traction system consisted of three units of 5500 kw each at 750 r.p.m. To care for the increase of load from the terminal operation, two units were recently added. These are double-flow turbines, direct-coupled to 11,000-volt, three-phase generators of 8000-kw capacity at 750 r.p.m. Two 3000-kw turbo-generators of the same type, generating three-phase current at 11,000 volts and 60 cycles, have been provided for auxiliary power purposes. These units relay similar units in the Thirty-first Street service plant and are used either for emergency or in summer when exhaust steam from the latter plant is not needed for heating the station building. There is space in the present building for an additional unit of 8000 kw, with the necessary boilers and accessories.

TRANSMISSION

The transmission of electrical energy from the power house is entirely 11,000-volt, three-phase, alternating current, the trac-

tion power being 25-cycle and the auxiliary power 60-cycle. The distribution of all power is by three-conductor, paper-insulated, lead-covered cables, drawn into the conduits between the switchboards and the shafts communicating to the tunnels.

Four power cables run from the power-house direct to service plant substation No. 2; three additional power cables run direct from the power house to substation No. 3 at the Hackensack portals, New Jersey, and two extension cables connect substations Nos. 2 and 3. At substation No. 3 these feeders leave the house in three three-phase open-wire circuits on the steel pole line, crossing the Meadows and terminating at substation No. 4 at Harrison. All these 25-cycle feeders are of 250,000 circ. mils section per conductor.

Power for the Long Island Railroad is supplied in a similar manner through seven high-tension cables laid in the conduit system to an arrester-house at the west end of Sunnyside yard, from which open circuits are continued, through suitable lightning arresters, overhead on a steel pole line through the yard and thence to various substations on the Long Island electric traction system.

To provide for the contingency of an extension of the traction system on the New Jersey side beyond Newark, or for tie

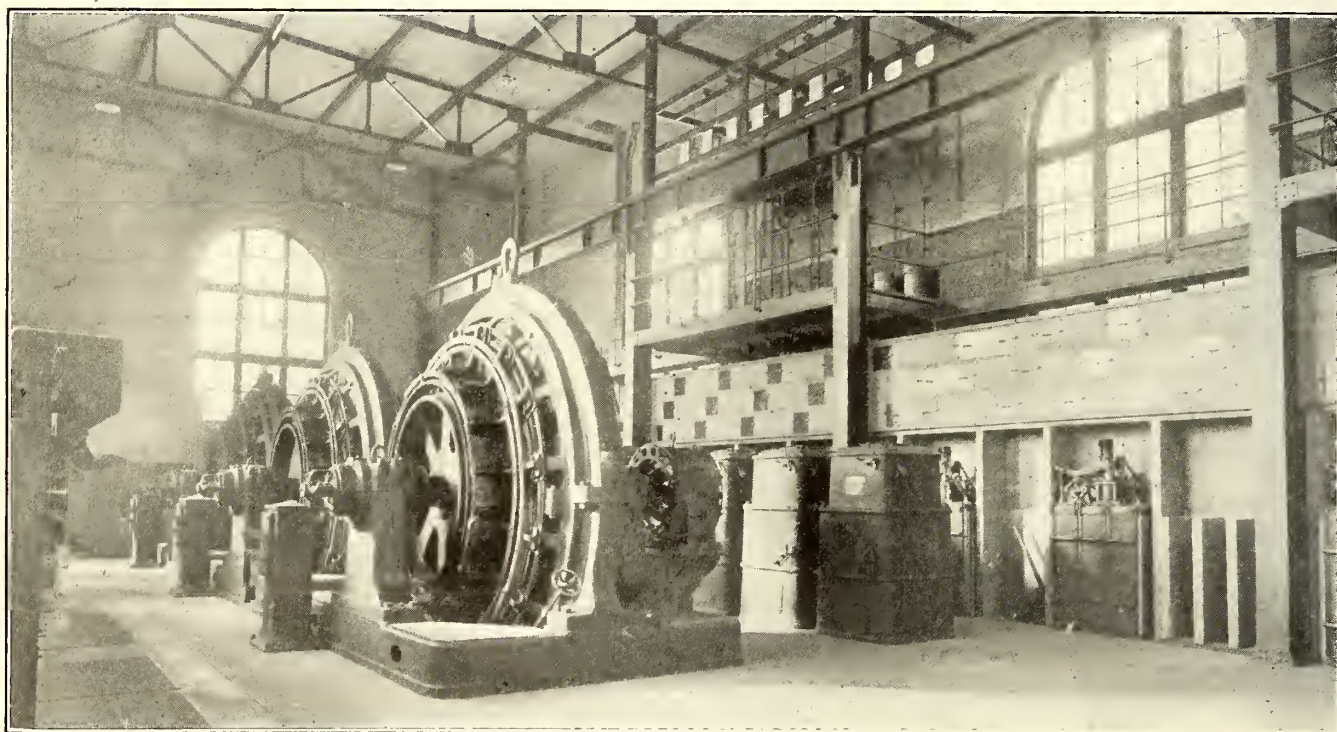
Furthermore, in providing cables for various purposes, by the above arrangement each substation has three or more traction power cables, two of which are ample to carry the load, and the auxiliary power cables are in duplicate; thus there is a margin of from 30 per cent to 50 per cent in the capacity of the cables to provide against breakdown.

At splicing chambers in the duct system, and where the cables are exposed in the substations, the lead sheathings of the cables are connected and grounded at intervals for protection against electrolysis.

TRACTION SUBSTATIONS

There are four traction substations for the terminal division and their locations have been fixed with reference to the loading requirements and by certain physical conditions along the line.

No. 1 has been placed in the power house and supplies the East River tunnel lines, Sunnyside yard and the Long Island tracks through the yard to a point where the load is taken by the first substation of the latter road. This location secures economy in first cost and operation of the direct-current supply for this section. No. 2, in the service plant, adjoins the main yard and is centrally located for movements in the yard, the



Pennsylvania Tunnel—Harrison Substation

lines to a future power house, space has been provided on the pole line for additional circuits suitably spaced for 33,000-volt transmission. In the event of such requirement it is intended to provide step-up transformers in the Hackensack portal substation and a 33,000-volt line westward therefrom.

Auxiliary power (60 cycles) is transmitted from the power house through the tunnels to the service plant in a similar way by four cables, two of these going to the service plant direct and two to the tunnel shafthouses for tunnel lighting and miscellaneous power. The two cables to the service plant have conductors of No. 00 B. & S. section and those to the tunnel shafthouses have conductors of No. 4 B. & S. section.

As there are four tunnels under the East River, the 25-cycle and 60-cycle cables are subdivided into groups and distributed through the tunnels so that there is a duplication of routes, as well as cables, for all service. Between the power house and the shafts the conduit lines are divided into two groups with separate manholes, in each of which approximately half of the cables of each type are run. Similarly, the cables for the Long Island transmission are kept entirely distinct from those of the tunnel operation.

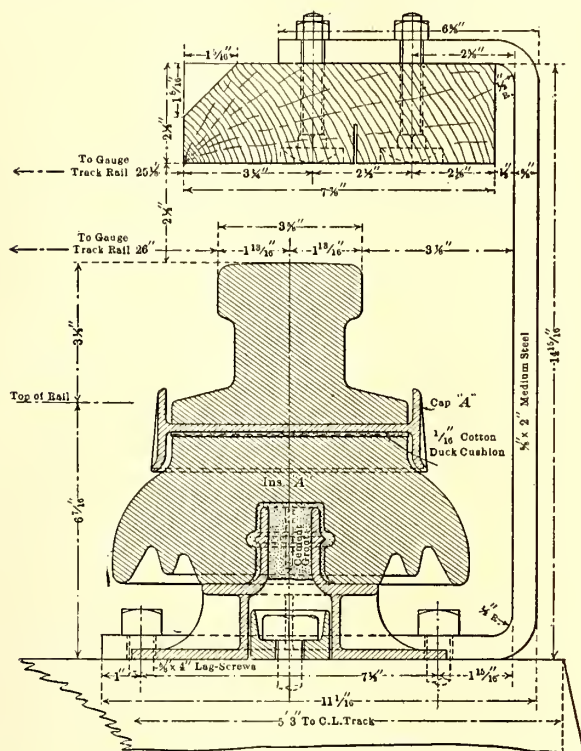
East River and North River tunnels. No. 3 is at the Hackensack portals, because of the desirability of having the power supply near the tunnel grades, and in order to permit of changing from underground cables to overhead line construction at the first point where such a change was permissible; it obviates separate provisions for housing switching apparatus and for lightning protection at a point between substations. No. 4 is at the junction of the Terminal and the New York divisions, making it available for supplying power not only to the Terminal division, but for the rapid transit line between Newark and Jersey City, in connection with the Hudson & Manhattan Railroad tunnels to Church Street, Manhattan.

In each of the substations there are installed high-tension switching apparatus, step-down transformers of the air-blast type and three 2000-kw rotary converters for converting the alternating current into direct current for traction purposes; also the necessary low-tension switching apparatus for controlling the out-going direct current to the various third-rail feeders. The normal direct-current voltage is 650, and the machines are designed with special reference to the fluctuating nature of the traction load and will operate up to 200 per cent

overload. Two of the rotaries in each substation will carry the load on that substation, the third being in reserve, and space is provided in the buildings for an additional machine when required.

SWITCHING STATIONS

Intermediate between the traction substations are located switching stations, in chambers built in the tunnel system, and in small buildings adjacent to the line in the open. These stations are not provided with attendants; they contain switches



Pennsylvania Tunnel—Section of Third-Rail and Protection for Tunnel Sections

for sectionalizing and cross-connecting the direct-current third-rail system. With two exceptions the stations are equipped for the remote control of switches and circuit-breakers, and are operated from the nearest traction substation by special control circuits. The two which are provided with hand-controlled switches are at or near signal cabins and are operated by the signalmen.

DISTRIBUTION AND CONTROL

In general the direct-current traction feeder circuits consist only of the third-rail and track return, with short cable connections between the substations and the third-rails and tracks, these being sufficient to carry the currents without excessive losses. The only exception is between substations Nos. 3 and 4, where the distance is such that it is necessary to supplement the third-rail and track return by a positive and negative feeder; these are each of 2,000,000 circ. mil section and are carried on the high-tension pole line. The return feeder is continuous between substations, with a connection to each track at each automatic signal. The positive feeder is omitted between switching stations.

It is necessary, in order to avoid undue current loss or excessive first cost, to connect all substations in parallel through the third-rail, and to interconnect the third-rails of the two tracks at intermediate points between substations. An accident, such as the grounding of the third-rail, under these conditions, however, would ordinarily affect the entire section of line; in order, therefore, to secure the advantages of the interconnected system and at the same time to permit of ready isolation of any section of track without interfering with operation on the adjacent tracks, a system of sectionalizing was installed. To do this the switching stations above referred to have been provided, in addition to the normal switching apparatus in the substations, and the connections at the switching stations are such

that by remote control the operator in any substation has complete control of each section of track between that substation and the nearest switching station. The circuit-breakers are also automatic at both points, so that on overload or short-circuit the section affected is cut out only between the substation and the nearest switching station and on one track only.

To restore the section after the overload, the operator closes a switch in the substation, and this, through the remote-control circuit, actuates the switch in the switching station. At the hand-operated switching stations the switches are closed by the signalmen on receiving instructions from the substations.

At the yards a complete system of sectionalizing is also provided. This is necessary because of the multiplicity of tracks and the necessity for isolating a limited section only, which may be affected by the accident. In the station yard the tracks are divided into twenty-one sections and these are planned so that an accident on any section will not interfere with through movements on the main tracks, and will not isolate an undue portion of the station tracks. The station yard sectionalizing is effected by switches in the service plant substation and under the control of the operator there. Similarly, the third-rails of the Sunnyside yard tracks are divided into seven sections, controlled in the yard switching station.

In addition to the provisions for sectionalizing and cross-connecting the third-rails, as above described, this rail in each tunnel is subdivided into sections, each about 1500 ft. in length, by quick-break knife switches. These are located approximately at each of the signals, and where the signals are far apart they are placed half way between. They are normally closed, but may be opened in emergencies, such as wreck or derailment, or the grounding of the third-rail, so as to localize the trouble and allow trains not immediately within this section to be operated out of the tunnel and also to allow electric wrecking trains to be operated close to the point of derailment to assist in clearing up the wreck, or to haul stalled equipment from the tunnels.

In connection with the subdivision of the third-rail into sections controlled from substations and switching stations, provisions have been made to prevent a train from running on a dead section of third-rail. To do this the rail is sectioned at certain of the automatic signals and a relay is provided, with connections to the third-rail and to the signal, to which the circuits are arranged so that when the rail is dead the signal indication will be "Stop," and at the same time a gong will ring at the signal to notify the motorman, when he brings his train to a stop, that he is not to proceed. Where the sections occur at interlockings the indication is given to the operator in the signal cabin.

THIRD-RAIL AND TRACK RETURN

The terminal operation, as elsewhere explained, required through service with the existing traction system of the Long Island Railroad, comprising more than 100 miles of electrified track. The top-contact type of third-rail is in use on the Long Island Railroad and has been found satisfactory, the cost of maintenance being very low, and it has the important advantage of simplicity of parts, flexibility, ease of maintenance and installation, and is easily repaired in cases of derailment. Third-rail location and clearances have been standardized by the American Railway Association, and, as a matter of course, the Long Island and the Terminal Railroad installations have been made to conform therewith.

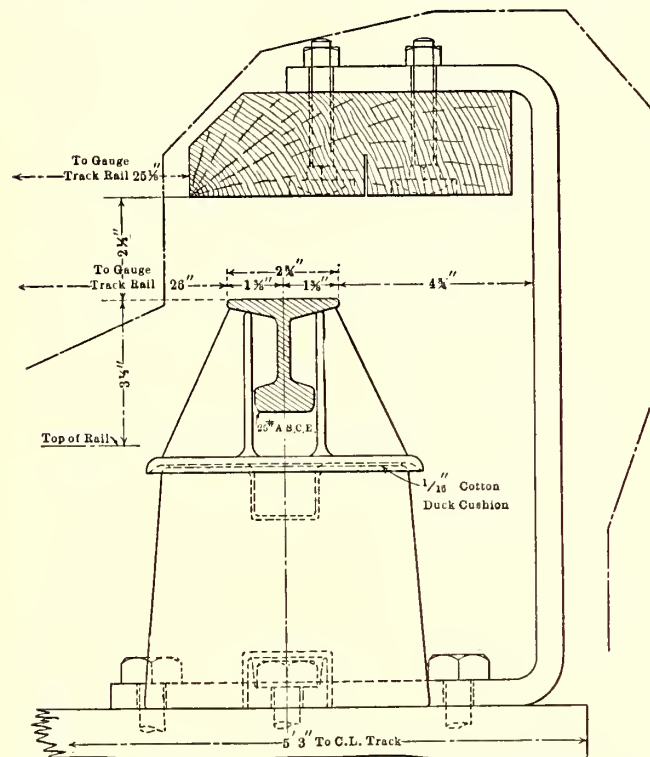
On account of the very heavy currents used for individual trains and the density of traffic it is necessary to have large current-carrying capacity and conductivity in the collector system. The capacity is in part fixed by the distance between the feeding points, and the required conductivity may be provided either by a light third-rail supplemented by copper feeders or a rail of large cross-section and special composition, which in most cases would require no supplemental feeders. The latter arrangement was adopted as being more economical in first cost and of greater simplicity. The rail section used on the main-line tracks is the heaviest yet adopted for traction pur-

poses, being 150 lb. per yard and of special chemical composition, low in carbon and other hardeners, giving a resistance of about eight times that of copper, instead of about twelve times, as in the ordinary track rail.

The rail is a tee section having a vertical height of 4 in. and a lower flange width of 6 in., making a section which allows for ample insulation from the track ties and is stable against overturning; it also provides for a simple form of splice and convenient bonding at the joints. In the yards, where the large section is not needed for conductivity, and where it is desirable to have the maximum of clearance for signal and other apparatus along the track, the section consists of 25-lb. standard Bessemer tee-rail mounted in an inverted position, the foot of the rail constituting the contact surface.

Experience on the Long Island Railroad and elsewhere with various type of insulators has resulted in the adoption by the Terminal Railroad of a simple and substantial form of insulating block for supporting the third-rail. These blocks are of porcelain, made by the "dry" process, which gives a very tough and mechanically strong insulator, with ample and permanent insulating qualities. For the open sections of the road a simple rectangular block with rounded corners is used; in the tunnels, where in places there is dampness due to condensation or salt seepage water, a petticoat-type insulator is used which furnishes a more extended surface to provide against leakage of current.

The heavy-section rail is bonded with ribbon type, compressed-terminal foot bonds, four to a joint, having a conductivity equivalent to 80 per cent of that of the third-rail. The light-section rails for the yards are bonded with the pro-



Pennsylvania Tunnel—Section of Third-Rail and Protection for Yard Tracks

tected-type, pin-terminal cable bonds. The third-rails throughout are protected by a continuous plank carried on wrought-iron brackets secured to the third-rail ties. On the open line this plank is of yellow pine, but in the tunnel Jarrah wood, imported from Australia, has been used because of its slow-burning qualities.

The connections to the third-rail from substations and switching stations are made by insulated cables of 2,000,000 circ. mil section for the heavy rail and 1,000,000 circ. mil for the light rail. The cables terminate in special porcelain "pot-heads" from which flexible cables are connected to the third-rail by bond terminals.

Throughout the main tracks both rails of each track are bonded; in the yards, however, only one rail is bonded. In the open, where there is danger of theft of copper, the bonds are of the protected type, placed under the joint angle-bars; in the tunnels and terminal yard, from which the public is excluded, long cable bonds are run around the angle-bars. All bonds are of wire cable, provided with forged copper terminals, and are secured in drilled holes in the rails by steel pins driven through the center of the heads. As a matter of interest, it will be noted that there was great difficulty in drilling the open-hearth steel rails for these connections. It was found that tools suitable for Bessemer rails would drill only from two to four holes in the open-hearth rails; therefore special steels had to be used for the drill bits.

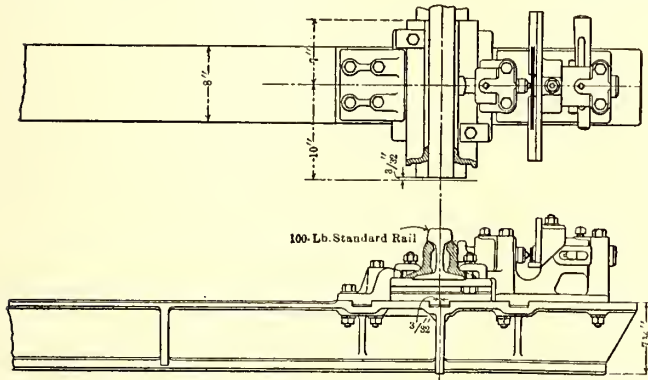
ELECTRIC LOCOMOTIVES

Quite independently of the general character of the traction system, it was felt that considerable experimental investigation was needed to decide on the type of electric locomotive suitable for handling heavy main-line trains. Therefore a special locomotive committee was appointed to investigate existing designs and develop, by experiment or otherwise, a suitable locomotive for the exacting conditions of the proposed service. As a result of the work of this committee two locomotives were designed and built at Altoona in 1905. These locomotives were designed for a maximum speed of about 45 m.p.h. on a level, with a normal train, as at that time it was intended to confine the terminal electric operation to the haul through the tunnels from the west portal at Bergen Hill, N. J., to the yard at Long Island City. Practically all this portion of the line is on heavy grades and over a short distance only, and a slow speed would conduce to economy and would not be prohibitive as to time consumed. Subsequently it was determined to extend the terminal run to Harrison, N. J., on the west, and possibly to Jamaica on the east, involving level stretches of about 10 miles at each end. Hence it became necessary to adapt the locomotives to the higher speed conditions normally obtaining in main-line operation. Accordingly, the two locomotives under test were modified electrically to permit of a maximum speed of about 65 m.p.h. Tests with these machines had demonstrated their hauling power and successful operation at the slow speed for which they were originally designed, but when speeded up it was found that they became quite destructive to track. At speeds greater than 45 m.p.h. they developed a tendency to rhythmic side swaying and the production of excessive lateral pressures at the rail heads. Such peculiarities in steam locomotives with low-hung boilers, of course, were not altogether unknown to railway engineers, but they are intensified in an electric locomotive, where the power is applied with extreme compactness and where a convenient method of motor attachment concentrates great weight around the axles; also where it is not only possible but generally most convenient to utilize all weight for adhesion.

TESTS ON WEST JERSEY & SEASHORE RAILROAD.

In order to bring out more fully the elements of design as affecting tracking, it was determined to institute a series of road tests, recording as far as practicable the comparative lateral rail pressures at various speeds with various types of steam and electric locomotives. A special recording apparatus for the purpose was devised and placed in a stretch of tangent track on the electrified portion of the West Jersey & Seashore Railroad. A complete series of tests was made, and from the information obtained the mechanical characteristics of the design of the locomotive to be built for tunnel operation were determined. During 1910 this test apparatus was again installed, this time in a section of the Terminal division track, and the new locomotives were tested thereon to check their actual with their expected performance. The test was made over a length of 165 ft. of special track carried on cast-steel ties having chairs near their ends for holding the rails. The chairs rest on rollers on seats in the ties and allow for free lateral motion outward of the rails, except as restrained by the pressure-registering device on each tie. This device is in the form of a plug carried in a guide on the chair-seat casting;

other it carries a hardened steel ball which is placed in contact with a strip of plate steel. Proper adjustment for gage is made before each run by wedges between the plugs and rails. Any side pressure at the rail from the wheel flanges of a locomotive moving over the track causes the steel balls to press into and indent the steel-plate strips. The diameter of the impression, when measured by a micrometer microscope, indicates the magnitude of the side pressure, the location of the maxima and the tendency of the locomotive to "nose" or oscillate. Typical samples of the records obtained along this track section are reproduced, one showing a normal record from a steam locomotive of the Atlantic type, another from the original design of electric locomotive and a third from the adopted type of electric locomotive. The tests were conducted



Pennsylvania Tunnel—Special Track Tie and Registering Device for Locomotive Tests

to show the free-running characteristics of the locomotives at speeds as high as 94.6 m.p.h. with a steam locomotive and 86 m.p.h. with an electric locomotive.

To test the pressure of individual wheels on curves, especially as affecting behavior in taking switches and turn-outs in yards, a hydraulic apparatus devised by George L. Fowler was used. With this device the side pressure of each wheel flange is measured by connecting a short section of one rail through a system of levers to a hydraulic cylinder and its pressure-recording device. From experience obtained in the service tests of three different types of electric locomotives and the results of the special track instrument tests it was decided to make quite a radical departure from general practice in the final design of the high-speed locomotives for the terminal equipment. An attempt has been made to pattern the locomotive mechanically on the fundamental characteristics of modern steam locomotive design in the following particulars:

(a) High center of gravity of the machine as a whole, and especially of the heavy electric motor portion.

(b) The large proportion of the total weight spring-borne and equalized by a system having considerable amplitude of motion.

(c) An unsymmetrical distribution of wheel-base of the locomotive.

(d) A combination of driving and carrying wheels.

To accomplish these results required an important modification in the customary method of mounting and connecting the electric motors; instead of being placed concentric with or in the plane of the axles, and direct-mounted or geared to them, they are placed on the main frames above the wheels and driving connections are made with rods. The locomotive is double, or articulated, each half being similar to an "American" type or eight-wheeled steam locomotive in the wheel arrangement, frames and running gear. These halves are permanently coupled back to back by a drawbar and equalizing buffer connection.

The maximum weight of train to be hauled by one locomotive under the given conditions was specified as 550 tons trailing load; the actual capacity, however, in intermittent service has approximated 700 tons trailing. The tractive effort per locomotive equals 60,000 lb. for one-half minute and 50,000 lb. for

two minutes, or 12,000 lb. at 800 amp, all with full field. One of the conditions was that the locomotive was to start and accelerate a 550-ton train, in addition to the locomotive, on the 1.93 per cent maximum tunnel grade, and with a 550-ton train on level tangent track was to attain a speed of 60 m.p.h.

SIGNALING

The switch and signal system was made unusually complete. The physical conditions surrounding the station yard are exceptional in the following respects:

(a) The yard is practically underground, and the view from trains and of the tower operators is obscured by numerous yard structures and building columns.

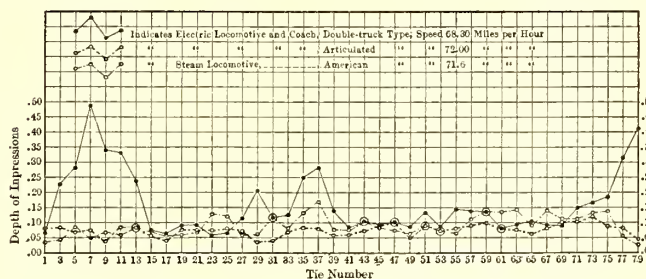
(b) Clearances, both overhead and side, between the trains and structures are very limited, and the space available for the installation of signals and apparatus is restricted.

(c) The character and extent of the train movements required the realization of the fullest capacity of all track facilities, necessitating the greatest freedom for simultaneous parallel movements.

(d) The complexity of the track plans and the presence of yard service facilities, such as the piping system for steam, air and water, drainage and traction conductors and conduits, required that the signal appliances should be mounted on special foundations and that control wiring should be run in permanent and accessible shape in a conduit system.

On account of these conditions it was found necessary to divide the control of the yard movements between four different power-operated switching cabins. These cabins, each controlling only a part of the yard, required a certain amount of inter-connection to insure rapid and complete movements in the yard, a result accomplished partly by electric locking between cabins, partly by light indicators on the track models in the cabins, to show how the tracks between them are occupied and when trains are approaching, and partly by central communication by telephone, etc., with the train director.

The tunnels involve train movements over heavy grades, at high speed and at the minimum safe interval, a condition which led to the adoption of automatic block signaling with overlaps of the same length as the block sections; in other words, a two-indication block in which a "proceed" indication requires that two sections shall be unoccupied. "Caution" indication must show that at least as much track is unoccupied as the foregoing. The length of the sections is variable, depending on the



Pennsylvania Tunnel—Diagram of Relative Riding Qualities of Steam and Electric Locomotives

grade and maximum train speed at the point in question, being made 150 per cent of the length in which a stop can be made by the application of the brakes.

At each block in the tunnels a "track stop" is installed to apply the train brakes automatically should a danger signal be overrun. The closest headway at which trains can be run at normal speed, therefore, is the time required to pass over two block sections, corresponding to about two minutes, and at restricted speed under caution signals, one block, or about one and one-half minutes.

"Lock and block" control has been provided between the station and the Long Island approach of the East River tunnels, so that if necessary any one of the four tunnel tracks can be operated in the reverse direction. The North River tunnels have the same provision, with the addition of automatic signals

for following movements. The grades are such that the spacing of signals for reverse movements could not be the same as for movements in the normal direction of traffic, and on account of this there was considerable complication in putting the signals for a certain direction out of commission and those for the opposite direction in, and changing the control of the automatic stops so as to make them effective at the right time.

The Meadows section has been equipped with automatic semaphore block signals without track stops. Complete reverse-movement signaling has been provided for at each block. At the Hackensack River, midway of the section, the drawbridge has been provided with the usual interlocking bridge and signal appliances and the cross-overs between tracks at the east approach to the bridge, so that reverse movements may originate either east or west from this point.

Because of the absence of daylight conditions in the tunnels and in the covered portion of the terminal area the indications are given entirely by lights. This signal contains no mechanism other than that required for changing the colors of stationary lights in such a manner as to reproduce the same colors and combinations as called for by changes in position of a semaphore signal under like conditions in the controlling currents. The signals are cast-iron receptacles carrying colored lenses, behind which are located standard 4-cp incandescent lamps (two in multiple for each lens), and the mechanism consists of relays housed in separate shelters near the signals, the contacts of which are adapted to shift the current from lamp to lamp and thus change the colors displayed as the relays are energized or de-energized by manipulation of the machine levers, or by the action of trains on track circuit, or by both.

Because of the difficulty of obtaining ample clearances and suitable supports for semaphore signals in the yard, and in order to maintain a uniform type of signal within the station area, special hooded lenses and lamps of high candle-power are used in the "lamp" type of signal in these exposed places and are found to give effective indication for the possible range of observance. Elsewhere on the line, outside of the terminal and tunnels, this form of signal would not prove satisfactory because of the higher speeds and longer range of observation required, therefore the semaphore type is used on the open line.

SINGLE-PHASE ELECTRIFICATION IN SOUTHERN FRANCE

In 1908 the Compagnie des Chemins de fer du Midi, the great railroad system of southern France, equipped experimentally a 10-mile section of the branch line between Villefranche, Vernet les Bains and Perpignan with a 4000-volt, 16 2/3-cycle, single-phase line. This installation has proved so satisfactory that an order has now been placed with the French Westinghouse Company for the electrical equipment, except for locomotives, of the 70-mile main line section between Pau and Montrejean, together with intermediate branch lines, comprising in all about 175 miles. The 70 miles between Pau and Montrejean are double track. The trolley voltage will be 12,000 volts and the frequency 16 2/3 cycles. Energy will be transmitted from four hydroelectric stations at 60,000 volts to substations at Pau, Lourdes, Tarbes, Launomezan and Montrejean. The plan is to operate express passenger trains at speeds up to 62 m.p.h. and regular passenger trains at speed up to 45 m.p.h. The main line trains are to be hauled by electric locomotives, but multiple-unit motor cars and trailers will be used on single-track branches.

The type of locomotive to be supplied by the Allgemeine Elektrizitäts Gesellschaft was illustrated on page 668 of the *ELECTRIC RAILWAY JOURNAL* for April 9, 1910. There is a leading axle at each end, while the three driving axles are coupled together and are driven from two jackshafts which are coupled in turn to two 800-hp Winter-Eichberg repulsion motors. The total weight of the first locomotive furnished is 85 tons, the weight available for adhesion is 54 tons and the weight per driving axle is 18 tons. The maximum drawbar pull is 27,500 lb. and the speed 47 m.p.h. The motors are supplied from a common transformer which is mounted between them. Regenerative control is in-

stalled to return energy to the line on down grades at speeds between 18.5 m.p.h. and 34 m.p.h. The order received by the French Westinghouse Company includes 30 double-truck motor cars each equipped with four 125-hp motors. Each motor car will weigh about 56 tons and is to haul four trailers.

MEETING OF NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on May 25, with President Franklin Woodman in the chair. At the conclusion of the usual dinner a short address was delivered by Charles C. Peirce, Boston, extending the best wishes of friends to Carl A. Sylvester, general manager of the Boston Suburban Electric Company, who is soon to leave New England to assume executive duties in the organization of the Rio Janeiro Tramway, Light & Power Company. On behalf of assembled friends Mr. Peirce presented Mr. Sylvester with a gold watch and a wardrobe trunk. The recipient responded in happy vein, after which the regular business of the meeting was resumed. Papers were read by Walter M. Denman, consulting engineer, Springfield, Mass., on "Reinforced Concrete Bridges" and by A. A. Hale, engineer Griffin Wheel Company, Boston, Mass., on "Chilled-Iron Wheels and Their Relation to Service Conditions."

REINFORCED CONCRETE BRIDGES

Mr. Denman described the type of reinforced concrete bridge construction designed by Daniel B. Luten, of Indianapolis, Ind. The usual practice is to place one rod near the upper surface of the arch ring to cover the region over the haunches which may carry tension stresses. A second rod is placed over the intrados for the full distance between abutments, although the only part in tension is located under the crown. In order to prevent the upper rod from bursting out of the crown when it buckles in compression many stirrups must be used, tying the upper and lower rods together. This applies only to the earth-filled arch. In the Luten method one rod covers all those points of tension and with less concrete at the crown than by the older method. Nearly 4000 of these arches are now in service. The first bridge of this type had a span of but 6 ft. and a rise of 18 in., the crown thickness being 4 in., with 1/2-in. rods for reinforcement. A large number of slides of bridges were shown, with comments upon special features of interest in each case. Emphasis was laid upon the use in some cases of an inexpensive bridge rail of concrete, which is molded in sections 4 ft. long during construction and then set in place on the coping. A separately molded hand rail is placed on top and the total cost is about \$1 per foot. The longest and highest bridge thus far built by this company's method is that over the Maumee River at Waterville, Ohio, for the Toledo & Western Railway. This is 1200 ft. long and has twelve spans. The filling was accomplished by placing timbers from spandrel to spandrel, laying the rails on the former and delivering material from a ballast train. The bridge has a capacity of 10,000 lb. live load per foot of track and cost \$100,000.

Short spans which are half-way between a bridge and a culvert often are the cause of accidents on account of the inadequate attention given to their design. The use of wooden stringers and steel I-beams is objectionable because of the subsequent rusting of the beams, and the practice of embedding I-beams in concrete is unduly costly since the I-beams are in no genuine sense reinforcements, as they must be heavy enough to carry not only the live load but all the dead load of the concrete as well. There has been developed in the Luten truss a reinforcement for spans from 5 ft. to 30 ft. to meet these objections. It is made of steel rods of the sizes best suited to the spans, and is supplied in units ready to place. It is cheaper in first cost and handling than are I-beams and cannot readily be installed incorrectly, as plans are supplied with the units. A view was shown of a bridge having five spans from 70 ft. to 84 ft. long, and a carrying capacity of a train of 75-ton cars run at high speed, the total cost being \$18,175. In conclusion, Mr. Denman described the methods of overcoming various difficulties in construction for the Portland & Lewiston Electric Railway. A span

of 15 ft. under fill, cost \$1,200; span of 25 ft., \$1,600; clear span of 100 ft., \$7,250; span of 35 ft. on piles, \$2,250.

CHILLED-IRON WHEELS

Mr. Hale stated that the Griffin company has a complete record of over 9,000,000 wheels, showing the serial numbers, date cast, railroad, total mileage and cause of removal, and touched upon the value of such data in manufacturing and selecting wheels for specific service. The practice of some operating companies was criticised on the ground that insufficient attention has been paid to increasing weights and speeds of cars when purchasing wheels. The methods of manufacturing wheels were reviewed, including the use of chemical and physical tests in the factory, selection of test pieces, and the measurement of the depth and range of chill. The marking of wheels to show each 1/16 in. variation in circumference is now standard practice. In the past few years exhaustive tests have been conducted upon various alloys to obtain a wheel which should be superior in strength and wear to the ordinary chilled wheel. As a result of these tests wheels have been placed on the market which have proved superior in both wearing quality and stability against structural failure. Such wheels are referred to by the Griffin company as the "FCS" type. The combined carbon in all parts of the chilled-iron wheel, except at the flange and tread, is about 0.7 per cent, which is about the same as that of all parts including flange and tread of the steel wheel. The chemical action which takes place when the molten metal comes in contact with the chiller when a wheel is poured increases the combined carbon to about 3½ per cent, thus increasing the hardness.

Mr. Hale referred to the brake test made last year at Purdue University for the M. C. B. Association to establish the relation between the brake friction, the amount of metal worn from the brakeshoe and from the wheel. These showed that the relative resistance to wear exhibited by different shoes is somewhat affected by the severity of the application of a series of shoes; that all shoes wear more rapidly on steel wheels than on cast-iron wheels when tested under like pressure; that shoes which wear greatly below the average are those which cause wear in the wheel, and that all shoes show greater wear per unit of work performed under the higher pressure.

The speaker stated that the economy of the chilled-iron wheel has been thoroughly demonstrated, and that if the capacity and weight of the car when light, the amount of brake pressure and the speed of the car are given the manufacturer chilled-iron wheels can be safely used for all classes of service which now exist. On account of the absence of ductile metal in the tread, the chilled-iron wheel is better suited than any other material for highly concentrated loads. By the use of alloys much can be accomplished along lines hitherto undesirable.

Uniform diameters are of great importance, since a difference of ⅛ in. in circumference of two 32-in. wheels mounted on the same axle on a car making 100 miles per day means a slippage of 636 ft. This tends to cause sharp flange and corrugated rail as well as to increase the power needed to run the car. This is less disastrous in a chilled wheel than in others of a softer material. Mr. Hale showed that off-center boring tends to cause locking of brakeshoes at the high point, with sliding and flat wheels. It is wise to check the jaws of the boring mill frequently, as one jaw is likely to wear out faster than the others. Better work can be done on a four-jaw or five-jaw boring mill. The importance of accurate mounting of wheels on axles was also mentioned and the use of the wheel check gage recommended. All axles should be prick-punched designating the center point. The practice of measuring the distance from the ends of the journals to the front hub when pressing on axles is not always accurate owing to the variation in the lengths of the axles and in the distance through the hubs of the wheels. Greater mileage and better wheel performance would result from giving more attention to the proper fitting of wheels on axles. The maintenance of track gage is also of the utmost importance in connection with the wheel wear. The accumulation of bolts, nuts, etc., in track work is highly objectionable as it

tends to produce chipped flanges. An average of from 15,000 miles to 20,000 miles has been obtained at slight cost from old wheels condemned to the scrap pile but reclaimed and mated with care.

At present the custom is too prevalent of scrapping wheels of chilled iron which have become flat in spots. The use of an emery truing brakeshoe is very successful on smaller properties where the wheels can be closely watched and the emery shoes taken out as soon as the flat spots have been removed. It is ordinarily only necessary to grind away 1/64 in. to 1/32 in. of the wearing quality of the wheel in order to eliminate the flat spots. This method is not so efficient in larger systems where it is impossible to keep a close watch of the wheels being ground while in service. Emery truing shoes can be purchased for \$7.50 per pair, and from ten pairs to fifteen pairs of wheels can be ground with one pair of shoes.

On large systems the pit grinder has proved economical. By its use an increase of 25 per cent to 40 per cent in wheel mileage has been obtained. Pit grinders can be installed at a cost of from \$375 to \$1,500. Many companies have built their own grinders. The time required to remove flat spots varies from twenty minutes to forty minutes. The cost of grinding wheels by pit machines consists of the items of actual labor expense, cost of emery wheel, and interest and depreciation on the investment. An average cost is from 40 cents to 60 cents per pair. The Public Service Railway Company of New Jersey will shortly have twelve pit grinders in service. The Rhode Island, Connecticut and Worcester Consolidated companies are also using them with success. When it is necessary to remove the wheels and axles from the trucks and grind them in the old type of grinder the cost is much increased, as the expense alone of removing and replacing a pair of wheels would amount to about 70 cents and to this must be added the cost of grinding.

It has been found that from 15,000 to 25,000 additional miles have been secured after grinding wheels which would have been scrapped otherwise. A pit grinder will pay for itself in a short time. If, upon examining the tread, no evidence of mottled gray iron is found to indicate that the chill is worn through, the question as to depth of chill can be determined by tapping or calipering the wheels in order to determine how much of the diameter has been worn away. This can be accurately calculated by keeping a record of the circumferences of the new wheels when put in service. It is safe to assume that a minimum of ¼-in. reduction in diameter can be allowed before the wheels are worn through the chill, and from this up to 1½ in. for the heavier weights of wheels. After inspecting wheels for a short time workmen are able to determine readily whether or not it would pay to grind them.

RECOMMENDATIONS OF COMMITTEE ON CITY RULES

The committee on city rules of the American Electric Railway's Transportation & Traffic Association has just issued a data sheet to all members giving the changes tentatively adopted in the existing code of city rules, also certain additional code rules, a set of carhouse rules, a set of prepayment-car rules and titles for local operating rules for each of these three codes. The proposed changes are being mailed thus early to the membership with the earnest plea that the members read them carefully and reply promptly to the committee whether they favor these amendments, and if not why not. The data sheet states in the case of practically every change the reasons which induced the committee to recommend the change, and after each rule on the data sheet a blank is left where members can say whether they favor the amendment, and, if not, give the reasons for their dissent.

The recommended changes follow in general the wording tentatively adopted at the meeting of the committee in New York on April 14-15, but further consideration by the members of the committee indicated that a few changes should be made, and these changes are incorporated in the data sheet just issued.

REPORT OF COMMITTEE ON OVERHEAD LINE CONSTRUCTION, N. E. L. A.

The National Electric Light Association's committee on overhead-line construction, of which Farley Osgood, Public Service Electric Company, is chairman, presented a report which occupied 195 pages of text. The members of the committee comprise representatives of other associations, among them Prof. A. S. Richey, of Worcester, who represented the American Electric Railway Engineering Association. The report is divided into four sections as follows:

Section No. 1: Specifications covering methods of overhead-line construction for 2300-volt distribution and for street-lighting circuits and specifications for material.

Section No. 2: Specifications covering methods of overhead-line construction for secondary voltages, including pole wiring for street-lighting work.

Section No. 3: Inter-company agreement form and specifications for the joint use of poles by lighting and telephone companies.

Section No. 4: Specifications for overhead crossings of electric light and power lines.

Sections 1, 2 and 3 have previously been submitted to the association in other form but have been revised. Sections 1 and 2 are of particular interest to lighting companies. To section 3 a clause (No. XIX) has been added on railway attachments and is of special interest to railway companies. It is printed below and is followed by Section 4.

CLAUSE RELATING TO THE POSITION OF RAILWAY ATTACHMENTS ON JOINT POLES

"(A) Where poles are jointly used for telephone attachments and attachments of railway feeders, supporting or span wires, supporting brackets and line apparatus used in connection with the overhead construction of electric railways, the attachments shall be made in accordance with the foregoing articles, wherever the same are applicable, excepting as modified by the following paragraphs, which refer specifically to poles jointly used by railway and telephone attachments.

"Double-Pole Line Construction:

"(B) Where the railway construction is of a type in which the trolley wire is supported by spans, attached to two separate lines of poles, and these two lines of poles are to be used for the attachments of the lighting, railway and telephone companies, it is always preferable that the lighting, power and railway lines should be carried on one line of poles, and that the telephone lines should be carried on the other line of poles.

"Single-Pole Line Construction:

"(C) Where the railway attachments and the telephone attachments are carried on one and the same line of poles the railway feeders and attachments shall occupy a position on the pole below that occupied by the telephone cross-arms. If the poles carry also lighting and power attachments these shall occupy the upper position on the pole and above the telephone attachments, subject to the provisions of Article IV.

"Spans and Brackets:

"(D) Where span wires and brackets for supporting or holding trolley and guard wires are attached to poles jointly used the attachments shall be made as follows:

"The span wires and supporting brackets may be attached to the pole at a height convenient for the railway operation.

"The span wires and brackets may be attached to the pole by bolts passing through the pole.

"Every span wire and bracket supporting trolley wires shall be effectually insulated from the railway potential.

"Feeders:

"(E) The railway feeders on poles jointly used shall be carried on cross-arms located on the pole approximately at the point of attachment of the supporting trolley span or bracket.

"Where telephone attachments are located above such feed-

ers a horizontal distance of not less than 24 in. shall be maintained between the pole pins on the cross-arms carrying the railway feeders.

"Distance to Be Maintained Between Telephone and Railway Lines:

"(F) On poles carrying railway attachments the lowest telephone cross-arm shall be at least 2 ft. above any part of the brackets or span wires supporting the trolley wire, and shall also be above the nearest railway cross-arm by a distance not less than 40 in.

"Railway Switches and Line Apparatus:

"(G) Signal boxes, switches, cut-outs and similar railway apparatus may be installed on the pole at the point necessary for convenient operation, provided that they shall not be installed in such a manner as to interfere with the employees of either company in climbing the pole or to prevent the installation of vertical runs, as described in Articles XII and XIII. When located below telephone lines or attachments they shall be of a type in which all live parts are covered and protected from accidental contact.

"Railway signal-line wires run on jointly used poles, and below telephone attachments shall be installed so as to provide a climbing space through them of not less than 24 in.

"Connecting wires to such railway apparatus run down the pole shall be insulated and shall be attached to the street side of the pole and maintained at a distance of not less than 5 in. from the surface of the pole.

"Telephone Attachments on Standard Short Railway Poles:

"(H) Wherever poles used by the railway company are too low to permit, under the terms of this specification, the attachment thereto by the telephone company of cross-arms for carrying their wires the telephone attachments which may be made shall consist only of twisted pairs or a single telephone cable.

"Where only one such twisted pair is used it may be carried on an insulator on the top of the pole or on a side bracket.

"Where more than one twisted pair is carried along the line of poles the pairs shall be bunched together throughout their length and attached at or near the top of the poles. In no case shall the pairs so carried exceed ten in number.

"Where the telephone cable is attached to such poles it shall not exceed 1½ in. diameter and shall be placed at or near the top of the pole.

"The attachment of twisted pairs or of telephone cables, as above, shall be so made as not to restrict the proper use of the pole by the railway company, and the railway company may use its standard methods of construction in installing its feeders, span wires, brackets, switches and any other appliances on such poles."

SPECIFICATIONS FOR OVERHEAD CROSSINGS FOR ELECTRIC LIGHT AND POWER LINES

These specifications are given in full below. They are followed by five appendices as follows: (A) Wind and ice loads. (B) Tables and curves of conductor sags. (C) Specification for galvanizing for iron and steel. (D) Pole formulas. (E) Drawings of typical crossings.

This report was made as a joint report with the following committees of other associations: The high-tension transmission committee of the American Institute of Electrical Engineers; the committee on power distribution of the American Electric Railway Association; the committee on high-tension wire crossings of the Association of Railway Telegraph Superintendents, and the sub-committee of the committee on electricity of the American Railway Engineering and Maintenance of Way Association. The specifications follow:

"General Requirements

"1. *Scope:* These specifications shall apply to overhead electric light and power line crossings (except trolley contact wires), over railroad right-of-way, tracks or lines of wires; and, further, these specifications shall apply to overhead electric light and power wires of over 5000 volts constant potential, crossing over telephone, telegraph or similar lines.

"2. *Location:* The poles, or towers, supporting the crossing span preferably shall be outside the railroad company's right-of-way.

"3. Unusually long crossing spans shall be avoided wherever practicable.

"4 The poles, or towers, shall be located as far as practicable from inflammable material or structures.

"5. The poles, or towers, supporting the crossing span, and the adjoining span on each side, preferably shall be in a straight line.

"6. The wires, or cables, shall cross over telegraph, telephone and similar wires wherever practicable.

"7. Cradles, or overhead bridges, shall not be used.

"8. *Clearance:* The side clearance shall be not less than 12 ft. from the nearest rail of main-line track, nor less than 6 ft. from the nearest rail of sidings. At loading sidings sufficient space shall be left for a driveway.

"9. The clear headroom shall be not less than 30 ft. above the top of rail under the most unfavorable condition of temperature and loading. For constant potential, direct-current circuits, not exceeding 750 volts, when paralleled by trolley contact wires, the clear headroom need not exceed 25 ft.

"10. The clearance of alternating-current circuits above any existing wires, under the most unfavorable condition of temperature and loading, shall be not less than 8 ft. wherever possible. For constant potential, direct-current circuits, not exceeding 750 volts, the minimum clearance above telegraph, telephone and similar wires may be 2 ft. with insulated wires and 4 ft. with bare wires.

"11. The separation of conductors carrying alternating current, supported by pin insulators, for spans not exceeding 150 ft., shall be not less than:

Line Voltage.	Separation.
Not exceeding 6,600 volts.....	14½ in.
Exceeding 6,600 but not exceeding 14,000.....	24 in.
Exceeding 14,000 but not exceeding 27,000.....	30 in.
Exceeding 27,000 but not exceeding 35,000.....	36 in.
Exceeding 35,000 but not exceeding 47,000.....	45 in.
Exceeding 47,000 but not exceeding 70,000.....	60 in.

For spans exceeding 150 ft. the pin spacing should be increased, depending upon the length of the span and the sag of the conductors.

"Note: This requirement does not apply to wires of the same phase or polarity between which there is no difference of potential.

"With constant-potential, direct-current circuits not exceeding 750 volts, the minimum spacing shall be 10 in.

"12. When supported by insulators of the disk or suspension type the crossing span and the next adjoining spans shall be dead-ended at the poles, or towers, supporting the crossing length of the crossing and adjoining spans generally shall be used as strain insulators.

"13. The clearance in any direction between the conductors nearest the pole, or tower, and the pole, or tower, shall be not less than:

Line Voltage.	Clearances.
Not exceeding 14,000 volts.....	9 in.
Exceeding 14,000 but not exceeding 27,000.....	15 in.
Exceeding 27,000 but not exceeding 35,000.....	18 in.
Exceeding 35,000 but not exceeding 47,000.....	21 in.
Exceeding 47,000 but not exceeding 70,000.....	24 in.

"14. *Conductors:* The normal mechanical tension in the conductors generally shall be the same in the crossing span and in the adjoining span on each side, and the difference in length of the crossing and adjoining spans generally shall be not more than 50 per cent of the length of the crossing span.

"15. The conductors shall not be spliced in the crossing span nor in the adjoining span on either side.

"16. The method of supporting the conductors at the poles, or towers, shall be such as to hold the wires, under maximum loading, to the supporting structures in case of shattered insulators or wires broken or burned at an insulator without allowing an amount of slip which would materially reduce the clearance specified in paragraphs No. 9 and No. 10.

"17. *Guys:* Wooden poles supporting the crossing span shall be side-guyed in both directions if practicable, and be head-guyed away from the crossing span. The next adjoining poles

shall be head-guyed in both directions. Braces may be used instead of guys.

"18. Strain insulators shall be used in guys from wooden poles carrying any power wire of less than 6600 volts. Strain insulators shall not be used in guying steel structures, nor required on wooden poles carrying wires all of which are 6600 volts or more.

"19. *Clearing:* The space around the poles, or towers, shall be kept free from inflammable material, underbrush and grass.

"20. *Signs:* In the case of railroad crossings, if required by the railroad company, warning signs of an approved design shall be placed on all poles and towers located on the railroad company's right-of-way.

"21. *Grounding:* For voltages over 5000 volts wooden cross-arms if used shall be provided with a grounded metallic plate on top of the arm, which shall be not less than ⅛ in. in thickness and which shall have a sectional area and conductivity not less than that of the line conductor. Metal pins shall be electrically connected to this ground. Metal poles and metal arms on wooden poles shall be grounded.

"22. The electrical conductivity of the ground conductor shall be adjusted to the short-circuit current capacity of the system and shall be not less than that of a No. 4 B. & S. gage copper wire.

"23. *Temperature:* In the computation of stresses and clearances, and in erection, provision shall be made for a variation in temperature from -20 deg. Fahr. to +120 deg. Fahr. A suitable modification in the temperature requirements shall be made for regions in which the above limits would not fairly represent the extreme range of temperature.

"24. *Inspection:* If required by contract, all material and workmanship shall be subject to the inspection of the company crossed; provided that reasonable notice of the intention to make shop inspection shall be given by such company. Defective material shall be rejected, and shall be removed and replaced with suitable material.

"25. On the completion of the work, all falsework, plant and rubbish, incident to the construction, shall be removed promptly and the site left unobstructed and clean.

"26. *Drawings:* If required, by contract, complete sets of general and detail drawings shall be furnished for approval before any construction is commenced.

"Loads

"27. The conductors shall be considered as uniformly loaded throughout their length, with a load equal to the resultant of the dead load plus the weight of a layer of ice ½ in. in thickness, and a wind pressure of 8 lb. per square foot on the ice-covered diameter, at a temperature of 0 deg. Fahr.

"28. The weight of ice shall be assumed as 57 lb. per cubic foot (0.033 lb. per cubic inch).

"29. Insulators, pins and conductor attachments shall be designed to withstand, with the designated factor of safety, the tension in the conductors under the maximum loading.

"30. The pole, or towers, shall be designed to withstand, with the designated factor of safety, the combined stresses from their own weight, the wind pressure on the pole, or tower, and the above wire loading on the crossing span and the next adjoining span on each side. The wind pressure on the poles, or towers, shall be assumed at 13 lb. per square foot on the projected area of solid or closed structures, and on one and one-half times the projected area of latticed structures.

"31. The poles, or towers, shall also be designed to withstand the loads specified in paragraph No. 30, combined with the unbalanced tension of:

- 2 broken wires for poles, or towers, carrying five wires or less
- 3 broken wires for poles, or towers, carrying six to ten wires
- 4 broken wires for poles, or towers, carrying eleven or more wires

"32. Cross-arms shall be designed to withstand the loading specified in paragraph No. 30, combined with the unbalanced tension of one wire broken at the pin farthest from the pole.

"33. The poles, or towers, may be permitted a reasonable deflection under the specified loading, provided that such de-

flection does not reduce the clearances specified in paragraph No. 10 more than 25 per cent or produce stresses in excess of those specified in paragraphs Nos. 65 to 69.

"Factors of Safety"

"34. The ultimate unit stress divided by the allowable unit stress shall be not less than the following:

Wires and cables.....	2
Pins.....	2
Insulators, conductor attachments, guys.....	3
Wooden poles and cross-arms.....	6
Structural steel.....	3
Reinforced concrete poles and cross-arms.....	3
Fountains.....	2

NOTE.—The use of treated wooden poles and cross-arms is recommended. The treatment of wooden poles and cross-arms should be by thorough impregnation with preservative by either closed or open-tank process. For poles, except in the case of yellow pine, the treatment need not extend higher than a point 2 ft. above the ground line.

"35. *Insulators:* Insulators for line voltages of less than 9000 shall not flash over at four times the normal working voltage, under a precipitation of water of 1/5 in. per minute, at an inclination of 45 deg. to the axis of the insulator.

"36. Each separate part of a built-up insulator, for line voltages over 9000, shall be subjected to the dry flash-over test of that part for five consecutive minutes.

"37. Each assembled and cemented insulator shall be subjected to its dry flash-over test for five consecutive minutes.

"The dry flash-over test shall be not less than:

Line Voltage.	Test Voltage.
Exceeding 9,000 but not exceeding 14,000.....	65,000
Exceeding 14,000 but not exceeding 27,000.....	100,000
Exceeding 27,000 but not exceeding 35,000.....	125,000
Exceeding 35,000 but not exceeding 47,000.....	150,000
Exceeding 47,000 but not exceeding 60,000.....	180,000
Exceeding 60,000.....	3 times line voltage

Each insulator shall further be so designed that, with excess of potential, failure will first occur by flash-over and not by puncture.

"38. Each assembled insulator shall be subjected to a wet flash-over test, under a precipitation of water of 1/5 in. per minute, at an inclination of 45 deg. to the axis of the insulator.

"The wet flash-over test shall be not less than:

Line Voltage.	Test Voltage.
Exceeding 9,000 but not exceeding 14,000.....	40,000
Exceeding 14,000 but not exceeding 27,000.....	60,000
Exceeding 27,000 but not exceeding 35,000.....	80,000
Exceeding 35,000 but not exceeding 47,000.....	100,000
Exceeding 47,000 but not exceeding 60,000.....	120,000
Exceeding 60,000.....	twice the line voltage

"39. Test voltages above 35,000 volts shall be determined by the A. I. E. E. standard spark-gap method.

"40. Test voltages below 35,000 volts shall be determined by transformer ratio.

"Material"

"41. *Conductors:* The conductors shall be of copper, aluminum, or other non-corrodible material, except that in exceptionally long spans, where the required mechanical strength cannot be obtained with the above materials, galvanized or copper-covered steel strand may be used.

"42. For voltages not exceeding 750 volts solid or stranded conductors may be used up to and including 4/0 in size; above 4/0 in size stranded conductors shall be used. For voltages exceeding 750 volts, and not exceeding 5000 volts, solid or stranded conductors may be used up to and including 2/0 in size; above 2/0 in size conductors shall be stranded. For voltages exceeding 5000 volts all conductors shall be stranded. Aluminum conductors for all voltages and sizes shall be stranded.

"The minimum size of conductors shall be as follows:

"No. 6 B. & S. gage copper for voltages up to 5000 volts.

"No. 4 B. & S. gage copper for voltages over 5000 volts.

"No. 1 B. & S. gage aluminum for all voltages.

"43. *Insulators:* Insulators shall be of porcelain for voltages exceeding 5000 volts.

"44. Strain insulators for guys shall have an ultimate strength of not less than twice that of the guy in which placed. Strain insulators shall be so constructed that the guy wires holding the insulator in position will interlock in case of the failure of the insulator.

"Strain insulators for guys shall not flash over at four times the maximum line voltage under a precipitation of water of 1/5 in. per minute at an inclination of 45 deg. to the axis of the insulator.

"45. *Pins:* For voltages of 5000 and over insulator pins shall be of steel, wrought iron, malleable iron or other approved metal or alloy, and shall be galvanized, or otherwise protected from corrosion.

"46. *Guys:* Guys shall be galvanized or copper-covered stranded steel cable, not less than 5/16 in. in diameter, or galvanized rolled rods of equivalent tensile strength.

"47. Guys to the ground shall connect to a galvanized anchor rod, extending at least 1 ft. above the ground level.

"48. The detail of the anchorage shall be definitely shown upon the plans.

"49. *Wooden Poles:* Wooden poles shall be of selected timber, peeled, free from defects which would decrease their strength or durability, not less than 7 in. minimum diameter at the top, and meeting the requirements as specified in paragraphs 17 30, 31 and 34.

"50. *Concrete:* All concrete and concrete material shall be in accordance with the requirements of the report of the joint committee on concrete and reinforced concrete.

"Structural Steel"

"51. Structural steel shall be in accordance with the Manufacturers' Standard Specifications.

"52. The design and workmanship shall be strictly in accordance with first-class practice.

"53. The form of the frame shall be such that the stresses may be computed with reasonable accuracy or the strength shall be determined by actual test.

"54. The sections used shall permit inspection, cleaning and painting, and shall be free from pockets in which water or dirt can collect.

"55. The length of a main compression member shall not exceed 180 times its least radius of gyration. The length of a secondary compression member shall not exceed 220 times its least radius of gyration.

"56. The minimum thickness of metal in galvanized structures shall be 1/4 in. for main members and 1/8 in. for secondary members. The minimum thickness of painted material shall be 1/4 in.

"Protective Coatings"

"57. All structural steel shall be thoroughly cleaned at the shop and be galvanized, or given one coat of approved paint.

"58. *Painted Material:* All contact surfaces shall be given one (1) coat of paint before assembling.

"All painted structural steel shall be given two (2) field coats of an approved paint.

"The surface of the metal shall be thoroughly cleaned of all dirt, grease, scale, etc., before painting, and no painting shall be done in freezing or rainy weather.

"59. *Galvanized Material:* Galvanized material shall be in accordance with the Specifications for Galvanizing Iron and Steel (Appendix).

"Bolt holes in galvanized material shall be made before galvanizing.

"Foundations"

"60. The foundations for steel poles and towers shall be designed to prevent overturning.

"The weight of concrete shall be assumed as 140 lb. per cubic foot. In good ground the weight of "earth" (calculated at 30 deg. from the vertical) shall be assumed as 100 lb. per cubic foot. In swampy ground special measures shall be taken to prevent uplift or depression.

"61. The top of the concrete foundation, or casing, shall be not less than 6 in. above the surface of the ground, nor less than 1 ft. above extreme high water.

"62. When located in swampy ground wooden crossing and next adjoining poles shall be set in barrels of broken stone or gravel, or in broken stone or timber footings.

"63. When located in the sides of banks, or when subject to

washouts, foundations shall be given additional depth, or be protected by cribbing or riprap.

"64. All foundations and pole settings shall be tamped in 6-in. layers while back-filling.

"Working Unit Stresses

"Obtained by dividing the ultimate breaking strength by the factors of safety given in paragraph No. 34.

"65. Structural Steel:

Tension (net section).....	18,000	lbs. per sq. in.
Shear	14,000	lbs. per sq. in.
Compression	18,000— $\frac{1}{r}$	lbs. per sq. in.

"66. Rivets, Pins:

Shear	10,000	lbs. per sq. in.
Bearing	20,000	lbs. per sq. in.
Bending	20,000	lbs. per sq. in.

"67. Bolts:

Shear	8,500	lbs. per sq. in.
Bearing	17,000	lbs. per sq. in.
Bending	17,000	lbs. per sq. in.

"68. Wires and Cables:

Copper, hard-drawn, solid, B.&S. gauge, 4/0, 3/0, 2/0—	25,000 lbs. per sq. in.
Copper, hard-drawn, solid, B.&S. gauge, 1/0	27,500 lbs. per sq. in.
Copper, hard-drawn, solid, B.&S. gauge, No. 1	27,500 lbs. per sq. in.
Copper, hard-drawn, solid, B.&S. gauge, No. 2, 4, 6	30,000 lbs. per sq. in.
Copper soft-drawn solid, B.&S. gauge.....	17,000 lbs. per sq. in.
Copper, hard-drawn stranded B.&S.....	30,000 lbs. per sq. in.
Copper soft-drawn stranded B.&S.....	17,000 lbs. per sq. in.
Aluminum, hard-dr'n stranded B.&S. gauge under 4/0	12,000 lbs. per sq. in.
Aluminum, hard-dr'n stranded B.&S. gauge 4/0 and over	11,500 lbs per sq. in.

"69. Untreated Timber:

	Bending	Compression.
	600 lbs. per sq. in.	600 (— $\frac{60D}{L}$)
Eastern white cedar.....	600 lbs. per sq. in.	600
Chestnut	850 lbs. per sq. in.	850
Washington cedar.....	850 lbs. per sq. in.	850
Idaho cedar.....	850 lbs per sq. in.	850
Port Orford cedar.....	1150 lbs. per sq. in.	1150
Long-leaf yellow pine.....	1100 lbs. per sq. in.	1100
Short-leaf yellow pine.....	950 lbs per sq. in.	950
Douglas fir.....	1000 lbs. per sq. in.	1000
White oak.....	950 lbs. per sq. in.	950
Red cedar.....	700 lbs. per sq. in.	700
Bald cypress (heartwood).....	850 lbs. per sq. in.	800
Redwood	850 lbs. per sq. in.	850
Catalpa	500 lbs. per sq. in.	500
Juniper	550 lbs per sq. in.	550

L = Length in inches.

D = Least side, or diameter, in inches.

This portion of the report concludes with letters from four companies regarding the specifications for overhead crossings. The Postal Telegraph Cable Company, the Western Union Telegraph Company and the American Telephone & Telegraph Company write that these specifications have received their approval. The fourth letter is from E. H. McHenry, vice-president New York, New Haven & Hartford Railroad, who writes that the report has been received by the committee of the American Railway Association appointed to consider the subject, and, while the committee has not finally acted upon it, it has been favorably received by the committee.

PACIFIC CLAIM AGENTS' ASSOCIATION MEETS

The third annual convention of this association was held in Seattle, Wash., on May 19 and 20 and was well attended. The Seattle Electric Company entertained the members of the association in a very hospitable manner.

The following officers were elected for the ensuing year: President, B. F. Boynton, claim adjuster Portland Railway Light & Power Company, Portland, Ore.; first vice-president, A. M. Lee, district claim agent Northern Pacific Railway Company, Seattle, Wash.; second vice-president, T. A. Cole, claim agent Los Angeles Railway Company, Los Angeles, Cal.; third vice-president, J. M. Hone, claim agent Spokane & Inland Empire Railroad, Spokane, Wash.; secretary-treasurer, Ida P. Newel, chief clerk of claim department Portland Railway Light & Power Company, Portland, Ore. The executive committee consists of the following: Chairman, J. H. Handlon, claim agent United Railroads of San Francisco; Geo. Carson, claim agent Seattle Electric Company; S. A. Bishop, claim agent Pacific Electric Railway Company; T. G. Newman, attorney Whatcom County Railway & Light Company, Bellingham, Wash.; A. E. Beck, claim agent British Columbia Electric Railway Company, Vancouver, B. C., and G. N. Smith, assistant claim agent Southern Pacific and Oregon Railway & Navigation Railroads, Portland, Ore.

CENTRAL POWER PLANTS AND ELECTRICITY SUPPLY FOR TRUNK LINE RAILROADS*

BY FRED DARLINGTON, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

It is the belief of the writer that when central station power supply is established on the larger scale to which it is surely growing the best interests of all concerned, including the public, will be served by railroads buying electric power and keeping its railroad business distinct and separate from the business of generating and distributing power.

There is one essential to railroad work that must be met to the fullest extent before central stations can hope to succeed in the general supply of electricity for railroad motive power. The railroads must be assured of its continuity of service under all circumstances. This implies a degree of permanency and a simplicity of construction that has not been generally attained by power transmission companies, but it is possible of achievement and will be amply justified by the very large installations which will be needed when railroad power is extensively supplied by central stations.

COMPARATIVE COSTS

For the purpose of argument, let us assume that as the capacity of a central station generating plant increases the various things that enter into the cost of power are reduced by generating current on a large scale in such a proportion that, while for plants of 50 kw the operating labor cost may be about 0.75 cent per kw-hour, for plants of 5000 kw it is about one-half of this amount. For very large plants working at a good load factor we may assume that it is about one-fifth of this amount, or, say, 0.15 per cent per kw-hour; and the very largest plants working at a good load factor have reduced this latter cost approximately one-half, or say to 0.075 cent per kw-hour. We may anticipate that the labor of producing power will eventually be reduced, under favorable conditions, to about 0.05 cent to 0.07 cent per kw-hour. The cost of fuel is likewise rapidly reduced as advantage is taken of the generation of power in large quantities. While it is customary for small generating units to use 6 lb. or 8 lb. of coal per kw-hour, many large central stations have got their coal consumption down to 3 lb. or 4 lb. per kw-hour. A few of the largest stations are reporting coal consumption as low as 2 lb. or 2½ lb., which latter is equivalent to about 10 per cent or 12 per cent thermal efficiency, with a possibility of some further savings in this direction with still larger stations and better load factors. Likewise, in the matter of installation cost of generating plants and of transmission and distribution lines, increased size leads to reduced cost of construction. Many central station plants with relatively small units are to-day costing to construct \$100, more or less, per kilowatt, while large plants have reduced their construction cost to the neighborhood of \$70 per kilowatt, with good prospects that in the future this cost will be reduced for very large installations to less than \$50.

The production of power in very large quantities also almost always results in good load factors.

In the transmission and distribution of power still more striking advantages are gained in large operations. It would ordinarily be unprofitable to transmit 1000 kw 25 miles, for it would not pay to secure 25 miles of right-of-way and put up pole lines, etc.; but if the amount of power to be carried is much larger, say 20,000 kw or 30,000 kw or more, the profitable distance for transmission may easily be 50 or 100 miles.

The economy of electric power from large generating plants as compared with isolated steam engine plants and other small sources of power is based on cheaper operation and maintenance of the large electric plants and not on a smaller first cost.

RAILROAD MOTIVE POWER

Let us next turn to the question of railroad motive power and its bearing on central stations.

*Abstract of paper presented at meeting of the National Electric Light Association, New York, May 29 to June 2, 1911.

The largest and best steam railroad locomotives are nothing more or less than relatively poor portable steam engine plants of 1000 i.h.p. or 1200 i.h.p. By the very nature of their service they are tied down to pretty nearly all of the conditions which are recognized as objectionable in stationary power generating plants. They have to be operated non-condensing, their fire-box space is very limited and, worst of all, they have a very poor average load factor. These things, together with many minor factors which often exist, contribute to make steam locomotives relatively poor power machines. These conditions offer opportunity for central stations to furnish railroads with power and thus to widen the scope of their own profit and usefulness.

On the other hand, electric locomotives can do other and better railroad work than can be performed with portable steam engines. It is not the purpose of this paper to touch these points, as they have already been widely discussed. But the fact that railroad motive power requires a sliding contact to deliver central station power to moving trains should not, and does not, constitute any good reason why central station companies should not supply their power for train propulsion as well as for mills and factories and all kinds of stationary work.

Much has been said about the very great cost of electric power on railroads, and the existing instances where electricity is used in heavy traction are referred to, to demonstrate this great cost, which is believed by many to be always greater with electric than with steam locomotives, and to be justified only where other questions than economy make electrification necessary. To install an entirely new motive power system for a few miles of operation must always be disproportionately expensive. But under suitable conditions electrification of trunk line railroads is advisable in many places for purely economical reasons. I do not mean by this that to-day it is economical or would be economical to electrify all railroads. There are many places where the conditions are unfavorable for doing so, where the density of railroad traffic is small, where the distances to be covered by trolleys or third-rails are very great relative to the amount of power to be served, just as there are still many places where it is unprofitable to carry transmission lines to serve stationary powers from central stations, because the distances are great and the quantities of power are small. But you people of the National Electric Light Association should begin by furnishing the railroad power where it is economical and profitable to use electricity. Up to the present time you have not furnished trunk line railroad power excepting in one single instance, namely, in the very recent installation in the Detroit River tunnel of the Michigan Central Railroad. In every other case the railroads are making their own power for trunk line service.

I will point out two examples which seem to me to be the logical solution of the power problem for certain territories. One is in the State of Illinois and the other in eastern Pennsylvania, including part of New Jersey. I do not propose these as exact descriptions of the most advisable developments, but as indications of general plans to be followed.

ILLINOIS POWER SYSTEM

In the State of Illinois, excluding Cook County, there will probably eventually be three or four power centers which will be located in coal mining districts. One district is in the northerly central part of the State, another district is in the southern and western part of the State and another in the eastern part, or perhaps just over the State line of Indiana. When the power business grows to its natural, most economical plan for generation and distribution, it is probable that three large central stations (or possibly more) will supply the State and will be connected together with high-tension transmission lines from which will extend branches and feeders to reach smaller outlying districts, and that this network will include and serve all of the power business for every kind of work in Illinois. The system of transmission lines and feeders will network the State in much the same manner that the State is now covered with railroad lines, excepting that there will probably be less

diversity of ownership and less competition than there is among the railroads. The advantage of the central stations for serving power will be so great, as compared with individual corporations and enterprises, that the latter will not be in a position to afford to generate their own power, because it will be cheaper to go to the central stations and buy power than to make it themselves.

This might at first seem in restraint of trade; but, as a matter of fact, provision of available cheap power will result in vastly increased railroad facilities and business. Experience will prove that there will be more incentive to singleness of ownership and management of power transmission business than there is in the railroad business, because the increased economy resultant upon increased service is proportionately greater in the power business than in railroad work. On the other hand, from the railroad point of view, one of the most objectionable features of electrical operation is that this work, if they make their own electric power, requires them to take up a new line of business, for which they are not equipped and with which they are not familiar, requiring a large and uneconomical expenditure for generation and transmission. Electrification would be much more acceptable to railroads if it required on their part only the purchase of electric locomotives and the erection of trolley lines or third-rails along their right-of-way, without necessity of going into the central station business. My belief is that when power lines are established, as suggested for Illinois, many railroads will go to the power companies and buy power just as they now go to the coal companies and buy coal. Furthermore, such business to the power companies will be one of the most assured sources of revenue that they can look forward to. The railroads have got to run regardless of any variable local conditions. Their power bills will have to be paid, and, being a monthly expenditure, these bills can be collected as reliably and surely as are the present coal bills or bills for any other supplies that enter into railroad operation.

Here I want to make one suggestion, namely, that the larger and more comprehensive the power systems of the country become the more the public may be expected to demand governmental supervision of such systems. They will require the right of eminent domain, and this right will properly be granted to them in their capacity as public service companies. That they will be treated by our law makers as our common carriers are treated is reasonable to expect, and probably the same methods of regulation that are found successful to govern railroads in matters of competition, rate making, etc., will be applied to power companies. It may prove advisable that they should be subjected to some of the same restrictions that apply to railroads in the control rates charged, the prohibition of rebates, etc.

EASTERN PENNSYLVANIA POWER SYSTEM

The second center instanced which seems to the writer to constitute a natural power supply center is the district of the anthracite coal mines of eastern Pennsylvania. There is a very large consumption of power in mining, cement manufacturing, lighting, railroad work, etc., that is within short transmission distance or within a radius of 75 miles of these mines. This power can be better made in central stations than in the small units now in use, and if the locomotives on the railroads within the district are added to the central station service the relative advantage of central station supply compared with small steam plants will be further enhanced. Such a center may eventually extend its service with profit to include much power as far away as New York City and Philadelphia. The transmission distances would be about 90 to 120 miles, but if the transmission to the larger cities is done on a large scale, it would be profitable as compared with the central stations now existing in the cities. It does not seem at the present time that the best economy in power service for New York and Philadelphia can be had by serving the power for the cities exclusively from central stations at the coal mines, but rather by installing very large transmission lines to Philadelphia and New York capable of carrying, say, one-third of the total

amount of power now produced in the big steam central station plants in these cities. These transmission lines could be utilized to carry the base load or long-hour service of the central-station plants in the big cities, and the existing city plants could be depended upon to take care of the peak loads and shorter hour service at the times of heavy or so-called peak-load demand. In this way central station plants of approximately one-third the maximum power of the city peak-load could supply something like three-quarters of the total kw-hours used and thereby cut the business of transporting coal for these large power plants to nearly one-quarter of what it would otherwise be. There is also a large amount of distributed power consumed in Newark, Jersey City, Trenton and intermediate points between New York and Philadelphia, and a vast amount of railroad motive power which could be supplied by electricity. Transmission lines installed between New York and Philadelphia could be made a sort of bus-bar connection tying the two city power supplies together and thus utilizing the space capacity in either city for reserve power when demanded in either city. At the same time these lines could be employed for the local distribution of power between the two principal points, making the main arteries a triangular connection with one point at the coal mines, one point in New York City and one point in Philadelphia. Into this great transmission system any economical power supply could be fed, as from the Delaware River.

REPORT ON THE PRIME MOTIVE POWERS*

BY THE COMMITTEE, I. E. MOULIROP, EDISON ELECTRIC ILLUMINATING COMPANY, BOSTON, CHAIRMAN

There were no important new developments in the field of power generation during the past year. The manufacturers of steam turbines have made a few minor improvements in design and construction which will affect the cost of maintenance more than efficiency of operation.

BALANCING OF VERTICAL TURBINES

The problem of securing a satisfactory running balance for Curtis vertical turbines was at one time a very serious one, but with experience in balancing it is now rare that trouble occurs due to serious vibration. The only rules laid down for balancing turbines appear to be, in general, "cut and try," balancing first the steam element and then later putting the field on the shaft and balancing the entire rotor. Balancing is done by attaching weights in different places on the revolving element, running the machine up to speed, noting the effect and if unsatisfactory removing some weights or adding others in different places; but when a satisfactory balance is once secured there appears to be little danger of the machine later becoming unbalanced.

Examination of a large number of carefully kept records of balancing operations indicates that for the first shot the balancing weight should be applied at a point 50 deg. behind the high marks on the shaft; in other words, after the point of maximum eccentricity has been determined on the shaft the weight should be first applied at a point on the turbine 50 deg. away in the direction opposite to the direction of rotation.

CONDENSER TUBE TROUBLES

Troubles with condenser tubes, such as pitting, breaking, etc., are confined almost exclusively to those stations located on the seacoast and using salt water for the circulating medium. One large central station on the seacoast has reduced condenser tube troubles to a very nominal amount by using untinned Admiralty mixture tubes of most careful manufacture. These tubes are given a very rigid inspection before being installed, and any one which shows even a blemish is rejected. Some other stations have tried every kind of tube which is on the market and have been unable to find any combination or mixture which would materially reduce the amount of their tube troubles.

Some companies have reported that they are troubled with the condenser tubes creeping endwise, and in some instances the endwise movement of the tube has been sufficient to wear away the shoulder on the gland and permit the tube to come out of the tube sheet. It would appear that this is caused by the high velocity of the steam entering the condenser, as the tubes which give trouble are those at the top of the condenser and receive the impact of the steam as it enters the condenser at a very high velocity. A suggested cure for this difficulty is to make a special gland for these tubes which will screw tight into the tube sheet, making a vacuum-tight joint without packing, with a groove on the inside of the gland next to the tube. The tube can then be rolled into the gland in a manner similar to the way a boiler tube is expanded in a boiler head. The other end of the tube may be packed in the ordinary manner.

CONTROL OF CIRCULATING WATER PASSES IN SURFACE CONDENSERS

Many central stations are so located that at certain seasons of the year the circulating water is very heavily laden with refuse and foreign matter of various kinds. The continuity of operation of the condenser then becomes a serious matter, as much of this refuse will pass through the usual screens, reach the tube sheets and clog up the tubes. Sometimes this obstructing of the tubes is done in an incredibly short space of time and to such an extent as seriously to cut down the cooling surface of the condenser and thus materially reduce the vacuum of the unit.

One central station reports that it has had serious trouble of this kind and has devised a remedy which is substantially an arrangement so that what was originally a multi-pass condenser is changed over to a single-pass. The condensers were originally constructed for three-pass and it was decided to cut away the first baffle, thus putting all the tubes in multiple with one another and making the condenser one-pass. This change resulted in presenting three times the opening to the flow of water and reducing the path of the flow of water to one-third of the former distance. When this change was made much less trouble was encountered by tubes stopping up. The tubes did become stopped up more or less, but with so many more tube ends exposed it took a much longer time to stop up a sufficient number of tubes seriously to affect the vacuum. No appreciable effect was experienced from reducing the path of the flow of the circulating water by two-thirds of its original amount, except that the discharge temperature of the circulating water was much lower. The same vacuum could be maintained in both cases. It should be noted, however, that with the one-pass condenser a much larger quantity of circulating water was used for the same vacuum and the temperature of the condensed steam was higher with the one-pass arrangement than with the three-pass. This latter was doubtless due to some peculiarity of the condenser, as otherwise the temperature of condensation should be the same for a given amount of vacuum, regardless of the number of passes of the circulating water. With plenty of circulating water available the single-pass condenser affords an increased tube area to the circulating water, thus eliminating to a great extent the trouble of choking of the tubes, and permitting a higher temperature of the condensed steam. Considerably more circulating water is required with the single-pass, which entails additional capacity in the circulating pumps and more power to drive them, but by reason of reducing the troubles incident to plugging up of the tubes, and the gain in temperature of the condensed steam, the cost of pumping the extra amount of water is more than warranted. These condensers are now arranged so that they may be readily converted from the three-pass to the single-pass or vice versa. This has been accomplished by replacing the baffle with a gridiron valve, which is operated from outside of the condenser nozzle.

CYLINDER OIL FOR AUXILIARIES USING SUPERHEATED STEAM

Considerable diversity appears in the practice of different companies in the specifications for cylinder oil for this purpose. The viscosity reported varies from 145 to 240, and the flash from 531 to 660. One company reports oil compounded at 7½ per cent of mineral oil and another company no compounding

*Abstract of report presented at meeting of the National Electric Light Association, New York, May 29 to June 2, 1911.

at all. Prices reported range from 27 cents to 40 cents per gallon. The oils which should be avoided are those having an asphalt base, which tends to carbonize in the cylinders under the high temperatures.

STEP BEARING OIL

Although a few instances are reported where water is being used for step bearings, and with satisfaction, a light pure mineral oil is generally used for this purpose, and here again is found considerable diversity in specifications and price.

The specifications which the General Electric Company recommends for step bearing oil are as follows:

"The oil must be pure mineral, hydrocarbon oil, free from:

"(1) Tarry, slimy and saponifiable matter;

"(2) Acid, soaps or thickeners;

"(3) Water, dirt, grit or other suspended matter;

"The specific gravity should be between 860 and 880 at 60 deg. Fahr.

"The flashing point, open-cut tester, must not be below 334 deg. Fahr.

"The viscosity as determined by the Seybolt 40 deg. C.

"Viscosimeter (Standard Oil Company) should be no greater than 228 seconds."

The purification of the oil is generally accompanied by straining through muslin bags. In some instances it is filtered through excelsior and in others it is merely passed through water and given some time to purify itself by gravity. Whatever separating of entrained water is done is usually by gravity.

One member company reports that the oil sometimes carries as high as 40 per cent of water in cases when the time allowed for settling is brief. Another company reports that when it is unable to free its oil from water by settling the moisture is boiled out in an open tank heated by steam coils. Some oil is inevitably lost with the water which is rejected from the filter, and the amount of this loss varies with the time allowed for quiescent settling and with the characteristics of the oil which enable it to form an emulsion more or less readily with the water.

Oil as it returns to the filter from the step bearing is at a temperature which necessitates cooling. This is usually accomplished by allowing it to flow over copper coils as it comes from the filter.

FEED-WATER HEATING IN STEAM TURBINE STATIONS

For heating feed water in steam turbine stations the general practice is to install principally non-condensing, steam-driven auxiliaries and use the exhaust steam mainly in open heaters for heating the feed water. The companies which reported on this subject use comparatively few electrical auxiliaries. About 75 per cent use the open heater in preference to the closed type. The conditions vary with different stations and a summary of the reports turned in is as follows:

The hot well temperature appears to range between 75 deg. and 125 deg. Fahr., with an average of about 90 deg. Fahr. The temperature of the feed leaving the heater ranges between 170 deg. and 210 deg. Fahr., with an average of about 195 deg. Fahr. It is rather significant that quite a number of plants using open heaters report a feed-water temperature between 200 deg. and 210 deg. Fahr., which is obtained without any other source of heating except that from the exhaust steam rejected by the auxiliaries. As a matter of fact, nearly all of the plants seem to have enough exhaust steam for heating the feed water, and only a few are making use of the expedient of taking a certain amount of steam from one of the intermediate stages of the turbine.

CLEANING OF AIR USED FOR VENTILATING TURBO-GENERATORS

Most of the companies corresponded with have turbines of the inclosed self-ventilating type and about one-half of them are taking fresh air from outside of buildings. None has installed any system of purifying the air, although in many instances the generator windings and ventilating slots rapidly accumulate a heavy coating of dirt, to the detriment of the machine. It would seem that a cheap and easily operated air-

cleaning system would be of considerable value for many central stations.

A purification system about to be installed by one large company is located outside of the engine room and will deliver clean, cool air free from all the dirt and oil present in the engine room, as well as free from the dirt and soot usually found around a power station, especially where located in the midst of railroad yards.

The turbine generating equipment for which ventilation is provided consists of four 12,000-kw Curtis vertical turbines of the self-ventilating type, running at a speed of 750 r.p.m. and requiring 40,000 cu. ft. of air per minute each delivered at the inlet opening, or 160,000 cu. ft. of air per minute for the four units.

After a careful study of the local conditions it was decided to place the air-cleaning equipment on the roof of the station, 70 ft. above the hoods of the units. The four units, which are located in a straight line on one side of the engine room on 20-ft. centers, have been connected to a common supply duct 8 ft. x 8 ft., of light sheet metal securely framed and supported on the wall 20 ft. distant from the units. The duct is carried through the north wall of the power station and rises vertically 70 ft. to the roof of the building, where the air cleaners are to be installed. Each unit is connected to the duct by a branch duct provided with self-closing damper. The main duct is provided in the engine room with a closed opening, which may be opened to admit air in severe weather to temper the cold air. The duct has been so designed that the velocity of the air in any part will be less than 2500 ft. per minute, except at the inlet opening on the turbine, where the velocity becomes 2700 ft. per minute.

One of the first propositions considered was a system of screens covered with a loose woven cloth, such as cheese cloth, but the screen area required to handle 160,000 cu. ft. of air per minute and the inefficiency of the cloth, together with the difficulty of keeping the screens clean, either with compressed air blown through the screens from the inside or a vacuum cleaner to remove the dirt from the face of the screen, caused the rejection of this type of cleaner at once. A velocity of 150 ft. to 200 ft. per minute, being the maximum permissible through cheese cloth, required an area of 800 sq. ft. to 1000 sq. ft. of exposed cloth surface. The weave of the cheese cloth is so close that the effective area is reduced to only about 20 per cent of the total, and a very small amount of dirt collecting on the surface decreases this area until the volume of air passing through the screen is practically zero.

A number of successful commercial systems of mechanical cleaning of air for ventilation of buildings by means of water spray for washing and cooling the air were investigated and found to be highly efficient and most satisfactory in removing dirt and soot and delivering clean, cool air. Various makes were carefully examined, and it was decided that the straight spray system and a combination of the spray and sheet-cleaning surface were the two that offered sufficient merit for consideration.

STRAIGHT SPRAY SYSTEM

The straight spray system consists of the following parts: Tempering coils, spray chamber or washer, eliminator consisting of a series of baffles, a system of spray piping, water circulating system and storage tank for cooling water, which are all housed into one unit on either a sheet-iron casing or concrete structure. The tempering coils are placed in front of the washer or spray chamber and consist of a sufficient number of cast-iron heater sections to raise the temperature of the air above 32 deg. to prevent freezing of the spray water. Directly behind the tempering coils is the spray chamber, which may be of any desired shape to suit local conditions. The spray water is brought into the chamber through a vertical or horizontal header, from which branch pipes lead to the spray heads. Below the chamber is the settling basin, consisting of a tank for storing water and a sump for catching the dirt. From this tank the spray water is drawn through a system of strainers by means of a centrifugal pump of suitable size and reciproc-

cated through the spray heads. The water for washing the air is used over and over again until it becomes too dirty, or in summer time the temperature is too great for properly cooling the air. The sump is connected to the sewer and can be flushed.

The most important part of the apparatus is the spray head and the arrangement of the same. The spray head consists of a nozzle containing a small or an adjustable opening, similar to a needle valve, together with a disk or spoon deflector, also adjustable, which regulates the size and density of the disk of water thrown off. The disk of water is several inches in diameter and consists of a solid sheet of water around the nozzle, then breaking up into a fine mist or spray composed of drops whose degree of fineness depends on the pressure of water and adjustment of deflectors.

To keep the nozzle clear of dirt the deflectors are automatically shifted at certain intervals, allowing the dirt to be carried away. The distribution of the spray heads over the area of the washer depends on the shape and, to a certain extent, on the size of the apparatus. They must be so located, however, that a curtain of water of uniform density is presented over the entire area. In order to accomplish this one of the methods provides two curtains of water, while the other requires only one with spray heads set nearer together and with the nozzles staggered so that the air will have to pass through an area of equal density. As the disk of water around the spray head rapidly breaks up into fine mist, the sprays are so spaced as to overlap each other and thus present a surface of almost uniform density.

The air after passing the tempering coils enters and passes through the spray chamber, coming into intimate contact with the water, and the heavier particles of dirt are at once deposited. The lighter particles having become thoroughly wet pass through the chamber and enter the eliminator directly behind. When the moist air enters the eliminator its direction is being constantly changed at right angles, the dirt not already deposited strikes a wet surface and the direction of motion being rapidly changed causes it to drop or be deposited on the first baffle. The entrained water in the air is also lost in the same way and the air leaves the eliminator after six or more alternate deflections free from entrained water and 98 per cent clear of dirt. The eliminator consists of vertical baffles set at an angle with the forward edge turned out at right angles, forming a hook arranged so that the current of air striking the baffle is deflected at right angles and strikes the next row of baffles until six or more rows of deflectors are passed. The air, still laden with dirt and a large percentage of spray water, strikes the first row of baffles violently, precipitating the dirt and water, which flows down the baffles into the tank. The amount of water contained in the air assures the thorough washing down of the forward baffle and keeps the plates thoroughly cleaned. The eliminator is approximately 3 ft. deep, and the baffles are so arranged that all of the entrained water is deposited and it is practically impossible to force water through the eliminator with a hose. Special flushing devices for cleaning the plates are unnecessary in the vertical type, as they are entirely self-cleaning.

Another type of washer is provided with six rows of horizontally inclined eliminators. The first row is a smooth plate with the rear edge hooked, which forms a gutter to carry off the water; the second row is corrugated and set below the first, every other row being corrugated. The air entering the eliminator is first deflected downward by the smooth plate, striking the corrugated plate below, which abruptly changes the direction at right angles, throwing the air upward on to the next plate. The upward and downward motion is repeated three times and the entrained water and dirt are removed by the scrubbing action on the surface of the corrugated plates and the abrupt change of direction of the current of air.

Automatic feed valves are provided to control the water supply; flushing of the spray heads is taken care of by a simple device which is operated by a part of the spray water being collected in a pivoted tank which automatically fills and dumps, at the same time tripping the flushing mechanism.

COMBINATION SPRAY AND SHEET CLEANING SYSTEM

The combination of spray and sheet cleaning surface differs radically from the system previously described, in that the air is kept in contact with a large area of wet surface in addition to passing through four sprays and two waterfalls.

Instead of taking the air directly through the narrow spray chamber of the previous type and giving the air only one opportunity to come in contact with the water, a series of curved deflectors in the shape of a letter "S" form the spray chamber, and the air is required to make a complete change of 360 deg. in the direction of motion, and at each turn is sprayed once and passes through the fall of water from the next spray above, in addition to being deflected by large surfaces over which the spray water is flowing.

The air enters at the lower portion of the "S"-shaped casing and immediately passes through a spray, and the water falling from the three sprays above is deflected by the curved lower surface of the casing through two center sprays and again deflected by the upper curved surface through a fourth spray; from these the air enters the eliminator chamber, which is the full height and width of the washer.

The spray heads differ from the mist or atomizing sprays and use a large volume of water, which is sprayed into the air, forming a curtain of water. In addition to the water curtain from the sprays, the water falling from the deflectors forms another curtain, and the large area of wet deflectors also offers a scrubbing surface, which effectually washes the air.

The eliminator is of the vertical type and is of several times the area of cross-section of the washer, so that the velocity of air passing through is reduced and the entrained water thoroughly removed. This type of washer offers several advantages over the "straight through" type, in that the thorough mixing of the air and spray water besides thoroughly removing the dirt results in greater cooling, due to the air being in contact with the water for a longer period of time. The transmission of heat is not an instantaneous process, and the longer the air and water are in contact the greater will be the cooling effect on the air. This transfer of heat controls the humidity as well as the temperature of the air.

The questions that are suggested in connection with the operation of an air washer are the danger of entrained water being carried through the eliminator; the regulation of the humidity in order that saturated air shall not enter the duct; also the degree of cooling of the air that may be reasonably expected in the summer and the protection against freezing of the water in the spray chamber in winter, and amount of steam required for tempering the coils.

Large units have been successfully operated for years without the slightest trouble from entrained water being carried through, even in case of hard driving rains, when the velocity of the air passing through the eliminators has been increased several times. The humidity can be regulated so that there will never be an occasion for trouble from saturated air entering the turbines and depositing moisture.

COST OF INSTALLATION FOR CLEANING AND COOLING AIR

The cost of a complete installation for thoroughly cleaning and cooling the air for large units will vary with local conditions, but the washer, eliminator, motor-driven circulating pump and housing should not exceed \$800 for an equipment furnishing 40,000 cu. ft. of air per minute. For a 160,000-cu. ft. washer approximately 1100 gal. of water per minute are required under ordinary weather conditions, which call for a 6-in. centrifugal pump working under 12 lb. to 14 lb. pressure with a 15-hp motor. The amount of make-up water depends on the quantity of dirt and temperature of air, and cannot be estimated, though the total quantity should be small.

LARGE-SIZED BOILER UNITS

None of the larger member companies is seriously considering the matter of installing large-size boiler units, with the sole exception of one company. The Detroit Edison Company has made an installation of some boilers, each having a capacity of 2300 hp. They are the largest single units reported

up to date, and while they have not been in operation for any great length of time they are apparently quite successful.

USE OF ECONOMIZERS

The general tendency in building large plants is to provide for the possible installation of such apparatus at some future time, but so far as learned economizers are not being generally installed at present.

ACCOUNTING FOR DEPRECIATION *

BY H. M. EDWARDS, AUDITOR NEW YORK EDISON COMPANY

It is assumed that every company recognizes that its tangible assets are disappearing with use or with the march of improvement and realizes that some provision must be made in the accounts to provide for the replacement of worn-out or superseded apparatus.

Starting with this premise there yet remain the questions: First, how should the amount to be reserved for depreciation be determined, and second, how should the reserve be treated in the accounts?

The Public Service Commissions of New York do not recognize as a proper subject for capitalization amounts spent for replacement of apparatus worn out by use or superseded by improved or more efficient devices—or, it should rather be stated, they permit the capitalization of the new expenditure but require that the thing replaced shall be credited at its cost to property account and charged against the reserve, or, in the absence of a reserve, to surplus account. It is not proposed to argue the question whether this theory is correct and the fair one to apply in all instances, although there is much to be said against the absolute acceptance of the theory. Let it be agreed, at least for this discussion, that the purpose of the depreciation fund is to maintain the efficiency of the property, as shown by the books, reinvesting the fund as the apparatus is replaced or retaining in the fund the cash equivalent.

Taking up the first of the two questions, two methods of determining the amount to be reserved suggest themselves, one of which may be called the specific method and the other the general method.

A company adopting the specific method would undoubtedly inventory its physical properties, noting in adjoining columns the original cost, scrap recovery value, life, etc.

Assuming that the books have been properly kept, it would not be difficult to inventory the plant and list the costs. The life table would present a real difficulty, for, as the life of the apparatus determines largely the amount of the reserve, it must be reasonably accurate. What is the life of any piece of apparatus? Such life tables as exist give the life of a boiler, for instance, as twenty years, but boilers forty years old are in existence to-day and doing their work acceptably. An Edison tube main would probably be rated as relatively short-lived. The copper is, of course, practically indestructible, but the insulation and those qualities which constitute it a conductor, would cause it to be assigned a life of, say, fifteen years; yet there is Edison tubing in the streets of New York twenty-five years old and, provided it is not disturbed, good for many years more.

The scrap recovery value also presents a difficulty. This value, it must be conceded, is largely conjecture, and at the same time may affect materially the amount of the reserve.

One of the objections to the specific method is that it endeavors to treat with exactness what in the very nature of things is inexact and to the last degree approximate. The second objection, and to the writer an insuperable one, is that the specific method takes no account of supersessionary depreciation. No one can even approximately forecast what the future will bring forth.

GENERAL METHOD

Under this method a reserve may be built up by a stated percentage of the inventory value of the property, by a percentage of the gross earnings, by a rate applied to the electric cur-

rent generated or sold, or by a definite amount appropriated from surplus earnings. A reserve created by any of these means is frankly approximate and its sufficiency can only be determined with the lapse of years. In this respect the method is in accord with the fact, for any reserve created to provide for the cost of replacement occasioned by use or supersession, and especially the latter, must be the result of approximation, and this approximation should not be in detail, but should be applied to the property as a whole.

The New York Edison Company started its depreciation reserve fund on the date of its incorporation, May 1, 1901. This was just after the time of the appearance of the rotary converter, which brought about so great a revolution in generating and transmission methods. The company was, therefore, fully alive to the necessity for providing for supersessionary depreciation. In the selection of a plan the company had in mind the desirability of having a ready means of computation, one which should be flexible, permitting the raising and lowering of the rate as experience might show to be necessary and would apply equally to its entire product. Generally speaking, depreciation is the result of use or, in our business, of kw-hours produced. A percentage of the book value of the property did not include the element of work done and a percentage of the gross earnings did not bear equally on the product because of the rate schedules. Upon the latter basis, assuming that the reserve was to be 10 per cent of the gross earnings derived from the sale of electric current, the retail customer at 10 cents per kw-hour would contribute 1 cent per kw-hour to the reserve, whereas current sold to large customers would contribute less than ½ cent per kw-hour, although the depreciation effect of both sales might be the same. The plan of creating a reserve by an appropriation from surplus earnings was discarded and the company finally adopted a rate of 1 cent per kw-hour sold to general customers. The selection of kw-hours sold rather than kw-hours generated was the result of local conditions and the fact that because of relations to affiliated companies a considerable portion of the current generated did not circulate through its entire system including transmission and distribution apparatus and devices. At 1 cent per kw-hour sold to general consumers the company has been able to accumulate an adequate reserve which has provided for all its depreciation to date, with ample provision for the future.

TREATMENT OF RESERVE IN THE ACCOUNTS

Should the amount be treated through operating expenses or as an appropriation from surplus earnings? Depreciation, whether from wear and tear or supersession, is a cost and must be recovered in the price of the product sold. The gross earnings, less the expenses of operation, including depreciation, taxes and bad debts, would represent the net earnings from the business which bear a direct relation to the amount of capital invested. It is apparent, therefore, that the theoretical price for the product would be a sum derived from adding together operating expenses, depreciation, taxes, bad debts, cost of money invested and a profit on the money invested, and this sum total divided by the kw-hours sold gives the average rate per kw-hour which the company should charge. If the gross earnings do not equal or exceed this total either some way must be found for reducing the cost of doing business or the price at which the product is sold must be raised.

It is customary to show the net earnings as applicable to the returns on the capital invested. It would not be consistent or logical to claim that depreciation is a part of the cost of the product and then provide for it through an appropriation from the surplus belonging to the owners of the property.

It is clear that the Public Service Commissions of New York recognize that depreciation or amortization is an operating expense and their treatment of it in the pamphlet issued by the commissions entitled "Uniform Systems of Accounts for Electrical Corporations" is consistent and logical, for to permit a company to recover the cost of depreciation as a part of operating expenses necessarily implies that the item of depreciation shall occupy an appropriate position in the schedule of operating expenses.

*Abstract of paper presented at meeting of the National Electric Light Association, New York, May 29 to June 2, 1911.

Reference has been made to the fact that the amount of the reserve should be based upon the property as a whole. If a contrary course is followed and reserves are accumulated separately for the production plant, the transmission plant, the distribution plant and the miscellaneous plant a number of reserves will be established, and, although the sum total may be adequate for the company's purpose, yet individual reserves may be insufficient or excessive and transfers from one to the other would throw the entire system out of gear. The argument for individual reserves is that the cost of production at the company's switchboard should include depreciation as an item of cost, as should also transmission and distribution expense totals, but the amounts of reserves are the result of approximations and the advantage of being able to show total costs at each of the main divisions of the operating expense schedule are overshadowed by the disadvantages and complications resulting from limiting the uses of the individual reserves.

The plan of the Public Service Commissions of New York is much preferable, as it simplifies all the transactions and treats the subject of depreciation in one item, the reserve accumulated being available for all the replacements which may be necessary.

If a company has accumulated a reserve for depreciation it is not necessary to charge off at annual intervals a proportionate amount of the cost of the tangible assets; rather the property should be carried in property account at its original cost until finally retired from service. This simplifies the accounting problem involved and enables an exhibit to be made of the status of the reserve fund showing the unexpended balance remaining therein, and also identifies the cost of the actual apparatus retired and charged to the reserve.

There remains for consideration the status of a company which has not created a depreciation reserve fund, and upon this point it may be well to refer again to the rule of the Public Service Commission of New York. The uniform system of accounts of the commission became effective Dec. 31, 1908, and all companies within the jurisdiction were required to establish a depreciation fund as of that date. The commission also required that all construction and property accounts in existence on Dec. 31, 1908, should be consolidated into one account to be known as "Fixed Capital—Dec. 31, 1908." The amortization rule in relation to such fixed capital on Dec. 31, 1908, means that a company which has not heretofore established a reserve fund will only be allowed to charge against the fund after it is created that part of the depreciation of a thing which occurred after the fund was started, the balance being charged to surplus account. This is a very drastic rule, and it is not unreasonable to expect that a strict adherence to its provisions might require a company having no reserve to make charges to its surplus fund sufficient in amount to prevent the payment of dividends for years to come.

The following recommendations seem to be justified:

First—In view of the fact that depreciation in electric lighting plants is to an extraordinary extent the result of supersession rather than of wear and tear, the reserve should be determined by the general rather than the specific method.

Second—Considering the nature of the business, and because of the fact that the entire product consists of electric energy expressed in kw-hours, the most feasible way of determining the amount of the reserve is by a rate per kw-hour generated or sold, according as local conditions apply.

Third—In view of the fact that depreciation is a definite item in the cost of operation the reserve should be built up through operating expense and not as an appropriation from surplus.

Fourth and Finally—Any member company which has not as yet provided for a depreciation reserve fund should do so at once as otherwise the day of reckoning will soon arrive and delay may seriously affect its financial stability.

At the celebration in Bismarck, Wash., recently, in honor of the extension of the lines of the Tacoma Railway & Power Company, Tacoma, Wash., to that place, L. H. Bean, general manager of the company, was presented with a leather wallet mounted with silver.

OTHER PAPERS AT THE NATIONAL ELECTRIC LIGHT CONVENTION

Four papers read May 29-June 2 at the convention of the National Electric Light Association being held this week in New York are published under separate headings elsewhere in this issue. The following are short abstracts of other papers presented during the first four days of the convention which are of especial interest to electric railway companies.

LIGHTNING PROTECTION

The committee on lightning protection, of which B. E. Morrow, Hudson River Electric Power Company, is chairman, discussed in its report methods of protection of high-tension transmission lines. The principal difficulties from lightning experienced on transmission systems at the present time are those arising from line failures, i.e., insulators breaking down either from direct or indirect discharges, wires burned off by direct strokes, etc. In tracing the failures of apparatus due to lightning the fact is sometimes overlooked that the apparatus might have been seriously weakened or strained at some previous time by heavy overloads, and but for that reason probably could have withstood the unusual stresses not taken care of by the arresters. It is in cases of this kind that some of the new and later types of arresters are credited with the failure to protect the apparatus on which the insulating value had already been seriously impaired. The results obtained from the use of the electrolytic type of arresters are very satisfactory, and in most cases justify the expectations of the purchaser and the guarantees of the manufacturers. In several cases reports have been made to the effect that the installation of these arresters has decreased both the interruptions to service and the cable punctures by large percentages. The principal objection to the electrolytic arresters is high first cost and the necessity of frequent charging and attention. In stations of minor importance it has been considered cheaper to replace an occasional damaged transformer.

Transmission lines having overhead ground wires seem to suffer the least damage; in fact, one company reports that the damage from broken insulators, shattered poles, burned-off wires and cross-arms on lines protected in this manner is less than 20 per cent of that on other lines without this type of protection. In some cases where an unusual amount of trouble was experienced from insulators spilling over, special devices have been developed as an alternative of the overhead ground wire. One of these devices is in the form of a grounded metal ring for each insulator. This is reported as being effective, although the use of them has not eliminated all line disturbances and is no protection against the direct stroke. In some other cases a grounded spark-gap has been provided for each insulator. Still another form is that of installing a grounded wire on each pole and carrying this wire well above the top of same. These experiments are reported as being more or less successful and especially to the end of reducing the interruptions to the service, but it is a question if the expense of installation will be justified in all cases. In some instances attempts have been made to protect the transmission lines by the installation of arresters at points far removed from the stations, but in most cases these experiments have resulted in failure.

A special device known as the arc suppressor is now being experimented with for the relief of transmission-line troubles due to an arc around the insulator. This arcing ground suppressor is designed to be used at the busbars of the principal station to take care of the entire system. It consists essentially of an electrostatic and electromagnetic selective relay. This selective device picks out the faulty phase and closes the release circuit of a single-pole oil switch which is connected between the faulty phase and ground. The oil switch shunts out the accidental arc at the insulator and opens up again immediately. If the insulator is properly designed the arc will invariably take place around the porcelain skirts, and, therefore, the arcing ground suppressor will entirely eliminate the trouble. If the insulator should be punctured the switch of the arcing

ground suppressor is again automatically closed and thus prevents the high-frequency oscillations from playing in the circuit which would otherwise result, due to the make-and-break of the arc at the faulty insulator.

Choke coils are in general use. One large company has discontinued the use of them in one generating station because of the fact that every time a bad short-circuit was experienced on the line the choke coils would be twisted out of shape. This is the first time where results of this kind have been reported, but there is nothing to indicate that the trouble was not limited to the question of mechanical design.

Where all lines leaving a station are operated separately it seems necessary that each of them be provided with an arrester, and this should be installed on the line side of all apparatus. In other cases, where two or more circuits are connected to a common busbar experience justifies the advisability of installing one arrester on the busbar. Of course, under the latter condition complete protection is not secured, as the line oil switches, relays and transformers for operating them are exposed. However, apparatus of this kind with a high factor of safety can now be secured, so that very little, if any, trouble is experienced with same. With some of the older types of apparatus it would probably be more desirable to install arresters on the individual circuits. In either case, provision should be made for quickly cutting the arresters out of service in the event of any trouble being experienced with same. In addition to the lightning arresters themselves choke coils should be installed on every circuit leaving the generating station.

VENTILATION OF TURBO-GENERATORS

R. B. Williamson, Allis-Chalmers Company, presented an interesting paper on this subject. He said that it is now universal practice to make turbo-generators totally inclosed and obtain the cooling by forced air circulation. By inclosing the generator the air currents can be more effectively directed to reach the parts where heat is generated and at the same time the noise is greatly reduced. The inclosed machine also has the advantage that air can be piped to it from outside or from other sources and discharged into the station, basement or outdoors, as may be required.

The quantity of air to be supplied should be from 100 cu. ft. to 150 cu. ft. for each kilowatt of internal loss in the generator. In some cases the air supply may be as low as 80 cu. ft. per kilowatt loss; 125 cu. ft. is a fair value and will give good results if the circulation in the generator is such that the air can get at all parts where heat is generated.

In estimating the internal loss to be carried off by the air, the windage loss must be included, as this is one of the largest losses in a turbo-generator and contributes to the heating just as much as the core loss or copper loss. A turbo-generator run on open circuit with no excitation and no loss in it other than the windage will show quite an appreciable rise in temperature, in extreme cases as much as 12 deg. C. to 15 deg. C. A great deal of windage loss is due to the skin friction of the rotor and is independent of the fans. The passage must be arranged so that the air will be guided through the generator with as small an amount of friction as possible.

In a 60-cycle generator of 5000 kva (normal) output, running at 1800 r.p.m. and operating at unity power-factor, the internal losses might be as much as 220 kw. Allowing 125 cu. ft. per kilowatt loss, this generator should have about 28,000 cu. ft. per minute for satisfactory cooling. This amounts to 2270 lb. of air per minute, or over 60 tons per hour. The total internal loss will usually be from 4 per cent to 6 per cent of the rated kva output, being a larger percentage for the smaller machines. As a rough estimate, therefore, the allowance of cooling air may be taken as 5 cu. ft. to $7\frac{1}{2}$ cu. ft. per minute per kilovolt-ampere rated output. On the above basis the weight of air to be passed through the generator end of a steam turbine unit is in many cases greater than the weight of steam passed through the steam end during a corresponding period of time. In order to handle this large quantity of air, careful attention must be paid to the ducts or pipes through which it is supplied and the air should be as clean and cool as practicable. In some cases

it may be drawn directly from the basement, but this should not be done if the space below the generator is occupied by auxiliaries which heat the air.

In case cool air cannot be obtained from the basement a pipe or duct should be run outdoors and the opening protected so that rain or dirt cannot be drawn in. Ducts should be as straight as possible and of such cross-section that the air velocity will not exceed 1000 ft. to 1200 ft. per minute. When air is drawn from outdoors it is advisable to have dampers arranged so that it can, if necessary, be taken from the basement in cold winter weather. The air should be clean. The quantity of air passed through a generator is so large that even a small percentage of dust soon results in a large amount of dirt within the machine. In Europe a great deal of attention has been paid to the cleaning of the air, and numerous forms of air filter have been devised. A filter can be easily made by stretching cheese cloth, cotton or thin flannel between two frames. The cloth is passed around flat strips of galvanized iron and is pulled taut by nuts on threaded studs at each corner. The cloth is threaded back and forth so that the entering air has a large surface of cloth to pass through. The velocity of the air through the cloth is, therefore, very low and a filter unit approximately 3 ft. wide, 3 ft. high and 2 ft. deep can pass 2000 cu. ft. of air per minute with an air velocity through the cloth not exceeding 10 ft. per minute. With this low velocity the filter does not throttle the flow of air to any great extent, and with the large area so obtained the cloth will not clog up rapidly. By constructing the filter in units as many units as may be required for a given machine can be set in a framework to form a wall through which the air must pass before reaching the generator.

Air filters should be mounted so that they can be easily taken out at intervals and cleaned. Unless they are cleaned from time to time they will become worse than useless by cutting off the air supply entirely. Even when they are provided, the interior of a turbo-generator should be cleaned periodically.

The discharged air is usually allowed to flow up into the power house, though frequently it is discharged downward into the basement or piped outdoors. The heat discharged represents from 3 per cent to 6 per cent of the station output, and it has been suggested that it be utilized under the boilers. It would not entail a very great additional expense to discharge the air downward into a duct leading to the boilers and opening under the grates.

WOOD PRESERVATION

The report of the committee on preservative treatment of poles and cross-arms was presented by W. K. Vanderpoel, chairman, C. C. Tutwiler, chairman sub-committee on preservatives, and Martin Schreiber, chairman sub-committee on treatments. This was the second report of this committee. It includes definite working data, such as plans and specifications, so that those desiring to treat timber will find many suggestions of practical use. The committee favors creosote oils partly because it still lacked evidence covering results that could be obtained through domestic application of other processes and partly because it still lacked evidence that such processes could be as successfully applied as creosote for the preservative treatment of poles and cross-arms. The committee presented three specifications for creosoting as follows: Specification "A," to insure the furnishing of high-grade coal-tar creosote; specification "B," covering the admixture of certain tars with coal-tar creosote, and specification "C," covering conditions where water-gas tar creosote is used. Important features of these specifications are the addition of certain tests which would more certainly tend to indicate adulteration and the adoption of the flask instead of the old-fashioned retort for making distillation tests. The mixed tar and water-gas tar creosote specifications were drawn up because considerable quantities of water-gas tar and distillates are available for wood preservation. The committee believes that, if the consumer can purchase the treated material from a reliable creosoting plant at a reasonable price compared with the cost of installing either a pressure or an open-tank system, the former course should be adopted, because the commercial organizations are

usually of sufficient size to justify the most approved apparatus, superintendence and labor. The commercial plant also could be held responsible for losses due to poor work.

As it was now certain that satisfactory results could be obtained with some kinds of wood through the intelligent use of the open tank, the committee did not hesitate to recommend its use in preference to brush treatment by those companies that do not find it feasible to purchase timber which has been treated in pressure cylinders. The committee therefore submitted plans showing the construction details of open-tank plants of various capacities and their cost, and also gave general instructions. The committee regarded the full-cell treatment of timber by the pressure process as the standard method, although it appreciated that conditions did not always make it possible to make it a universal practice to use only pressure-treated timber. Attention was called to the need for caution on the part of those who contemplate undertaking timber preservation.

In addition, this report contains a number of valuable appendices. Appendix "A," by Dr. Hermann von Schrenk, described the treatment of telephone and telegraph poles for preventing decay as practised in Europe during the year 1910; appendix "B," by Howard F. Weiss, described the open-tank treatment of poles with creosote; appendix "C" was a company's experience with a creosoting plant; appendix "D" related to the inflammability of treated timber, from which it appeared that creosoted timber is less damaged by fire than untreated timber identical in every respect; appendix "E" was a report from the Bureau of Entomology, United States Department of Agriculture, on damage to timber by wood-boring insects; appendix "F" was a reprint of the statistical information in Bulletin No. 9 of the Forest Service; appendix "G" was a discussion of timber preservation by Dr. Hermann von Schrenk.

UNDERGROUND CONSTRUCTION

The report of the committee on underground construction of which W. L. Abbott, Commonwealth Edison Company, Chicago, is chairman, included specifications for joints in paper-insulated cables, a discussion on the prevention of electrolysis in cable sheaths and a discussion on methods of protecting cables in manholes. With regard to splicing the committee's conclusions are as follows:

A good splicer can produce a good joint of either of the two types commonly used. The personal equation plays a greater part in the production of a satisfactory joint than does the type of joint. Neither type of splice can be made fool-proof; neither eliminates the human error element—therefore, assuming the method and material used to be nearly equal in all essential respects, other conditions also being equal, a joint of either type will be only as good as the splicer makes it. A well-made joint (either type being considered) is electrically as good as or better than any part of the cable.

With reference to the use of compound, high-melting value is a good point in its favor. Adhesiveness is not such an important point, unless the filling job is a poor one and the compound has to depend upon its adhesiveness to stay where first put. Brittleness is a bad quality, but, unless a joint is subjected to severe mechanical shocks or excessive vibration, brittleness does not become a menace to the electrical security of the joint. Paraffine is indisputably inferior to the compound on account of its excessive contraction coefficient, but, in spite of the points against its use, paper or cambric tape joints filled with paraffine have given satisfaction.

Eight companies from which inquiries were made all reported to have experienced trouble from electrolytic action on cable sheaths. It was impossible to ascertain definitely the influence of the duct material as affecting electrolytic action, but two companies reported their preference for fiber conduits over any other material for ducts. These two companies are using waterproof joints between sections of fiber ducts and claim thereby to secure waterproof duct throughout.

In the case of tile ducts distinct evidence of electrolytic ac-

tion at the joints of successive sections of ducts was found in at least one instance. In other instances of electrolytic action in ducts the pitting was more distributed throughout the length of the cable, making it difficult to separate the influence of the non-waterproof joints of successive sections of ducts. The committee was unable to put a definite value upon the advantages of fiber conduits in respect to electrolysis. Two companies which have had severe troubles with electrolysis place insulating joints in the lead sheath at intervals of 400 ft. or 800 ft., and at one end of each section they ground the lead to a pipe driven in the bottom of the manhole, or, in one case, to a special bare-ground return conductor paralleling the cable. By this arrangement any portion of the lead sheath is prevented from carrying the cumulative return railway currents of a long length of cable.

Some companies have attempted to keep the whole length of the cable practically insulated from ground, except at the station ends, relying on the vitrified-duct material or fiber conduit for the insulation in the ducts, and placing a rubber cushion under the cable in the hangers in the manholes. All of these methods have proved beneficial.

Wherever several large-size cables are exposed in a manhole there is always a danger that a short-circuit occurring on one cable in the manhole will involve some or all of the remainder, and possibility of such cases of trouble in congested manholes is obviously a matter of very serious concern.

To protect cables in such situations from the arcing flame of an adjacent cable various methods of protection have been adopted, principally as follows:

- (a) Concrete shelves.
- (b) Cement coating with $\frac{1}{4}$ -in. rope bond.
- (c) Asbestos tape saturated with silicate of soda.
- (d) Asbestos tape covered with soft-steel tape armor.
- (e) Asbestos rope.
- (f) Split tile duct.

The first method is applicable only to manholes containing few cables.

Cement coating seems to have given good results in many cases, the principal objection being its liability to crack and fall away from the cable if not well or properly bonded. On the other hand, in case of a breakdown of the cable insulation the location of the rupture will be plainly indicated by the cement covering being blown off the cable at that point.

The objection to split-tile duct is its clumsiness, and that in manholes with numerous cables it cannot be used on account of lack of space.

Of the three remaining types asbestos tape saturated with silicate of soda and protected with soft-steel tape armor seems to be very generally used with satisfactory results. There is very little difference in cost between the types mentioned. The asbestos tape saturated with silicate of soda and with steel armor is perhaps a little higher in cost, but the protection afforded is more than sufficient to warrant this slight increase.

REPORT OF THE COMMITTEE ON PUBLIC POLICY

Questions relating to the environment of working classes constitute the subject of the report of the public policy committee. Modern industry depends upon three factors: Capital, direction, executive and administrative, and labor. The harmony of all is essential. The question of wages is a local one, but in the same locality wages should be fully equal to those paid by other employers engaged in similar work. The term "service annuity" is adopted rather than pension as compensation for continuous service over a period of several years. Wages is inclusive of both wages and salaries. Any contribution for the improvement of an employee's surroundings or of himself should not be construed as affecting his wage or as either charity or philanthropy. It is to secure the added service of enhanced efficiency, increased devotion to the employer and more careful utilization of time, tools and materials that the committee has directed its efforts to find a form of compensation reasonable and mutually satisfac-

tory. The suggested forms of relationship between employer and employee include, in brief, accident insurance, sickness insurance and death benefits, service annuities, profit sharing, employees' savings and investment funds and life insurance.

METROPOLITAN STREET RAILWAY REORGANIZATION PLAN

Additional testimony in the reorganization case of the Metropolitan Street Railway of New York was offered before the New York Public Service Commission, First District, May 24.

Benjamin S. Catchings appeared on behalf of a tort creditors' committee to defend the interests of the accident creditors of the New York City Railway and the Metropolitan Street Railway in the proceedings. He had evidence to introduce with regard to the value and nature of the accident claims and had a proceeding pending before the United States Circuit Court to adjudicate the question as to whether or not the claims for injuries sustained in the operation of the Metropolitan Street Railway system by the New York City Railway between April 1, 1902, and Sept. 24, 1907, amounting to about \$1,877,000, should not be classified also in the receivership proceedings as claims against the Metropolitan Street Railway Company.

Mr. Catchings asked that he be permitted to withhold evidence which he might desire to introduce until after the commission had introduced its evidence and the claimants had concluded their proof with regard to the value of the property.

Commissioner Maltbie said that the hearings would not be closed immediately and legal procedure in the presentation of evidence was not followed strictly so that that could be arranged unless the time was too long.

R. Gray, head clerk in the office of the auditor for the receivers of the Metropolitan Street Railway, testified as to the correctness of certain accounts. Edward Krause, assistant to the auditor of the New York City Railway, gave testimony of a similar nature.

METROPOLITAN STREET RAILWAY REORGANIZATION.—SUMMARY OF ASSETS AS OF OCT. 1, 1910.

Reproduction cost of system.....	\$102,206,240
Additions representing sub-contractors' profit, plus additions to general contractor, engineering, interest and taxes, not previously included.....	1,834,765
Acquisition value of land above W. H. Wheelock's valuation, making claim valuation at least \$15,000,000.....	1,191,013
Revised total.....	\$105,232,018

In addition to above assets are the following reorganization assets:

Bonds of Central Park, North & East River Railroad.....	\$1,200,000
Amount remaining of \$10,000,000 to be raised after discharge of all obligations of the companies and receivers (\$10,000,000 less \$7,785,000).....	2,215,000
Total realized from various claims, at least.....	1,600,000
Total	\$110,247,018

NOTE: The last two items, particularly the latter, are estimates only, although believed conservative, and the commission is not asked to accept them so far, as, if at all, they may be material, until realized.

Also "going concern" value, or whatever term is employed to identify the item, estimated upon percentages or amounts stated by the various witnesses and adopted in other cases, \$7,500,000 to \$15,000,000 and certainly not less than the amount of any physical deterioration in the plant.

The above are exclusive of "special value of amount for street railway purposes as distinguished from ordinary purposes," of any "promoters' profit," of any "discounts on securities" and of any "special value of existing franchises," and also of the net investment in super-seeded property, except so far as any part of such sum may be included in "going concern" value. All these items are claimed as capitalizable even where no testimony has been presented of their cost or value.

Schuyler C. Stivers, accountant for Ford, Bacon & Davis, supplemented his testimony in reference to the accounts.

Charles F. Mathewson, counsel for the reorganization committee, presented the accompanying statement of reorganization assets in response to a request from Commissioner Maltbie.

The Grand Rapids (Mich.) Railway is planning to enlarge its resort at Ramona Park, Reed's Lake, by using part of the land on the lake front formerly occupied by a private theatrical enterprise. The private theater was burned about a year ago.

ATTACK ON THE "LOAN SHARK" EVIL IN NEW YORK

A meeting was held in New York on May 18 under the joint auspices of the Russell Sage Foundation and the Merchants' Association of New York to discuss various phases of the salary-loan problem. Addresses were given by various employers and others who have given attention to this subject, among them C. D. Meneely, vice-president and treasurer of the Brooklyn Rapid Transit Company. After the addresses a general discussion followed, and the following four resolutions were unanimously adopted:

"First—That employers rescind rules of discharge in order to assist employees in resisting unreasonable interest charges and deprive money lenders of the power of extortion.

"Second—That all employers disregard claims filed by money lenders against the wages of employees, not in direct compliance with law, the employers to interest themselves in assisting employees involved with loan sharks.

"Third—That, in self-interest as well as for the benefit of their employees, all large employers of labor encourage and assist in the creation of co-operative savings and loan associations in their respective establishments.

"Fourth—That laws be enacted which will allow a reasonable rate of interest on all small loans and provide for the licensing of money lenders and the efficient supervision and control of such licensees, preferably under the supervision of the State Banking Department."

Mr. Meneely said that about ten years ago his corporation, on the recommendation of its legal department, decided on the policy of refusing to recognize assignments of wages. The loan companies brought three or four cases in court, in defending which the corporation placed the borrower on the stand to prove usury. All the cases were won by the corporation. For a short time thereafter the loan companies brought a few more suits, which were abandoned as soon as he, accompanied by the borrower and counsel, appeared in court. In thus defending worthy employees involved with loan sharks the corporation greatly benefited itself because the money lenders quickly realized the futility of filing and the danger in bringing suit to collect. The Company's Mutual Aid Association supplies the aid to employees which might otherwise be sought from the loan shark. The company's rule at the present time simply requests employees not to assign their wages in place of the mandate in effect years ago summarily discharging an employee for such act.

Other testimony presented at the meeting showed that the extent of the usurious loan business in New York City is \$20,000,000 annually, and that the net profit of the money-lenders exceeds 100 per cent a year on the capital invested. The fear of discharge, due to the attitude of many employers toward men who assign their wages for loans, serves the loan shark as the most efficient collection agency which could be devised.

A number of employers testified that it was their fixed policy not to discharge employees for assigning wages, but to help them when they need financial assistance. According to one speaker, under a recent decision based on Section 42 of the Personal Property law, the loan company must file notice on an employer in a salary loan within three days after the loan is actually made. This decision was considered all-important as a weapon against the loan shark because it removed secrecy from the transaction. An employee was not likely to make a loan if the employer was to become aware of it within three days after the transaction. The addresses also showed that with a number of the companies employees' co-operative savings and loan associations had been established to counteract the salary loan evil. The usual charge to borrowers is about 1 per cent per month. An official of the Celluloid Company testified that such an organization had been conducted among the employees of that company since 1906. During that time he stated that the company had loaned about \$60,000 with a loss of less than \$100.

RECENT NEW YORK RAPID TRANSIT ADVERTISEMENTS

During the past week three large advertisements have appeared in the daily papers on the proposed rapid transit franchises in New York. The first was published on May 26 in the interest of the Interborough Rapid Transit Company and occupied six columns. It was headed "The Interborough offer completes the city-owned subway, the Brooklyn Rapid Transit Company asks the city to build subways as terminals for its elevated railroads. The Brooklyn Rapid Transit Company proposes more elevated roads for Brooklyn, the Interborough builds subways there. The Interborough plan gives a 5-cent fare to Coney Island." The advertisement was accompanied by a map, and said in part:

"The Interborough's plan establishes a universal 5-cent subway fare from Fort Hamilton, Coney Island, Sheepshead Bay, East New York, Ridgewood, Woodside, Corona, Astoria and all parts of the Bronx. The Brooklyn Rapid Transit Company's plan establishes a 10-cent fare within the Greater City and for a great many of the people in Queens, Manhattan and the Bronx a 15-cent fare to Coney Island. The Brooklyn company claims that it will make a great saving to Brooklyn people by extending its lines into Manhattan, thus avoiding a double fare.

"The Interborough Company, by going to Brooklyn for the people with its numerous lines with a single fare, saves more than the Brooklyn Company claims to save, because on the Interborough there will be a single fare to reach from every point in Brooklyn to every point in Greater New York.

"If the Brooklyn Rapid Transit Company is so interested in reducing the expenditures of the fare-payer, why do they insist in their proposition that for a short ride from Brooklyn to Coney Island the fare must be 10 cents?

"The Interborough has adopted the principle that a single 5-cent fare paid on the subway system shall carry a person from one end to the other of the Greater City of New York. On the other hand, the Brooklyn Rapid Transit Company's plan proposes to perpetuate a two-fare and three-fare system.

"The Brooklyn Rapid Transit Company's proposal is that it will spend less than \$21,000,000 for construction in improving its elevated lines in Brooklyn and placing third-tracks thereon if the Greater City of New York will pay about \$168,000,000 of the taxpayers' money for subway construction and connect it with the out-of-date elevated lines in Brooklyn, provided further that all the receipts on the subways built by the taxpayers' money shall be used by the Brooklyn Rapid Transit Company in establishing for all time a dividend on many of the unprofitable elevated lines in Brooklyn.

"The Interborough's plan proposes to extend the present city subway so that all the people in Brooklyn, including the outlying districts, will be given a 5-cent subway fare from one end to the other of the Greater City of New York. If the Interborough's plan is adopted by the city it will save \$58,000,000 of the taxpayers' money that the Brooklyn Rapid Transit Company's plan calls for and this \$58,000,000 will construct the lines shown on this map to Richmond, to Jamaica and to Flushing, and if these lines are constructed there would still be \$30,000,000 of the taxpayers' money saved by accepting the Interborough's plan.

"The Brooklyn Rapid Transit Company advertises that it will take only \$73,500,000 of city money to construct the rapid transit lines which it has been showing in heavy black lines on its advertising maps. The misleading character of this talk about cost can be seen readily by looking at its offer of April 25, in which it was stated that the city's requirement of new capital would be \$73,500,000 for the lines then proposed.

"Since that date and on May 1 the Brooklyn company added to its so-called original lines: (1) The Jerome Avenue extension to Jerome Park reservoir; (2) the Southern Boulevard extension to the Bronx River; (3) lines to Astoria and Corona; (4) the Nostrand Avenue extension; (5) the Livonia Avenue extension; and (6) the Fourteenth Street tunnel to East New York.

"But not a word has been said about the additional cost of these lines. Every day since they were added the Brooklyn company has stuck to its original figure of \$73,500,000. More than this, and still further showing the deceptiveness of their advertisements, the Brooklyn company are placing upon their advertising maps in black lines the following lines which they have not even yet agreed to put in their offer: (a) The Southern Boulevard line extending as far as Pelham Bay Park; (b) the Utica Avenue extension, and (c) the tunnel to Staten Island.

"And still they seek to lead the public to believe that all the black lines will cost the city only \$73,500,000.

"Now, the facts are that the cost to the city of the lines first mentioned by them will be \$118,000,000. The cost to the city with their additions of May 1 will run up to \$168,000,000. The grand total cost to the city of this layout as advertised will run up to \$188,500,000."

THE BROOKLYN RAPID TRANSIT COMPANY'S REPLY.

On May 31 the Brooklyn Rapid Transit Company replied with an advertisement headed "Abraham Lincoln and the Interborough," in which it stated in part:

"The first sentence of that familiar saying of Abraham Lincoln about fooling some of the people part of the time still has attractions for the Interborough Rapid Transit Company. It has made one set of propositions to the Board of Estimate Committee and Public Service Commission and by transparently deceptive literature is making another set of propositions to the reading public.

"It has added in its newspaper and pamphlet propositions 24 miles of routes which are never mentioned in its official propositions. These do not include many miles indicated with ciphers, which without figures before them are generally understood to stand for nothing. It seeks to convince the public that these new routes are all to be built if the city accepts the Interborough proposal.

"Not one of them can be built and operated under that proposal without an absolute guarantee by the city indemnifying the company against any loss of any kind—even to the extent of interest on its own investment for equipment required for the operation of these lines.

"The wonder is that with such a saving clause the company did not add 100 miles to its pictured routes. But perhaps in that event none of the people would have been fooled any of the time. The published products of acceleration indicate that some good people have already been fooled.

"But even if the 24 miles of additional routes should yet be embodied in the Interborough's formal proposition, and even if the city might be persuaded to give the company the guarantee of indemnity against loss which it demands, what would the people get under the revised plan?

"One hundred and two miles of rapid transit routes (including existing subways) against

"One hundred and twenty miles of rapid transit routes furnished under the B. R. T. plan.

"And what would the city invest?

"One hundred and ten million dollars under the Interborough plan—taking the company's own figures; and

"One hundred and three million five hundred thousand dollars under the B. R. T. plan—including the extensions to be built and operated as 'original lines.'

"Truly, the thoughtful citizen or taxpayer would not hesitate long in his choice between these two offers if he were not deceived by misleading representations and fallacious figures.

"Certainly the careful merchant will not fail to detect in which proposal his greatest interest lies if he studies this transit controversy with full information of the facts.

"Then, if the city is to go into partnership with transportation companies, there is the question of the character and corporate history of the partner to consider. On the one side consolidation and growth have been accompanied by great scandalous and fictitious increases of capitalization (see Judge Gaynor's article in *Pearson's Magazine*); on the other side, by many millions of decrease in capitalization. On the one

side is a shady record of juggling with corporate accounts and improper diversion of corporate moneys (see records of the Public Service Commission's investigation and of the District Attorney's office); and on the other side is a clear bill of corporate health and living (see records of the Public Service Commission's investigation). On the one side is a year's negotiation with the city accompanied by subterfuge, threat, political influence and intrigue—no yielding in terms except under compulsion; and on the other side is a three months' frank, open, honest and conciliatory conference with the city's representatives for the proper working out of the city's great problem.

"We prefer to trust to the latter part of Abraham Lincoln's famous utterance—that you cannot fool all the people all of the time."

THE ANSWER OF THE INTERBOROUGH RAPID TRANSIT COMPANY

In the same issue of the daily newspapers the Interborough Rapid Transit Company published the following advertisement:

"No out-of-date and inefficient plan of rapid transit. No use of taxpayers' money to bolster up the B. R. T.

"This is what the late John H. Starin, vice-president of the Rapid Transit Board, said about the B. R. T. in 1906:

"It's the old, old struggle that I have seen over and over again on this very board of the out-of-date and comparatively inefficient system resisting the advance of the modern and efficient.

"I want, now, to register on the records of this board that I am opposed to this elevated loop plan, among other reasons, because I do not intend to have any part in bolstering up any private corporation at the expense of the city of New York.

"If the old city of Brooklyn gave away hundreds of millions of dollars worth of street franchises and has nothing to show for it except an overgrown and undeveloped railroad system, I see no reason why this board should be forced to come to the rescue. We have built subways for Manhattan and the Bronx that are the best that money can buy, and we propose doing as much for Brooklyn; our opponents propose that we patch up an ineffectual system with another piece from the same old material.

"Let us not assist in perpetuating a great error. Let us build a modern system and at least do our part toward remedying the blunders that have been made in the past in Brooklyn."

"The Interborough offers to extend its modern system which Vice-president Starin described. This will make it possible to go from one part of the city to any other part for one 5-cent fare, which Mayor Low said was necessary for the unification of the city.

"Does Brooklyn want a unified subway system or patched-up elevated lines? Judge what you may hope for by what you have."

FIRE HOSE SPECIFICATIONS

At the annual meeting of the National Fire Protection Association, whose headquarters are in Chicago, there was presented a report which gave a list of the most common defects of the fire hose now sold in the market and which explained how such defects could be detected. In order to enable purchasers to secure high-grade hose the report included a complete set of specifications covering the materials of which the hose should be made for different sizes and the test conditions which the product should satisfy before it should be accepted for service. The report stated that the present general practice of purchasing hose by brand or trade names was chiefly responsible for the present unsatisfactory condition of this material.

STORAGE-BATTERY CAR FOR LONG ISLAND RAILROAD.

The Long Island Railroad has placed a single-truck Beach storage-battery car in regular operation on its Bushwick branch to replace steam operation. The car runs between Bushwick and Bushwick Junction, a distance of $3\frac{1}{2}$ miles, and makes seven round trips or 49 miles per day.

SOUTHERN PACIFIC COMPANY ENTERTAINS A. I. E. E.

On the evening of May 19 the Southern Pacific Company celebrated the completion of the first part of the work of changing its elaborate suburban steam service in and around Oakland, Berkeley and Alameda to electric operation by inviting to inspect its power station at Fruitvale, the San Francisco Section of the American Institute of Electrical Engineers and the officials of the various power and railway companies in San Francisco, Oakland and vicinity. An elaborate dinner had been prepared on the floor of the power house under the management of the commissary department of the railway company, and the corps of dietetic experts abandoned for a few hours their exciting life on the bounding main, or rather rail, for the more prosaic domesticity of the great building.

One of the company's standard dining cars was placed in the power house on the permanent construction track for a kitchen. By means of a skip attached to the 15-ton hoist of the traveling crane a quick and easy transfer was made between the dining car and the machine shop, which was utilized temporarily as a serving room. The dining tables were placed on the main floor of the generator room between the turbines and the rotaries. The building was as neat as a parlor, and, with its ceiling 50 ft. above the diners and the harmonious decorative effect of its construction, was as impressive as a great church interior. During the evening many compliments were extended



Banquet in Fruitvale Power Station

over the successful completion of the work so far performed to the members of the engineering staff of the Southern Pacific Company, and to A. H. Babcock, its chief electrical engineer.

After the dinner had been discussed the large party of experts left the tables to inspect the details of the plant. The difficulties outlined above were found to have been solved by the adoption of a 1200-volt d.c. catenary trolley system for which current is furnished by 600-volt rotary converters assembled in pairs and operated in series, the rotaries being actuated from 25-cycle, three-phase generators.

The third-rail being entirely out of the question locally, the engineers felt that they had the problem as cornered as well as it could possibly be cornered, so that no matter which way "the cat jumped" they could easily adapt themselves to whatever conditions the future might have in store as the best system, whether 600 volts d.c., 1200 volts d.c., 25-cycle single-phase a.c., or three-phase a.c.

While the guests were engaged in strolling about, studying and admiring the excellent work to be met with everywhere, the tables were removed, and at 9 p. m. the visitors again sat down this time to the regular monthly meeting of the large San Francisco Section of the American Institute of Electrical Engineers. At this meeting papers were read by those various engineers of the railway company who had designed and developed the details of the construction. These papers were followed by discussions, and the occasion was concluded with everyone feeling he had been honored by being present at the

celebration of this great undertaking, which, considering the vast fuel oil and hydroelectric possibilities of California, is destined to be followed in its field by as rapid extensions as was the successful demonstration of electric street railway operation in Richmond, Virginia, twenty-five years ago. An account of the engineering details of this work, with illustrations, appeared in the Feb. 4 number of the JOURNAL.

In connection with this meeting it is of interest to report that in the daily papers of the morning following the event just described the announcement appeared that the Southern Pacific company contemplated at once undertaking the problem of changing from steam to electricity on its vast suburban and interurban system in and about Los Angeles, Pasadena, Riverside, Redlands, etc., and perhaps as far north as Santa Barbara.

SOLID STEEL WHEELS IN BROOKLYN

The Brooklyn Rapid Transit System was one of the first electric railways to adopt the solid rolled-steel wheel for surface cars. The company has operated thousands of these wheels for the past three years with such satisfactory results that it has also designed and ordered them for the pony axles of its maximum traction trucks. The original estimates made by the mechanical department showed that the steel wheel would be cheaper than chilled cast iron on a cost per mile basis if it gave a minimum average life of 120,000 miles. In practice, however, the average mileage obtained has frequently exceeded this figure.

The satisfactory results obtained from solid steel wheels are shown by the following averages made up in October, 1909, for wheels placed in service at various dates between Dec. 19, 1906, and May 6, 1907, inclusive on 100 cars:

Average Mileage per Wheel.	No. of wheels.	No. of Turnings.
83,904	312	None
54,915	308	One
63,346	146	Two
66,613	34	Three

The mechanical department inspects all wheels on arrival as to their conformity to the specified profile, dimensions, thicknesses, etc. The Brooklyn company would like to use the standard wheel of the American Electric Railway Association, but cannot do so because its track conditions demand a flange 1 in. wide at the gage line and $\frac{5}{8}$ in. high. The wisdom of selecting this special profile is proved by the entire absence of flange breakage, such as frequently occurs on other railways where the track work is unsuitable for the wheels.

The average life of the solid steel elevated wheels is 10,000 miles per 1/16-in. wear and of the surface wheels 6000 miles to 7000 miles per 1/16-in. wear. The limit of radial wear is 2 in., corresponding to a reduction of 4 in. in diameter. On the elevated division all of the rolling stock except 36 special equipments is furnished with solid steel wheels. The wheels for the elevated motor trucks are 34 in. in diameter, while those for the trailer trucks are 31 in. in diameter. As the larger wheel weighs 850 lb. and the smaller one 690 lb., there is obtained a net saving of 640 lb. of revolving weight per car as compared with the practice of using the same diameter wheel for both trucks.

The surface car wheels of 34 in. diameter weigh 560 lb., those of 33 in. diameter weigh 530 lb. and the pony wheels of 21 in. diameter 250 lb. One point usually brought up in favor of the cast-iron wheel when possible savings in weight are considered is that a 33-in. cast-iron wheel weighs only 420 lb., whereas a solid steel wheel of the same diameter weighs 530 lb. The difference in weight rapidly decreases, however, with service, because the cast-iron wheel is scrapped after it is worn down, say, $\frac{3}{4}$ in., corresponding to a loss of 40 lb., whereas the steel wheel will lose over 200 lb. by the time it has reached the limiting radial wear of 2 in. It will therefore be seen that by the time the steel wheel has reached about one-half its useful mileage its weight will become less than that of a cast-iron wheel, so that there is little to choose between the two types in respect to saving weight.

COMMUNICATION

TRUNK LINE ELECTRIFICATION

DEPARTMENT OF WAYS AND COMMUNICATION OF RUSSIA.

St. Petersburg, May 12, 1911.

TO THE EDITORS:

I have read in your issue of April 15 the report of the paper by W. S. Murray on trunk line electrification, and although his evidence goes to show that the electric system of the New York & Hartford Railroad is a complete success, I cannot agree with him in his conclusions as to the universal use of the single-phase system on trunk lines. It is impossible to disregard the question of the relative costs and merits of the various system of electric traction, and no one electric system can yet be considered the best for all conditions unless one is satisfied under some conditions with a very poor average. The adoption of the single-phase system would mean too heavy a sacrifice in numerous instances where we ought really now to see electric traction substituted for existing steam traction.

I am by no means opposed to the single-phase system, nor am I an advocate of other systems, yet the really wonderful performances of many existing direct-current and three-phase lines cannot be ignored. It seems to me that the much-discussed question of one single universal system of electric traction for trunk lines is purely of an abstract character. If all railroads had to be electrified in the same way the single-phase system might at present be the best suited for such a general purpose, or it might not be.

This same policy of reasoning in the abstract was followed by several of those who presented reports on electric traction at the International Railway Congress held at Bern in 1910, and, so far as the purely hypothetical case was concerned, the opinion of these gentlemen in favor of the selection of the single-phase system as a universal system may in a way have been justified. But the same speakers, from their elaborate studies of the question of electrification in Bavaria, Austria and Switzerland, reached the conclusion that electric traction could advantageously be substituted for steam traction on trunk lines only under two conditions, namely: (1) Where the energy required could be generated at less than a certain sum per kw-hour, and (2) when the density of traffic was greater than a certain amount.

If we consider the cases even of these three countries, whose representatives at the congress were those who took the position mentioned above, in favor of the adoption of the single-phase system as a universal system, we find that there are only two classes of trunk lines which are warranted now in adopting electrification, namely: (1) Mountain divisions, sometimes with short, flat adjacent sections, and with a cheap source of energy in the vicinity, and (2) suburban sections of trunk lines which adjoin larger cities and have a high density of traffic. For these two special applications, which represent the real possibilities of electrification, other systems, such as the three-phase system and the direct-current system, would often be more economical and more desirable from purely technical reasons than the single-phase system. This has been shown by the records of performance, time and again.

What then remains of the electrification of entire systems of trunk line railroad, which is advanced as the chief argument for the adoption of the single-phase system as the universal system of electric traction? Nothing. And what would be the real benefit of finding such a universal electrical system, if that was possible? None; that is to say, unless we are prepared to underestimate the capabilities of the modern steam locomotive, which is now and for a long time will remain the cheapest and best motive power for miles of existing railroads, and unless also we disregard the merits of all other electrical systems.

On the other hand, the art is progressing so rapidly that no one can guarantee that ten years from now some other system will not be developed which will compete actively with any now in existence.

The practice of extrapolation has always been condemned by mathematicians, and where the expenditure of millions of dollars is at stake, as in the case of electrification of trunk lines, and where the owners of these great railroad systems are pretty apt to ask specific explanations as to the return each year on the money expended in electrification, it would seem that engineers must be even more careful than mathematicians in their attempts to extrapolate in an unknown field.

It might also be said that since motor-car trains are peculiarly suited only for local traffic, all long-distance service with heavy trains must be handled by locomotives, and it will not take any more time nor trouble for a train to change electric locomotives of different types, say from three-phase and to single-phase or vice versa, than it now takes to change the steam locomotives on a train at the end of an engine run. The very small complications involved in the distribution system for making such a change are not worth consideration.

The conclusions at the Bern congress on the question of systems of electric traction seem fully to confirm these views. Clause No. 2 of these conclusions was accepted by the vast majority of the attendants at that convention, which included railroad men and electrical engineers from all countries, and was as follows: "There are various systems at hand and the selection of one or another system is dependent on its respective suitability in each case."

It is better, then, to let each system develop along natural lines and find its own field rather than arbitrarily to attempt at this time to compel adoption of one to the exclusion of others. The one most fitted for the service will win.

HENRY GRAFTIO,

Engineer of Ways and Communication.
Local Hon. Secretary, A. I. E. E.

CONVENTION OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION

The thirty-fourth annual convention of the National Electric Light Association was in session in New York City as this paper went to press and the last session was to be held June 2. The report of the membership committee of the association shows that the number of members has nearly doubled during the past year, the gross gain being 3919. The total membership of all classes on May 30 was 8665 and the registration at the convention was 4154. Most of the meetings were held in the Engineering Societies Building on Thirty-ninth Street and the long program of papers and committee reports was divided into commercial, accounting, technical and power transmission sessions.

Abstracts of several of the papers and reports presented at the technical sessions are printed elsewhere in this issue.

ANNUAL REPORT OF LEEDS AND BRADFORD TRAMWAYS

The report of the Leeds Municipal Tramways for the fiscal year ended March 31, 1911, shows total receipts of £370,402, total expenditures of £195,303. A payment of £51,886 was made toward the reduction of taxes. The number of passengers carried was 80,806,270, and 4,308,439 car miles were operated. The receipts per car mile advanced from 21.04 cents in the preceding year to 21.38 cents.

The annual report of the Bradford Tramways for the same fiscal year shows passenger earnings of £264,075. The earnings per car mile were 23.2 cents, against 22.4 cents for the preceding year. The number of car miles operated was 5,461,562, and the number of passengers carried 52,919,559. The last figure was equivalent to carrying every inhabitant of Bradford 157 times a year.

Blind passengers were given 82,589 free trips, in accordance with custom. The Bradford system comprises 54.8 miles of route.

AEROPLANES AT STREET RAILWAY PARKS

One of the principal show features of large electric railway parks this year promises to be aviation meets. No invention in recent years has attracted such popular interest as the aeroplane, and none attracts such a large attendance. Inquiry at the headquarters of the Curtiss Exhibition Company in New York recently elicited the information that this company is planning to pay special attention to electric railway parks this year. The Winona Interurban Railway, of Warsaw, Ind., as mentioned in the issue of this paper for May 20, is one of those which will provide such an attraction this summer. In many respects the aerial flights are especially adapted for electric railway exhibit purposes, because they can be held at any point on the line where there is an open field or even, by the use of the new hydro-aeroplane devised by Mr. Curtiss this year, where there is a body of water. Thus, at the aviation meet in Los Angeles, Dec. 27, 1910, on the line of the Pacific Electric Railway, no enclosure was used. The right-of-way of this railroad is fenced in and persons holding admission tickets arriving on the railroad were allowed simply to pass through a gateway in



Hydro-Aeroplane

the right-of-way fence and the field was practically inaccessible in any other way.

The general type of the Curtiss aeroplane is the biplane, formed by two sets of wings or surfaces, one directly over the other. The woodwork is almost entirely of selected spruce, and the trussing is done with galvanized-steel wire cables. The propeller is of ash and spruce, the heavier and more flexible wood forming the core. The wing panels are made with a light and strong wooden frame covered with linen cloth. Light bamboo rods extending to the front and rear of the main planes support the forward horizontal surface, which acts as a rudder to steer upward and downward, and also the rear vertical rudder and stabilizing plane. At the ends of the main framework there are small movable planes to maintain the lateral balance of the aeroplane. The motive power is supplied by an eight-cylinder, 60-horse-power "V"-shaped, gasoline engine.

The new Curtiss hydro-aeroplane is similar to the standard type of Curtiss aeroplane except that it is fitted with a skimmer-shaped boat on wheels, which enables the machine to be used on land or water, or in the air. This design was developed by Mr. Curtiss last winter at San Diego, although his first demonstration with the machine was at Salt Lake April 10-12, 1911. The hydro-aeroplane can arise from or descend to the water, over which it can skim at the rate of 50 m.p.h., and it is safer than the ordinary aeroplane because its ability to alight on water provides it with a safe place for landing. The accompanying view of the hydro-aeroplane was taken at San Diego.

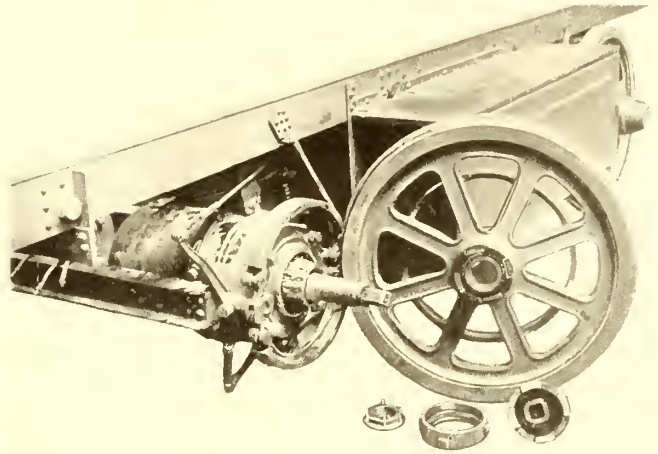
FOUR-WHEEL DRIVE STORAGE BATTERY CAR

The Third Avenue Railroad has placed in regular service on the Twenty-eighth and Twenty-ninth Street crosstown line in New York City a storage battery car mounted on a Berg four-motor, four-wheel drive truck. This type of driving mechanism is a modification of the four-wheel, four-motor drive which has been successfully applied to a large number of heavy automobile trucks and omnibuses during the past five years by the Commercial Truck Company of Philadelphia. Each of the four motors drives a single wheel through suitable reduction gearing and each wheel therefore acts as an independent unit. The advantages claimed for this method of driving are: (1) Curves and inequalities of the track are compensated for and the wear on the wheels and rails is thereby reduced; (2) higher rates of acceleration are possible with less drain on the battery; (3) in starting, the motors can be connected four in series and thus prevent losses of current in external resistances; (4) the gearing between the motors and the wheels is incased and runs in an oil bath so that the gears have a high efficiency and long life. The motors are of General Electric manufacture and are rated at 22 amp on 100 volts. They are completely inclosed and are mounted between two channel cross-beams. The pinion engages with a triple planetary gear the casing of which is bolted to the end of the motor and forms an oil reservoir in which the gears run. On the outer face of this casing is a hollow axle on which the wheel turns. The spider of the planetary gear has a shaft which passes through the hollow axle and as shown in one of the accompanying illustrations terminates in a square end. In the hub of the wheel is mounted a Timkin roller bearing and the outer face of the hub is notched to engage with the hub cap which fits on the square end of the shaft. The wheel has a rim cast on the side of the spokes into which an internally expanding band brake is fitted. If it should be necessary to remove a wheel or a motor it can be done in a few minutes by the removal of the hub cap.

The compactness of the driving mechanism and the absence

Other advantages obtained by mounting the battery under the car are less side sway and splashing of the electrolyte due to the battery being low down; battery may be handled as a unit by machinery; ample ventilation can be provided and no gases or fumes can enter the car; the electrolyte which is spilled out cannot come in contact with and rot any wood except the inexpensive battery trays.

The body of the car was built by the Third Avenue Railroad. The side panels, dashers and roof are formed of Agosote.



Method of Dismounting Wheel

The car will seat twenty-eight passengers and has the following weights:

Truck, including motors, battery tray and control.....	5,000 lb.
Body	4,200 lb.
Wheelguards	346 lb.
Battery—50 cells at 75 lb.....	3,750 lb.
Total	13,296 lb.

The operation of the car since it was put in service early in May has been very satisfactory. It is equipped with a Gould battery of fifty cells and a rated capacity of 520 amp-hours. The car runs from 50 to 70 miles per day and uses from 330 to 400 amp-hours on one charge of the battery. The following table shows the performance of the car for seven days:

Days.	Car Miles.	Amp-Hours.	Amp-Hrs. per Mile.	Watt-Hrs. per Mile.
April 28.....	51	330	6.46	646
May 3.....	51	336	6.60	660
May 4.....	51	360	7.05	705
May 6.....	51	336	6.60	660
May 7.....	61	384	6.30	630
May 11.....	66	390	5.90	590
May 13.....	67	378	5.64	564

Between May 7 and May 11 the brakes were adjusted with a resulting marked improvement in the current consumption. Assuming an average passenger load of 2000 lb., the power consumption per ton mile based on the average of May 11 and 13 was 75 watt-hours. The car makes an average of nine stops per mile.

The truck was designed by Charles Berg, president of the Imperial Electric Motor Company and general manager of the Berg Storage Battery Car Company, Hudson Terminal Building, New York. It was built by the Commercial Truck Company of Philadelphia, of which Mr. Berg was one of the founders. The Berg Storage Battery Car Company is preparing to design and build four-motor four-wheel drive trucks for all types of storage battery and overhead trolley street cars.



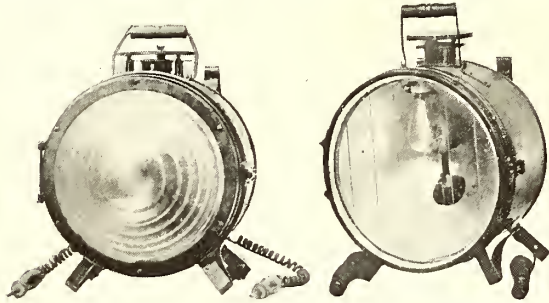
Four-Motor Storage Battery Car

of all chains or gears between the two pairs of wheels makes it possible to mount the storage battery in a box attached to the truck frame under the car body. With this arrangement an exhausted battery can be removed and replaced by a fully charged battery in less than one minute without taking the car out of service. Smaller batteries, therefore, can be used, ample time can be given to charging and inspection under favorable conditions, and by providing a few extra batteries all cars can be kept in service for a full day of sixteen or eighteen hours.

The Public Service Commission of New York, Second District, has required reports of steam-railroad companies for three years of all delayed passenger trains in the State. For the year ended March 31, 1909, an average of 54,216 trains per month were run on the steam railroads of the State. For the year ended March 31, 1910, the number was 58,651½, and for 1911 it was 63,236. For the three years the average per cent of trains on time as reported to the commission of the second district was 83.4.

ARC HEADLIGHTS FOR ELECTRIC CARS

In the new line of arc headlights for electric cars developed by the General Electric Company the well-known characteristics of the luminous magnetite arc have been advantageously employed. The brilliant and large volume of light given, when operated normally, insures units of high efficiency and the low luminosity resulting with reversed polarity affords a most convenient means for dimming the glare of the lights. The last-



Two Types of Magnetite Arc Headlights

named feature is distinctly new and tends to eliminate the inconvenience attending the use of screens. Since some electric railways favor auxiliary incandescent lamps for dimming, several of the eight styles available are equipped with one or more standard 16-cp, 110-volt incandescent lamps connected in series with a suitable resistance for operation across the nominal voltage of the railway circuit. All the styles are usually adjusted to operate on 550-volt direct current, with an 80-volt arc and a 4-amp current. Four of the styles are suitable for suburban, two for interurban and two for mine service.

The headlights for cars operating on suburban tracks with many curves and intersecting roadways are equipped with parabolic reflectors of highly polished metal. They furnish a broad fan beam which illuminates the track directly from the head of the car and 50 ft. on each side to a distance of 1200 ft. or 1500 ft., thus enabling the motorman to see to some extent around curves and also to detect the presence of persons or vehicles approaching the track. Special chimneys or shields are provided for cutting off the objectionable side rays, and suitable arrangements are made for dimming by reversed polarity or by incandescent lamps. In either case the motorman merely throws a switch to obtain full or subdued illumination at will.

The interurban styles are equipped with mirror reflectors or with semaphore lenses and spherical mirrors. The semaphore lens is of the molded plano-convex type. It consists of a series of circular sections arranged for giving the best optical effect with great structural strength and minimum weight. Its depth of focus enables it to be placed sufficiently far from the electrodes to prevent its being materially affected by the heat of the arc. This headlight furnishes a brilliant beam which illuminates the track to a distance of about 2000 ft. Since an interurban limited traveling at 60 m.p.h. can be brought to a stop within 1700 ft. or 1800 ft. the illumination obtained from this headlight affords an ample factor of safety. The illumination is confined practically to the width of the track, and, therefore, the motormen of cars running in opposite directions are not blinded by the glare of other headlights, nor is the traffic on paralleling roadways interfered with in any way. Dimming is accomplished by reversing the polarity or by means of auxiliary incandescent lamps.

All the styles operate on the same principle and differ only in the details required for adapting them to various classes of service. The electrodes automatically maintain the arc at the focus of the reflector, thus eliminating from the duties of the motorman the trouble of frequent adjustment. The positive electrode consists of a stationary copper forging sheathed in suitable metal to prevent it from oxidizing. It has a life of 2000 hours to 3000 hours and may be considered as non-consuming. The negative electrode is a steel tube containing the

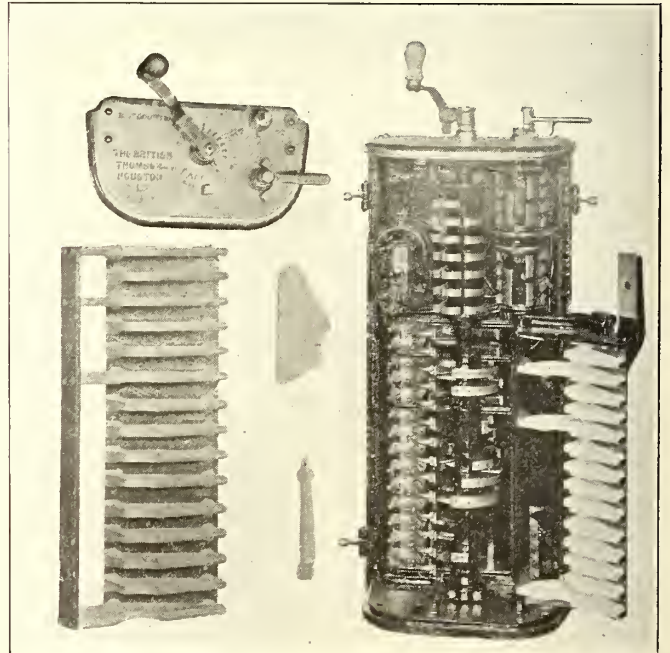
mixture of iron oxide and other substances for forming the luminous arc. It has a life of 60 hours to 80 hours. The slow rates of consumption serve to maintain the arc within safe voltage limits.

The high efficiency of these headlights is due to the fact that the light of the luminous magnetite arc is emitted by the entire arc stream in which the vapors from the negative electrode are heated to high incandescence. Therefore, the volume of light available is much greater than that obtainable from ordinary arc lamps, the luminosity of which is derived only from the incandescent tips of the carbon electrodes.

A BRAKING CONTROLLER EFFECTIVE IN BACKWARD RUNNING

Controllers of the braking type now in use are so arranged that if the car is running forward on moving the handle to the brake notches currents are generated in the motors to produce a retarding torque, the direction of the currents in the motors being such as to strengthen the magnetism of the fields. If, however, the car is running backward and the controller handle is moved to the brake notches, the direction of currents generated in the motors is such as to demagnetize the fields, so that no braking effect is produced.

To obtain braking when the car is running backward the British Thomson-Houston Company, Limited, of Rugby, England, has introduced controllers in which, when the controller handle is moved to the "off" position, connections are made which cause one or more of the motors to act as generators to produce the desired effect. These connections are such that no braking action is obtained during the forward running of the car if the handle is in the "off" position. An arrangement preferable to this, however, is one in which the motion of the control handle which produces braking for forward running will



Controller Arranged for Braking in Either Direction

also produce braking for backward running. The B-49 controller shown in the illustration will give this result. The reverse switch handle may be in either the forward or reverse position, when by moving the main control handle to the braking notches a rheostatic braking effect will be obtained for either the forward or backward motion of the car. This controller is suitable for use with two 40-hp, 500-600-volt series motors and has four series, four parallel and seven brake controlling points.

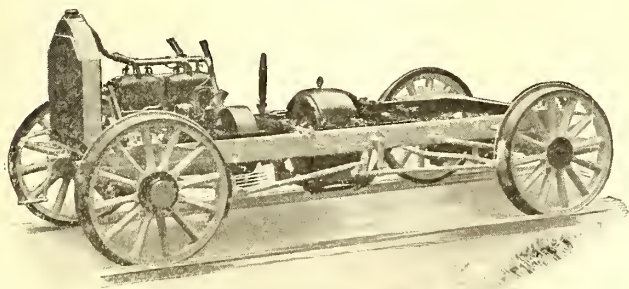
Another important new feature of the B-49 controller is the

mechanism by which a defective motor may be cut out of service without removing the cover of the controller. To cut out a motor it is only necessary to remove the reverse switch handle from its spindle and apply it to the cut-out spindle which projects through the cap plate, shown in the illustration near the back edge of the cap plate. This cut-out spindle has three running positions, a central position for which both motors are in circuit and a position on each side to cut out either motor. An interlocking mechanism prevents the moving of the reverse switch unless the cut-out switch spindle is in one of its three running positions. The usual interlocking mechanism is provided to prevent the reverse switch from being moved unless the main cylinder is in the "off" position.

The arc deflector of the B-49 controller, consisting of fire-proof barriers, is of strong mechanical construction. The large deflector plates are supported at both ends, and the small plates molded with large bosses for the fixing screws, thus providing rigid fixing for the plates. A magnetic blow-out is provided for all fingers of the main cylinder on which arcing takes place. An insulating trough surrounds the back half of the main cylinder to protect the frame from the influence of the arc or live parts. The trough is divided into sections by barriers; these, with the arc deflector which covers the front half of the main cylinder, form separate chambers for inclosing various sections of the cylinder which may be at different potentials. The brake cylinder is mounted on the main cylinder spindle in accordance with this manufacturer's standard practice. This prevents any possibility of change in the relative positions of brake cylinder and handle, which may occur due to wear on the gears or cams when the brake cylinder is mounted on a separate spindle.

GASOLINE SECTION REPAIR CAR

The accompanying illustration shows the frame work of a gasoline section repair car for railways recently built by the Otto Gas Works, Philadelphia. This car was designed especially for use on the Chicago, Rock Island & Pacific Railroad, but is, of course, adaptable to any interurban electric line. The power is supplied by 30- to 35-hp, four-cylinder, four-cycle gas engine. The car also carries a 10-hp Crocker-Wheeler electric generator which is arranged to be driven by the engine and thus supply power for operating electric drills, rail saws, portable emery wheels or any other electrical track repair tools. The truck frame shown in the illustration is surmounted by a body which will seat from eight to ten men, and will also carry a complement of tools, spikes, cable and other material.

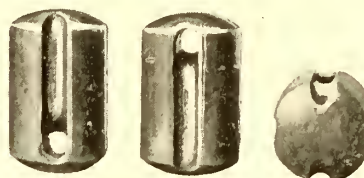


Gasoline Section Repair Car

The car is operated in the same manner as an automobile, but is provided with a clutch by which the engine can be disconnected from the driving axle and made to engage with the generator. When the site where the work is to be done is reached the engine is connected with the generator and two power cables, each about $\frac{1}{4}$ mile in length are stretched each way from the car. These cables are provided with plug switches every 20 ft., so that the electric portable tools can be used for $\frac{1}{2}$ mile along the track without any change in the position of the car. The car weighs about 3000 lb.

PORCELAIN STRAIN INSULATORS

There are many conditions for which properly designed porcelain strain insulators are admirably suited. They are largely used in guy wires by street railway and by electric power companies. Groups in series are used at dead ends to take the strain of and to insulate the line wires. The Westinghouse Form P-2 porcelain strain insulators shown in the accompanying cut are made of a grade of porcelain said

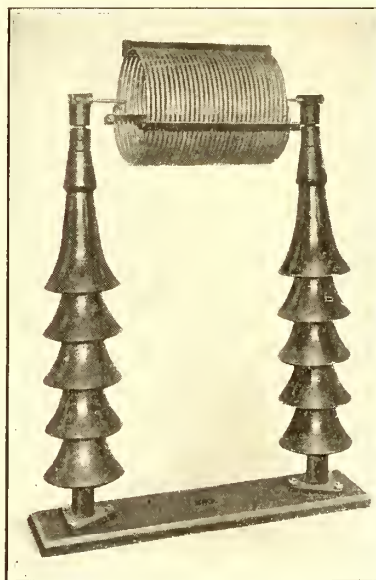


Porcelain Strain Insulators

to be much superior to that ordinarily used for such appliances. The glaze is a dark brown, so the insulators do not readily attract attention in the air. Sharp corners that would be apt to chip have been avoided and the shape of the grooves is such that the wires lie naturally in them. The break-down voltage when the insulators are dry is about 20,000 volts for each of the three sizes. The approximate ultimate tensile strengths of the insulators, when wired up in guy wires, are respectively 14,000 lb., 16,000 lb. and 23,000 lb. Even if one of these insulators fails either because of excessive stress or through accident, the wires that it carries cannot drop because they are interlinked. Two of these insulators are often installed in series; then if one breaks the other provides insulation.

AIR-COOLED CHOKE COILS

It is sometimes convenient to mount choke coils on ceilings so that the insulating coil supports hang pendent. At other times it is preferable to arrange them so that the coil rests on the supports, as shown in the accompanying cut of the new Westinghouse Dr coil. This coil can be mounted either way, because the insulating columns can be removed and inverted by taking out four bolts.



Air-Cooled Choke Coil

An aluminum rod, bent into a helix of about 15 in. diameter and containing about thirty turns, forms the coil proper. Bracing clamps are provided to give mechanical strength to the helix. The aluminum rod used is of sufficient diameter to carry 200 amp safely. Each coil is supported on two insulating columns made up of porcelain insulators, which, except for the end pieces are interchangeable. The number of insulators used in any column depends on the voltage of the circuit in which the coil is to be used.

These coils can be mounted in any position convenient for the wiring on the floor, wall or ceiling. For floor mounting, the parts are arranged as illustrated, and for inverted mounting the insulator columns are inverted and the base is attached to the ceiling. The insulating columns are supported on substantial cast-iron blocks fixed on wooden bases. These choke coils are intended principally for the protection of transformers and should not be used for generators. Where greater reactance than is afforded by a single coil is desired for the higher voltage circuits, it is recommended that two or more coils be connected in series.

MOTOR TOWER WAGONS FOR THE UNION RAILWAY, NEW YORK

The Union Railway, New York, N. Y., is operating four Packard 3-ton tower wagon trucks for use in line repair work. The normal capacity of the truck is 6000 lb. and the maximum speed is 12 m.p.h. The trucks are the standard Packard 3-ton chassis, equipped with special bodies, built by John McCardell, of Trenton, N. J. The wheel base of the truck is 12 ft. It



One of Four Gasoline Tower Auto-Trucks for the Union Railway, New York

has a four-cylinder, water-cooled motor located in front of the driver's seat under the bonnet. The cylinders are 4½-in. bore by 5½-in. stroke, and 24 brake-hp is developed at 650 r.p.m. The distance from the ground to the top of the frame is 37 in. Each truck is equipped with a dry plate clutch, which operates without lubrication and, therefore, works equally well in both cold and hot weather. It has a delicate positive action at all times.

The regular brakes, operated by pedal, are on the ends of the countershaft, so that there is no braking strain on the trans-

OPERATING COST PER MILE IN CENTS OF GASOLINE AUTO TRUCKS, UNION RAILWAY				
PACKARD				
	Jan.	Feb.	March.	April.
Gasoline .....	.0375	.0514	.0375	.0440
Lubricants .....	.0133	.0133	.0317	.0132
Labor .....	.1116	.2531	.2254	.2860
Totals .....	.1624	.3178	.2946	.3432
COUPLE-GEAR.				
Gasoline .....	.0524	....	.0612	....
Lubricant .....	.0133	....	.0133	....
Labor .....	.2729	....	.2783	....
Totals .....	.3386	....	.3528	....

mission or bevel gears. The emergency brakes are expanding and operate on drums on the rear wheels. The over-all length of the body, not including the steps, is 12 ft. 3 in.; over-all length of body, including step, 13 ft. 6 in., and width of body inside the running boards, 4 ft. 1 in. The running boards are 13 in. wide. The inside measurements of the lockers back of the tower are as follows: Length, 16 ft. 2 in.; width, 14 in., and height, 14 in. The dimensions of the tower when telescoped are as follows: Base, 4 ft. 7 in. long; width, 4 ft. wide; height, 8 ft. 1 in. high from the top of the chassis. The height of the tower when raised is 14 ft. 2 in. from the top of the chassis. The measurements of the working platform are as follows: Length, 9 ft. 6 in.; width, 4 ft., and sides, 22 in. high from floor; approximate weight, 1600 lb.

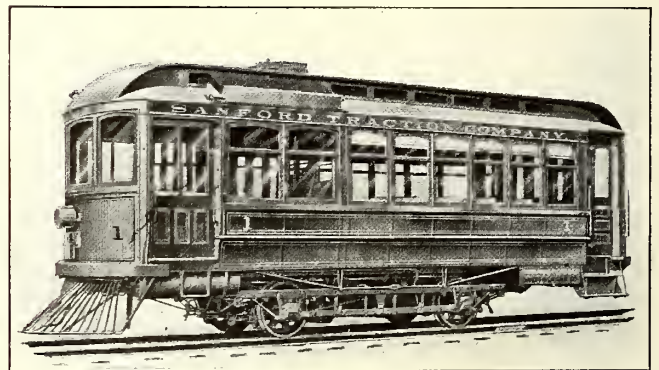
In connection with the foregoing description, James D. Kent, electrical engineer Union Railway Company, has supplied the accompanying table of mileage operating costs on the four Packard trucks and the single 40-hp Couple-gear truck now in service. The Packard trucks weigh 8500 lb. and the Couple-gear truck, 10,400 lb. light. The January figures for the Packard truck can be disregarded in the comparison, as

all labor was not included since this was the instruction period for the men. The Couple-gear costs for February and April, 1911, were omitted because of high charges for straight emergency service, due to the fact that the standby labor cost continued, although no mileage could be recorded against it.

GASOLINE MOTOR CAR FOR ALASKA

The Alaska-Northern Railroad, of Seward, Alaska, which is now operating 71 miles of track, has recently purchased a gasoline motor car from Fairbanks, Morse & Company, Chicago, Ill. The principal dimensions of this car, which is shown in the accompanying illustration, are as follows: Extreme length over the pilot, 34 ft. 2 in.; length over the vestibule, 32 ft.; length over the end panels, 26 ft. 3 in.; width, 8 ft. 6 in. The seating capacity is thirty-five. The rear platform is of the vestibuled type with folding doors on each side and with drop windows. The car is divided in two compartments, one for the engine room, baggage, etc., 11 ft. 1 in. long, and one for passengers exclusively, 15 ft. 2 in. long. The passenger compartment has reversible rattan covered seats for twenty-three passengers, drop windows and double-sliding doors at the rear. The engine room is separated from the passenger compartment by a partition with a swing door. It has baggage doors at each side. This compartment also has folding seats for passengers. The body is mounted on a single truck of 10-ft. wheel base, furnished by the Taylor Truck Company. The axles are of 4 in. diameter, 3¼ in. x 6 in. at the journals. The wheels are cast iron of 30 in. diameter. The body is carried on full elliptic springs which are independent of the engine and transmission.

The gasoline engine is of the water-cooled type with four 6¼-in. x 7-in. cylinders. It is rated at 50 brake-hp. The transmission is of the gear type. All gears are constantly in mesh and changes of speed are made by sliding jaw clutches. There are three speeds in each direction. The average running speed is 35 m.p.h. The transmission operates in conjunction with a master clutch of the disk type in the flywheel of the engine. The drive is accomplished by means of two chains attached to the front axle. All shafts run in roller bearings. The several control levers for the operation of the engine, transmission, brake and whistle are located in the front end of the car. The transmission is controlled by a



Gasoline Car for the Alaska-Northern Railroad

single hand wheel which shifts the jaw clutches and controls the master clutch through cams on a side shaft running parallel to the transmission. The speeds and the master clutch are so interlocked that there is no possibility of two speeds being engaged at the same time.

The car is equipped with straight air brakes and with a ratchet wheel for hand-braking. Other equipment includes an air whistle and foot gong at the front end, an acetylene headlight and oil interior lamps, and hot-water heating from a heater in the engine compartment. The weight of the car is 26,000 lb.

O-B THERMO BONDING PROCESS

The Ohio Brass Company has recently put on the market a patented process of soldering its standard all-wire compressed-terminal rail bonds to the rails after the bonds have been attached to the rail in the usual way. The additional tool equipments required are simple and low in cost and the operation can be performed by one man in a very few minutes. In fact, it has been possible to apply bonds by this process on electric railways which have a two-minute headway without delaying the traffic.

The process consists in heating the bond terminal after com-

A HEAVY BAND RIP SAW FOR ELECTRIC RAILWAY CAR SHOPS

The use of the band rip saw as a substitute for the circular saw is increasing because of the saving on saw-kerf and the increase in efficiency and output. Hence the latest type of band rip saw, made by the J. A. Fay & Egan Company, Cincinnati, is of interest. This saw is designed for doing any kind of ripping in large and heavy timbers. It will rip with facility any thickness from $\frac{1}{2}$ in. to 14 in. and 28 in. wide. While it is adapted for heavy work, it is equally efficient for ripping the finest lumber into small strips, and it is here that



Figs. 1, 2 and 3—Process of Thermo-Welding Rail Bonds

pression and the adjacent web of the rail practically instantaneously, independent of cold or windy weather conditions, by a chemical reaction. The heat produced is so concentrated that while the terminal and the adjacent web are quickly brought to a soldering heat the ball of the rail remains so cool that the hand can be laid upon it while the soldering is being done so that no injury to the rail or body of the bond can possibly result.

The solder enters at *C*, Fig. 4, under the shoulder *B* of the terminal and firmly unites the entire shoulder to the web of the rail, forming a fillet at *C* and thus sealing the joint against the entrance of moisture between the head of the bond and the web of the rail and uniting the compressed portions of the terminal to the annular walls of the hole in the rail. In the section Fig. 4, *A* is the head of the bond, *B* is the extra contact surface gained by the process, *C* is the fillet of solder which

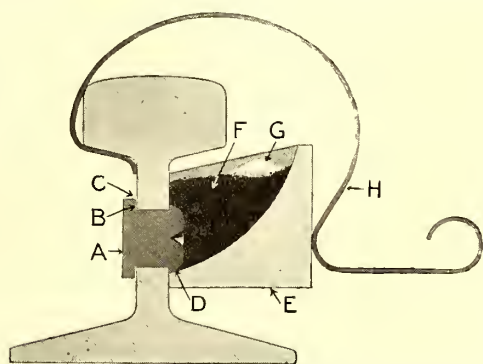


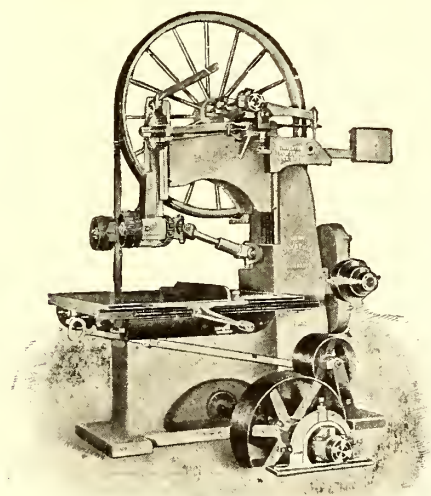
Fig. 4—Section Showing Rail, Bond, Thermo-Cup, Etc., Used in Thermo-Bonding Process

seals the joint against moisture, *D* is the button head formed by the compressor, *E* is the thermo cup in position, *F* is the thermo compound, *G* is the ignition powder and *H* is the clamp which holds the cup in position.

The manufacturers state that a number of trial installations of this process have been made with very satisfactory results and that strong patents have been issued under which its use is strictly limited to its application to rail bonds furnished by the Ohio Brass Company.

the thin blade of the saw will be best appreciated. In ripping heavy timbers that are very long the manufacturers recommend the use of a traveler on a track to insure a straight cut.

The table is 47 in. x 45 in. and has at the front a plainly stamped index. There are three driven feed rolls in the table. A cam lever releases, moves and clamps the fence, accomplishing its adjustment in the quickest possible manner. The wheels are 50 in. in diameter. The wheel shafts run in extra long bearings. The upper wheel is fitted with an im-



Heavy Band Rip Saw

proved sensitive straining device. The feed consists of five 8-in. feeding rolls. The upper rolls are adjustable up and down instantly and may be raised from the board, stopping the feed, or lifted quickly out of the way for use as a hand-feed rip saw, all being accomplished by a single movement of a long lever which is conveniently located for the operator. There are three speeds of feed. This machine is usually furnished with a 5-in. blade, $24\frac{1}{2}$ ft. long. The driving pulley is 24-in. x 8-in. face, and should make 550 r.p.m. under regular operating conditions.

LONDON LETTER

(From Our Regular Correspondent)

The Brighton Railway has completed the extension of its electrified lines to the Crystal Palace, and has opened the line to the public. The electrification of the line from Victoria to London Bridge, by way of East Brixton and Peckham, has been so successful that the company has regained the patronage of the persons that they had lost to the tramways. Similar hopes are entertained in regard to traffic to Crystal Palace, which it has always been difficult to reach. It took half an hour to make the trip by steam, whereas the through electric trains will cover the distance of nine miles in about fifteen minutes, and local trains in about twenty minutes. The work of construction was started about nine months ago by R. W. Blackwell & Company, who constructed the first section two years ago. The single-phase system is used the same as on the Victoria to London Bridge section. There is, however, a difference in the rolling stock. On the South London line the motor cars are equipped with four motors, rated at 115 hp for one hour, or 57 hp continuously, whereas those of the Crystal Palace extension are equipped with four motors rated at 175 hp for one hour, or 100 hp continuously. On the South London line the normal train-unit consists of one motor car and one trailer, whereas on the Crystal Palace service two trailers can be used for each motor car. When traffic is very heavy two of these trains can be united to make a train of two motor cars and four trailers. The side-corridor system introduced on the South London rolling stock has not been used on account of the restrictions imposed by tunnels. Thirty new trains have been built for this service. The electrical equipment was supplied by the Allgemeine Elektrizitäts-Gesellschaft, Berlin, and the motor coaches and trailers were built by the Metropolitan Amalgamated Railway Carriage & Wagon Company, Birmingham. Philip Dawson, the consulting electrical engineer to the Brighton Railway, designed the electrical equipment and it was completed under his personal supervision. Lord Bessborough presided at the inauguration ceremony, which was somewhat more elaborate than usual, owing to the fact that the Festival of Empire at the Crystal Palace was to be opened by the King within a very few days.

James Dalrymple, general manager of the Glasgow Corporation Tramways, has reported to the finance sub-committee on the experiment which his department is making with two-stage tickets. These tickets were introduced to enable passengers to travel two $\frac{1}{2}$ d. stages for $\frac{3}{4}$ d., but in order to avoid the necessity of farthings passengers had to pay $1\frac{1}{2}$ d. for the original ticket, which was retained and later presented in payment of the second two-stage journey on any part of the system. There has been a considerable reduction in the number of 1d. fares, but many passengers who formerly bought $\frac{1}{2}$ d. tickets now use the two-stage tickets. The tickets have increased the number of passengers for short distances so that the increase in revenue from the increased traffic has more than counterbalanced any reduction in revenue caused by the decrease in the number of 1d. passengers. Mr. Dalrymple has suggested that the experiment should be continued for another year.

The contractors have completed the installation of the overhead system through the center of Bournemouth, and the new system has been placed in operation. As already outlined in this column, the general manager hopes to make an annual saving of about £3,000 in operation by the change from the underground contact system.

The annual meeting of the Municipal Tramways Association will be held at Glasgow on Sept. 27, 28 and 29, 1911. An exhibition will be held in connection with the meeting. Information in regard to the meeting can be obtained from James Dalrymple, general manager of the Glasgow Corporation Tramways, who is president of the association.

As an aid to the success of the Festival of Empire at the Crystal Palace, a small electric railway has been constructed in the grounds by Dick, Kerr & Company from plans by A. T. Snell, consulting engineer. The line will be known as the "All-Red Route," and will run through scenery representing the industries and special features of the various colonies. It will be lighted at night by 10,000 incandescent

lamps and eighty arc lamps. The route comprises about $1\frac{1}{4}$ miles of single track, is laid to 3 ft. 6 in. gage with 45-lb. rails, and the transmission is effected by a third and fourth rail. The line is equipped with automatic signals and is divided into sixteen sections. Nine trains have been provided. The motor cars are equipped with Dick, Kerr & Company standard type of motor controllers and apparatus. Six stations have been provided. They are named respectively South Africa or Pageant Station, Newfoundland, Canada, Australia and New Zealand.

A. H. Stanley, managing director of the Metropolitan District Railway, various underground railways and the London United Tramways, has announced that an agreement has been provisionally arrived at between the London General Omnibus Company and the various companies which he represents and with the other tubes not controlled by the Underground Railways by which transportation facilities in London will be improved. A system of interchangeable and through tickets will be inaugurated which will afford the public considerable freedom of travel. A committee composed of two representatives of each of the companies has been formed so that it will soon be possible to secure in London a ticket which will enable one to ride in an omnibus, on a tram and on one of the underground tubes. This arrangement will meet the threatened invasion of London by another motor omnibus company which announced that it intended to organize a company with a capital of £1,000,000 to put about 1000 omnibuses of the Milnes-Daimler type in operation.

The East London Railway, which has more than 5 miles of double track, and connects the Liverpool Street Station and New Cross, will be equipped with electricity in the near future. The railway is worked by a joint committee formed of several railways, and was not electrified at the time the Metropolitan Railway and the Metropolitan District Railway were equipped with electricity, and has lost a large amount of traffic on account of the discontinuance of through trains. Electrification will make it possible to resume a continuous service between the Metropolitan and District Railways. As a matter of expediency the third-rail system will be adopted, as the Metropolitan Railway and District Railway are equipped with the third rail.

Horace F. Parshall, chairman of the Central London Railway, has stated that a determined effort is being made to improve the air in the Central London tube. At present large exhaust fans are used at certain localities, but other portions of the tube still suffer from a concentration of foul air. It is now proposed to pump in fresh air, mixed with ozone from a special ozone generator. The air will then be filtered and sterilized, and again enriched at the platform level with more ozone.

The London County Council's proposal to install electric tramways along the Edgware Road from Marble Arch to Cricklewood is being opposed. The total length of the proposed tramway is about $2\frac{1}{2}$ miles, and the cost of construction would be £116,500. The widenings of the street, which are proposed, however, would entail an expenditure of £277,000. The matter has been taken up by the Home Office, which has issued a report stating that a dead-end terminus at Marble Arch would be dangerous. Mr. Fitzmaurice, chief engineer of the Council, in cross-examination stated that he did not agree with the report. He was also asked whether the Council intended eventually to continue the tramway through Park Lane, and replied that he had not recommended any such extension, although he had considered a scheme to carry a tramway under Hyde Park. It would appear that attempts are being made to discountenance further extensions of electric tramways in London, as motor omnibuses have become much more popular within the last year or two. Five years ago the noise and smoke created by motor omnibuses in the streets of London was intolerable. The most recent types of motor buses are operated silently, and emit practically no smoke, and are fast replacing the old vehicles.

Dundee Town Council has approved the penny-all-the-way tramway fare system, which involves the abolition of the workmen's fares and other preferential charges, and the making of all the halfpenny stages a uniform length of about half a mile, with a penny all the way to and from the High Street of Dundee.

A. C. S.

News of Electric Railways

Program of the Annual Convention of the A. I. E. E.

The official program of the annual convention of the American Institute of Electrical Engineers to be held in Chicago, Ill., June 26 to June 30, 1911, inclusive, has just been published by the Institute. The official headquarters will be at the Hotel Sherman, corner Clark Street and Randolph Street, where the technical sessions will also be held. The railway session is to be held Wednesday morning, June 28, when the following papers will be presented:—

"Some Data from the Operation of the Electrified Portion of the West Jersey & Seashore Railroad," by B. F. Wood.

"Analysis of Electrification," by W. S. Murray.

"Solution to Problems in Sag and Spans," by W. L. R. Robertson.

"Induction Machines for Heavy Single-Phase Motor Service," by E. F. W. Alexanderson.

The sessions of the Institute will meet in the following general order:

MONDAY, JUNE 26.

9.00 p. m., reception and dance, Hotel Sherman.

TUESDAY, JUNE 27.

10.00 a. m., power station session.

2.30 p. m., visit to Western Electric and Commonwealth Edison Companies' plants.

8.30 p. m., electric lighting session.

WEDNESDAY, JUNE 28.

10.00 p. m., railway session.

2.30 p. m., industrial power session.

2.30 p. m., telegraphy and telephony session.

Evening, boat excursion on Lake Michigan.

THURSDAY, JUNE 29.

10.00 a. m., high tension transmission session.

2.30 p. m., visit to Indiana Steel Company's plant, Gary, Ind.

8.30 p. m., conference of Institute officers and sections delegates.

FRIDAY, JUNE 30.

10.00 a. m., educational session.

Report On Public Service Commission of New York

John N. Carlisle, who conducted an investigation of the Public Service Commission of the First District of New York, at the request of Governor Dix, presented his findings to the Governor on May 29, 1911. He has condemned the proposal for the consolidation of the two public service commissions and also the suggestion for the re-establishment of a Rapid Transit Commission appointed by the municipal authorities. He has expressed the opinion that public officials should determine the routes of new subways without consulting the companies that would presumably operate them, and that thereby the delays caused by the present system would be largely avoided.

As to the suggested substitution of one State-wide commission for the present two commissions, Mr. Carlisle says:

"In my judgment this should not be done. As all public service corporations now are required to submit any franchise procured by them for approval, to procure consent for the exercise of any rights under any franchise, and to secure approval before issuing any stocks or bonds or certificates of indebtedness for a longer period than one year, the corporations subject to such control are entitled to prompt action upon applications of this character.

"I thoroughly believe that consolidation of the commissions would result in great delay in the work intrusted to them, which would seriously affect the corporations under their control, and would be detrimental to the service which such corporations are required to render to the public at large. The saving in cost would be small."

Passing on to consider the proposal to take the power of the old Rapid Transit Commission out of the hands of the Public Service Commission and intrust it to a separate body, Mr. Carlisle points out that the present commission

has on hand a comprehensive plan for building new subways which it hopes soon to carry out. He says:

"An attempt at this time, when the work has progressed so far, to change the personnel of the commission would result in further delay in subway construction, and I do not believe would be tolerated by the people of New York, who are so greatly in need of additional facilities."

Mr. Carlisle devotes a good deal of space to the transit problem in New York and considers the criticisms over the delay in determining new subway routes in the light of history. In concluding his report he says:

"The only fair criticism that can be laid against the commission in connection with the delay is that after it had laid out the triborough route it was apparently willing to postpone action and negotiate for a change of route to suit the demands of proposed operators."

Cleveland Railway Requested to Reduce Fare

G. M. Dahl, street railway commissioner of Cleveland, Ohio, sent a communication to the Cleveland Railway on May 23, 1911, in which it was stated that the amount in the interest fund exceeds the required \$500,000 by \$200,000 and that under the conditions of the Tayler grant the fare must be reduced to the next lower point in the sliding scale, which would be straight 3 cents, with a penny for transfers, to be rebated when the transfers are presented. This would do away with the charge for the transfer, the payment being required by the conductors giving the transfers merely to prevent fraud. It is calculated that to eliminate the charge for the transfer would cost the company about \$40,000 a month, or \$480,000 a year. Should the lower fare be installed, it would under the ordinance have to remain until a deficit of \$200,000 under the required \$500,000 was shown, when the fare would increase automatically to the charge now made. Mr. Dahl argues that the increase in patronage will off-set the loss caused by doing away with the transfer charge.

On April 30, 1911, a surplus of \$174,170.80 existed in the interest fund, with an even distribution of the interest charges over twelve months, but under the method of making the charges laid down in the ordinance, Mr. Dahl estimates that the amount on that date was \$214,898. This, of course, brings it up to the amount named in the franchise, when a reduction fare is to take place automatically. Mr. Dahl's letter to the company follows:

"According to the books of your company, there was a surplus in the interest fund on April 30, 1911, over and above the original \$500,000 of \$174,170.80, without figuring the accrued proportional payments to be deducted when estimating the amount in the interest fund, in accordance with the last paragraph of Section 23 of your franchise. According to our figures, the surplus in the interest fund at the same time, without so deducting accrued proportional payments, was in excess of the amount shown on your books. However, in accordance with the surplus as set up on your books and deducting accrued proportional payments, as specified in the ordinance, viz., 7 per cent for January, 6 per cent for February, 7 per cent for March and 8 per cent for April, there was, on April 30, more than \$200,000 surplus in the interest fund in excess of the original \$500,000.

"In accordance with Section 23 of the ordinance, whenever the balance in the interest fund, less proportionate accrued payments to be made therefrom, shall be more than \$500,000 by the amount of \$200,000, the rate of fare shall be lowered to the next lower rate on the scale provided in Section 22, which is 3 cents cash fare and 1 cent for a transfer and 1 cent rebate.

"In accordance, therefore, with the ordinance, you are hereby requested to at once install that rate of fare."

A public meeting of the Council street railway committee was held on May 25, 1911, but the subject of doing away with the transfer charge was not mentioned, the reply of the company not having been submitted at the time. It is intimated that the company will contend that instead of a

surplus existing it is laboring under a deficit of more than \$350,000, arising from the requirements of operation and maintenance.

Attorney Andrew Squire, acting for the company, opposed the proposed amendment to the Tayler ordinance which would give the city the right to control improvements to within 5 years of the expiration of the franchise. He said that city control for the first ten years of the life of the franchise was satisfactory, but that the company should have this privilege for the last fifteen years.

James R. Garfield, who served as a member of the Chamber of Commerce committee, argued against the extension of the 3-cent fare to suburbs annexed in the future. He contended that it would endanger the low fare for the entire city. Attorney Squire stated that the company did not object to the extension of this fare to the suburbs. Mr. Garfield also urged that some agreement should be had with the company as to the manner of spending the \$2,500,000 required by one of the proposed amendments. Attorney Squire said that the company would finance the requirement by the sale of bonds.

Pennsylvania Fare Act Unconstitutional

The Supreme Court of Pennsylvania has declared that the act of the Legislature to regulate the maximum fares of street railways in second-class cities is special legislation and unconstitutional, and the Pittsburgh Railways can legally resume double fares on its lines within the city limits between midnight and 5 a. m. In presenting its finding the court said:

"The right of the city of Pittsburgh under the constitution to impose terms on the defendant company, as a condition to granting it the privilege of constructing its railway within the City, is not involved in this case. That is a constitutional right of which neither the Legislature nor the courts can deprive the municipality. The City may impose conditions as to rates of fare for permission to use its streets, but it is not the exercise of such power or authority that is invoked here as a justification for attempting to regulate the fares to be charged by the defendant company in Pittsburgh. That question, therefore, does not enter into the case. Our conclusion is that the act of 1907 does not relate to the exercise of the corporate powers, or to the corporate officers of cities of the second class, nor regulate the municipal affairs of such cities, and hence is not a subject for which cities may be classified. It follows that as the act applied to certain street railways located in but two of the cities of the State it is special and local legislation and, therefore, unconstitutional and void."

The Appraisal of the Toledo Property

At a conference between the city authorities of Toledo and the officials of the Toledo Railways & Light Company on May 25, 1911, Albion E. Lang, president of the company, and Mayor Whitlock differed in regard to the course to be pursued in appraising the property. As previously stated the city has selected Prof. E. W. Bemis to act for it on a board of appraisal. It seems that Mayor Whitlock decided to proceed without the selection of a third expert by the two selected respectively by the city and the company. His idea was that the negotiators themselves could adjust such differences as arose. To this Mr. Lang objected. He insisted upon the original plan of having an arbitrator selected or, if more satisfactory to the city, a board of arbitration made up of experts, to settle differences between the two. He said that neither he nor Mayor Whitlock is competent to go into many questions that may arise and that only experts should be employed to consider them. Mayor Whitlock repeated that he had been authorized by the City Council to name only one man for the appraisal work and that he could not agree to the selection of a third by the two appraisers without further action upon the part of the Council.

Mr. Lang felt that every step should be taken that would hasten the settlement. He believed that the Mayor's plan would result in a long-drawn-out discussion over points that could be settled by an arbitrator within a short time.

On May 26 a resolution of the board of directors of the company was presented to Mayor Whitlock, supporting

Mr. Lang and refusing to co-operate in the appraisal unless a third man was selected. The Mayor was assured that, if he desired Prof. E. W. Bemis to proceed with an appraisal, all the books and records would be at his disposal and he would be given any aid that the company was able to offer. Mayor Whitlock decided to submit the matter to the Council before replying.

F. T. Barcroft, Detroit, Mich., has been engaged to assist Prof. E. W. Bemis in appraising the property. He was considered for the place of chief appraiser.

The Council committee on railroads and telegraphs has decided to take the ordinance giving the company the right to lay a double track on Huron Street. The company had already given notice that the grant will not be accepted unless it is allowed to build certain side-tracks to its property at Huron Street and Beach Street. Underlying the refusal of the committee to recommend the ordinance for passage is the fear that such an action might complicate the final settlement of the fare question and the granting of a blanket ordinance, such as is now under discussion.

Chicago Subway Plans

The committee on local transportation of the Chicago City Council has held a number of conferences and public hearings recently at which plans for the construction of municipal subways were presented by their designers. On May 22, 1911, Bion J. Arnold, chief subway engineer of the city, described his latest plans. Briefly, they included a two-level subway system to be built section by section. The total cost of the subways, according to Mr. Arnold's plans, was estimated to be \$21,000,000, and would require five years for completion. Mr. Arnold recommended that the river tunnels, which were recently completed for the Chicago Railways under the guidance of the Board of Supervising Engineers, should not be included in the proposed subways, although these tunnels have been provided with low-grade headings arranged for connection to subways. Mr. Arnold brought out the point that the city has decided to build its own subways and has defined its position clearly with regard to the use of the present tunnels by the surface lines and that joint use of the tunnels by such transportation systems as are designated to operate through the new city subways and by the surface system now operating through the tunnels, would undoubtedly bring about legal entanglements that it would be very desirable to avoid. Summing up his plans for the subways Mr. Arnold said he had considered three fundamental principles—maximum capacity, maximum extent and minimum cost. The plans do not include any grade crossings.

On May 24, 1911, George W. Jackson, of George W. Jackson, Inc., which has done considerable underground construction work in Chicago for the city, for the Illinois Tunnel Company and other large corporations, described the subway system proposed by him. He would build a group of single-level subway loops under the important streets of the downtown district with inclines to the surface at Chicago Avenue on the north, Halsted Street on the west and Sixteenth or Twenty-second Street on the south. Mr. Jackson would excavate the street from curb to curb and drive the lower half of the side subway walls as tunnel drifts, under air pressure, thus providing against damage to buildings which have floating foundations. Mr. Jackson recommended that five new tunnels should be driven under the branches of the Chicago River. His completed subway system would cost \$2,600,000 per mile and would have 8 miles of bore, reaching from curb to curb, and provide a floored pipe gallery 5 ft. high located directly above the cars. Provision for through-routing from one subway loop to another would be had by switches and interlockings at the most important intersections. A foot-walk, which would serve as a platform, would be built throughout the length of each subway bore in the downtown district.

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., June 14.

New England Street Railway Club—Boston, Mass., June 22.

Central Electric Accounting Conference—Springfield, Ill., June 10.

Central Electric Railway Association—St. Joseph, Mich., June 22.

Street Railway Association of the State of New York—Cooperstown, N. Y., June 27 and 28.

American Electric Railway Association—Atlantic City, N. J., Oct. 9 to 13.

National Society for the Promotion of Engineering Education.—The National Society for the Promotion of Industrial Education will hold its fifth annual meeting at Cincinnati, Ohio, Nov. 2, 3 and 4, 1911. One complete session of the convention will be devoted to a consideration of the industrial training given in the schools of Cincinnati.

Offices of Railway Appliances Association.—At the meeting of the executive committee of the Railway Appliances Association, held in Chicago, Ill., on May 23, 1911, John N. Reynolds, who has been secretary and treasurer for the last nine years, resigned both positions, effective on June 30, 1911. Mr. Reynolds was re-elected treasurer and Bruce V. Crandall was elected secretary.

Washington Water Power Company Improvements.—W. A. White, chairman of the finance committee of the Washington Water Power Company, Spokane, Wash., has outlined as follows work to be undertaken by the company at Spokane: Large amounts of money have been provided to develop the large power station at Long Lake and the Spokane & Long Lake Railway, and to complete the Little Falls plant, purchase additional cars and equipment, extend the local distributing lines within the city, install storage batteries, extend the underground conduit system and complete the transmission line from Post Falls to Newport.

Newark & Marion Railway to Operate by Steam.—The Newark & Marion Railway, Newark, N. Y., which operates 10 miles of standard-gage line between Newark and Marion, N. Y., will substitute oil for coal as fuel in the locomotives now in use on the road. Steam was adopted temporarily as motive power for the road, it being intended finally to operate the line by electricity. The residents of the district through which the road operates appealed to the Public Service Commission of the Second District of New York to order the company to substitute electricity for steam as motive power and the decision to substitute oil for coal as fuel in locomotives was based on the findings of the commission.

Additional Time Denied in Which to Comply With Commission's Order.—The New York & Queens County Railway has been served with an order denying its application for an extension of time in which to complete certain double-tracking work on its Flushing-Jamaica line, ordered by the Public Service Commission of the First District of New York in 1909. The original order called for the completion of this work by June 1, 1910, but, owing to the delay incident to the company's application to the Board of Estimate and Apportionment for a franchise for the new tracks, the commission from time to time extended this limitation to June 1, 1911. Recently the company made application for a further extension of six months in which to complete the work ordered to be done by the Public Service Commission.

Right of County Commissioners to Fix Franchise Terms in Georgia.—The right of the Fulton County board of commissioners to grant a 15-year franchise to the Georgia Railway & Electric Company, Atlanta, Ga., for the proposed Buckhead extension, on which the maximum fare of 5 cents from the city line to the end of the extension was fixed, has been denied by the Georgia Railroad Commission. In concluding its decision the Railroad Commission said: "The commission, therefore, declines to approve the grant to the Georgia Railway & Electric Company by the commissioners of roads and revenues of Fulton County, in so far as it relates to or proposes to fix or regulate fares to be charged by said corporation for transportation of passengers over the proposed extension or any part thereof. Upon proper application to this commission, it will hear evidence as to what is a reasonable and just charge for the transportation of passengers over the proposed extension, and will prescribe such a rate subject to revision or change under terms of the law."

LEGISLATION AFFECTING ELECTRIC RAILWAYS MASSACHUSETTS

The bill regulating the hours of labor of street railway employees (House 204) was killed in the Senate, and a motion to reconsider was lost. This bill specified that a day's work for all conductors, guards, drivers and motormen should not exceed nine hours, and should be arranged to be performed in not more than eleven consecutive hours. House Bill 1479, to provide seats for motormen in the cars of street and elevated railways, has received a report of no legislation necessary by the committee on street railways. The Senate and House have accepted the report. A bill relative to an investigation of transit conditions on the Boston Elevated Railway has been read in the Senate. The Henebery bill to limit the terms of franchises to be granted by municipal authorities to street railways for the carriage of freight and express matter has been killed in the Senate for the third successive year. A bill has been reported by the committees on railroads and metropolitan affairs, sitting jointly, in favor of the Boston & Eastern Electric Railroad receiving a certificate of public convenience and necessity. The bill provides for the deposit of a substantial bond by the company as an evidence of its good faith, and requires the Railroad Commission and Boston Transit Commission to proceed in relation to the company's plans in the same manner as though the certificate had been granted by the Railroad Commission. The same committees have voted to report a redraft of the Matthews resolve on behalf of the electrification of steam railroads at Boston. The railroads are to file plans and specifications with the commission by Sept. 1, 1912.

PENNSYLVANIA.

The General Assembly of Pennsylvania adjourned sine die at noon on May 25, 1911, without enacting Governor Tener's principal pre-election promise to create a public utilities commission possessing rate-making and rate-enforcing powers. The bill, which was drawn by Attorney-General Bell, and presented to the Legislature by Representative Alter, passed the House by a vote of 178 to 11, but was defeated in the Senate on second reading by a vote of 29 to 17. Senator Tustin contended that a measure to regulate twenty-nine different classes of corporations should be considered by a commission for at least two years before being enacted, and that the judiciary special committee of the Senate had not had time properly to consider the bill. The Senate also defeated a resolution to provide for a commission of five, to be appointed by the executive, and turn the bill over to the revenue commission. On the closing day of the session Governor Tener announced that he would not call an extra session for the reason that "to do so would be futile with the Senate as now constituted." He does not agree with those Senators who contended that the bill was too drastic, and states that he had informed the Senate of his willingness to have minor corporations eliminated from the provisions of the measure. The Governor concludes his statement with these words: "At the convening of the new Assembly in 1913 I shall again have introduced a bill substantially as drawn by the Attorney-General. This will afford the members of each body ample time to consider the bill and to amend it as above indicated, or otherwise, so as to bring this commonwealth abreast of our sister States in this respect."

The Dunn employers' liability bill, which passed the House by a vote of 112 to 53, and had been indorsed by the administration, was defeated in the Senate. The Ehrhart full-crew bill, which passed both branches, is in the hands of the Governor, who is allowed thirty days in which to dispose of the bills before him. This bill provides for an additional member upon the crew of each passenger, freight, mail or express train. The measure to make it a misdemeanor to use a street railway transfer issued to another person was passed by both houses. It provides a penalty of \$5 fine. Measures defeated included the following: Providing that land taken through eminent domain laws be surrendered within thirty days; granting permission to the Valley Forge Park Commission to make franchise awards to railway companies; requiring electric railways to equip cars on suburban lines with toilet facilities; requiring trolley tracks to be removed from side to center of highways in villages upon petition of residents.

Financial and Corporate

New York Stock and Money Markets

May 29, 1911.

Business on the New York Exchange has dwindled, but optimism prevails, based on the maintenance of the higher price levels reached during the flurry and upon the strength of the bond market. The money market is still easy and rates are low. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{1}{2}$ per cent; ninety days, $2\frac{3}{4}$ @3 per cent.

Other Markets

Trading in Philadelphia has been light during the week. Demand for Rapid Transit shares followed failure of the strike movement and slight fluctuations were registered in Union Traction. Stocks were not influenced by rumors of new obstacles in the reorganization plan of the Philadelphia Rapid Transit Company.

Boston markets have experienced mild activity, and firmness ruled throughout the list.

The Baltimore market has been quiet and prices steady. Income bonds of the United Railways of Baltimore eased somewhat, in consequence of the announcement that payment of June interest is to be in cash.

Chicago trading has been light in volume and prices are well maintained. Elevated Railway shares advanced a point or so and show the influence of the merger in the transactions.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 22.	May 29.
American Light & Traction Company (common).....	a292	a295
American Light & Traction Company (preferred).....	a107	a108
American Railways Company.....	a44½	a44½
Aurora, Elgin & Chicago Railroad (common).....	a40	40
Aurora, Elgin & Chicago Railroad (preferred).....	a86	86
Boston Elevated Railway.....	a128	a127½
Boston Suburban Electric Companies (common).....	a15	a15
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	10	a8½
Boston & Worcester Electric Companies (preferred).....	a49½	a50
Brooklyn Rapid Transit Company.....	80½	80
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	86½	85½
Capital Traction Company, Washington.....	128	a130
Chicago City Railway.....	188	a195
Chicago & Oak Park Elevated Railroad (common).....	2	2
Chicago & Oak Park Elevated Railroad (preferred).....	6	7
Chicago Railways, pteptg., ctf. 1.....	a85	a82
Chicago Railways, pteptg., ctf. 2.....	a22½	a22½
Chicago Railways, pteptg., ctf. 3.....	a9	a10
Chicago Railways, pteptg., ctf. 4.....	a5½	a6
Cincinnati Street Railway.....	*131	a130½
Cleveland Railway.....	a98	98
Columbus Railway (common).....	*96	a96
Columbus Railway (preferred).....	a100½	a101
Consolidated Traction of New Jersey.....	a77	a77
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105½
Dayton Street Railway (common).....	*30	a30
Dayton Street Railway (preferred).....	*100	a100
Detroit United Railway.....	72	71¾
General Electric Company.....	160½	167½
Georgia Railway & Electric Company (common).....	136	136½
Georgia Railway & Electric Company (preferred).....	95	92
Interborough Metropolitan Company (common).....	18¾	18¾
Interborough Metropolitan Company (preferred).....	53	53
Interborough Metropolitan Company (4½s).....	79½	79½
Kansas City Railway & Light Company (common).....	a19	a19
Kansas City Railway & Light Company (preferred).....	a25	a49
Manhattan Railway.....	137½	136½
Massachusetts Electric Companies (common).....	a20¾	a21¾
Massachusetts Electric Companies (preferred).....	a89¾	a89½
Metropolitan West Side, Chicago (common).....	24	a26
Metropolitan West Side, Chicago (preferred).....	a71	a72½
Metropolitan Street Railway, New York.....	*15	15
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	76	75
Northern Ohio Light & Traction Company.....	46	46
Northwestern Elevated Railroad (common).....	27	a27½
Northwestern Elevated Railroad (preferred).....	67	a69
Philadelphia Company, Pittsburgh (common).....	a57½	57
Philadelphia Company, Pittsburgh (preferred).....	a43¾	43¼
Philadelphia Rapid Transit Company.....	a18½	17¾
Philadelphia Traction Company.....	a83½	82½
Public Service Corporation, 5% col. notes (1913).....	a101	101
Public Service Corporation, ctf.....	a107	a107
Seattle Electric Company (common).....	a109½	a109½
Seattle Electric Company (preferred).....	a100½	a101
South Side Elevated Railroad (Chicago).....	a75	a77½
Third Avenue Railroad, New York.....	12¾	*12¾
Toledo Railways & Light Company.....	a8	7¼
Twin City Rapid Transit, Minneapolis (common).....	a110	a110
Union Traction Company, Philadelphia.....	a46½	a94½
United Rys. & Electric Company, Baltimore.....	a18½	a18½
United Rys. Inv. Co. (common).....	41½	41½
United Rys. Inv. Co. (preferred).....	72	*72
Washington Ry. & Electric Company (common).....	a34¾	a34
Washington Ry. & Electric Company (preferred).....	a90	a89¾
West End Street Railway, Boston (common).....	a91	a90½
West End Street Railway, Boston (preferred).....	a103½	a103½
Westinghouse Elec. & Mfg. Co.....	74	78½
Westinghouse Elec. & Mfg. Co. (1st pref.).....	117	118

a Asked. *Last sale.

ANNUAL REPORTS

Illinois Traction Company.

Earnings and expenses for the last two years compare as follows:

	1910.	1909.
Gross earnings.....		
Interurban.....	\$2,304,945	\$1,980,778
Local street railway.....	2,027,206	1,754,893
Gas.....	357,315	293,072
Electric light and power.....	1,327,609	1,161,128
Steam heating.....	174,822	166,000
Miscellaneous.....	26,140	7,512
Total gross earnings.....	\$6,218,037	\$5,363,383
Operating expenses.....	\$3,441,100	\$2,874,340
General and overhead expense.....	58,596	43,150
Taxes.....	165,932	146,001
Total operating expenses.....	\$3,665,628	\$3,063,491
Net earnings.....	\$2,552,409	\$2,299,892
Net earnings, 1910 and 1909.....	\$2,552,409	\$2,299,892
Less net earnings of Des Moines and Topeka prop- erties prior to purchase.....	54,182	372,628
Total net revenue of Illinois Traction Company....	\$2,498,227	\$1,927,264

H. E. Chubbuck, vice-president executive, says in his report to the president and directors:

"The year 1910 marks in the history of the Illinois Traction Company the completion of its most important undertakings, which have been under construction during the past three years. On Nov. 10 the magnificent bridge across the Mississippi River at St. Louis was thrown open to the public. The terminal facilities in St. Louis were sufficiently completed to allow the operation of the interurban cars directly into the heart of the city, and local service between St. Louis and the Tri-Cities over the bridge was established.

"The Granite City, the Edwardsville, the Springfield and the Decatur belts have been either completed in whole or so far advanced that very little work is left to be done in 1911. These belt lines will enable the transportation of heavy through freight to and from the extensive freight terminals in St. Louis for which provision has been made—something which has not been attempted on the same scale by any other electrically operated railroad, and which will result, it is anticipated, in a heavy increase in the volume and ratio of freight traffic with a corresponding increase in the company's revenue.

"In the latter part of the year there was delivered to the company a large amount of new equipment for passenger and freight service. The benefit derived from changing the lines from Peoria to Bloomington and from Mackinaw Junction to Springfield from alternating to direct-current propulsion was marked, and justified this change in the operation of the property.

"Extensive betterments have been made in buildings—new substations, new depots and additional freight facilities having been provided. The terminal power station at Venice—typical of the most advanced power plant construction—has been completed.

"Improvements and additions to the Decatur shops have been completed and six advanced type locomotives of our own design have been built in these shops. We are now prepared to make repairs—heavy as well as light—and to construct a limited number of the different kinds of cars which are used by us.

"Referring to the report of 1909, the establishment of the Western Illinois Accident Association has been effective in protecting the operating accounts, as the serious collision near Stanton found the accident fund with \$86,000 in cash available. The association will take care of this accident in addition to the minor claims upon it without resorting to the necessity of making any direct charge against operating, so that it is not anticipated that operating accounts will be directly affected by the accident. The membership of the Western Illinois Accident Association comprises the operating companies which are controlled by the Illinois Traction Company, and also the operating companies which are controlled by the Western Railways & Light Company, which is a corporation, organized under the laws of Maine, controlling street and interurban railway, electric and gas properties in Illinois. These companies contribute each month a percentage of their respective gross earnings to a general fund, from which disbursements are made within

the limitations prescribed by the association contract. The contributions to the fund are charged against the operating accounts of the participating companies.

"In the last quarter of the year an improved program of signal protection was developed and contracts were entered into with the Union Switch & Signal Company for automatic block signals of most modern development and design, and with the Blake Signal Company for the rebuilding of the signals previously in operation and the purchase of a large number of new ones. This signal work was well started at the close of the year.

"New contracts have been entered into with the trainmen, effective Dec. 1, for a period of three years, covering both the interurban lines and the St. Louis electric terminal service between St. Louis and the Tri-Cities. These contracts insure a continuation of the pleasant relations existing between the employees of the interurban lines and the management.

"Sleeping car service established last April between Peoria and St. Louis has been successfully and profitably operated. Two more of these specially designed sleepers have been ordered, but will not be completed and delivered before the close of the year.

"This year has seen the building and completion by farmers' elevator associations of eight elevators located on the right-of-way of the Illinois Traction lines. This is the nucleus of what will be in the future an extensive grain freight business.

"To the public utilities controlled by the Illinois Traction Company have been added during the past year those of the Topeka Railway and the Topeka Edison Companies operating the street railway and heating and lighting systems, respectively, in Topeka, Kan., a city of 43,684 inhabitants. The Topeka Railway operates 30 modernly equipped cars, about half being of double truck pay-as-you-enter type. The property comprises about 30 miles of track with strictly modern car houses and shops. The shops are equipped to do all necessary repair work, and in addition can and do make all special work. The Topeka Edison Company does the lighting and steam heating business of the city. Its brick and steel constructed power house and distributing system are of the most advanced type. The installation of a storage battery, which takes the fluctuations due to street car load, is only one of the economies affecting the low cost of operation of this plant. Both the Topeka Railway and the Topeka Edison Company operate under very favorable franchises. These properties have fully justified their acquisition."

During the last year \$904,046 or 14.6 per cent of gross earnings, was expended for maintenance, renewals and betterments.

Albany Southern Railroad

During the twelve and one-half months ended Sept. 30, 1910, the results of operations were as follows:

Earnings:	
Railway	\$321,345
Electric	112,852
Gas	42,540
Miscellaneous	3,325
Total gross earnings.....	\$480,062
Total operating expenses.....	282,267
Net earnings.....	\$197,795
Taxes	\$26,562
Interest on bonds, rentals and amortization.....	68,064
	\$94,626
Surplus	\$103,168

R. A. C. Smith, the president, says in part:

"Almost immediately after the organization of your company, J. G. White & Company, Inc., New York, N. Y., were engaged as operating managers and engineers to supervise and direct the construction work and the operation of your company's properties.

"As you are aware, the plan of organization of your company was submitted in great detail to the Public Service Commission of the State of New York, and was approved by that commission, which further granted its consent to the issue of \$1,250,000 first mortgage bonds out of a total

authorized issue of \$1,500,000. Of these bonds \$765,000 were sold and the proceeds thereof used to purchase the Albany and Greenbush bridge, a modern double-deck structure connecting the cities of Albany and Rensselaer, and over which the cars of your company have entrance into the city of Albany.

"The remaining \$485,000 of said \$1,250,000 of bonds were sold and the proceeds used in the building of a second track between Rensselaer and the company's amusement park at Kinderhook Lake, involving the construction of 13 miles of track with the necessary third-rail installation, and the relocation of the road at several points, eliminating dangerous curves. At the same time the existing track was placed in good condition and all construction work was completed promptly and at a cost considerably less than the estimates. The new track was placed in service July 4, 1910. Improvements were also made at the power house resulting in greater efficiency.

"In addition to the above betterments and improvements paid for from the proceeds of the sale of the above bonds, your directors have made other expenditures amounting to approximately \$62,000.

"As to the operation of your company, we beg to quote from a report made to your directors by J. G. White & Company, Inc., as follows:

"During the past year the rolling equipment has nearly all been thoroughly overhauled, and the cost has been included in the operating expenses. Active campaigns for new business in the electric and gas departments have been carried on with satisfactory results. The entire property has been adequately maintained and is in good operating condition. Improvements where necessary are being made with a view to giving good and up-to-date service under the most economical conditions possible. The relations of your company with the municipal authorities and the public generally, are, in our judgment, very satisfactory, and the relations between the company and its employees are harmonious; the employees are loyal to the company, and their personnel is of high grade."

"Your directors are considering a plan, and have appointed a committee to present a report to them on the same in the near future, by which the employees shall receive recognition for faithful and continued service."

Toledo, Railways & Light Company

Operations during the year ended Dec. 31, 1910, resulted as follows:

Gross income for the year.....	\$2,985,382
Operating expenses, including maintenance, renewals and depreciation	1,868,600
Net income.....	\$1,116,782
Taxes	\$111,954
Interest	814,427
Total	\$926,381
Surplus	\$190,401

Albion E. Lang, the president, says in part:

"In addition to having properly maintained the properties of the company, \$393,802 was spent for improvements and betterments.

"The company again wishes to express its appreciation for the continued consideration shown by the committee representing the company's 4 per cent consolidated bonds, in permitting the company to continue to expend its net earnings in improvements and betterments to its properties, notwithstanding the principal of these bonds became due on July 1, 1909, and no interest has been paid on them since July 1, 1908.

"Negotiations between the city authorities and the company relative to the street railway franchises of the company were commenced last spring. The auditors appointed by the city for such purpose have finished their examination of the books and operations of the company and have made their report to the city. At the request of the city authorities we have had prepared and furnished them an inventory of the street railway properties of the company. The city authorities are now engaged in formulating the conditions desired by the city to be embraced in a new contract fixing the terms of the company's street railway franchises."

Chicago Elevated Merger

During the week which ended on May 27, 1911, the Blair interests submitted formal proposals to the directors of the Metropolitan West Side Elevated Railway and the South Side Elevated Railroad for merging the elevated railways in Chicago. The directors of the Metropolitan West Side Elevated Company voted on May 24, 1911, to accept the terms of purchase and to recommend them to the shareholders, and the directors of the Northwestern Elevated Railroad and the Chicago & Oak Park Elevated Railroad, both of which are controlled by the Blair interests, also voted to approve the merger. The directors of the South Side Elevated Railroad approved the agreement on May 25.

It was reported in Chicago that the Chicago & Oak Park Elevated Railroad, which is not earning the interest on the first-mortgage bonds, would possibly be placed in receivership in order that its financial affairs might be adjusted previous to the merger of this road. Rumor is current that the Commonwealth Edison Company, or influential interests in it, will become a factor in the merger. The new Illinois corporation which will take over the roads will be incorporated as the Chicago Elevated Railroad Company. It will be capitalized as follows: Three-year 5 per cent notes, \$30,000,000; preferred 6 per cent cumulative stock, \$16,000,000; common stock, \$25,000,000. It is estimated that the economies which will be effected by the merger will enable the Chicago Elevated Railroad Company to pay 6 per cent dividends from the date of acceptance of the terms of the merger, and that after meeting all obligations, including dividends, on the preferred stock about \$350,000 will remain to be applied to the common stock. This is about 1.4 per cent on the common stock.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C.—The stockholders of the Columbia Street Railway, Light & Power Company, on May 15, 1911, authorized an increase in the stock of the company as proposed and also a change in the name of the company to the Columbia Railway, Gas & Electric Company. There have been no changes in the officers of the company, but J. G. White and J. H. Pardee, of J. G. White & Company, Inc., New York, N. Y., and Franklin Q. Brown, of Redmond & Company, New York, N. Y., have been elected directors of the company.

Columbus Railway & Light Company, Columbus, Ohio.—A special meeting of the stockholders of the Columbus Railway has been called for June 26, 1911, to authorize an increase of \$3,000,000 in capital to be divided equally into preferred and common stock, bringing the total authorized common up to \$5,000,000 and the preferred up to \$4,500,000. The additional capital is to be issued to reimburse the Columbus Railway & Light Company for expenditures for improvements and betterments on the Columbus Railway. Under the terms of the lease to the Columbus Railway & Light Company that company is to be reimbursed for permanent improvements or equipment either by repayment or in cash or by the securities of the Columbus Railway at par. Since the lease was made about \$200,000 a year has been expended in such improvements, for which the Columbus Railway & Light Company has received \$1,483,080 in cash and stock, leaving a balance still due to the leasing company of \$113,390. The additional capital of Columbus Railway will provide for payments for improvements for some years to come.

Kansas City Railway & Light Company, Kansas City, Mo.—Robert J. Dunham, chairman of the board of directors of the Kansas City Railway & Light Company, has supplemented as follows the statement in regard to the passing of the quarterly dividend due on the company's preferred stock, on June 1, 1911, to which reference was made in the ELECTRIC RAILWAY JOURNAL of May 27, 1911, page 931: "It is thought that the ultimate interests of the stockholders will be best subserved by this course for these reasons: The company's \$5,500,000 of 6 per cent notes mature on Sept. 1, 1912, when some arrangement must be made to meet or refund them. Meanwhile it is impossible to obtain new money for extensions and additions without giving security upon the new property acquired therewith. This security can only be given with the consent of the city, which

apparently cannot be obtained. All resources must at the present time be conserved so that the present franchise requirements may as far as possible be met from the earnings without any increase of the floating indebtedness. The Kansas City bankers will not increase that indebtedness, but insist upon its reduction. The interests of stockholders are, of course, subordinate to the demands of creditors and rights of the public."

Ohio Valley Electric Railway, Huntington, W. Va.—It is announced that the American Railways Company, Philadelphia, Pa., will take over the Ohio Valley Electric Railway. The American Railways Company will issue \$2,000,000 of 5 per cent collateral trust bonds, of which \$1,700,000 will be given in exchange for the stock of the Ohio Valley Electric Railway, and \$300,000 will be retained for extensions and improvements of the new lines. It is also stated that negotiations have been re-opened by the American Railways Company for the acquisition of the Joplin & Pittsburg Railway.

Piedmont Railway & Electric Company, Burlington, N. C.—J. W. Murray, president of the Piedmont Trust Company, has written the ELECTRIC RAILWAY JOURNAL that the Piedmont Railway & Electric Company, which was chartered recently, is being organized to take over and complete the 8½ miles of track which connects Burlington, Graham and Haw River purchased from the receiver of the Southern Traction & Power Company by Mr. Murray.

Dividends Declared

Chicago (Ill.) City Railway, quarterly, 2½ per cent. Second and Third Streets Passenger Railway, Philadelphia, Pa., quarterly, \$3. United Railways & Electric Company, Baltimore, Md., 2 per cent, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

Period.		ATLANTIC SHORE RAILWAY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	April '11	\$21,736	\$18,593	\$8,337	+\$5,193
1 "	" '10	23,895	19,437	12,463	+8,005
4 "	" '11	76,705	71,450	32,156	+26,900
4 "	" '10	85,982	67,183	50,152	+31,353

Period.		CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	April '11	\$86,528	\$49,374	\$37,154	\$30,091
1 "	" '10	80,003	47,082	32,921	29,794
4 "	" '11	326,910	193,654	133,257	120,149
4 "	" '10	296,123	188,553	107,570	119,176

Period.		EL PASO ELECTRIC COMPANY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	March '11	\$57,090	\$32,720	\$24,370	\$8,247
1 "	" '10	51,579	29,564	22,015	8,574
12 "	" '11	650,990	379,983	721,008	98,152
12 "	" '10	621,847	359,758	262,089	100,193

Period.		GALVESTON-HOUSTON ELECTRIC COMPANY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	March '11	\$116,287	\$70,985	\$45,302	\$24,682
1 "	" '10	105,144	67,673	37,471	23,080
12 "	" '11	1,348,693	804,541	544,152	294,819
12 "	" '10	1,228,619	734,835	493,784	266,126

Period.		MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	April '11	\$400,099	\$211,319	\$188,780	\$120,156
1 "	" '10	376,793	202,242	174,550	111,704
4 "	" '11	1,597,892	852,630	745,262	474,777
4 "	" '10	1,494,477	816,320	678,156	441,191

Period.		MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	April '11	\$122,112	\$36,640	\$85,472	\$69,159
1 "	" '10	116,202	33,891	82,316	67,281
4 "	" '11	479,484	148,022	331,462	275,407
4 "	" '10	455,866	136,670	319,196	268,935

Period.		MONTREAL STREET RAILWAY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	April '11	\$372,309	\$200,719	\$171,590	\$50,338
1 "	" '10	344,765	190,842	153,923	44,584
7 "	" '11	2,575,224	1,571,191	1,004,032	279,543
7 "	" '10	2,337,001	1,407,826	929,174	257,170

Period.		NORTHERN TEXAS ELECTRIC COMPANY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	March '11	\$142,938	\$74,894	\$68,044	\$25,138
1 "	" '10	128,679	67,290	61,389	18,786
12 "	" '11	1,491,232	789,327	701,905	254,920
12 "	" '10	1,306,550	710,483	596,067	207,820

Period.		SAVANNAH ELECTRIC COMPANY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	March '11	\$53,062	\$34,770	\$18,292	\$18,283
1 "	" '10	49,907	32,049	17,858	17,846
12 "	" '11	646,587	428,504	218,083	216,984
12 "	" '10	605,093	393,127	211,966	210,675

Period.		SEATTLE ELECTRIC COMPANY.		Fixed Charges.	Net Income.
		Gross Revenue.	Operating Expenses.		
1m.,	March '11	\$458,458	\$271,838	\$186,620	\$115,593
1 "	" '10	461,289	279,043	182,246	110,109
12 "	" '11	5,593,870	3,155,242	2,438,628	1,313,098
12 "	" '10	6,011,320	3,504,360	2,506,960	1,274,242

Traffic and Transportation

New York Company Converts Restaurant Profits Into Loan Fund for Employees.

The Metropolitan Street Railway, New York, N. Y., has announced that the profits from five lunch rooms, patronized and run by the men in the company's employ, have been turned into a loan fund, amounting now to about \$2,000, from which the employees will be permitted, in times of emergency, to draw sums without paying interest. The fund is controlled by the trustees of the Metropolitan Street Railway Association, three of whom are motormen, three others officers of the company, and the chairman, Oren Root, general manager for the receivers of the company. Each of the 5000 members of the association is to be entitled to borrow an amount equal to two weeks' pay, and he is to be allowed two months in which to repay the loan. This he may do in instalments or in a single payment. Mr. Root has posted notices in all the carhouses announcing the establishment of the new loan fund. The notice follows:

"From time to time my attention has been called to instances where men have borrowed money from money lenders, commonly known as loan sharks, and have paid excessive rates of interest, sometimes several hundred per cent a year. A typical case was reported to me recently. A man borrowed \$15 and agreed to pay to the money lender \$1.95 a week for sixteen weeks, or \$31.20 in all, of which \$15 represented the actual amount borrowed, and \$16.20 represented the interest for the sixteen weeks. The borrower, therefore, paid interest at the rate of considerably more than 300 per cent a year, whereas the legal rate of interest in this State is only 6 per cent.

"In order that members of the Metropolitan Street Railway Association may not be obliged to go to these loan sharks when the need for borrowing money arises, an arrangement has been made to turn into the treasury of the Metropolitan Street Railway Association all the profits obtained from the lunch rooms at the various carhouses in the system, and this money will be used to make loans to members of the association, without any interest charge whatsoever, under proper regulations, and for a certain length of time.

"It is desirable that every man should save money to meet emergencies which are likely to arise as the result of sickness or other causes, and it is hoped that this assistance which the association plans to extend will not cause its members to cease saving money on their own account. But the trustees realize that at certain times need for money arises which cannot be foreseen and which a man cannot always provide for from his regular wages. It is to afford assistance to members who find themselves placed in such a position that the trustees have arranged to make this fund available."

Increase in Wages in Syracuse

The Syracuse Rapid Transit Company, the Oneida Railway, Utica & Mohawk Valley Railway and the Syracuse & Suburban Railroad, Syracuse, N. Y., have announced an increase in the wages of the employees of the companies, effective from May 1, 1911. The increase affects 480 employees of the Syracuse Rapid Transit Company, 350 of the Utica & Mohawk Valley Railway, 42 on the Oneida Railway and 30 of the Syracuse & Suburban Railroad. The pay of the employees of the Syracuse Rapid Transit Company, Oneida Railway, and Utica & Mohawk Valley Railway, by the new schedule follows: First 6 months of employment, 22½ cents; second six months, 24½ cents; after first year, 26½ cents. Pay for service between Syracuse and Utica is made 31 cents an hour. The new schedule on the Syracuse & Suburban Railroad is: First year, 21 cents; second year, 22 cents; third, 23 cents; fourth 24 cents, and fifth, 25 cents. Pay on the Utica & Mohawk Valley Railway is made 28½ cents an hour. Since Jan. 1, 1899, employees of the Syracuse Rapid Transit Railway have had their wages increased nine times. The wage schedules as raised on Jan. 1, 1899, ranged from 14 cents to 16½ cents. They were raised again on Jan. 1, 1901, one

cent an hour, as follows: First six months, 15 cents; second, 15 cents; second year, 16 cents; third year, 17 cents; fourth and fifth year, 16 cents. The next increase was on Jan. 1, 1903, one cent an hour, except employees in service more than five years, and they were increased two cents. On Jan. 1, 1903, another cent an hour advance was made, followed by another on Feb. 1, 1906, and still another July 22, 1906. At that time the wages were 18 cents, twenty cents and 22½ cents. July 1, 1907, they were increased to 20 cents, 22 cents and 24 cents. The next increase was May 1, 1910, when the wages were raised 1½ cents, as follows: First six months, 21½ cents; second six months, 23½ cents, and after first year, 25½ cents.

Charles N. Black On the Best Type of Car

Charles N. Black, vice-president and general manager of the United Railroads of San Francisco, San Francisco, Cal., in a letter on the new pay-as-you-enter cars of the company, which he addressed to the *San Francisco Call* recently to correct statements made in an editorial in that paper, said in part:

"The inside dimensions of the new cars are practically the same as the inside dimensions of the old cars, while the seating capacity of the new cars is actually 18 in. greater than in the old cars. The aisle space in the new cars is much greater than in the old cars, thus enabling passengers to pass in and out with greater facility and with less inconvenience. These so-called dangerous and uncomfortable cars, as far as seating arrangement is concerned, are patterned after the most modern, up-to-date vehicles of transportation which have been adopted and are in use in New York City, where the question of urban transportation has have given more thorough study than in any other community in the country.

"Cars with longitudinal seats are not confined to the surface roads in New York City, but are in use almost exclusively on both the elevated railways and the subway, where the trains make a much higher speed and where the acceleration and braking are much more severe. It is strange, indeed, that the greatest metropolis in the country should adopt a dangerous and uncomfortable type of car, especially in view of the fact that there exists in New York a public service commission with practically unlimited powers of regulation. You further state that 'In case of a collision this huddled mass of humanity would be flung violently against the nearest solid obstacle.' Our purpose has been to remove all obstacles as far as possible in these new cars, and it is perfectly apparent that in case of a collision there would be less danger with the longitudinal seat than with the cross seat, as there would not be the obstacles to be thrown against. The greatest and most difficult problem which every street railway has to face is the handling of the public during the hours of congestion of travel, and the car which solves this problem in the most satisfactory manner is the one which is for the best interests of both the community and the transportation companies."

New Transfers in Scranton.—The Scranton (Pa.) Railway is considering the adoption of a transfer with a shorter time limit so as to prevent passengers from taking advantage of the company by not using their slips on the next connecting car.

Complaint Against Ithaca Street Railway.—The Common Council of Ithaca has filed a complaint with the Public Service Commission of the Second District of New York in regard to the condition of the track and roadbed and the service of the Ithaca Street Railway. Complying with the request of the Common Council the commission has detailed inspectors to investigate the matters mentioned in the complaint.

Discrimination Charged in New York Seaside Service.—The Public Service Commission of the First District of New York has served upon the Brooklyn Rapid Transit Company a complaint order directing it to answer within ten days the complaint of the Luna Park Company and others asking for an order to compel the re-establishment of the express service to the center of Coney Island, formerly operated by the company.

Curtailing Stop-Over Privileges.—The San Bernardino (Cal.) Valley Traction Company has announced a change of service, requiring all purchasers of tickets from Redlands to Urbita to remain on the cars for the trip to the springs, not permitting of stops at San Bernardino and transfers to Urbita cars. Heretofore the company has sold tickets to San Bernardino and given transfers on them to Urbita. Extra fares will now be collected for all persons stopping in San Bernardino on the trip.

Chicago Schools to Help in Accident Campaign.—Mrs. Ella Flagg Young, superintendent of schools of Chicago, proposes to assist the surface street railways in Chicago in their campaigns to prevent accidents. She suggests instructing school children in regard to boarding and alighting from cars. Mrs. Young has volunteered to co-operate with the street railways by having the teachers present the subject of safety to the children in such a way that they will fully realize the dangers that come from playing in the street and in jumping on and off cars while they are in motion.

F. A. Delano on the Interstate Commerce Law.—F. A. Delano, president of the Wabash Railroad, at the luncheon of the Traffic Club, in the Hotel La Salle, Chicago, Ill., recently, spoke on the subject "Optimism." Mr. Delano said: "The Interstate Commerce Law was passed in 1887 and it was passed in the interest of the general public, particularly shippers. While railway officials at that time through the entire country feared the effect of the law, I sincerely believe that the law has been of great benefit to those who have capital invested in railway stock and property and that every change and amendment in the law has proved beneficial to honest railway methods."

Need of Cross-Town Lines in Milwaukee.—R. W. Harris of the Railroad Commission of Wisconsin, in a report to that body, in regard to the need for the construction of a cross-town line by the Milwaukee Electric Railway & Light Company, said: "A study of the total amount of this through-town travel for all the lines clearly indicates that there is a considerable demand for a cross-town line between Twelfth Street and Twenty-seventh Street, across the Sixteenth Street viaduct and along National Avenue. The amount of travel in Milwaukee has experienced a very material increase during each year for some time past and for this reason the demand at the present date is still much more pronounced than it was at the time this study was made, and consequently the demand is greater for a cross-town line now than it then was."

Conference in Regard to Terms of Service in Trenton.—Oscar T. Crosby, president of the Trenton & Mercer County Traction Corporation, Rankin Johnson, vice-president of that company, and J. C. Thompson, superintendent of the company, conferred with representatives of the employees recently in Trenton in regard to wages and terms of service of the men. The editors of the local newspapers and prominent citizens were permitted to attend the conference. As a result of the conference the employees will hereafter be paid for the ten minutes each day spent by them in reporting before going on duty and for the fifteen minutes spent by them after their run each day in submitting their accounts. The employees now receive 23 cents an hour and have asked for an increase in wages to 28 cents an hour. This request was discussed at the meeting and it was decided to consider this question in detail at a conference to be held in the near future.

Law Upheld Regulating Hours of Railroad Service.—In the test suit instituted by the Baltimore & Ohio Railroad the Supreme Court of the United States has unanimously upheld the law regulating the hours of service for railroad employees passed by Congress in 1907. The decision was announced by Judge Hughes on May 29, 1911. He said that the words of the statute were plain that only persons engaged in interstate commerce and interstate carriers were affected by the statute. In this particular, he said, the law differed from the Employers' Liability Law of 1906, and added that because interstate employees sometimes engage in intrastate business did not defeat the law. The act made it unlawful for any common carrier engaged in interstate commerce to permit any trainman subject to the act to remain on duty longer than sixteen consecutive hours, or

any telegraph operator more than nine or thirteen hours, according to the time the telegraph station was open for business. The act also created periods of rest for the employees.

Combined Freight Service of Philadelphia Suburban System and City Lines.—A. Merritt Taylor, president of the Philadelphia & West Chester Traction Company, Upper Darby, Pa., has announced plans for a freight service to connect with the freight service of the Philadelphia Rapid Transit Company between Sixty-third Street and Market Street and Delaware Avenue. Mr. Taylor states that freight stations are to be erected at Sixty-third Street and Market Street, Ardmore and Clifton Heights, and that service on these lines of the company will be inaugurated within sixty days. With regard to the West Chester line the statement is made that the new service will be inaugurated before Sept. 1, 1911. The freight service of the company will be operated in conjunction with that of the Philadelphia Rapid Transit Company, traffic agreements having been made between the two corporations so that shipments from points on the lines of the Philadelphia & West Chester Traction Company will be transferred to cars of the Philadelphia Rapid Transit Company and taken to the freight station at Delaware Avenue and Market Street. Shipments from Philadelphia will be transferred from Sixty-third Street and Market Street for points on the line of the receiving company.

School Fares in New Jersey.—The formal reasons why the Public Service Railway, Newark, N. J., holds the order of the Board of Public Utility Commissioners of New Jersey directing it to resume the transportation of school children at reduced rates should be set aside, have been filed in the Supreme Court. The company has placed before the court for review the letter of Thomas N. McCarter, president of the company, to the Public Utility Board and the formal order of the board adopted May 5. The letter stated that it had been the practice of the company to carry school children and teachers in the same localities at reduced rates, but the practice had been discontinued after advice that it was illegal under the new public utility law. The order of the board directed the company to resume the special rate, or, in other words, to suspend the increased rate, pending a hearing and final determination of the question. Following the promulgation of this order, the Public Service Railway began this suit to set the order aside. The reasons assigned for setting the order aside are that the new law makes compliance with the order illegal; that the discontinuance of the special rate is not an increase, but the abolition of a discriminatory rate in compliance with the new statute; that the board had no authority to issue the order, and that the order is contrary both to the State Constitution and the Federal Constitution.

Summer Season at Winona Lake.—The *Winona Quarterly*, which is published by the Winona Interurban Railway, Warsaw, Ind., for gratuitous distribution outlines as follows the program of the company at Winona Lake for the summer season: "Glenn H. Curtiss, the noted aviator, with his hydro-aeroplane, guarantees us two great flights. W. D. Chenery, the author of last year's feature 'Egypta,' announces his new and surpassing sacred opera, 'Ahasuerus.' The American Brass Band of Providence, with fifty musicians, will delight music lovers for three days. Another welcome announcement is the return of the tuneful children's operetta, 'The House that Jack Built.' Under the able direction of Mrs. Hortence R. Reynolds this feature will again delight children and adults alike. Plans are laid for a more elaborate 'Venetian Night,' now almost as well known among water spectacles as is the Mardi Gras among the land pageants. The lecturers are stronger than ordinary, William Jennings Bryan heading an imposing list. Music runs at the top line of the season's offerings. The LeBrun Grand Opera Company, singing portions of the greatest operas in English, the Gamble Concert Party, the annual musical contest, the oratorios, the bands, the quartets and soloists combine to make the year a rich one musically. The leading entertainers and readers are engaged for 1911, and many of the country's leading preachers will be heard at the Sunday services." Following the special announcement the program of the attractions, including the lectures and recitals, is given in detail.

Personal Mention

Mr. John Blair MacAfee, president of the Norfolk & Portsmouth Traction Company, Norfolk, Va., will relinquish his active interest in that property and subsidiary companies on July 1, 1911, when the road is merged with the Virginia Railway & Power Company.

Mr. Carl A. Sylvester, retiring general manager of the Boston (Mass.) Suburban Electric Companies, was presented with a set of Thermos bottles at the regular May meeting of the Suburban Railway Club, and at the recent meeting and dinner of the New England Association of Purchasing Agents at the Boston Yacht Club he was presented with a loving cup.

Mr. A. A. Dunlap, who for the last five years has held various positions in the roadway department of the Indiana Union Traction Company, Anderson, Ind., from construction timekeeper to division engineer, has recently been appointed division engineer of the Tipton Division of the company, in charge of all track, bridges and buildings from Indianapolis to Logansport, Kokomo to Peru and Tipton to Alexandria, a distance covering 121 miles, exclusive of the city lines in Elwood, Ind.

Mr. C. H. Andrews has been appointed manager in charge of the North Carolina Public Service Company's properties at Greensboro and High Point, N. C., furnishing electric-lighting, gas and street-railway service in these cities. Mr. Andrews was graduated from Purdue University in 1908 and entered the employ of the North Carolina Public Service Company two years ago as a meter reader and tester. Since then he has been successively placed in charge of the electric lighting, commercial and gas departments, finally succeeding Mr. E. C. Deal, whose appointment as general manager of the Augusta Railway & Electric Company and the Augusta-Aiken Railway & Electric Company was noted in the *ELECTRIC RAILWAY JOURNAL* of April 1, 1911.

Mr. L. W. Jacques has resigned as master mechanic of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., to become master mechanic of the Rockford & Interurban Railway, Rockford, Ill. Mr. Jacques began his railroad career with the Baltimore & Ohio Railroad, which he served for fourteen years in various capacities, finally becoming roundhouse foreman at South Chicago. He then became connected with the Twin City Rapid Transit Company, Minneapolis, Minn., and was with that company three years as foreman of its Thirty-first Street shops. Mr. Jacques resigned from the Twin City Rapid Transit Company to become master mechanic of the Ft. Wayne & Wabash Valley Traction Company and has served that company more than five years.

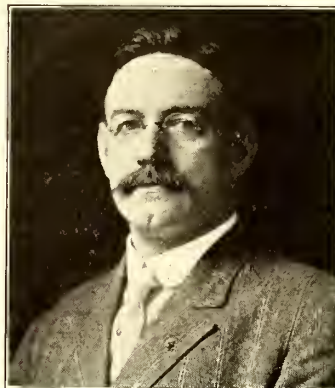
Mr. Horace Field Parshall has been appointed chairman of the Central London Railway, London, England, which operates the original "Twopenny Tube." Mr. Parshall was electrical engineer for this line and has been closely connected with the work of the railway since it was placed in operation, about ten years ago. Mr. Parshall is an American, but has been in England about fifteen years. He was electrical engineer for the Dublin Tramways, the Glasgow Tramways, the London United Tramways and the Bristol Tramways, and has been connected with many other large electrical projects in Great Britain. He prepared the plans for the Central London Railway installation, the first railway in England to be operated on the multi-phase system with converting substations, and has been associated with the operation of the line ever since. He succeeds Sir Henry Oakley as chairman of the Central London Railway.

Mr. Rankin Johnson, who was recently elected vice-president of the Trenton & Mercer County Traction Corporation, Trenton, N. J., was graduated from Sheffield Scientific School, Yale University, in the class of 1895. After leaving college he served in Mexico for about eight years as chief engineer of the Mexico International Railroad. On leaving this position he was for three years chief engineer and general manager of the Bolivia (S. A.) Railway, during which period he operated about 300 miles of track of a system which will embrace about 1000 miles of track when completed. Since September, 1909, Mr. Johnson has maintained an office in New York City as a consulting engineer and at present he devotes part of his

time to consulting work. The Trenton Street Railway is now controlled by the Trenton & Mercer County Traction Corporation.

Mr. F. T. Hepburn has resigned as general manager of the Saginaw-Bay City Railway, Saginaw Power Company, Saginaw City Gas Company, Bay City Power Company and the Bay City Gas Company, of Saginaw and Bay City, Mich., to become a member of the firm of H. D. Walbridge & Company, bankers, New York, N. Y. Mr. Hepburn will, however, remain in Saginaw for the present or until a successor to him with the companies mentioned has been appointed. Mr. Hepburn was graduated from Rensselaer Polytechnic Institute, Troy, N. Y., in 1893, and for thirteen years was connected with the construction, maintenance and operating departments of the Pennsylvania Railroad. In 1906 he was appointed general manager of the Lima & Toledo Traction Company and the Indianapolis, Columbus & Eastern Traction Company, Lima, Ohio, which operated 250 miles of interurban electric railway in Ohio and now comprise what is known as the northern district of the Ohio Electric Railway. Mr. Hepburn was appointed general manager of the companies at Saginaw and Bay City in May, 1910.

Mr. George M. Cox has been appointed acting general manager of the subsidiary companies of the Boston (Mass.) Suburban Electric Companies, including the Middlesexes & Boston Street Railway, Lexington & Boston Street



G. M. Cox

Railway and the Norumbega Park Company, to succeed Mr. Carl A. Sylvester, resigned. Mr. Cox was born in Waltham in 1866 and has lived in West Newton for the last forty-five years. He was graduated from the Pierce Grammar School of West Newton in 1880 and from the Newton High School in 1884. He entered the employ of the Boston Suburban Electric Companies on Feb. 18, 1902, in the capacity of book-keeper. On Feb. 22, 1904,

he was appointed chief clerk of the company and on Nov. 23, 1905, he was elected by the board of directors as assistant treasurer of the various companies.

Mr. G. Frank Hailman has been appointed superintendent of the Southern Pennsylvania Traction Company, Chester, Pa., to succeed Mr. Arthur G. Jack, whose appointment as general claim agent of the Wilmington & Philadelphia Traction Company was noted in the *ELECTRIC RAILWAY JOURNAL* of May 27, 1911. Mr. Hailman was born in Virginia, and after working on a farm until he was twenty-one years old he secured a position in 1892 as a conductor with the Eckington & Soldiers Home Railway, Washington, D. C. The following year he was made a clerk in the office of the company, but resigned from the company in 1896, when the Eckington & Soldiers Home Railway and the Belt Railway, Washington, D. C., were placed in the hands of a receiver. Mr. Hailman became connected with the Metropolitan Railway, Washington, D. C., under Mr. W. A. Heindel, superintendent. In 1898 he was made acting clerk of this company and was subsequently advanced to other positions until in 1900 he was made division superintendent of the company in charge of the Columbia Division under Mr. R. E. Lee, who now is superintendent of the Cincinnati (Ohio) Traction Company. In the fall of 1904 Mr. Hailman resigned from the Metropolitan Railway to go into business for himself. In 1906 he became connected with a firm in Philadelphia which makes a specialty of railroad investigation work and has been connected with that company since that time.

OBITUARY

Charles H. Shattuck, president and general manager of the Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., died at his home in that city on May 27, 1911. Mr. Shattuck was also president of the Citizens' National Bank, Parkersburg. He was seventy-seven years old.

Construction News

RECENT INCORPORATIONS

***Bakersfield & Kern Electric Railway, Bakersfield, Cal.**—Chartered in California to build an electric railway in Bakersfield. Capital stock, authorized, \$250,000. Stock, subscribed, \$5,000. Directors: C. R. Eager, S. B. Cushing, H. A. Blodgett, F. T. Whorff and C. N. Beal.

***Los Angeles & San Fernando Electric Railway, Los Angeles, Cal.**—Incorporated in California to build an electric railway between Los Angeles and San Fernando, via Griffith Park. Capital stock, \$25,000. L. C. Brand, president; W. C. Kerckhoff, vice-president; J. F. Sartori, treasurer, and H. Chandler, secretary.

***Ventura Railway, San Francisco, Cal.**—Application for a charter has been made in California by this company to build a 30-mile electric railway to connect Hueneme and Oxnard with branches from Oxnard to the Patterson Ranch, McGrath Ranch and Browne Ranch in Ventura County. Capital stock \$500,000. Incorporators: I. B. Bary, San Francisco; J. A. Driffel, A. M. Dupru and R. Beck of Oxnard, Ventura County.

***Chicago & Joliet Railroad, Chicago, Ill.**—Incorporated in Illinois to build track in Cook County, which will enable the Chicago & Joliet Railway to move from the highway to a private right-of-way. It is also reported that this company will build an extension of several miles. Principal offices, Chicago. Capital stock, \$5,000. Incorporators and first board of directors, J. R. Blackhall, Joliet; H. K. Crafts, George M. Stevens, William B. Stevens, Clayton E. Crafts, Chicago.

Duluth & Northern Traction Company, Duluth, Minn.—Application for a charter has been made in Minnesota to build a 4½-mile electric railway in Duluth. Capital stock, \$500,000. Incorporators, Charles P. Craig, J. G. Williams, A. M. Marshall, Chester A. Congdon, M. H. Alworth, John Millen, Joseph B. Cotton, D. F. Cole, I. L. Washburn, Luther Mendenhall, D. B. McDonald, W. H. Cole, A. M. Chisholm and Dr. W. H. Magie, all of Duluth. [E. R. J., May 20, '11.]

***Lehigh Coal & Navigation Company, Philadelphia, Pa.**—Chartered in Pennsylvania to build an electric railway from Summit Hill to Mauch Chunk.

***Centralia Electric Light & Traction Company, Centralia, Wash.**—Application for a charter has been made in Washington by this company to build a 15-mile electric railway between Rochester and Centralia. Financial backing has been secured and most of the right-of-way has been obtained. The company will also furnish power for lighting purposes. Incorporators: Walter Copping, G. W. Muck, N. W. Mills, Bruce Richards and Dan Salzer.

FRANCHISES

***Redwood City, Cal.**—Edward F. Fitzpatrick, Redwood City, has asked the Town Trustees for a franchise to build a line through Redwood City. This is part of a plan to operate a railway and bay steamer line between San Francisco and Redwood City.

Bridgeport, Conn.—The Connecticut Company has received a franchise from the Common Council to extend its Main Street line to Barnum dyke, in Bridgeport. It has also received permission to double-track and extend some of its lines on Baldwin Street and South Main Street, in Waterbury. The company has asked the Council for a franchise to extend its tracks through Homer Street and Thomaston Avenue, in Waterbury. This will necessitate the rebuilding of the bridge over Hancock Brook, on Thomaston Avenue, probably of reinforced concrete.

Waycross, Ga.—The Waycross Gas, Electric & Railway Company has received a franchise to build its tracks over certain streets in Waycross. [E. R. J., Nov. 27, '09.]

Indianapolis, Ind.—The Indianapolis, Nashville & Southern Traction Company has asked the County Commissioners for a franchise to build an electric railway through Marion County. This 108-mile railway will connect Indianapolis, Trafalgar, Nashville, Bloomington, Bedford, Mitchell, Orleans and French Lick. John A. Johnson, Indianapolis, president. [E. R. J., April 22, '11.]

***Gretna, La.**—Leo A. Marrero has received a fifty-year franchise from the Council to build an electric railway between Gretna and Waggaman. Immediate steps will be taken to form a company to build and operate this proposed line.

Northampton, Mass.—The Northampton Street Railway has asked the Board of Aldermen for a franchise to double-track and extend some of its lines in Northampton.

Worcester, Mass.—The Worcester & Providence Street Railway, Worcester, has received a six months' extension of time on its franchise from the Council, in which to begin the construction of its railway in Worcester. It will connect Worcester and Providence. Walter F. Angell, president. [E. R. J., Dec. 24, '11.]

Langdon, Minn.—The St. Paul Southern Electric Railway, St. Paul, has received a franchise from the County Commissioners to build its tracks over certain streets in Langdon and Cottage Grove. It will connect St. Paul, Red Wing, Hastings, Point Douglas and Lake City. W. L. Sonntag, St. Paul, general manager. [E. R. J., April 15, '11.]

Vicksburg, Miss.—The Vicksburg Traction Company has asked the Board of Supervisors for a franchise to build an extension of its Water Street line to Waters.

Billings, Mont.—The Billings Traction Company has accepted the amended franchise granted it by the Council. It is said the company contemplates extending this line to Laurel. John A. Connolly is interested. [E. R. J., Aug. 10, '10.]

Asheville, N. C.—The Asheville Electric Company has received a franchise from the Board of Aldermen to extend its tracks in Asheville.

Fayetteville, N. C.—The Fayetteville Street Railway & Power Company has received a franchise from the Board of Aldermen to extend its tracks on Hay Street and over to Haymount.

Canadagua, N. Y.—The Ontario Light & Traction Company has asked the Board of Trustees for a new franchise to extend its tracks through additional streets in Canadagua.

Little Falls, N. Y.—The Little Falls & Johnson Railroad has asked the Common Council for a franchise to build its line over certain streets in Little Falls. J. L. Hess, 103 Park Avenue, New York City, president. [E. R. J., May 6, '11.]

New York, N. Y.—The Manhattan Bridge Service Company will ask the Public Service Commission and the Board of Estimate for a franchise to operate its railway across the Manhattan Bridge. This is part of a plan to build a 2-mile electric railway from Manhattan Plaza to Fulton Street and Flatbush Avenue, Brooklyn. Arthur C. Hume, 165 Broadway, New York City, N. Y., is interested. [E. R. J., May 27, '11.]

Dayton, Ohio.—The Dayton, Springfield & Xenia Southern Railway has asked the Council Committee for a twenty-five-year extension of its franchise and the right to build an extension of its tracks on Fifth Street from Ludlow to Main Street, and thence north to Third Street, in Dayton.

Toledo, Ohio.—The Toledo Railways & Light Company has received a franchise to double-track Huron Street, between Adams Street and Cherry Street, in Toledo.

New Castle, Pa.—The New Castle & Beaver Falls Street Railway has received a six months' extension of time from the Select Council in which to begin work on its proposed 22-mile electric railway to connect New Castle and Beaver Falls. [E. R. J., May 13, '11.]

Bristol, Tenn.—The Bristol Traction Company has asked the City Council for a franchise to extend its tracks over certain streets in Bristol to Virginia Park.

Memphis, Tenn.—The Memphis Street Railway has received a franchise from the Council to extend its tracks over certain streets in Memphis.

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—This company has completed and placed in operation its Edgewood line connecting the new South Highland suburbs with Birmingham.

Marked Tree, Harrisburg & Newport Railway, Harrisburg, Ark.—Preliminary arrangements are being made by this company to build a 50-mile electric railway between Marked Tree, Harrisburg and Newport. L. D. Freeman and J. C. Mitchell, Harrisburg, are interested. [E. R. J., May 13, '11.]

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—An extension from Fresno to Calwa is being considered by this company.

Pacific Electric Railway, Los Angeles, Cal.—Arrangements have been perfected by this company to build an extension from Homewood and Redondo, a distance of about three miles. Another extension will be built from Santa Ana to Anaheim.

***Marysville, Cal.**—G. W. Hall, Marysville, plans to build a 3-mile electric railway in Marysville. Eventually, it is said, the line will be extended until it is a belt line encircling Marysville.

Watsonville Railway & Navigation Company, Watsonville, Cal.—It is reported that contracts will be awarded at once and construction will begin in June by this company on its extension from Watsonville to Rows Corners, thence to Corralitos and along the Santa Cruz road, returning to Watsonville. Another line is to be built along San Juan road, Driscoll's lane and Salsipuedes road, to a connection with the main line at Rows Corners, and a branch may also be built to Pajaro and the Werner district. Concrete docks will be built at Port Watsonville. F. E. Snowden, 311 California Street, San Francisco, president. [E. R. J., May 6, '11.]

Kamouraska-L'Islet Railway, Ste. Anne de la Pocatiere, Can.—This company advises that it will soon begin the construction of its railway from Ste. Anne de la Pocatiere to connect with ship across Murray Bay and at Pointe de la Riviere Ouelle wharf and Moosehead Lake, Me. The motive power will be gasoline or steam. The repair shops will be located at Ste. Anne de la Pocatiere. Capital stock, authorized, \$200,000, with authority to increase it to \$10,000,000. Officers: Charles Kidd, Ste. Anne de la Pocatiere; Adolphi Stein, Fresserville, secretary, and G. A. Michand, Ste. Anne de la Pocatiere. [E. R. J., Jan. 21, '11.]

Colorado Interurban Railroad, Denver, Col.—This company advises that it has awarded the contract to the Interurban Construction Company, Denver, for the construction and equipment of its 71-mile electric railway. Construction will begin as soon as pending financial deal is completed. The line will connect Denver, Ft. Lupton, Ft. Collins, Peatsville, La Salle, Evans, Fristown, Frederick and Longmont. Capital stock, authorized, \$6,000,000. Bonds, authorized, \$6,000,000. Eben N. Reaser, vice-president. [E. R. J., May 27, '11.]

Elberton & Eastern Railway, Augusta, Ga.—Z. B. Rogers, Elberton, of this company, states that as yet no definite plans have been completed for building this proposed railway to connect Elberton, Tignall, Washington and Lincoln-ton. [E. R. J., April 15, '11.]

Caldwell-Roswell Interurban Railway, Caldwell, Idaho.—This company advises that it is uncertain when construction will begin on its electric railway to connect Caldwell, Roswell, Greenleaf and Big Bend. H. W. Dorman, Caldwell, president. [E. R. J., June 4, '10.]

Springfield, Beardstown & Quincy Railway, Springfield, Ill.—This company advises that nothing definite has yet been decided as to when the construction of this line will begin. It will connect Springfield, Petersburg, Chandler-ville, Beardstown, Mount Sterling and Quincy. Officers: G. L. Harnsberger, Springfield, president; H. H. Colby, Petersburg, vice-president; R. E. Bone, Petersburg, secretary, and C. W. Houghton, Petersburg, treasurer. [E. R. J., Oct. 15, '10.]

Alton, Jacksonville & Peoria Railway, Whitehall, Ill.—A contract has been awarded by this company to Grommett & Johnson to build an extension from Godfrey, Ill., north-west to Jerseyville and extending into Calhoun County.

Ft. Wayne & Winona Traction Company, Ft. Wayne, Ind.—The controlling interest of this company has been purchased by the Ft. Wayne & Northern Indiana Traction Company. The Ft. Wayne & Winona Traction Company was organized in 1908 to build a line from Ft. Wayne to

Warsaw paralleling the Pennsylvania Railroad between those points. Preliminary surveys were made and franchises and right-of-way secured, but no construction work was ever done. It is stated that the line will be built next year by the Ft. Wayne & Northern Indiana Traction Company. [E. R. J., May 20, '11.]

Kokomo, Marion & Western Traction Company, Kokomo, Ind.—This company is asking for bids for the construction of its line from Kokomo to Terra Haute. George J. Marott, Indianapolis, president.

Creston-Winterset Interurban Railway, Creston, Ia.—This company advises that it will begin construction probably during the latter part of this year on its 60-mile electric railway to connect Spaulding, Macksburg, Winterset and Des Moines. The company intends to first build from Creston to Macksburg. The motive power will be steam for freight and gasoline motor cars for passenger service. The repair shops will be located at Creston. Capital stock authorized, \$500,000. Officers: R. Brown, Creston, president; Clarence Wilson, Macksburg, vice-president; A. S. Lyon, Orient, secretary; W. W. Walker, Macksburg, treasurer, and C. B. Judd, Clarinda, chief engineer. [E. R. J., March 18, '11.]

Lewiston, Augusta & Waterville Railway, Lewiston, Me.—Plans are being considered by this company to build a 12-mile extension from Bath to Popham Beach.

Battle Creek, Coldwater & Southern Railway, Battle Creek, Mich.—Negotiations are being made by this company for the sale of \$120,000 worth of bonds for the construction of its 28-mile electric railway to connect Battle Creek and Coldwater. An office has been opened in Coldwater and promotion work for the proposed line is now under way. Fred Warren is in charge. [E. R. J., March 5, '11.]

Springfield & Western Railroad, Springfield, Mo.—This company advises that preliminary surveys have been made, but contracts have not yet been awarded for the construction of this 90-mile electric railway to connect Springfield, Nichols, Halltown, Paris Springs, Mount Vernon, Hoberg, Freistatt, Monett, Pierce City, Wentworth, Diamond, Joplin and Springfield. Capital stock authorized, \$2,000; bonds authorized, \$1,500,000. Officers: H. D. Mackay, Springfield, president; I. N. Smith, vice-president; J. I. Woodhull, secretary and superintendent; J. P. McCammon, attorney, and M. M. Hollenback, Springfield, chief engineer. [E. R. J., May 13, '11.]

Piedmont Railway & Electric Company, Burlington, N. C.—J. W. Murray, president of the Piedmont Trust Company, advises that the Piedmont Railway & Electric Company, which was chartered recently, is being organized to take over and complete the 8½ miles of track which connects Burlington, Graham and Haw River, purchased from the receiver of the Southern Traction & Power Company by Mr. Murray. [E. R. J., May 20, '11.]

Hendersonville (N. C.) Traction Company.—This company is reported to be in the market for rail for 3 miles of track. [E. R. J., Oct. 23, '09.]

Hudson River & Eastern Traction Company, Ossining, N. Y.—The Public Service Commission, Second District, has given its permission and approval to this company to build its line in Sherman Park through Mt. Pleasant and North Castle and into White Plains. The company is authorized to exercise franchises granted by these localities. The consent now given permits the construction of a line from Ossining to White Plains.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—This company is double-tracking about 5 miles of its line. Eventually the entire line from Lockport to Rochester will be double-tracked.

Syracuse, Watertown & St. Lawrence River Railroad, Syracuse, N. Y.—The Public Service Commission, Second District, has received a petition from this company asking for a certificate of convenience and a necessity and for authority to exercise franchises granted to it. It is proposed to build a railroad from a connection with the Syracuse and South Bay Electric Railroad at or near stop 9 in Cicero, to and into Brewerton, passing through Cicero and Brewerton, a distance of 6½ miles. The authorized capital stock of the company is \$1,250,000. This electric railway will connect Syracuse, Watertown, Cicero and Brewerton, C. D.

Beebe and William Nottingham, Syracuse, are said to be interested. [E. R. J., May 6, '11.]

Midland Power & Traction Company, Cambridge, Ohio.—A contract has been awarded by this company to George Morehead, Senecaville, to build an extension from Byesville to Pleasant City.

Ohio Electric Railway, Cincinnati, Ohio.—Work has been begun by this company on its extension from Springfield to Dayton. A steel bridge over the Snyder Park entrance and over Buck Creek will be built at a cost of about \$14,000.

People's Railway, Berlin, Ont.—The contract has been awarded by this company to the Acme Construction Company, Toronto, to build its line from Guelph to London.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—This company is making a survey for an extension from Hamilton to Galt.

Williamette & Molalla Valley Railway, Canby, Ore.—This company will award contracts during the next month to construct its 12-mile electric railway through the Molalla Valley to Canby. Surveys have been completed. W. J. Lee, Canby, general manager. [E. R. J., May 27, '11.]

Union Traction & Terminal Company, Marshfield, Ore.—Work will be resumed by this company at once for its electric railway between Marshfield and North Bend. J. M. Blake, Marshfield, president. [E. R. J., Feb. 5, '11.]

Middletown & Elizabethtown Street Railway, Middletown, Pa.—This company has secured right-of-way and has issued a mortgage for \$35,000 to the Harrisburg Trust Company. Its line will connect Middletown and Elizabethtown, also the lines of the Conestoga Traction Company, Lancaster, thus making a continuous electric line between Philadelphia and Harrisburg. F. H. Alleman, Summit, N. J., is interested. [E. R. J., April 22, '11.]

West Penn Railways, Pittsburgh, Pa.—Reagom & Lynch, Uniontown, have been awarded the contract by this company to build an extension from Vance's Mills to Phillips, a distance of two miles. Work will be begun at once. This company has authorized the expenditure of about \$100,000 for a 2½-mile extension from Masontown to Martin Station. The extension will require the construction of a \$25,000 bridge over the Monongahela Railroad.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C.—This company has been authorized to increase its capital stock from \$1,300,000 to \$3,000,000. It expects to extend several of its lines in Columbia.

Kittitas Railway & Power Company, Cle Elum, Wash.—This company advises that work will begin about July 1 on the construction of its proposed electric railway to connect Cle Elum, Roslyn, Camp No. 5, Ronald and Janesville. Capital stock, authorized, \$300,000. Bonds authorized, \$500,000. Officers: Paul L. Richards, 909 Second Street, Tacoma, president; E. A. Watson, 912 South Sixth Street, Tacoma, vice-president and treasurer, and H. N. DeWolfe, Box 656, Tacoma, secretary. [E. R. J., April 8, '11.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—This company has completed and placed in operation its extension to Barker.

Wausau (Wis.) Street Railway.—Plans are being made by this company for the expenditure of \$50,000 this summer for improvements. These will include double tracking some of its streets in Wausau and a new amusement pavilion.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—It is reported that this company will soon award contracts for building new carhouses and machine shops in Chilliwack. The cost is estimated to be about \$20,000.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—Plans have been completed by this company for its new office building on I Street, in Fresno. The structure will occupy two lots, 50 ft. x 150 ft. It will be two stories in the front and one story in the rear. The second floor will contain office rooms and accessories. Work will be begun in the near future. The cost is estimated to be about \$20,000. [E. R. J., March 25, '11.]

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—This company will build a five-story building

on Tenth Street, between K Street and L Street, in Sacramento.

Connecticut Company, New Haven, Conn.—Plans for the company's new carhouse in Waterbury have been completed and construction will begin within a short time. The proposed building will be located directly east of the present operating carhouse. It will be 360 ft. x 182 ft. On the second floor will be located the suite of offices for the officials, and there will be fourteen tracks in the carhouse capable of storing all the cars used in operating the Waterbury lines.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company is considering plans to erect a new joint terminal station in Bluffton.

Southwestern Traction & Power Company, New Orleans, La.—This company is considering plans to erect a new carhouse.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—Plans are being considered by this company for a new carhouse in Waynesboro.

Galveston-Houston Electric Railway, Houston, Tex.—Work has been begun by this company tearing away the structure on the west side of Twenty-first Street, between Church Street and Post Office Street, in Galveston, on which it will erect a new carhouse. The building will be 65 ft. x 165 ft.

POWER HOUSES AND SUBSTATIONS

Sacramento Electric, Gas & Electric Railway Company, Sacramento, Cal.—This company has purchased five acres of land on the bank of the Sacramento River, in Sacramento, upon which it will build a new power house.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—This company has purchased from the General Electric Company, through J. G. White & Company, New York, a 4000-kw turbo-generator, a 100-kw turbo-exciter and two 1000-kw, 250-volt motor-generator sets, which will be used on the three-wire lighting system.

Des Moines (Ia.) City Railway.—Among the improvements planned by this company during the year is an addition to its power house. The contract has been awarded to the General Electric Company, Chicago, for installing a to the General Electric Company, Chicago, for installing 4000-hp in generating equipment.

Southwestern Traction & Power Company, New Orleans, La.—A new power house will soon be erected by this company. F. W. Crosby, Tenegre Building, New Orleans.

Escanaba (Mich.) Traction Company.—It is reported that this company will construct a second power dam on the Escanaba River, capable of developing 2500 hp.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has ordered from the General Electric Company three 1000-kw, 600-volt rotary converters; four 1050-kw, 3-phase transformers; three 350-kw single-phase transformers; one 75-kw turbo-driven exciter; one blower set, one air compressor and one switchboard. Two of the 1000-kw rotary converter equipments will be installed in the new South Omaha substation, while the third is for installation in the company's power plant.

Tidewater Power Company, Wilmington, N. C.—This company has completed and placed in operation its new addition to its power house in Wilmington. It has purchased and installed one 500-kw rotary and one 250-hp Babcock & Wilcox boiler.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—This company has ordered from the General Electric Company, through J. G. White & Company, New York, a 300-kw, 2300-600-volt rotary converter.

Washington Water Power Company, Spokane, Wash.—This company proposes to complete its Little Falls plant, extend many of its distributing lines in Spokane, install storage batteries, extend its underground conduit system and complete its transmission line from Post Falls to Newport.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has ordered four 9-retort Taylor gravity underfeed stokers, to be used with four 800-hp boilers.

Manufactures & Supplies

ROLLING STOCK

Piedmont Traction Company, Charlotte, N. C., will close contracts within a few days for twenty-three new cars.

Washington Water Power Company, Spokane, Wash., is reported to be considering the purchase of several new cars.

Mercer County Traction Company, Trenton, N. J., has ordered ten two-motor railway equipments from the General Electric Company.

Salem Railway & Light Company, Salem, Ore., has ordered six 22-ft. closed motor cars with Brill 21-E trucks from the Danville Car Company.

Union Railway, New York, N. Y., has ordered two 34-ft. 4-in. motor flat car bodies and four 27-G2 trucks without wheels from The J. G. Brill Company.

St. Louis, Monte-Sano & Southern Railroad, St. Louis, Mo., expects to purchase during the next two months two or three gasoline cars for hauling passengers.

Wausau (Wis.) Street Railway has purchased a quadruple equipment of No. 307 motors, with type K-35 control, from the Westinghouse Electric & Manufacturing Company.

Toledo Railways & Light Company, Toledo, Ohio, has ordered 100 type 310-C box frame interpole motors from the Westinghouse Electric & Manufacturing Company.

New York & North Shore Traction Company, Roslyn, N. Y., has ordered three 30-ft. 8-in. semi-convertible cars mounted on Brill 27-E-1 trucks from the G. C. Kuhlman Car Company.

Springfield (Mass.) Street Railway has ordered from the Wason Manufacturing Company one 33-ft. closed car body, two 32-ft. closed car bodies and six 28-ft. closed car bodies.

Guelph Radial Railway, Guelph, Ont., has ordered from the Westinghouse Electric & Manufacturing Company one 27-ton locomotive with four No. 101-B2 motors and type K-28B control.

Asheville & East Tennessee Railway, Asheville, N. C., has ordered one quadruple equipment of No. 307 motors, with type K-35-G control, from the Westinghouse Electric & Manufacturing Company.

Philadelphia & Easton Electric Railway, Doylestown, Pa., has ordered two quadruple equipments of No. 101 B-2 motors, with type K-28 control, from the Westinghouse Electric & Manufacturing Company.

New York, New Haven & Hartford Railroad, New Haven, Conn., has purchased four quadruple equipments of No. 409 a.c. motors with unit switch control from the Westinghouse Electric & Manufacturing Company.

Texas Traction Company, Dallas, Tex., noted in the *ELECTRIC RAILWAY JOURNAL* of March 25, 1911, as being in the market for three cars, has ordered three interurban cars mounted on Brill 27-MCB-3 trucks from the American Car Company.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., is in the market for ten center-dump ballast cars of 25-yd., 30-yd. or 35-yd. capacity; also for possibly five flat cars of 60,000-lb. or 80,000-lb. capacity, all to have M.C.B. equipment.

Omaha & Council Bluffs Street Railway, Omaha, Neb., has ordered from the General Electric Company twenty two-motor, GE-80 car equipments, five two-motor, GE-201 car equipments and five straight air-brake equipments, with CP-27 compressors.

Connecticut Company, New Haven, Conn., has ordered seventy-three pairs of Standard O-50 trucks from the Standard Motor Truck Company for the forty cars being built by the Osgood-Bradley Car Company and thirty-three by the Wason Manufacturing Company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has ordered four closed vestibuled motor cars from the G. C. Kuhlman Car Company. The length of the car bodies is 42 ft. 9 $\frac{5}{8}$ in., over bumpers 53 ft. 6 $\frac{5}{8}$ in. They are to be equipped with quadruple GE-205 motors.

Conestoga Traction Company, Lancaster, Pa., has included the following in its specifications for the three closed vestibuled motor cars which are being built by The J. G. Brill Company:

Seating capacity.....44	Gears and pinions.....West.
Weight (car body)...18,500 lb.	Gongs .....Dedenda
Bolster centers, length, 18 ft. 8 in.	Hand brakes .....vertical
Length of body....30 ft. 8 in.	Heaters .....Consol.
Over vestibule.....40 ft. 1 in.	Headlights ..Imperial S. arc
Width over sills...7 ft 11 $\frac{1}{2}$ in.	Journal boxes .....Sym.
Over all .....8 ft. 2 in.	Motors .....4 West. 101-B
Body .....wood	Motors .....outside hung
Interior trim .....cherry	Sanders .....Dumpit
Roof .....monitor deck	Sash fixtures ....double sash
Underframe .....steel	Seats .....Winner
Axles .....Brill std.	Seating material.....rattan
Bumpers ....Brill angle iron	Springs .....Brill
Car trimmings .....bronze	Step treads .....wood
Couplers .....Hovey	Trucks .....Brill 27 MCB1
Curtain fixtures...C. S. Co.	Ventilators .....regular
Curtain material ..pantasote	Wheels .....33-in. Nat.

TRADE NOTES

Ackley Brake Company, New York, N. Y., has received an order for additional Ackley brakes from the Basle Tramway, Basle, Switzerland.

Page & Hill Company, Minneapolis, Minn., has installed at its Minnesota Transfer yard a plant for giving cedar poles a preservative treatment.

Massachusetts Chemical Company, Walpole, Mass., announces that its Chicago office is now located in the Brooks Building, Jackson Boulevard and Franklin Street.

Griffin Wheel Company, Chicago, Ill., has purchased a tract of nearly five acres in West Forty-third Street, Chicago, on which it is said a new factory will be erected.

Pyrene Manufacturing Company, New York, N. Y., has moved its general offices to 1358 Broadway, New York. The factory will remain at 410 East Thirty-second Street.

Edgar Allen American Manganese Steel Company, Chicago, Ill., has appointed H. H. Hunt eastern sales agent with headquarters at New Castle, Del., to succeed V. W. Mason, Jr., resigned.

H. O. Fetting has resigned as representative of the Safety Car Heating & Lighting Company, New York, to become connected with the Clement Restein Company, Philadelphia, Pa., as manager of the railway department.

American Steel & Wire Company, Worcester, Mass., has received through Stone & Webster, Boston, Mass., an order for cables to cost about \$300,000 for the Boston Elevated Railway, for use in its distributing system from the new South Boston power station.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for ventilators for forty all-steel cars for the Boston (Mass.) Elevated Railway, which are now being built by the Standard Steel Car Company. These cars have arch roofs and are for use in the new Cambridge subway.

United States Metal & Manufacturing Company, New York, N. Y., has appointed J. J. Ross manager of the western railroad department, with headquarters in the McCormick Building, Chicago, Ill. Mr. Ross was formerly connected with the Featherstone Foundry & Machine Company, and with the J. V. Dowling Company.

Bronze Metal Company, New York, N. Y., at the annual meeting elected Otis Cutler and Joel S. Coffin, directors of the company, in addition to E. H. Fallows, R. J. Davidson and Alexander Turner. The following officials were also elected: E. H. Fallows, president; Alexander Turner, vice-president and general manager, and C. D. Johnson, secretary and treasurer.

Southern Car Company, High Point, N. C., which was recently reorganized, expects to cater for business to the entire country, as its freight rates are so favorable that it can reach out in competition to any part of the United States. The company also expects eventually to do considerable foreign business. Its plant will be in operation in the early part of June.

Kingston Locomotive Works, Kingston, Ont., at a special meeting of the stockholders, on May 26, accepted the offer of Emilius Jarvis & Company, of Toronto, representing a syndicate of engineers and capitalists, including Lord Glenconner, Marlborough Prior, J. Leigh Wood and F. R. S. Balfour, of London, Eng., for the purchase of the works. The company will shortly be reorganized, the capital stock increased to \$5,000,000, and the plant doubled in capacity. At present the capital is \$500,000, and the number of men employed between 500 and 600.

Sargent & Lundy, Chicago, Ill., consulting engineers, announce that James Lyman, formerly district engineer for the General Electric Company, Chicago, Ill., has become a member of the firm and will assume the duties of chief engineer of the electrical department. Mr. Lyman was associated from 1884 to 1887 with Thomas A. Edison in installing the first lighting plants in Pennsylvania, Maryland and other states. After a period of several years in the manufacturing business Mr. Lyman entered the employ of the General Electric Company, being located first in Schenectady and, for the past sixteen years in Chicago as district engineer. W. S. Monroe, formerly in charge of the drafting room of Sargent & Lundy, has been also taken into the firm and will hereafter assume the duties of chief engineer of the mechanical department under Mr. Sargent.

Electric Storage Battery Company, Philadelphia, Pa., has received the order for the battery equipment of the thirty-five new storage battery cars for the Dry Dock, East Broadway & Battery Railroad, of New York City, which will be placed in service this summer. These cars have been specially designed by the Third Avenue Railway. Each car is equipped with two motors and the batteries are installed under the longitudinal seats. The cars will have a maximum speed of 15 m.p.h. on level track with a schedule speed of 7 m.p.h. to 8 m.p.h., including stops. They are of the open platform single-truck type with 18-ft. bodies. The battery equipment of each car is to consist of fifty-eight cells of type 20 MV "Hycap-Exide." Cells of this type have been operated in street-car service in New York for about a year with marked success.

Sprague Electric Company, New York, N. Y., will be merged with the General Electric Company, Schenectady, N. Y., on June 1, 1911. Its business will be conducted under the name of Sprague Electric Works of General Electric Company. The manufacture and sale of the lines of apparatus and supplies heretofore exploited by the Sprague Electric Company will be continued by the Sprague Electric Works of General Electric Company under the same organization, with D. C. Durland in responsible charge as general manager. All correspondence should be sent to the Sprague Electric Works at the same address as in the past. The officers of the Sprague Electric Works will be continued as heretofore, with main offices at 527-531 West Thirty-fourth Street, New York, N. Y., and branch offices in the principal cities.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., reports the following recent orders: From the Toledo Railway & Light Company, 100 type 310-C box-frame interpole street railway motors; from the New York, New Haven & Hartford Railroad, four quadruple equipments of No. 409 a.c. railway motors with unit switch control; from the Guelph Radial Railway, one 27-ton locomotive with four No. 101B2 railway motors and type K-28-B control. Other recent orders for motors have come from the Hummelstown & Campbellstown Street Railway, Hershey, Pa.; the Nashville Railway & Light Company, Nashville, Tenn.; the Cumberland Electric Railway, Cumberland, Md.; the Frederick Railroad, Frederick, Md., and the Connecticut Company, New Haven, Conn. Recent foreign railway orders include one from the Takasaki Water Power Electric Company, of Japan, for two double equipments of No. 12A street railway motors with type 210D controllers. This order was placed through Takata & Company, the Westinghouse Company's representatives in Japan.

Woodmansee, Davidson & Sessions, Chicago, Ill., has been formed to act as consulting engineers, with headquarters in the First National Bank Building, Chicago, Ill. The firm is composed of Fay Woodmansee, C. J. Davidson and

E. O. Sessions. It is prepared to undertake consulting civil, electrical and mechanical engineering propositions of any character and magnitude. Fay Woodmansee began his first practical work in engineering with the government on the deep waterway survey of the Hudson River from the Troy State dam to Germantown, in 1898. He then became connected with the General Electric Company, and remained until Feb. 1, 1903, when he resigned to become electrical engineer for Sargent & Lundy, Chicago, Ill., consulting engineers. This position he held until his retirement from this company, on April 1, 1911. During his connection with Sargent & Lundy Mr. Woodmansee assisted in the rehabilitation of the International Traction Company of Buffalo, N. Y., and in the construction of several large power plants in other cities. C. J. Davidson formerly was chief engineer of power plants of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. A biographical sketch of Mr. Davidson was printed in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, when he resigned from that company. E. O. Sessions entered the employ of the Thomson-Houston Electric Company, Lynn, Mass., in 1880, and became assistant superintendent of the Edison General Electric Company, New York, in 1891. From 1894 to 1896 Mr. Sessions was general superintendent for Frank Jones, and during this period he installed thirty power plants and three railways. He then became connected with the General Electric Company as engineer of construction, and from 1901 to 1908 was engineer for the Stanley-G.I. Company. In 1908 he joined the General Electric Company as special engineer, which position he held until his retirement from that company, on May 1, 1911.

ADVERTISING LITERATURE

Indianapolis Brass Company, Indianapolis, Ind., is mailing a circular which describes the I. B. C. section insulator.

U. S. Metal & Manufacturing Company, New York, N. Y., has issued an interesting booklet on the subject of varnish, its history and manufacture.

Electric Storage Battery Company, Philadelphia, Pa., is distributing a small pamphlet with the title "The Story of the Storage Battery." It describes briefly some of the many applications of storage batteries of different sizes and types which the company makes.

Schuchardt & Schütte, New York, N. Y., have issued a pamphlet which describes and illustrates their hand tachometers for indicating accurately the speed of the shafts and spindles and also the periphery or belt speeds. The thumb-slide adjustment of the single spindle gives four ranges of speed.

National Carbon Company, Cleveland, Ohio, has issued a 4-in. x 6-in., 76-page, cloth-bound booklet, entitled, "Practical Operation of Arc Lamps." This publication describes fully the different types of a.c. and d.c. arc lamps and explains how their various operating troubles may be avoided or overcome. In addition to this, data are presented on wiring, line work, electrical instruments, etc., and tables are given on light reflection, interior illumination, wiring and miscellaneous engineering subjects.

General Electric Company, Schenectady, N. Y., has issued Bulletin Nos. 4826 and 4827, which describe the company's water and air-flow meters, respectively. Bulletin No. 4825 illustrates and describes a line of compact, accurate and moderate-priced instruments for use on alternating and direct-current switchboards. The bulletin contains dimension diagrams and also illustrations showing the actual size of the meter scales. The company has also issued Bulletin No. 4831, which describes briefly a type of oil switch suitable for installing in manholes. These switches are made single, double or triple pole, single-throw, and are for use on circuits on voltages up to 7500. The normal current rating is 200 amp.

NEW PUBLICATION

Locomotive Breakdowns. By George L. Fowler and William W. Wood. New York: The Norman W. Henley Publishing Company. 270 pages; illustrated. Price \$1.

This is the 1911 edition of this well-known aid for steam locomotive engineers. A large portion of the book is devoted to air brake troubles.

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CONTENTS.

The Railway Mechanical Conventions.....	1001
The Rapid Transit Situation in New York.....	1001
Electric Light and Electric Railway Business.....	1002
Electric Operation on the Long Island Railroad.....	1002
Morning Sessions at the Electric Railway Convention.....	1003
Car Equipment Inspection and Maintenance on Long Island Railroad.....	1004
New 82-Ton Electric Locomotive of the Northern Electric Railway.....	1011
Pole Lines of the Pennsylvania Railroad Across Hackensack Meadows.....	1014
Pennsylvania Commission Report of the Philadelphia Rapid Transit Company.....	1016
Papers Presented Before the Pacific Claim Agents' Association.....	1022
Receivers for Metropolitan Street Railway, Kansas City.....	1024
Brief of Company in Milwaukee Low-Fare Case.....	1025
Hearing in Regard to Interpretation of New Jersey Law.....	1026
Division of Five-Cent Fare in New York State.....	1027
Papers Read at National Electric Light Association Convention.....	1027
Report of Indiana Railroad Commission on Signals Delayed.....	1028
The Letter Ballot on Standards.....	1028
Aerial Monorailway.....	1028
Reheater for Speed-Roll Insulator.....	1028
New Lighting Transformers.....	1029
Spoke Type Steel Wheels.....	1029
Double-Track City Cars for Boise & Interurban Railway.....	1029
Outing Car of the Detroit United Railway.....	1030
Automatic Section Insulators.....	1030
Charcoal Cones for Grounding.....	1030
News of Electric Railways.....	1031
Financial and Corporate.....	1034
Traffic and Transportation.....	1037
Personal Mention.....	1039
Construction News.....	1040
Manufactures and Supplies.....	1043

The Railway Mechanical Conventions

The programs of the annual conventions of the Master Car Builders' and Master Mechanics' Associations, which will be held this year at Atlantic City, June 14-21, do not include committee reports or individual papers on any subjects relating especially to electric railway practice. But the sharp line which in the past was drawn between steam and electric railway rolling stock is rapidly disappearing, and every electric railway officer who can attend these conventions will find many things of interest and value to him in the discussions at the meetings and in the elaborate exhibit of railway appliances which will be made. The steady growth of interurban freight traffic and the developments in heavy electric traction are bringing the steam and electric railways closer together in their relations with each other, as witnessed by the admission of several electric interurban roads to membership in the American Railway Association and the active participation of representatives of electrified steam roads in the affairs of the American Electric Railway Association. Electric railways which are anxious to extend their freight operations must keep in touch with the Master Car Builders' rules and standards relating to interchange of equipment and be prepared to follow them. In the design and operation of electric locomotives many lessons can be learned from the ripe experience of the men long in charge of steam locomotive equipment. Such matters as third-rail and overhead trolley clearances are of mutual interest to steam and electric railways. Attendance at these June conventions affords the electric railway engineer an excellent opportunity of becoming acquainted with the point of view of steam railway men and of keeping in touch with new developments in their field which sooner or later may affect the construction and operation of electric railway equipment.

The Rapid Transit Situation in New York

At the time of going to press with this issue the exact terms of the report of the committee of the Board of Estimate on rapid transit facilities in New York had not been published, but they are said to provide entrance to Manhattan as far as Fifty-ninth Street and several extensions in Brooklyn for the Brooklyn Rapid Transit Company, while the Interborough Rapid Transit Company is to get its upper east-side and lower west-side lines, extensions in the Bronx and in Brooklyn, and the right to build third-tracks on its elevated lines in Manhattan not so equipped at present. The financial terms under which these extensions are to be allowed are also not yet known, so that it is impossible to determine whether the companies will find such lines profitable, but on the assumption that these terms are not too arduous the proposed plan seems very attractive. At last a comprehensive rapid transit system has been seriously proposed by the city authorities! As so

far outlined the plan does not permit a trip from the Bronx to Coney Island for 5 cents, but this is not needed and it would be unfair to the other travelers in New York to provide it. The extent of the proposed lines has given rise to fear in some quarters that the city will be overprovided with rapid transit facilities, but we have no apprehension on this point. By the time that the lines are built we believe that they will be overcrowded, not perhaps to the same extent as the present subway, but so much so as then to require new transit facilities. The only danger now is that there will be a deadlock between the city authorities and one or both of the railway companies as to the terms for the franchises. The Interborough Rapid Transit Company at present is in a very strong position, owning as it does the right for many years to the best single rapid transit route in Manhattan. We trust that the city authorities will realize this situation and will not, in their effort to secure "good terms," sacrifice the far more important demands of the city for rapid transit service. On the other hand, we are equally anxious to see both companies meet the city on the broadest possible basis, and hope that they will realize that the development and prosperity of the city are intimately associated with their own business prosperity.

Electric Light and Electric Railway Business

A marked feature of the convention of the National Electric Light Association last week and of the general tone of the conversation of those in attendance was a general optimism for the future. This fact, accompanied as it is with evidence that it has become more easy to interest financial houses in new electric lighting enterprises than in new electric railway undertakings, suggests the inquiry as to the reasons for this difference. At first sight the two lines of business would seem to be very closely allied and to be affected by the same political and economical conditions. But further consideration shows a number of striking points of contrast to which the difference in financial status, if such exists, may probably be attributed. In the first place, it is probable that the lighting industry has been less affected than the railway business by the large increased cost of labor which has occurred during the last few years. In the second place, a lighting company has a better control over the rates which it charges. With the railway a change of rate is almost always out of the hands of the management and even out of those of a public service commission. Nearly always, by statute or charter, the railway rate within city limits is fixed irrespective of the service rendered and can never be more than 5 cents, and may be a much lower sum, depending upon the extent to which passengers use transfers; in the lighting industry the net profit for the different classes of service may be calculated to a nicety. In railway work again the erection of every tall office building in a city means greater street congestion and slower speed, and the extension of the city limits is equivalent to the extension of the ride which must be given for a 5-cent fare. In the electric lighting industry these evidences of a city's growth are simply opportunities for increased business at a profitable rate. Finally there have undoubtedly been more technical improvements in the lighting industry during the last few years than in the railway business. The introduction of the metallic-filament lamp with its high efficiency has been a tremendous stimulus to the use of illumination, and while the immediate effect may have been to reduce the

demand for central-station current, practically all thoughtful observers are agreed, we believe, that the net effect already has been very beneficial to the electric lighting business. Concurrently, also, there has been a more general adoption of electric current for light and heavy power uses, as the convenience and economy of electric power for various households and industrial purposes have become more apparent. Both branches of the electrical industry have received the benefit of the improvements in generating apparatus, but in railway work there have not been the same radical improvements from invention as in other branches of the service.

ELECTRIC OPERATION ON THE LONG ISLAND RAILROAD

The Long Island Railroad was the first railroad in the United States to substitute electric traction for steam on a large scale. The success of the experiment was immediate, and from the standpoints of economy, reliability and traffic productivity electric operation has more than come up to expectations. It is now six years since the first of the electric lines, from Flatbush Avenue, Brooklyn, to Rockaway Park, a distance of 13.5 miles, was opened for traffic. Since 1905 the route mileage of the electric lines in operation has been increased to 62 miles, 100 trains a day in each direction are being run through the East River tunnels in and out of the new Pennsylvania terminal station, and the commuter traffic has increased from an average of 6387 passengers daily to 11,869 passengers. The three elements of a system of electric traction which do not enter into steam railroad operation are the power generating apparatus, the transmission and distribution network and the electric motor cars or locomotives which propel the trains. The generation of electric power in central stations has reached a stage of efficiency and reliability far beyond that of individual steam locomotive power units. The transmission and distribution of electricity through overhead trolley wires or third rails involves no special difficulties in the matter of reliability or cost of upkeep. To the steam railroad man the most important consideration in comparing steam and electric operation is the relative performance of electric motor cars or locomotives and steam locomotives. An electric motor car with its brakes, control and other auxiliary apparatus may seem complicated to one unfamiliar with the purpose of each part. But the fact remains that the electrical equipment of a motor car performs its functions with remarkable reliability, and practically all of it is not only damage-proof but fool-proof.

On another page in this issue will be found an extended description of the electric equipment, inspection and maintenance methods of the Long Island Railroad, which concludes with a summary of failures and the train delays caused thereby for the year 1910. The number of failures and the total delays for the year may impress the reader at first as large, but they amount to less than one failure per day, or averaged throughout the year the delays were but seven minutes a day, with an average daily train movement of 5340 miles. A comparison of steam passenger locomotive failures for the whole Long Island Railroad system with the electric car failures shows the greater reliability of the electric equipment. If the comparison were made on the basis of motive power equipment alone, excluding from the electric train column all delays due to failures of trucks, bodies or body brake gear, approximately seventy-

five delays for a total of 740 minutes, the comparison would be still more favorable to the electric equipment. In this connection it is interesting to note that the New Haven a.c.-d.c. locomotives during the last six months of 1909 made 11,100 miles per failure, while the steam passenger locomotives on the same road made only 4750 miles per failure.

The economy of electric operation for heavy suburban traffic, such as the Long Island Railroad carries on its western lines, was clearly shown in the report on electric traction by George Gibbs, presented last year at the International Railway Congress. In 1908 the Long Island operated its electric trains at a cost of 17.80 cents per car mile as compared with 27.95 cents for its former steam service. In the matter of repairs to rolling stock equipment the electric service cost much less than steam. Assuming a three-car train composed of two motor cars and a trailer, the cost of inspection, cleaning and maintenance per 100 train miles was \$6.10 in 1910. The cost of the same item for a steam train of the same make-up was more than \$11.

The secret of successful operation of electric equipment such as is owned by the Long Island Railroad is thorough and systematic inspection and prompt remedying of minor defects which are found. The cost is not excessive—in fact, it is less than the cost of car cleaning—but its value cannot be overstated. The failures of the electric apparatus usually are of minor importance, and they can be prevented in a large measure by careful inspection, cleaning and adjustment. The motormen cannot be depended upon to find and remedy troubles developed on the road without incurring long delays and possibly seriously damaging the equipment in their effort to keep the trains moving.

MORNING SESSIONS AT THE ELECTRIC RAILWAY CONVENTION

In arranging the program of the electric railway convention it has been the custom in the past to provide for morning and afternoon sessions of one or more associations on four out of the five days. Last year the five associations held twenty-one sessions in all, and of this number eight sessions were in the afternoon. With the exception of the American Association, which held no morning sessions, it was noticeable that at the afternoon sessions the associations were invariably late in getting down to business, that the attendance was smaller than at the morning sessions and the interest taken in the discussions was less. By Thursday afternoon the work of the convention was practically over, yet the Engineering Association in order to finish its long program was obliged to have two sessions on Friday, after most of the other convention visitors had left for their homes. We venture the suggestion that the convention work of all of the associations would be expedited and interest in the discussions would be maintained to a greater extent throughout the week if the program this year could be arranged so as to provide more morning sessions and fewer afternoon sessions, especially after the first day.

A session on Monday morning would be inconvenient because that is the time at which most of the delegates arrive, and the hours before luncheon are necessary to allow delegates to get settled at their hotels and to register. Hence Monday afternoon could well be utilized for the transaction of the

routine business of the opening sessions of each of the four affiliated associations. Then on Tuesday morning the presentation of papers and committee reports and the discussion thereon could be begun without delay. It would then be necessary only to lengthen out the morning sessions somewhat during the succeeding three days in order to dispose of all matters which might be brought up for discussion. The Engineering Association met last year on Tuesday, Wednesday and Friday and held two sessions on each day. With the larger number of reports this year it probably would require, if it held an opening session on Monday afternoon, four long morning sessions to complete its program. This would carry the meetings of the Engineering Association over until Friday noon. The Transportation & Traffic Association might require an equal number of meetings. The Claim Agents' and Accountants' associations, however, if they should take the same time as last year, could easily dispose of their business by Thursday noon.

It would probably be advisable for the American Association to continue to hold all of its sessions in the afternoon, so as to permit the executive officers to attend any of the morning sessions of the affiliated associations in which they were especially interested. We see no good reason, however, why the Claim Agents', Accountants', Transportation & Traffic, and Engineering associations should not hold their meetings simultaneously. Last year all four of these associations held meetings on Tuesday morning, and two and sometimes three of the associations held simultaneous meetings on other days of the week.

One reason for prolonging the meetings of the Engineering Association until Friday afternoon has been the desire to give the members of that association one whole day in which to inspect the exhibits. It is a fact, however, that the intermission of one day between the meeting on Wednesday afternoon and Friday morning has resulted for a number of years in many members leaving on Wednesday evening, so that they not only missed inspecting the exhibits on Thursday, but were also absent from the two sessions on Friday. If the meetings of the Engineering Association were held on consecutive days in the morning, the members would have four afternoons free for the exhibits, and would really have more time to spend in visiting the booths and in examining the new apparatus than they have at present.

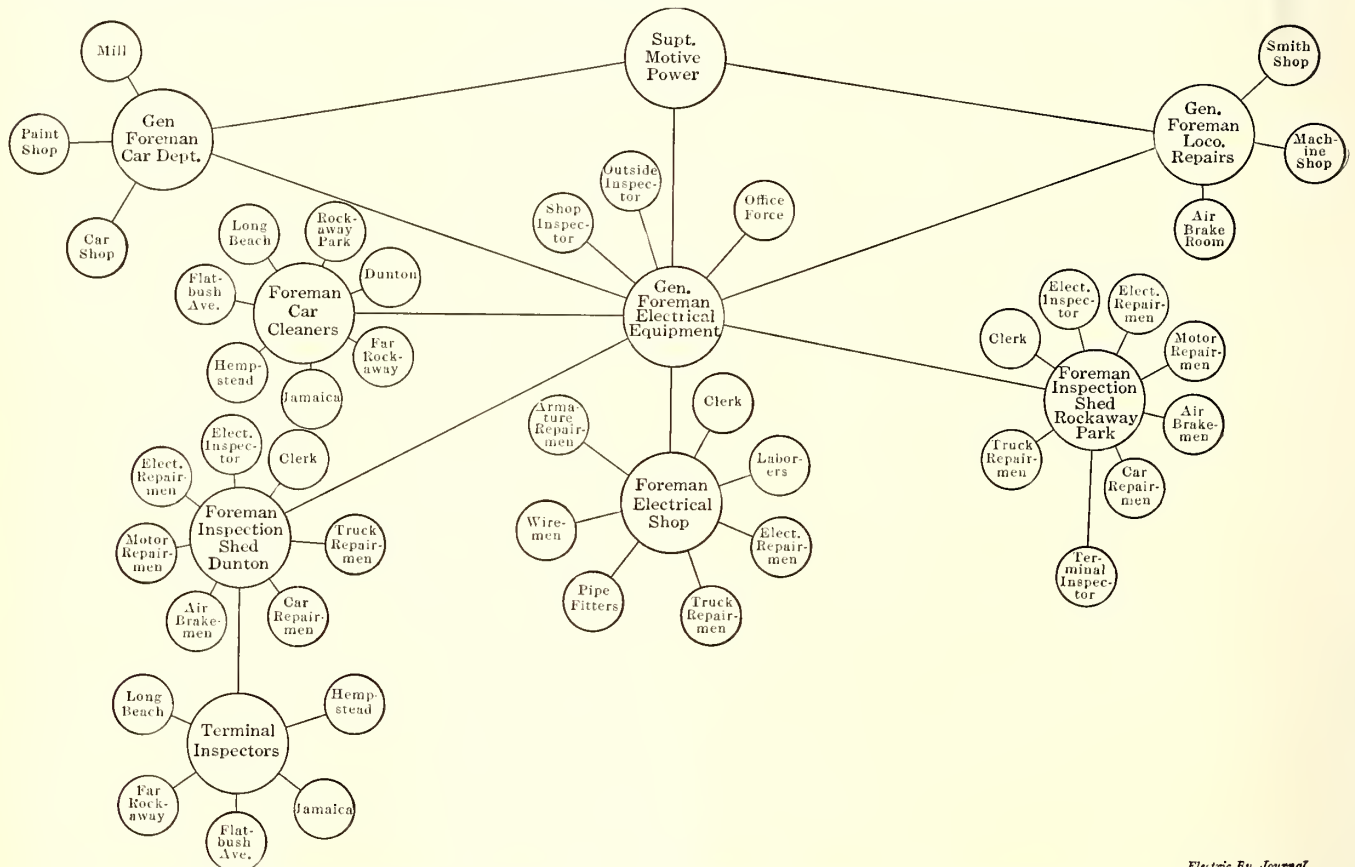
The plan outlined is that which is followed at the conventions of the Master Car Builders' and the Master Mechanics' associations. Each of these associations holds only three sessions, beginning promptly at 9:30 in the morning and lasting until 1:30 or 2 p. m. Their programs are long and the discussion seldom lags, yet they usually succeed in dispatching the business which comes before them and have some time to spare. In a convention town like Atlantic City, where the delegates are widely scattered at different hotels, some of them a long distance from the meeting place, it is almost impossible to begin an afternoon session before 2:30 or even 3 o'clock, even when there is no morning session, and when a morning session continues until 1 o'clock, the time at which the afternoon session begins is apt to be still later. The days are short in October and by 5 o'clock the daylight is gone. We hope that this plan will be considered by the executive committees of the different associations in making up their programs for the 1911 convention.

CAR EQUIPMENT INSPECTION AND MAINTENANCE ON THE LONG ISLAND RAILROAD

Regular operation of electric trains on the Long Island Railroad between Flatbush Avenue, Brooklyn, and Rockaway Park was begun on July 26, 1905, and before the end of that year was extended to Rockaway Junction, Valley Stream and Far Rockaway. Electric trains are now being operated also to Hempstead, Long Beach and the Pennsylvania Station in New York City. The electrified lines include about 62 route miles and 164 miles of single track. The original electric car equipment has been in service for nearly six years and the work of maintaining it in good condition has reached the stage of uniform routine based on experience covering all conditions of weather and traffic demands. The methods of inspection and shop overhauling used are representative of the requirements of an electrified steam railroad operating heavy high-speed local and express suburban service with direct-current, multiple-

Fifty additional steel motor passenger cars with 54-ft. bodies are now being built.

The 134 steel motor passenger cars with 41-ft. bodies constitute the original motor car equipment. They were built in 1905 from designs of George Gibbs, chief engineer of electric traction of the Long Island Railroad, and resemble very closely the steel cars designed by him and built about the same time for the Interborough Rapid Transit Company's subway service. A complete description of these cars was printed in the STREET RAILWAY JOURNAL of Aug. 11 and 18, 1906. The bodies are of steel, 41 ft. $\frac{1}{2}$ in. long over corner posts with four cross seats in the center on each side. They are mounted on a motor truck and a trailer truck, both of the equalized, pedestal type made by the Baldwin Locomotive Works. The electrical equipment consists of two Westinghouse No. 113 split-frame motors of 200 hp each, with Westinghouse electro-pneumatic unit-switch control, using storage batteries for the control circuits. The five wooden baggage cars have the same trucks, motors and control apparatus as the steel passenger cars. The



Long Island Railroad—Diagram of Electric Car Equipment Inspection and Maintenance Organization

unit trains. Since electric operation was begun there have been no long interruptions to service owing to failures of the car equipment, nor have there been any serious accidents resulting from derailments or collisions of electric trains. Some changes have been made in the details of the electrical apparatus on the original cars and in the new cars now being equipped and put in service, but on the whole the motors, control equipment and brakes installed on the cars six years ago have given excellent results and are still in good condition.

EQUIPMENT

The electric car equipment of the Long Island Railroad includes the following:

- 134 steel motor passenger cars, 41-ft. bodies.
- 5 wooden motor baggage cars.
- 80 wooden trailer cars.
- 150 steel motor passenger cars, 54-ft. bodies.
- 15 steel combination passenger and baggage motor cars.
- 7 steel motor baggage cars.
- 1 motor rotary snow plow.
- 2 calcium chloride cars to remove sleet from third-rail.

trailer cars were formerly used in suburban steam service and were wired with control and bus line cables, lights and heaters.

The 150 steel passenger cars and the 15 combination cars are of the standard design of the Pennsylvania Railroad, slightly modified to permit the installation of electric equipment. They will be fully described in a later issue. The bodies are 54 ft. long over corner posts and are mounted on a motor and a trailer truck. The trailer truck, which is the Pennsylvania Railroad standard four-wheel design, was illustrated in the ELECTRIC RAILWAY JOURNAL for June 29, 1908. The motor truck is of the same general type and on it are mounted two Westinghouse No. 308 interpole, box-frame motors of 215 hp each. The control apparatus and air-brake equipment is the same as on the earlier steel motor cars with some slight changes. The seven steel baggage cars are equipped with two No. 308 motors on each truck and duplicate control apparatus, making them practically two single-car equipments in one. The first of the new steel cars was put in service early in 1910, but the routine inspection and maintenance work is the same on them as on the old cars. In addition to caring for this equipment the elec-

trical repair shops at Morris Park do all the electrical overhauling and truck work for about 50 surface cars operated on the trolley lines owned by the Long Island Railroad at Huntington, Northport, Sea Cliff, Glen Cove and Rockaway Beach.

SHOP AND INSPECTION FACILITIES

At the time electric operation was begun reinforced concrete inspection sheds were erected at Dunton and Rockaway Park, and an addition to the car and locomotive shops at Morris Park was built to handle repairs to electric cars. The structural features of the shops and inspection sheds were fully described in the STREET RAILWAY JOURNAL for Aug. 18, 1906. The Dunton inspection shed is 242 ft. 8 in. long and 94 ft. wide. It contains six pit tracks, each long enough to hold a train of four cars of the older types or three cars of the 1910 type. The shed at Rockaway Park is of the same length, but contains only three tracks. The third-rail is not continued into the sheds, but the cars are moved inside of the buildings by connecting to one contact shoe a jumper cable dropped from a carriage running on a T-iron track above the aisle between pits.

The electrical shop at Morris Park consists of a one-story brick and steel frame building 216 ft. long and 110 ft. wide, parallel to and separated from the car and paint shop building by a transfer table pit. The two buildings are connected at one end by a two-story mill, part of the ground floor of which is used for the armature and electrical repair shop and for wheel turning. The electrical shop contains 13 pit tracks each holding one car with ample space at each end next to the walls. Two tracks next to the mill building are spanned by two 10-ton Niles electric traveling cranes and are used for truck repairs.

ORGANIZATION OF ELECTRICAL EQUIPMENT DEPARTMENT

The force of men in charge of maintenance and repair of electrical equipment is headed by G. C. Bishop, superintendent of motive power, who also has supervision over all steam locomotive and car equipment belonging to the Long Island Railroad. Reporting to him are a general foreman of electrical equipment, R. W. Brodmann, who has supervision over all electrical repairs and inspection; a general foreman of the

INSPECTION METHODS

The inspection given to all electric cars includes terminal train inspection whenever a car is put on or cut off of a train, regular inspection at one of the two inspection sheds at the completion of 1000 miles, general inspection and oiling at the completion of about 6000 miles and general overhauling at the completion of 60,000 miles. When electric operation was begun the inspection methods of the Interborough Rapid Transit Company as used in the subway service were adopted, but it soon became evident

LONG ISLAND RAILROAD CO.

Motorman's Report of Defects in Motor Trailer Baggage Car No. _____

Date _____ 1911 Division _____

Time _____ M.

Train No. _____ Place of Trouble _____

Length of Detention _____ Hrs. _____ Mins. _____

Place Laid Up _____

Motorman _____ Conductor _____

Air Brake Troubles.

Motorman's Valve _____

Brakes do not stop train _____

Governor _____

Compressor not working _____

Compressor fuse blown _____

Air Whistles _____

Slide Valve Feed Valve _____

Triple Valve _____

Controller and Motor Troubles.

(CONTINUED.)

Limit Switch _____

Switches _____

Line Relay _____

Batteries Weak _____

Resistance Grinds _____

Main Fuse blown _____

Circuit Breaker blown _____

Bus Fuse blown _____

Shoe Fuses _____

Contact Shoe broken _____

Car jumps when starting _____

Car fails to work at times _____

Lights _____

Fuses _____

Heaters _____

Truck Troubles.

Flat Wheel _____

Hot Box _____

Broken Brake Rigging _____

Truck Noisy _____

Car lurches when approaching sidings or curves _____

Dead Car _____

Was Power Reversed? _____

Were motors bucked? _____

Was emergency brake used? _____

Obstruction on track _____

REMARKS

Form M.P. 16 17x7 1/2

L. I. R. R. CO.

M. P. Dept.

Car _____

Date _____

Arm. Bearings Oiled

Air Compressor Oiled

Motors Cleaned

Brakes Adjusted

Control Inspected

Lights & Heaters Insp.

Car Bodies Inspected

Contact Shoes & Beams

Auto Couplers & Hoses

Brake & Feed Valves

Blower Motors Insp.

Long Island Railroad—Method of Boring Motor Bearings

car department who has charge of all freight and passenger car body repairs and painting, and a general foreman of locomotive repairs who is in charge of the machine and smith shops at Morris Park and also the air-brake department. Heavy repairs to electric car bodies and trucks are made by the car and locomotive departments on shop orders signed by the general foreman of electrical equipment. The complete organization of the electrical department is shown in the diagram on the opposite page.

Long Island Railroad—Motorman's Report of Defects and Record of Inspection

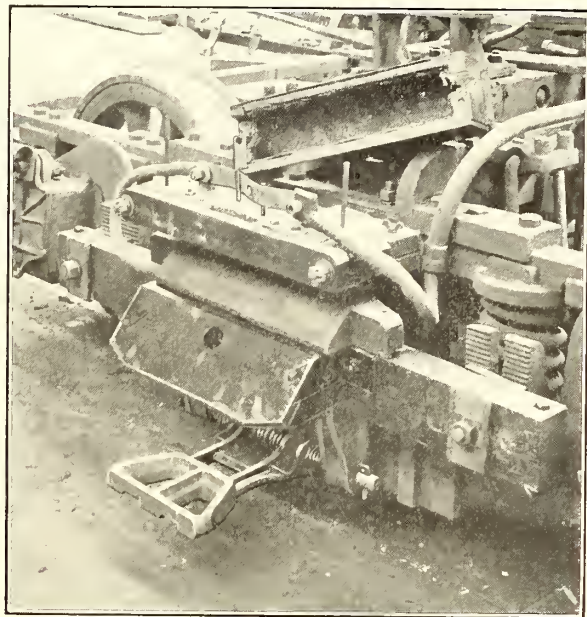
that a regular three-day inspection period was unsuited to the conditions on the Long Island Railroad. Unlike the subway service, where the cars were kept together in trains, cars were put on and cut off of trains on nearly every trip and it was impossible to keep together cars due for inspection on the same day. A mileage basis was adopted later and the period between inspections was fixed at 800 miles. After a thorough trial the period was lengthened to 1000 miles.

The foreman of the inspection shed at Dunton receives each day duplicate copies of all conductor's car-mileage reports to the car record office at Jamaica. A clerk sorts these by car numbers and the mileage of each car is entered on a separate card. The clerk goes over these cards every day and makes up a list of the numbers of all cars which will have made 1000 miles by the following day. A copy of this list is sent to the trainmaster, and all cars due for inspection are cut out of trains at the Jamaica terminal yard as they come in during the day. They are made up into trains, and a special drill crew runs these trains to the Dunton inspection shed and brings back trains which have passed inspection. The Rockaway Park shed adjoins the terminal at that part and no drill crew is required there. As fast as the cars are inspected and found in good condition they are returned to service. All inspection at the sheds is done during the daytime.

TERMINAL INSPECTION

Terminal inspectors are stationed at Rockaway Park, Hempstead, Far Rockaway, Jamaica, Flatbush Avenue and Long Beach

for the purpose of inspecting the brakes and control on all trains after cars have been put on or cut off and for detecting hot journals, worn brakeshoes and other visible defects. At the end of a run the motorman makes out a repair report card if he or the conductor has noted any defects in the train and this card is turned in to the terminal inspector. If the inspector cannot remedy the defect or trouble reported or he discovers any other defects which he cannot remedy the car is cut out and sent to the inspection shed with a statement of the reason for



Long Island Railroad—Third-Rail Shoe Fuse

taking the car out of service. For convenience the principal defects found on a car are noted on a tag which is attached to the car when it is sent to the inspection shed. The terminal inspectors make a daily report to the general foreman of electrical equipment by car numbers of all defects noted and repaired and copies of these reports are sent to the inspection shed foremen so that attention may be given to any defects to remedy which temporary repairs were made.

REGULAR INSPECTION

Cars brought in for the 1000-mile inspection are made up in trains of three or four cars. The following is an outline of the work done on each car:

Trucks: Third-rail shoe fuses, shoe fuse boxes, shoe beams and contact shoes inspected; broken and blown fuses replaced and contact shoes gaged. Journal brasses inspected for loose or broken babbitt. Worn brakeshoes replaced and brake rigging adjusted; side bearings and center plates oiled; all truck bolts inspected and tightened; brake rigging and bolster chafing plates oiled. Wheels gaged, tires and flanges inspected.

Motors: Motors cleaned and blown out with compressed air; brushes removed, brush holders, commutators, armature clearance and motor leads inspected; brushes cleaned and returned; brush holder shunts, hammers and springs examined.

Oiling: Armature bearings oiled. Oil wells are first gaged, then replenished with oil to a depth of $3\frac{1}{2}$ in. on commutator end and 4 in. on pinion end. Axle bearings gaged and replenished with free oil to a depth of $2\frac{1}{2}$ in. If axle bearings are worn to exceed $1/16$ in. they are replaced.

Car Bodies: All bolts inspected and tightened; drawbars, pilots, trapdoors, windows, seats, sliding doors, end doors, safety tread, flooring, bells, bell cords, gates, chains, sliding door devices, roofs, ventilators, etc., inspected.

Air Brake: Compressor motor blown out, cleaned and inspected; armature clearance gaged; brushes removed, brush holders examined and tension readjusted if necessary, brushes cleaned and replaced; commutator cleaned if necessary; compressor bearings and crank chamber oiled; air strainer inspected

and cleaned; piston travel and slack adjuster examined and set; main reservoirs drained; control reservoirs drained; conductor's valve, motorman's brake valve, feed and reducing valves tested; whistle tested; air hose and automatic couplers inspected; hand brakes inspected and tested.

Switch Group: Blown out and cleaned; all worn parts replaced; interlock fingers examined for tension and contact; switch group operated for sluggish switches or leaking valves.

Line Switch: Same as switch group.

Reverser: Same as switch group.

Switchboard: Blown out with compressed air and all switches and other apparatus examined and wiped off; heater circuits tested; light circuits tested; master switches examined and tested.

After all work on the cars is completed each car is operated from both ends in the forward and reverse directions, with the line switch out. The train is then made up and operated from both ends, and the action of the switch groups and reverses is noted. The circuit-breakers are tripped and reset; the automatic emergency train brake tried and the air brakes tested; storage batteries are tested for charge.

An inspection crew consists of one electric repairman and one helper who inspect and repair all electrical apparatus; one motor repairman and one helper who inspect motors and oil bearings; one air brake repairman who inspects the air brake apparatus; one carpenter who attends to the necessary body repairs, and one electrical inspector who gives the trains a final inspection and tests both the air brakes and electrical equipment before the train leaves the inspection shed. If more than one train must be inspected at a time an extra crew of the same size is put on each train. The time required for a regular inspection of a four-car train is $1\frac{1}{2}$ hours.

A record of each inspection of each car is kept on small cards $1\frac{7}{8}$ in. x $7\frac{3}{4}$ in., one of which is placed in a tin holder and hung on the car when it is brought into the inspection shed. This card has 11 blank spaces for entering the signatures of the men who inspect each of the different parts on the car. On the back of the card the mileage of the car since the last previous inspection is entered and the card is then filed by the car number for convenient reference. The inspection shed foreman sends to the general foreman of electrical equipment each day a full report of all defects discovered while going over cars for inspection and also a report of incandescent lamps renewed. If a car needs to be sent to the shop a statement of all the defects found is sent with the car for the information of the shop foreman.

Owing to the short time available for making an inspection, repair work at the inspection sheds is confined to renewals of worn or defective parts. A small stock of brakeshoes and contact shoes, fuses, brushes, lamps, etc., is kept at each inspection shed and one or two extra brake valves, feed valves, triple valves, compressors, blower motors, storage batteries and other unit parts are also kept on hand to replace any defective parts found. All parts removed from the cars are returned to the shops at Morris Park for repairs.

GENERAL INSPECTION

At every sixth inspection, or 6000 miles, each car is given a thorough inspection and oiling which includes everything done at the regular inspection with the following additional work:

Packing is removed from all journal and bearing boxes; waste is teased and the boxes are repacked with the same waste if in good condition; free oil in the armature and axle boxes is brought up to proper level; journals are supplied with two galls of additional oil; gears and pinions are examined and supplied with 10 lb. of gear grease per motor; car wiring is examined and tested; junction boxes, switch group, reverser, line switch and other apparatus are examined as to general condition of wiring and wire terminals and connection blocks. Switch groups, line switch, reverser and rheostat frames and batteries are tested for grounds; all insulated bolts, washers and pipe insulators are cleaned and shellacked; plug is removed from switch group air chamber

and air chamber is blown out; all power connections in the switch group and line switch are examined and tightened; the pistons of the air cylinders in the switch group are oiled, pin valves on all electro-pneumatic switches are removed and cleaned; brake valves, feed valves, compressor governors, check valves and other air brake apparatus cleaned, oiled and adjusted. Brake cylinders are cleaned and lubricated every six months. A general inspection of this kind requires three hours for a four-car train.

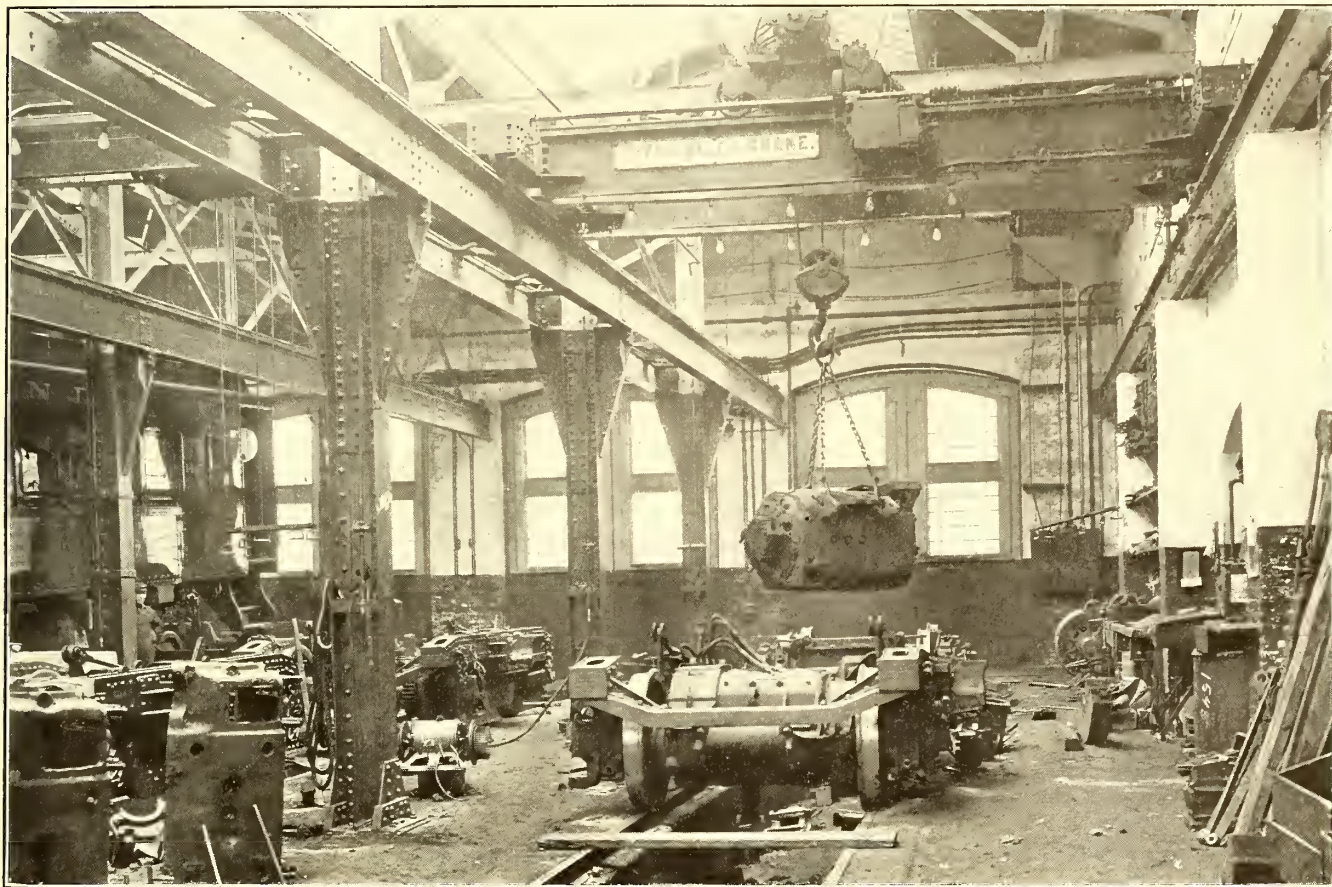
SHOP OVERHAULING

When a car has completed 60,000 miles it is sent to the shop at Morris Park for a general overhauling. The body is jacked up off of the trucks and supported on wooden horses and is stripped of all removable parts. The brake valves, triple valve, governor and air compressor are sent to the air-brake room for cleaning. The brake cylinder is cleaned and oiled and the reservoirs are drained. All piping is carefully inspected for leaks and corrosion. The line switch is removed and taken

axle and armature-bearing shells on all motors are re-babbitted with a tin-base metal composed of 80 per cent tin, 10 per cent lead and 10 per cent antimony. The interior and exterior of the motor are given a coat of asphaltum paint. Brush holders are removed and overhauled; all brass parts are dipped in an acid bath and new shunts and springs applied.

ARMATURE WINDING

The armatures of the motors used on the Long Island Railroad are wound with strap copper, each coil consisting of three ribbons. The two halves of each coil when new were riveted together at the pinion end after being put in place in the slots. In rewinding the armatures several departures from ordinary practice have been made. The old coils are stripped and are then built up with strips of thin micanite coated on both sides with white shellac to prevent flaking. The micanite is placed between the copper straps and the coil is then wrapped with one layer of thin linen tape to hold it together. The straight part of the coil is surrounded with a box of sheet



Long Island Railroad—Truck Repair Bay

apart for inspection and cleaning and all switches on the switchboard are cleaned and polished. The switch group and reverser are not taken down but the pistons are removed and the cylinders cleaned and oiled, contacts polished and interlocks inspected. All junction boxes are opened, connections examined and binding-post nuts tightened. The control storage batteries are tested and replaced by others if they are deteriorated. Heaters are inspected and their capacity tested with an ammeter. The lighting circuits are also tested and the sockets examined for loose connections. Unless a car requires heavy body repairs it is not moved from the electrical shop and all painting and varnishing is done while the equipment is being overhauled.

MOTOR REPAIRS

After the trucks have been removed the motors are opened and inspected for baked fields and armatures. A motor which shows any signs of defective insulation is taken off and if in the judgment of the foreman of the electrical shop the fields or armature need rewinding the necessary work is done. The

micanite and thin fish paper and the whole coil is taped with asbestos tape 1 in. wide, after which it is dipped in an insulating compound and allowed to dry. The asbestos tape is kept in rolls in a steam drying oven and is exposed to moisture only while the coil is being wrapped and before it is dipped. After the top and bottom layers are in place small clips of tinned copper are slipped over the ends of the two halves of each coil and soldered on. A canvas hood is then applied over the soldered joints. A Passburg vacuum impregnating plant has been installed recently and all armature and field coils will be impregnated with this process in the future. Two old lathes are used for banding. One is belted for slow speed and the other for high speed. An apprentice learns on the slow-speed lathe and then is advanced to the high-speed lathe as he becomes more proficient. A piece of German silver set in the slot of the tool post is used to give the desired tension on the banding wire.

COMMUTATORS

Commutators are turned in a large Pond lathe used for

boring bearings and other machine work. A fine feed with a sharp-pointed diamond-shaped tool set well above the center is used. This gives an excellent surface to the commutator. When electric operation was first begun several commutators were slotted to a depth of about $3/32$ in., but unsatisfactory results were secured due to short-circuiting between the bars and the practice was discontinued. Recently, however, a few commutators have been slotted to a depth of $1/32$ in. and it has been decided to slot all commutators in the future. For patching burns on commutators a cement made of dextrine, plaster of paris and shellac is used.

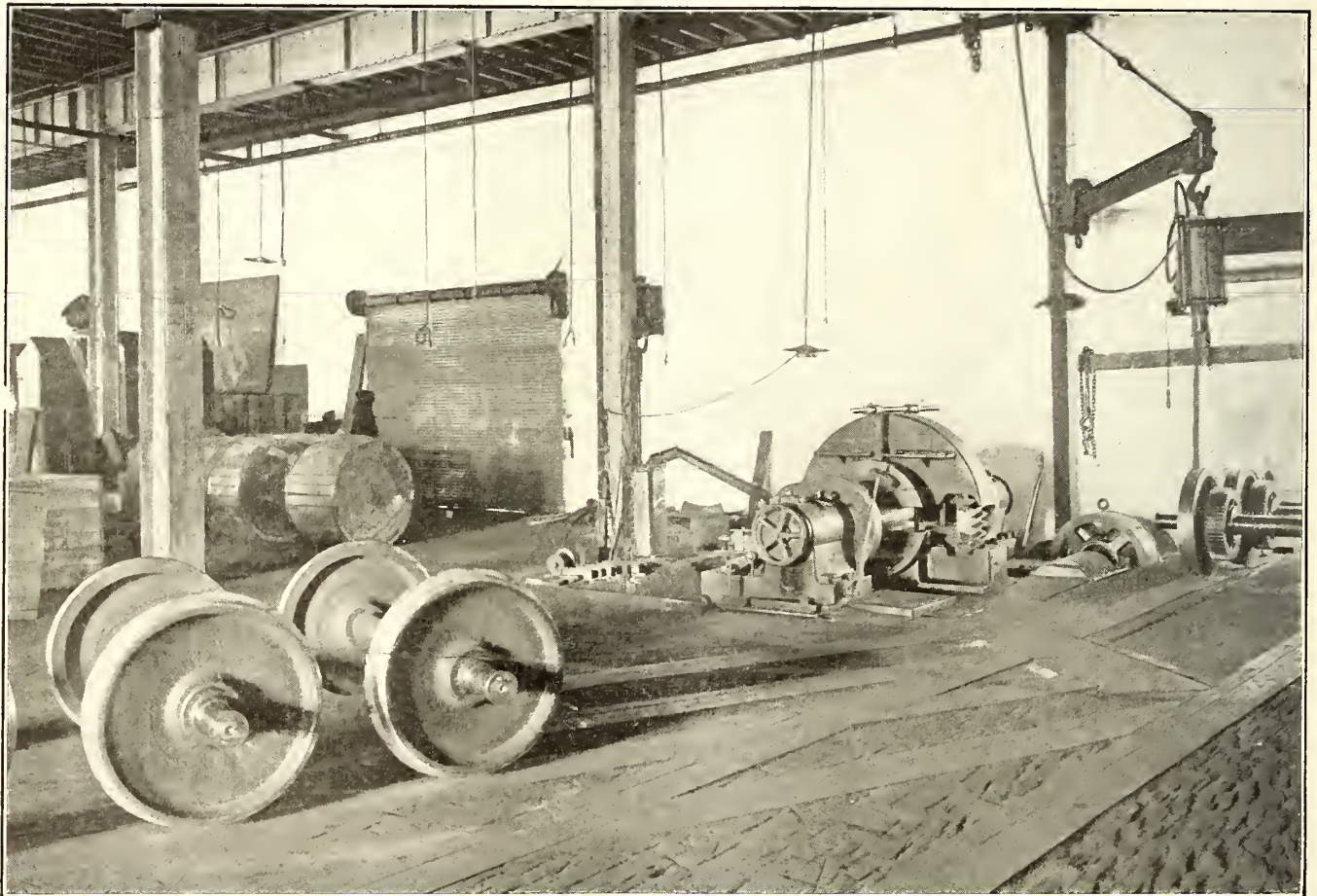
BRUSHES

While no serious brush troubles have developed a thorough test was made about two years ago to determine the cheapest grade of brush which would give satisfactory results. The brushes now used are a medium hard grade of the Laclede brand

down as required and there has been no unusual or irregular flange wear. Steel-tired wheels are used under the old cars but several hundred solid steel wheels have been applied under the new cars. A Niles center-drive wheel lathe is used to turn all electric car wheels and some steam passenger car wheels. It is located in a pit on the ground floor of the mill building adjoining the truck overhauling tracks in the electrical shop. The floor of the shop is of smooth asphalt in which have been embedded flat steel plates about 12 in. wide to form runways on which a pair of wheels and axle can be rolled from the electrical shop into the adjoining room and on to the bed of the wheel lathe. A jib crane with an air hoist is used to serve the wheel lathe. All wheels are pressed on and off in the machine shop.

TESTING CARS

After a car has been overhauled and all parts reassembled



Long Island Railroad—Wheel Lathe and Steel Plates in Shop Floor

made by the National Carbon Company. The life of the brushes is from 45,000 to 50,000 miles. All brushes are of the same width and hardness and are held on the commutator with a pressure of about 6 lb. per square inch. No difficulty from worn commutators, excessive sparking or carbon dust is now being experienced.

BEARINGS

Motor armature and axle bearings of all sizes are turned in a chuck on the Pond lathe. Various sizes of bushings are used to hold the bearings in the chuck and these bushings serve as templates for worn or twisted shells. Only a few of the original armature shafts have required turning and the reduction in diameter has been by even sixteenths of an inch. The bearings for armature shafts of reduced size are bored out to the proper size as required and no stock of odd sizes is kept on hand.

WHEELS

No special records are kept of wheels. They are turned

the wiring and equipment is given a thorough electrical test. On the old steel cars all main motor circuit and bus wiring is given an insulation test of 2000 volts a.c. by means of a transformer set mounted on a two-wheel truck. A test of 3000 volts a.c. is given to the same wiring on the new steel cars. Light, heat and control circuits are also given voltage tests of 1000 volts and 1500 volts respectively on the old and new cars. The car is then operated forward and back from both ends with the master controller and the action of all the contactors is noted by notching up with the line switch out and in. In order to test the control train-line connections from both ends a master controller mounted on a panel with a jumper and plug is used. The plug is inserted in each of the two jumper sockets on each end of the car and the master controller operated with the line switch out and in. The final tests are those given to the line-switch circuit-breaker and the limit switch. A water rheostat is used for these tests. It consists of a rectangular wooden tank outside of the building in which

are placed two large iron plates. One plate is stationary and the other is hung from a cross-bar mounted on wheels running along the top of the tank. A long wooden handle is attached to the center of the cross-bar and projects through a window into the shop. By pushing the handle in or out the movable plate is moved toward or away from the fixed plate. To test the limit switch the car is blocked and a bell is inserted in the control circuit of the limit switch. One man on the car notches up the controller one notch while another man manipulates the water rheostat and watches the ammeter mounted on the wall near the window. When the limit switch opens owing to the flow of an excess of current the bell stops ringing and the man on the car blows the whistle. The ammeter reading is then taken and the limit switch is adjusted until it opens at 350 amp. The capacity of the line switch is tested in the same way. The car is blocked and the controller notched up to the full series position. The water rheostat is then closed up until the safe current value is reached or the circuit-breaker opens. The circuit-breakers on the old steel cars are set for 750 amp and on the new cars for 850 amp.

FUSES

Among the minor electrical troubles which have developed and have been overcome may be mentioned breakages of contact shoe fuses. When the cars were first put in service the contact shoe fuse boxes were mounted on top of the shoe beam. Cartridge type fuses were used, but because of the absence of spring support the excessive vibration caused the fuse links to break and the arcing between the broken ends set the paper shells on fire. Copper ribbon fuses set vertically on edge were next tried, but these also broke at the punched hole in the center. The experiment was made of removing the fuse box from the shoe beam and bolting it to the truck side frame so as to introduce some spring resilience and this remedied part of the trouble. At the suggestion of one of the inspection foremen two wooden pins staggered on each side of the fuse were set in the base and the copper ribbon was woven in between these pins so as to give it support and a slight tension. This simple remedy has greatly reduced the number of broken shoe fuses. The attachment of the fuse box covers also proved a puzzling problem. They are now fastened on with two long bolts passing through the base and the top of the cover, on which thumbscrews are turned down. Even if the thumbscrews work loose and drop off the cover cannot shake off of the long stud bolts. On all the new steel cars ribbon fuses supported in standard boxes with clamping wedges are mounted on the truck side frame. Ribbon fuses are punched in a special cutting die which was made in the company's shop. This cutter works on the principle of a perforating punch for filing papers. Both ends are cut and the hole punched in the center at one operation. It has been found that fewer breakages occur with hard drawn copper ribbon fuses than with fuses made from annealed copper. Two 750-amp fuses are used on each contact shoe in summer and three 750-amp fuses in winter.

SNOW COVERS

The No. 113 motors used on the 41-ft. steel cars have large ventilating openings in the frame which are covered with perforated plates. During snowstorms it is necessary to close these openings in order to keep out snow which is picked up by the air currents under the cars. At the beginning of the winter season the bottom openings on all motors are closed with sheets of tin plate inserted under the ventilated cover plates, but the openings in the top are not covered in order to permit of some ventilation. At the first indication of a snowstorm the terminal inspectors begin to apply snow covers to the top openings on all cars as fast as they arrive at the terminals. These covers are sheets of tin plate cut to fit the ventilating openings. The perforated covers are loosened and the plates are slipped underneath, after which the cover clamps are fastened down tight. An inspector can carry eight or ten snow covers over one arm and all the motors in a train can be fitted in a few minutes. The snow covers are allowed to re-

main on the motors until the snow between the rails has packed down hard, when they are removed at the terminals and stored away for use when again needed. The No. 308 motors on the new cars have sheet-iron guards over the ventilating openings, and as they are ventilated from the interior by forced draft supplied by a blower snow is not likely to sift into the frame.

STORAGE BATTERIES

The control circuits on the cars are energized from storage batteries carried in a cradle under the body. Two batteries of seven cells each are placed on each car. They are connected in multiple with a resistance unit which is in series with the compressor motor, so that they are charged when the compressor motor is running. Two double-throw switches are installed on the switchboard in the motorman's vestibule and the two batteries are oppositely connected to these switches. When both switches are up one battery is connected for charging and the other for discharging through the control circuits. When both switches are down the functions of the two batteries are reversed. It is the duty of the terminal inspectors to throw the battery switches every morning. On even-numbered days of the month the switches on all cars are thrown up and on odd-numbered days they are thrown down. In this way the batteries are reversed every twenty-four hours. The batteries are inspected and tested for charge at each 1000-mile inspection and very few road failures have been experienced.

TRUCK BRAKE RIGGING

The Baldwin motor trucks under the old cars are all fitted with spiral brake release springs attached to the tops of the line levers and compressed when the brakes are applied. Considerable trouble has been experienced due to the live lever brake rods dragging on the wheels and wearing through. To overcome this the brake release springs are being turned around and attached to the side frame on the opposite side of the transoms.

The first brakeshoes used were made of soft gray iron with crucible steel inserts in the face. These caused some trouble by scoring the tread of the wheel. The company is now using a soft-iron reinforced back shoe with chilled ends. The life of these shoes is less, but the cutting of the wheel treads has been overcome.

WINTER STORAGE FOR CARS

The winter schedules do not require as many cars as in the summer and the surplus equipment is stored under cover in a shed at Springfield. This shed contains three tracks, each holding a ten-car train, and it is in charge of a watchman. On Sunday of each week an inspector goes to the storage shed and connects the bus line on each train to the third-rail outside of the building. This starts the compressors and charges the control storage batteries. After the air-brake system is charged with air the brakes are applied and released a few times and the control is notched up and off with the line switches out so as to move all the parts and keep them lubricated. The brake and control reservoirs are then bled off to prevent condensed moisture from freezing in them.

The cars in storage are kept in complete operating condition and no parts of the equipment are allowed to be removed. When extra cars are needed for any reason they are withdrawn from the storage shed and during the winter months as cars are overhauled in the shop they are sent to the storage shed instead of being returned immediately to service. Thus as the summer season comes on the equipment which is withdrawn from storage is freshly painted and in perfect operating condition. Before being placed in service cars which are withdrawn from storage are given the regular 1000-mile inspection.

COST OF INSPECTION AND MAINTENANCE

The average cost of terminal and shed inspection of the electric car equipment for the two years ended Dec. 31, 1910, was 20 cents per 100 car miles. This did not include car cleaning, which cost 25 cents per 100 car miles. The cost of maintaining the bodies and electrical equipment of the motor cars for the same period was \$2 per 100 car miles and for the wooden trailer cars, 75 cents per 100 car miles.

PERFORMANCE OF CAR EQUIPMENT IN 1910

Table I shows the total motor and trailer car miles and train miles operated on the electric divisions of the Long Island

TABLE I.—LONG ISLAND RAILROAD ELECTRIC EQUIPMENT—TRAIN MILES AND CAR MILES OPERATED IN 1910

Month	Train Miles	Motor Car Miles	Trailer Car Miles	Total Car Miles
Jan.	109,785	269,165	96,264	365,429
Feb.	102,062	240,735	92,542	333,277
Mar.	117,672	286,396	106,781	393,177
April	115,100	297,708	91,584	389,292
May	140,204	350,311	116,768	467,079
June	152,496	429,267	156,851	586,118
July	203,975	662,612	272,331	934,943
Aug.	201,392	636,221	267,102	903,323
Sept.	207,406	594,524	167,484	762,008
Oct.	221,957	614,828	143,632	758,460
Nov.	186,763	482,214	92,824	575,083
Dec.	191,408	519,525	94,189	613,714
Total ...	1,950,220	5,390,985	1,698,599	7,089,584*

*Includes 243,435 motor car miles and 141,460 trailer car miles of Brooklyn Rapid Transit joint service equipment.

Railroad in 1910. Table II shows for the corresponding months the number of road failures of electric car equipment and the total number of minutes of delay to all trains resulting from such failures. The failures are classified under nine general heads and the number of minutes' delay shown includes all the time lost by reason of the ignorance or inefficiency of the trainmen, as well as the time actually required to remedy the trouble. Thus a failure of the trainmen to open the angle cocks between cars is included under air and hand brakes, although, strictly speaking, it is not a delay caused by any defect of the equipment. From the last column of the table it will be seen that brakes caused 25 per cent of the total delays, electrical equip-

tem and the electric car equipment. While the steam passenger locomotives made a larger mileage per failure than the electric

TABLE IV.—LONG ISLAND RAILROAD—FAILURES OF STEAM LOCOMOTIVES AND ELECTRIC TRAINS IN 1910

	Steam Locos.	Electric Trains
Number of road failures.....	331	218
Total minutes detention.....	9,222	2,648
Train miles operated.....	3,180,273	1,950,220
Train miles per failure.....	9,608	8,946
Train miles per minute of detention.....	345	736
Minutes detention per failure.....	28	12

trains the average detention per failure was more than twice as long.

IDENTIFICATION OF POWER HOUSE PIPING

A committee of the American Society of Mechanical Engineers of which H. G. Stott, Interborough Rapid Transit Company, is chairman has reported in favor of the following method of painting pipes in power houses for purposes of identification:

"In the main engine rooms of plants which are well lighted, and where the functions of the exposed pipes are obvious, all pipes shall be painted to conform to the color scheme of the room; and if it is desirable to distinguish pipe systems colors shall be used only on the flanges and on the valve-fitting flanges.

"In all other parts of the plant, such as boiler house, basements, etc., all pipes (exclusive of valves, flanges and fittings), except the fire system, shall be painted black, or some other single, plain, durable, inexpensive color.

TABLE II.—LONG ISLAND RAILROAD—MINUTES TRAIN DELAY DUE TO FAILURES OF ELECTRIC CAR EQUIPMENT IN 1910

Classification of Failures	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Delays 1910	Percentage of Total Delays
	No.	Min. Delay	No.	Min. Delay	No.	Min. Delay	No.	Min. Delay	No.	Min. Delay	No.	Min. Delay	No.	Min. Delay
Air and hand brakes...	5	31	6	30	4	17	6	58	4	22	6	52	80	662
Control	4	69	2	8	3	31	3	14	4	22	6	52	53	531
Motors	0	0	0	0	1	4	0	0	0	0	0	0	10	159
Gears	1	4	0	0	2	23	0	0	0	0	3	15	13	90
Third rail shoes.....	0	100	0	0	0	0	52	2	37	0	0	0	0	369
Blown fuses.....	2	236	3	16	4	31	2	4	2	16	1	5	3	27
Trucks	1	4	0	0	0	0	0	0	0	0	0	0	23	279
Body defects.....	0	0	1	15	1	7	1	4	1	14	0	0	9	119
Accidents	2	32	0	0	0	0	0	0	0	0	0	0	3	45
Total	15	476	12	69	15	113	12	132	16	159	11	84	34	383

ment 58.3 per cent and bodies, trucks and accidents, 16.7 per cent. In comparing the performance of the car equipment by months it is interesting to note that the two best monthly records of car miles per minute of train delay were made in October and February respectively.

"All fire lines (suction and discharge), including pipe lines, valve flanges and fittings, shall be painted red throughout.

"The edges of all flanges, fittings or valve flanges on pipe lines larger than 4 in. inside diameter, and the entire fittings, valves and flanges on lines 4 in. inside diameter and smaller,

TABLE III.—LONG ISLAND RAILROAD—REPLACEMENTS OF ELECTRIC CAR EQUIPMENT PARTS IN 1910

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Main fuses blown.....	14	0	9	2	8	22	29	35	25	39	21	33	237
Shoe fuses blown.....	276	105	41	82	65	54	157	150	143	133	86	237	1529
Shoe fuses broken.....	389	353	481	235	206	241	329	429	281	123	124	168	3359
Bus fuses blown.....	16	0	0	2	6	9	5	7	20	24	15	23	127
Lamps replaced, 16 cp.....	654	383	1219	571	1567	1266	1300	1228	1437	2356	2801	3070	17,852
Hot journal bearings.....	4	3	6	9	1	8	15	5	14	19	6	12	102
Flat wheels.....	1	2	1	0	0	8	6	14	12	20	9	15	88
Broken gears.....	8	2	4	1	1	2	1	4	9	7	5	10	54
Broken contact shoes.....	223	48	25	64	61	84	59	95	129	62	153	208	1211
Worn contact shoes replaced.....	14	2	1	1	1	2	0	3	1	3	0	9	37
Brake shoes, motor truck replaced.....	213	220	207	265	346	421	612	712	621	723	595	594	5529
Brake shoes, trailer truck replaced.....	257	325	308	364	426	421	756	733	723	745	621	582	6261
Brake shoes, trailer cars replaced.....	20	55	28	30	42	27	81	86	46	51	23	30	525
Motor brushes replaced.....	97	133	65	115	101	145	87	194	23	33	420	421	1834
Compressor motor brushes replaced.....	137	75	111	78	117	119	215	181	194	193	254	245	1919
Blower motor brushes replaced.....	27	40	52	41	42	36	23	16	8	10	25	43	363

Table III shows by months the consumption of fuses, lamps, brakeshoes, third-rail shoes and other parts of the equipment. Motor troubles were infrequent during 1910. Only twenty-eight armatures were removed for grounds, open circuits or short-circuits, and only nine motor flashovers were reported. Nine flat commutators were turned up and two motors were removed from service on account of grounded fields. Hot armature bearings developed six times during the year and hot axle bearings nineteen times. The new No. 308 motors had no hot axle bearings and only one hot armature bearing.

Table IV shows the comparative performance of the steam passenger locomotives of the entire Long Island Railroad sys-

tem shall be painted distinguishing colors by the following method:

Steam division.....	High pressure—white
	Exhaust system—buff
Water division.....	Fresh water, low pressure—blue
	Fresh water, high pressure boiler feed lines—blue and white
	Salt water piping—green
Oil division	Delivery and discharge—brass or bronze yellow
Pneumatic division.....	All pipes—gray
Gas division.....	City lighting service—aluminum
	Gas engine service—black, red flanges
Fuel oil division.....	All piping—black
Refrigerating system.....	White and green stripes alternately on flanges and fittings, body of pipe being black
Electric lines and feeders.....	Black and red stripes alternately on flanges and fittings, body of pipe being black

NEW 82-TON ELECTRIC LOCOMOTIVE OF THE NORTHERN ELECTRIC RAILWAY

BY J. PAULDING EDWARDS, ELECTRICAL AND MECHANICAL ENGINEER
OF THE COMPANY

An electric locomotive designed by the writer has recently been placed in service on the lines of the Northern Electric Railway, a California corporation owning and operating 150 miles of third-rail electric railway in the Sacramento Valley. The locomotive with but a few minor exceptions is constructed entirely of steel, and was built and equipped at the company's shops at Chico, Cal.

The accompanying engravings illustrate the principal features of the construction of this locomotive.

GENERAL SPECIFICATIONS.

BODY.

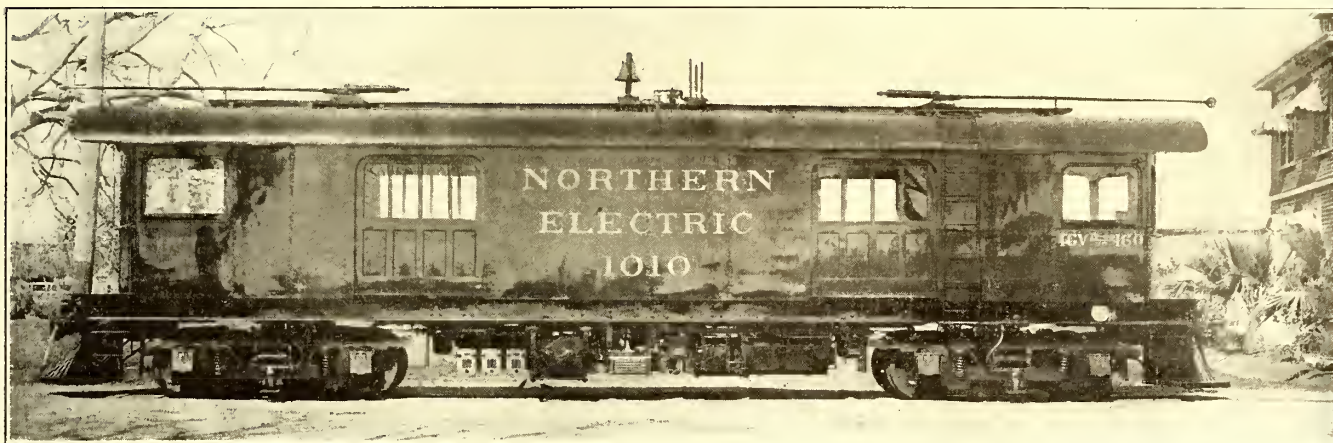
Class, steel express locomotive.
Built by Northern Electric Railway, Chico shops.
Date completed, April 1, 1911.
Capacity (load), 50,000 lb.
Total weight loaded, 164,600 lb.
Length over all, 53 ft. 2 in.
Length inside of body, 45 ft. 2 in.
Bolster centers, 32 ft. 0 in.
Width over all, 9 ft. 9 in.
Width inside sheathing, 8 ft. 11 $\frac{5}{8}$ in.
Height, rail to top of roof, 12 ft. 11 $\frac{1}{2}$ in.
Height, rail to floor, 4 ft. 7 $\frac{1}{2}$ in.
Clear height inside, 7 ft. 3 in.
Body bolsters, box type.
Pilots, locomotive type with footboards.

12 in. Both are securely riveted to the fillers and longitudinal sills by $\frac{3}{4}$ -in. rivets. The entire framing is stiffened by diagonal braces on each side of the bolsters, and the ends are braced from the center by 6-in., 12 $\frac{1}{2}$ -lb. I-beams, fastened to the side sills, and by the $\frac{1}{2}$ -in. x 14-in. plates which form the drawhead bumpers and end-sill contours.

The side framing members, together with the thick steel sheathing, form plate trusses of each side frame; truss rods, therefore, are not required. This construction leaves the under side of the frame free for the attachment of equipment. The side framing consists of 4-in. x 3-in. x $\frac{1}{2}$ -in. angle posts connected at the top with a 4-in. x 3-in. x $\frac{1}{2}$ -in. angle plate by means of gussets and angles, and riveted with $\frac{5}{8}$ -in. rivets. The sheathing is of $\frac{3}{16}$ -in. steel plate, with butt joints, and is fastened to the side framing with $\frac{5}{16}$ -in. button-head rivets.

A plain arched roof, consisting of $\frac{3}{16}$ -in. steel plates supported on 2 $\frac{1}{2}$ -in. x 2 $\frac{1}{2}$ -in. x $\frac{1}{4}$ -in. angle carlines spaced 2 ft. on centers, forms an arched truss and adds materially to the strength of the body. The plates extend out over the body on the ends and sides, and afford protection from the weather and give a pleasing appearance to the roof. There is a wide wooden running board extending along the top of the roof. It is fastened to the roof by cleats which are bolted to angles riveted to the roof plates.

The first floor is nailed to 4-in. x 4-in. pine girths fastened to the sides of the four sills. This floor is made of $\frac{7}{8}$ -in. vertical



Northern Electric Locomotive—Side View

TRUCKS.

Type, No. 90-50-A Baldwin.
Gage of track, 4 ft. 8 $\frac{1}{2}$ in.
Wheelbase, 90 in.
Weight without motors, 17,060 lb. each.
Designed to carry on center plate, 55,000 lb.
Bolsters, steel castings.
Center transoms, 12-in. 35-lb. channels.
Brakes, inside-hung.
Wheels, 36-in. rolled steel.
Gears, solid type.
Axles, 6 $\frac{1}{2}$ in. diameter.
Journals, 6 $\frac{1}{2}$ x 11 in.
Painted, Pullman standard green.

MOTORS.

Type, Westinghouse, No. 301-D interpole; forced air ventilation.
Number per locomotive, four.
Weight of each, 5650 lb.
Gear ratio, 17:60.

OTHER EQUIPMENT.

Draft rigging, Miner friction, class A-2-E.
Couplers, M.C.B. Climax, 5 x 7-in. shank.
Sanders, electro-pneumatic.
Whistle, Northern Electric triple trombone.
Trolley retrievers, Knutson No. 4.
Headlights, G. E. luminous arc with semaphore lens.

BODY

The body underframing is constructed of four 12-in., 35 $\frac{1}{2}$ -lb. I-beam side and center sills, running the entire length of the locomotive. The cross members are of the same size material and were accurately cut to fit the contour of the sills. Connecting angles, 6 in. x 4 in. x $\frac{1}{2}$ in., with $\frac{3}{4}$ -in. rivets, are used to fasten them in place. The bolsters are built in place and consist of a top and bottom plate. These plates are securely riveted to two 12-in. I-beam fillers. The top bolster plate is 1 in. x 12 in., and the bottom bolster plate 1 $\frac{1}{2}$ in. x

grain tongue and grooved pine, and is laid slightly diagonal of the car, one end being 11 in. ahead of the transverse center line. The top floor is laid crosswise, also, and is securely nailed to the first floor. A double thickness of deadening felt was placed between the two floors. The flooring on the platforms is placed diagonally, and also is entirely separate from the main floor of the locomotive.

All the doors and sashes are made of ash and faced on the outside with No. 16 sheet steel. They are finished inside in natural color. The glass used is $\frac{3}{16}$ -in. American polished plate. The side windows are arranged to slide, and owing to their weight are hung on overhead tracks with rollers. The end sashes are stationary and secured by bolts to the window frames.

TRUCKS

The trucks were built by the Baldwin Locomotive Works, and in size are among the largest trucks ever built for this class of service. They are of the M.C.B. type, with an equalized swinging bolster carried on triple elliptical springs. They are designed to carry 55,000 lb. on center plates, and have a 90-in. wheelbase.

The axles are 7 in. in diameter at the center, with 6 $\frac{1}{2}$ -in. x 11-in. journals, and are fitted with standard 36-in. M.C.B. rolled-steel wheels. The side frames are forged of 2 $\frac{1}{2}$ -in. x 4 $\frac{1}{4}$ -in. steel bars, and are connected to the transom channels by heavy steel castings which also support the brake levers and shoes. The brakes are inside hung and are equalized at the top

of the live levers by a crossbar connecting both sides and working across the top of the inside motors. The bolster is a steel casting with the side bearings and center plate cast integral. Both sides of each truck are equipped with contact shoes for the conductor rail. The shoes, which are of the slipper type operating on a top running rail, are mounted on a beam suspended from brackets cast on the bottoms of the equalizer spring seats.

MOTORS

The motor equipment is quadruple. The motors, which were designed particularly for locomotive service, are Westinghouse No. 301-D, interpole, 550-650-volt d.c., series-wound, railway type, and were built to specifications requiring the fulfilment of guarantees as follows:

MOTOR PERFORMANCE

"Considering the nominal rating of these motors as the load which gives a rise in temperature of not to exceed 90 deg. C. at the commutator and 75 deg. C. at any other part of the motor after one hour's continuous run on the testing stand with covers removed, but without artificial or forced ventilation (referred to surrounding air at 25 deg. C.), these motors shall not rate less than 160 hp at 550 volts, or 175 hp at 600 volts. The nominal rated capacity for one hour shall be

Forced ventilation for cooling the motors is provided by a 12-in. Sturtevant type blower driven at 1500 r.p.m. by a 3½-hp, series-wound, 550-volt motor. As shown in the interior view of the locomotive, the blast is conveyed through metallic conduits directly to headers immediately above the motors. From these headers it is led through the floor and through canvas tubes to the motor inlets. The efficiency of forced ventilation for the motors of this type of locomotive is well shown by the following tabulated comparison of ratings:

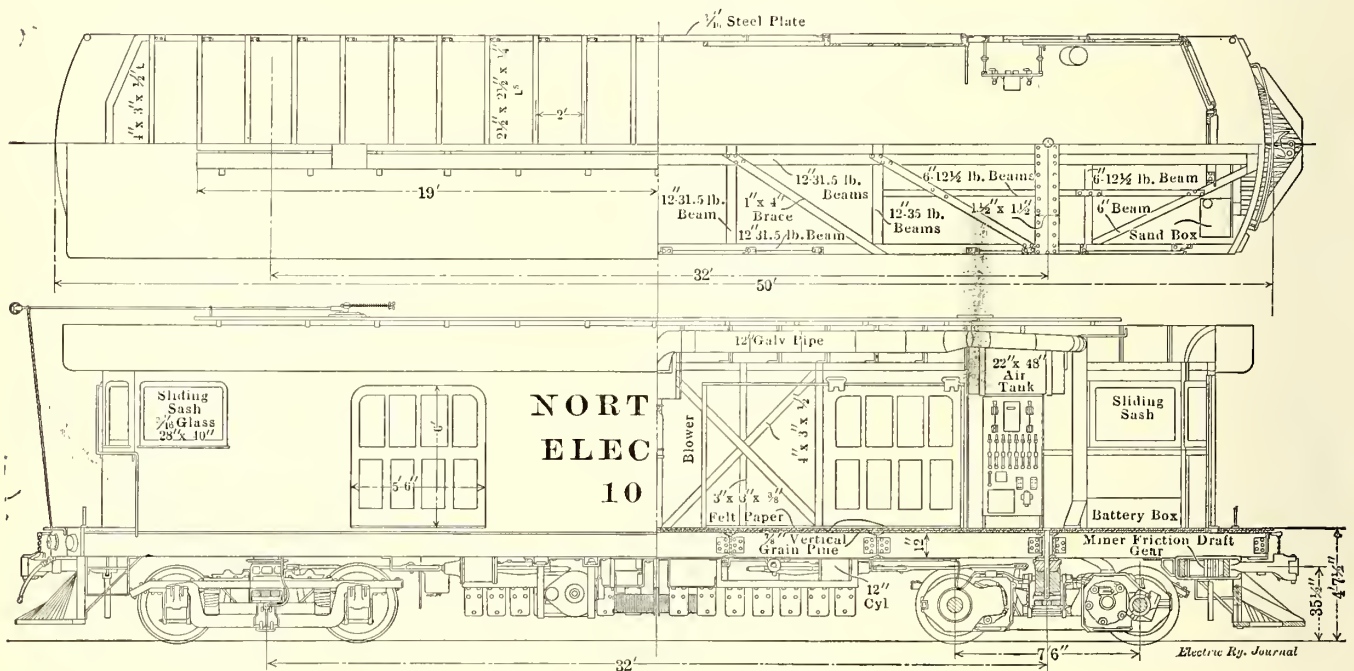
CONTINUOUS CAPACITY OF LOCOMOTIVE.

Covers Arranged for Normal Ventilation.	Forced Ventilation.
480 amp at 300 volts	580 amp at 300 volts
440 amp at 400 volts	540 amp at 400 volts
400 amp at 500 volts	500 amp at 500 volts
350 amp at 550 volts	452 amp at 550 volts

The nominal one-hour ratings with 550 volts at the motors are, with natural ventilation, 724 hp, and with forced ventilation, 870 hp.

CONTROL EQUIPMENT

The control equipment consists of a double equipment of Westinghouse unit-switch-control apparatus. Provision is made for three running points, with no external resistance in the circuit. The motors may be operated four in series, two pairs in series, or four in multiple. The pair of motors on each truck



Northern Electric Locomotive—Sectional Plan and Side Elevation

not less than 246 amp at 550 volts; continuous capacity not less than 120 amp at 300 volts, or 110 amp at 400 volts, these current ratings being equivalent to the square root of the mean square values of current under operating conditions. Using a gear ratio of 17:60, ratio 3.53, with 36-in. wheels, the efficiency of these motors shall not be less than 85 per cent with gears at full load.

LOCOMOTIVE PERFORMANCE

- "(A) Based on a total locomotive weight of 80 tons.
- "(B) The motors to be provided with adequate means of artificial ventilation.
- "(C) Wheels 36 in. in diameter and a gear ratio of 17:60.
- "(D) Train resistance not to exceed 3.5 lb. per ton.
- "(E) Locomotive resistance not to exceed 6 lb. per ton.

"Based on the foregoing figures the quadruple motor equipment shall be capable of accelerating from rest a train of 750 tons total weight to a speed of 15.2 m.p.h. at the rate of 0.14 m.p.h.s. on a 1 per cent grade with a potential of 550 volts at the motor brushes; and, further, the equipment shall be capable of hauling continuously in service at a potential of 550 volts at the motors, a train of 1000 tons gross weight at a speed of not less than 15 m.p.h. on tangent level track."

with its control forms a complete unit and may be operated as a unit or in conjunction with the other set of motors.

The main control apparatus consisting of two line switches, two switch groups, two reversers, series-paralleling switch, change-over switch and resistance grids is attached underneath the sills in two symmetrical groups with all conductor wires and cables run in conduit. In order to leave a clear space for all conduits and air pipes and to avoid making a number of short turns the apparatus was suspended at a distance of from 4 in. to 6 in. below the bottom of the sills. The resistance grids were placed directly below the center sills, and were dropped below the other control equipment to give them free ventilation. Resistance grids of sufficient number and capacity have been installed to provide for the continuous operation of the locomotive at full rated capacity in any resistance control step without overheating the grids. The equipment is double-ended in every respect.

The controllers are of the throttle type, and are provided with push-button control for securing:

- (1) Operation of series-paralleling switch.
 - (a) In series position.
 - (b) In parallel position.

- (2) Reset of both line switches.
- (3) Operation of forward sander.
- (4) Operation of rear sander.
- (5) Operation of bell.
- (6) Operation of whistle.

These combinations are all secured through the use of electro-pneumatic valves, using current from the control circuit at 14 volts for their operation.

The control circuits of the series-paralleling switch interlock electrically with the master controller so that operation from one position to the other can be effected only when the controller is in the off position; this prevents the burning of propulsion circuit contacts should the buttons be depressed during the flow of current through these switches.

Direct-reading ammeters with illuminated dials are installed immediately in front of the controllers and adjacent to the air gages of the brake system. These serve to keep the operator informed at all times as to the ampere demand being made by the locomotive upon the line.

The function of the automatic change-over switch mentioned is to change the trolley and third-rail connections as required. Its operation is automatically controlled by 600-volt interlocking



Northern Electric Locomotive—Interior View of Cab

relays in connection with the trolley and third-rail circuits respectively.

The switchboard is in the number one end and on it are located all the switches necessary for the control of the main and auxiliary circuits. At the top of the board are the two main knife switches controlling the circuits to each pair of motors; between these switches is a recording wattmeter. The knife switches controlling the headlights, interior lights, gage lights, pump and blower motors are located on this board; also the battery switches and the change-over relays. At the back of the board are the governor and headlight resistances, and at the side are the control batteries.

The locomotive interior is illuminated by two five-light incandescent circuits suspended from the roof. The lamp sockets are of marine type in conduit fittings. There is also an incandescent circuit of five lamps placed underneath the body between the sills to provide light for inspection purposes. General Electric luminous arc headlights with semaphore lenses are provided, one at each end, and operate independently, the circuits being controlled by knife switches located on the board.

The locomotive is equipped with Westinghouse automatic air brakes, schedule EL, which includes both the automatic and straight air features. The air brakes are arranged in two units

and can be operated independently, if necessary. Two 12-in. cylinders are used, each one operating on one truck independently of the other. They are both controlled, however, by the same distributing valve, which is located approximately in the center of the locomotive beneath the underframing. Compressed air is supplied by two Westinghouse D-3 compressors controlled by a single governor, but on separate circuits, so that either pump may be operated singly. The pumps are connected with two 22-in. x 48-in. reservoirs through radiator piping, and these reservoirs are equalized through a 1-in. pipe from which the supply is taken. The feed valves are located near the engineer's valves in the end of the locomotive.

A triple trombone whistle and locomotive type bell are mounted on the roof in the center of the body, and are operated by air through magnetic valves which are controlled by push buttons on the master controllers. The electro-pneumatic sanders located in front of the trucks on each end are also controlled by push buttons on the controllers.

PAINTING

The steel work of the body was all cleaned thoroughly by sand blast before assembling, and also after being riveted together, and was painted with one coat of Mindura primer; the outside surface was then given one coat of glazier, four coats of surfacer and rubbed down. Four coats of Northern Electric standard orange body color were applied and finished with three coats of standard special wearing body varnish. On the inside one coat each of Mindura field and Mindura finish was applied in addition to the priming, leaving the interior with a black finish. The roof is finished the same as the interior, and all the underframing, equipment and conduits were painted black excepting the air piping and trucks. In order to readily distinguish between the air pipes in the brake system and those of the electrical equipment the former were painted a dull slate color, the latter black.

OPERATING RESULTS

This locomotive was placed in regular freight service and tests were made giving the following results: On a light run of 18 miles, with a trailing load of $13\frac{1}{2}$ tons, a maximum speed of 36 m.p.h. was obtained, and an average running speed of 23 $\frac{1}{2}$ m.p.h. was made with a power consumption of 0.0472 kw-hour per gross ton mile with an average potential of 550 volts. With a trailing load of $850\frac{1}{2}$ tons on a 1 per cent grade, with an average potential of 420 volts, a maximum speed of 10 m.p.h. was reached, and the power consumption on the run of 5 miles was 0.0207 kw-hour per ton mile. With a trailing load of 1145 tons on an 18-mile run, with no stops, and under ordinary conditions, an average speed of 13.3 m.p.h. was maintained, which at times reached a maximum of 24 m.p.h. The average power consumption on the trip was 0.0156 kw-hour per ton mile.

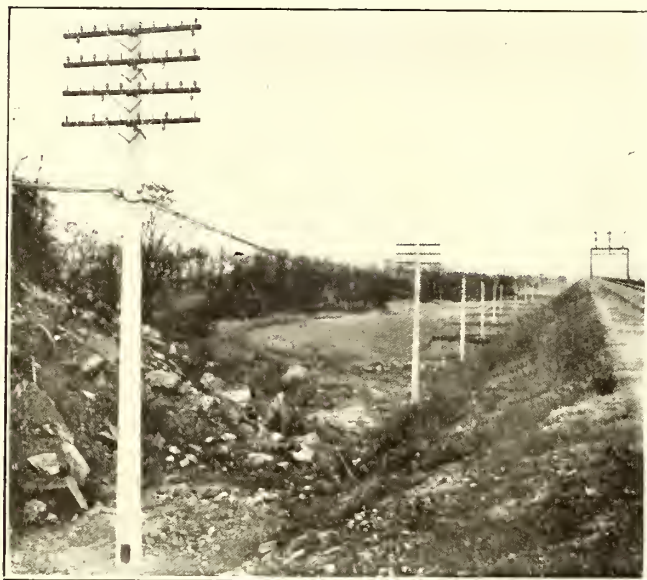
The design of this locomotive conforms, as does all the rolling stock equipment of the Northern Electric Railway, to the standards of the Master Car Builders' Association, and meets the requirements of the Interstate Commerce Commission as to the details of the safety devices.

CENTRAL STATION INVESTMENTS IN THE UNITED STATES

According to a pamphlet presented by the Electric Bond & Share Company to the members of the National Electric Light Association at the annual convention held in New York City there is an investment of \$2,000,000,000 in central electric stations in the United States, not including the investment in the thousands of miscellaneous isolated plants and those stations devoted to street railway purposes. The remarkable growth in the electric light and power industry can be best realized when it is remembered that the first practicable system of electric lighting was installed as recently as 1879. The first commercial system of incandescent lighting was not put into operation until 1882, while the first alternating-current station was not opened until 1886. Accordingly, the present great development has been the growth of a little less than a third of a century, a period of time during which the entire industrial life of the country has been remade by the electrical discoveries.

POLE LINES OF THE PENNSYLVANIA RAILROAD ACROSS HACKENSACK MEADOWS*

The meadows section of the Pennsylvania Railroad entrance to the new terminal station in New York City is a 5-mile continuous stretch of semi-tidal meadow swamp land, except for a short section of rock outcropping at Snake Hill. The Hackensack River is crossed midway of this section. The ground surface is covered with a heavy growth of reeds, and the top



Pennsylvania Railroad—Reinforced Concrete Telegraph Pole

stratum is a peaty bog, from 8 to 15 ft. deep, underlaid with varying strata of clay, fine sand, and mixed sand and clay for very considerable depths. Across this section, and adjoining the track embankment, a pole line was erected for telegraph and telephone purposes, and one for the high-tension power wires.

Ultimately, the telegraph and telephone service will require sixty open wires and two 40-pair cables, and it was desired to make this line entirely secure against probable interruption by severe storms or fires in the swamp reeds. The character of the foundation, as indicated, was bad, and, after much consideration, it was decided to substitute for a wooden pole line, which would be inadequate for the conditions, one of concrete poles, which, while somewhat experimental and perhaps somewhat more costly, would provide a safe and durable construction.

In this section 202 poles were required. They were spaced from 70 ft. to 135 ft. apart, with an average standard span of 120 ft., the variations in span being due to the numerous railway and highway crossings. The heights of the poles above the ground vary from 25 ft. to 50 ft., and they are from 35 ft. to 65 ft. in total length.

The design, made by R. D. Coombs, structural engineer on the staff of the chief engineer of electric traction, called for transverse loading conditions, in case of maximum storms, equivalent to 6000 lb. at 6.5 ft. below the top of the pole for the 120-ft. span length. The poles are square in cross-section, with chamfered corners and with a taper of $\frac{1}{2}$ in. in 5 ft. The 1:2:4 concrete mixture of which they are made was assumed to have an ultimate unit strength, in compression, of 2200 lb. The reinforcement is composed of mechanical bond bars tied together into a square skeleton frame. In the complete pole this reinforcement is covered by a 1-in. minimum thickness of concrete. The skeleton reinforcement

was placed in horizontal frames, and the concrete mixture was poured in and carefully tamped. A special yard was established near the line, in which to make, store and season the poles. The average number of poles made per day was six, and they were left in place sixteen days to season.

After a number of experiments, it was found best to set the poles in pits excavated in the marshy stratum. These pits were generally about 9 ft. square and 5 ft. deep, and a timber grillage was placed around the base of each pole and about 5 ft. below the top of the ground. This grillage consisted of six track cross-ties bolted together and to the pole, and partly planked over by 3-in. rough lumber. The pole, which projected below the grillage and was pointed at the butt, was jetted down by compressed air into the sandy layer, so that the grillage would rest at the bottom of the pit. The pits were then back-filled with rock and clay. Poles on curves are cross-guyed, and the terminal and railway crossing poles are head-guyed with steel cables.

Because of the unusually heavy line and the extra length required for the foundations, the gross weight per pole, exclusive of grillage and cross-arms is more than would be required for ordinary telegraph poles, and varies from 5300 lb. for a 35-ft. pole to 17,300 lb. for poles 65 ft. in length.

The wires for the transmission of traction energy from the tunnel portal to Harrison substation, and the wires of the high-tension signal power circuits in the same section, are carried on a line of steel poles along the southern edge of the right-of-way across the meadows. These poles are set 300 ft. apart, and are designed for not only the present requirements but to carry seven additional three-wire transmission circuits which may be required in the future. The total loading called for a very substantial pole construction, and also for foundations to be carried through the soft upper strata of the marsh to a firm bearing.

The poles are of latticed structural steel, square in cross-section, with one angle at each corner and single-angle bracing. The poles have a parabolic outline, conforming to the load requirements and giving an improved appearance. The parabola



Pennsylvania Railroad—Setting Reinforced Concrete Pole and Grillage with Air Jet

is of such flat outline that it was not necessary to bend the main angles before assembling. The poles were completely riveted at the shop, with the exception of the cross-arms. The latter consisted of single ship-channels with flanges turned downward. The pole has a cast-iron cap at the top, and a section of pipe to carry a 250,000-circ. mil copper ground wire, which also forms a part of the negative, or return circuit.

*Abstract from a paper by George Gibbs, entitled, "The New York Tunnel Extension of the Pennsylvania Railroad: Station Construction, Road, Track, Yard Equipment, Electric Traction and Locomotives," to be presented before the American Society of Civil Engineers, Oct. 18, 1911, and printed in the *Proceedings* for May, 1911, page 636.

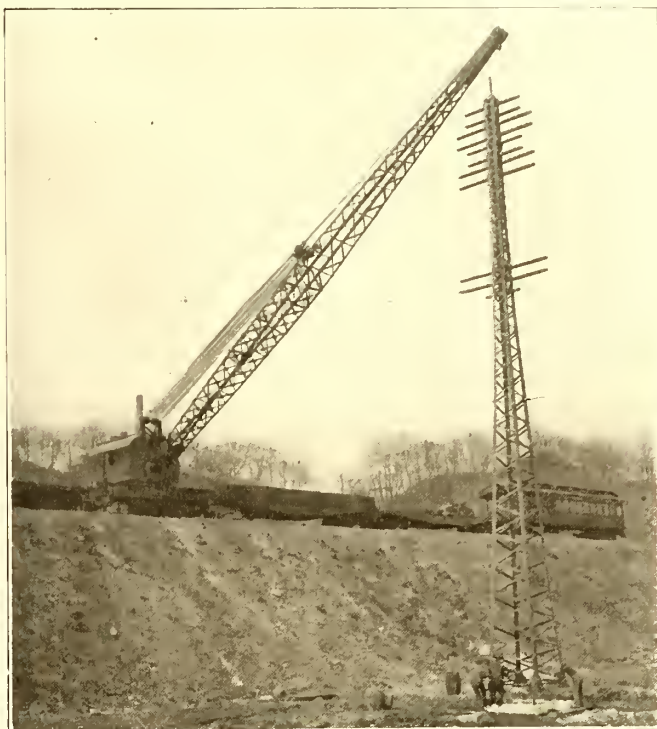
In crossing the Hackensack River it was determined to carry the wires overhead rather than by submarine cables, in order to preserve the integrity of the line against lightning disturbances, and to provide for the use of 33,000-volt transmission in the future. For this purpose it was necessary to carry all wires with the clearance specified by the War Department over navigable streams, and this required the use of two unusually high steel towers. The line approaches the river with 300-ft. spans on 50-ft. poles, rising to an intermediate 70-ft. pole, then sharply to the high towers, 181 ft. 4 in. above high water; the lowest wire in this crossing is 137 ft. 4 in. above high water. The wire span over the river has a length of 765 ft. The towers are of the same general outline as the poles, but of much heavier section and larger dimensions. They are 15 ft. square at the base and 3 ft. square at the top. The tops of the foundations are 6 ft. above high water, and the total height from the water to the ground wire is 195 ft. The towers are carried on twin-pier, reinforced concrete foundations, each having eleven timber piles under it.

The pole foundations across the meadows are of concrete on from eight to ten piles, depending on the size of the pole; the piles were driven to a depth of from 30 to 80 ft., as occasion required.

The poles, both of steel and of concrete, were erected with a standard 75-ton wrecking derrick, fitted with a special 90-ft. boom capable of lifting either the steel or concrete poles at a point 90 ft. from the center of the track. The concrete poles were lifted from the cars on which they were loaded, and placed on timber horses adjacent to the excavation where they were to be set; the cross-arms and grillage were then put in place, and the pole, thus equipped, was picked up at the top and lowered into the excavation. The steel poles were picked up from the embankment, where they had been unloaded, and lifted by the derrick vertically over the foundation and set in place.

All high-tension insulators are of porcelain, of the petticoat type. Straight-line insulators are made of three pieces, and

various railroads in the meadows section and the city streets in the Sunnyside yard section were provided with double cross-arms, strain insulators, and a dead-end clamping device designed to attach the power wires securely to the structure.



Pennsylvania Railroad—Setting Transmission Line Pole with Derrick Car

At the Hackensack River the power line rises sharply, in one span, to the top of the high towers, and required special



Pennsylvania Railroad—Transmission Line Across Hackensack Meadows

strain insulators of two pieces. These insulators are mounted on cast-steel pins bolted to the steel channel cross-arms. The transmission line poles supporting the spans crossing the

insulating attachments. Each power wire, in passing over the steel cross-arms of the tower, is carried in a saddle supported by a nest of four standard line insulators. The saddle is pro-

vided with a special six-bolt clamp, and its wire groove is curved to prevent sharp bending.

The 2,000,000-circ. mil direct-current feeders, in addition to a similar clamping saddle, have an auxiliary butterfly clamp on each side, about 2.5 ft. from the saddle and attached thereto by adjustable rods.

In addition to the present signal circuits through the yard, and feeding the New York division at the Passaic River, the pole line is arranged to carry in the future two three-wire, high-tension power circuits.

PENNSYLVANIA COMMISSION REPORT ON THE PHILADELPHIA RAPID TRANSIT COMPANY

The full text of the report on the Philadelphia Rapid Transit Company, made by Ford, Bacon & Davis to the Pennsylvania State Railroad Commission, has just been made public by the commission. It consists of two volumes. One contains the text of the report and occupies 142 pages. The other contains the tabulated statements, maps and diagrams, and has 158 pages and thirty-four maps.

SUMMARY OF THE REPORT

A summary of the report was made public by the commission about a month ago and was published in the *ELECTRIC RAILWAY JOURNAL* for March 18, 1911, page 455. The report is dated March 7, 1911, and the information was secured during the period from June 1, 1910, to Feb. 1, 1911, so that the date of the report may be considered as Feb. 1, 1911. The statistics of physical property and operation are principally as of June 30, 1910, or the year ending with that date. The observations of traffic and service are largely of September and October, 1910. The report discusses in extent the physical property of the company, the operating statistics from 1907 to 1910, car maintenance, accidents, traffic and service, the rush-hour problem and car routing.

The extent of the report precludes an abstract of its entire contents in this week's issue of the *ELECTRIC RAILWAY JOURNAL*, but a summary will be given of the recommendations in regard to track construction and cars. The consideration of the subject of cars is probably the most extended discussion of the design of city cars contained in any of the many reports published of individual systems. The following paragraphs are taken from the report:

RAIL

"In 1903 a 9-in. 141-lb. rail was adopted as standard in Philadelphia. Since that time it has been used almost exclusively in paved streets and now constitutes 35 per cent of the total track. In the weight of the rail and its average age the report says that track in Philadelphia is superior to that in other large American cities, except in Chicago, where the track system has been largely reconstructed during the last four years. The desirability of using a rail as heavy as 141 lb. per yard may be questioned, however, in view of the development of light weight cars. A portion of the track is laid in concrete, but with this exception practically all track in Philadelphia is laid without foundation or ballast. This results generally in poor line and surface, but not to an extent to impair seriously the riding qualities of the track. No preservative treatment for ties has been adopted. On the heavy rail an expensive patented joint has been used, with excellent results.

SPECIAL WORK

"On account of the wide and uniform distribution of population and of the narrow streets requiring the use of single track more special work is required in Philadelphia than in all other large cities. Of this special work about 71 per cent is of hard steel center or solid manganese construction. Great care has been given to all details of design.

IMPORTANCE OF PROPER SELECTION OF CARS

"The car is the most important part of the street railway property from the standpoints of both the public and the company. Upon the car design depend largely the comfort and satisfaction of the passenger on the one hand, and, on the other,

the amount of riding per capita per year and the cost of operation. A street railway company may store its cars in dilapidated barns or in the open air, may supply itself with power from a plant of poor design and may even have its track and overhead line of inferior standard, yet it may render satisfactory service to the public, provided its cars are modern, comfortable, cleanly and well maintained. Defects of the other portions of the company's property increase the cost of operation. Up to 1900 single-truck cars were the standard in Philadelphia and practically all of these cars have been retained in operation, although some of them have been rebuilt into slightly longer double-truck cars by splicing and reconstructing them and by their conversion into pay-within cars. At present the percentages of single-truck and double-truck cars, including both open cars and closed cars, in New York, Philadelphia and Brooklyn are as shown herewith:

	Total Number of Sur- face Cars.	Per Cent Single Truck.	Per Cent Double Truck.
Philadelphia	3,292	63.3	36.7
New York City*	3,200	25.0	75.0
Brooklyn	3,023	8.9	91.1

*Two largest companies.

"On the two Chicago surface systems there are 2925 cars, of which approximately 75 per cent are double-truck cars.

LIFE OF CARS

"From the standpoint of wear and tear, a car, if well maintained, can be preserved almost indefinitely, as each part when worn out would be replaced with new material. Its economical life, however, can be definitely ascertained.

"In the case of steam railroad passenger equipment the useful life of cars is often from thirty to forty years. With steam railroad freight cars, however, as the first cost of the car is comparatively small and the type of equipment has changed so rapidly, due to the economy of operating large units, it has not been found desirable to retain cars for a longer average life than from fifteen to twenty years. The same principle of economical operation has sealed the fate of the single-truck street railway car for use on congested lines of many large street railway systems. With the advance in the art, with the careful design of the car to embody all presently conceivable points of operating efficiency and with the requirement by public opinion and governmental authority to charge the cost of replacement to income account instead of to capital, it is believed that the modern street car with proper maintenance will have a life considerably in excess of fifteen to twenty years and probably as much as steam railroad cars of a settled economical design, the life of which is placed by competent authorities at from twenty-five to thirty-five years.

"The small single-truck car has its usefulness in street railway systems in large cities for lines of light, regular traffic which do not traverse the congested tracks of the down-town delivery district. Philadelphia has a large amount of track mileage and a large number of separate lines for the population served. It would therefore be expected that a larger proportion of single-truck cars can be used to good advantage in Philadelphia than in the other cities named. The principal objection to single-truck cars is to their limited size and not to the four-wheel truck. A modified design of the latter, such as a radial axle truck, may permit the use of longer car bodies and thus remove this disadvantage. During the last ten years only 655 double-truck closed cars and 100 subway-elevated cars have been added to the Philadelphia system. In New York City the two principal surface companies have added 1472 double-truck cars, the Brooklyn system 1007 double-truck cars and the Chicago systems 2200 double-truck cars. In Philadelphia, as of Jan. 1, 1911, 700 cars have been converted to pay-within cars. This represents 67 per cent of the company's double-truck closed (including maximum-traction) cars and 34 per cent of total double and single-truck closed cars owned. On an average about 40 per cent of the maximum cars operated in winter are of the pay-within type.

COMPARISON OF DETAILS OF STANDARD SURFACE CAR DESIGN AFFECTING THE TRAVELING PUBLIC

"Considering surface car design from the standpoint of the

public, there should be adopted, wherever practicable, those features, both large and small, which contribute to the safety, comfort and convenience of the street car traveler.

SIGNS

"Taking up the various points of design as they would be encountered by the passenger, the first items of importance as the car approaches are the line and destination signs. In the Philadelphia car there is a wooden sign, not illuminated, on each upper side deck, giving the line designation. An additional glass sign is placed on the end of the vestibule hood, illuminated from the car lights, which generally gives the car destination. The objectionable features of these Philadelphia car signs are, first, poor illumination, and, second, the lack of a definite system of designating line or destination.

"In Boston the route and intermediate points are designated by wooden signs on the front and rear hood and on the sides of the lower deck, not illuminated. The destination signs are removable steel plates in the middle vestibule space under the hood, specially illuminated, and in addition metal disks show the division number.

"In Brooklyn translucent line signs are shown in the ends and sides of the car monitor, and wooden block destination signs are placed in the corner, specially illuminated. The two New York companies and the two Chicago companies use 'Hunter' cloth signs either in the front and sides of the car monitor or in the middle of the vestibule under the hood, and in the upper part of the windows at the center of the side of the car. The monitor signs are illuminated from the car and the vestibule signs by lamps provided for the purpose.

"It is recommended that transparent line signs be provided for front, rear and sides of the monitor, illuminated by the lights in the car, and in addition a destination sign in the center of front and rear vestibules under the hood, independently illuminated.

STEP HEIGHT

"In boarding the car the first feature of interest to the passenger is the step. On the present double-truck closed cars in Philadelphia the height of the first step from the ground varies from 15½ in. to 17¾ in., while with the single-truck closed cars this is as low as 11 in., and with the open cars it ranges from 17½ in. to 20½ in. The second step on the closed cars averages 13½ in. and on open cars 15 in., while the third step from the platform to the interior of the car varies from 5¼ in. to 9¾ in. for the double-truck cars and 5½ in. for the single-truck closed cars, while, of course, on the open cars the platform is at the same level as the interior. With the New York and Brooklyn maximum-traction cars the first step ranges from 14½ in. to 15½ in., the second step is 13 in. and the third step averages 9¼ in. In the Chicago cars the first step ranges from 16½ in. to 18 in., the second step averages 14 in. and the third step 11 in., while with the Boston car there are three steps to reach the platform, these being 15½ in., 12 in. and 11½ in. The height of steps on closed cars where there are two steps from ground to platform and one step from platform to interior is dependent on type of truck used, diameter of wheel, design of bottom framing and size of motor. With the standard double-truck four-motor equipment the height of the car floor from the ground (which is here assumed to be even with the head of the rail) is, of necessity, from 38 in. to 42 in. or more, and this involves a first step of about 16 in. With the use of the Metropolitan type of maximum-traction car it is possible to reduce the total height of car floor from ground to 37½ in. and to reduce the height of the first step to 15 in., a convenient height of the second and third steps being 13 in. and 9½ in.

"If the use of a radial-axle, single-truck type of car with large motors proves to be practicable, it would permit a still further reduction of about 1½ in. in the total height of the car floor from the ground and height of steps. Any reduction in the height of steps is a matter of great importance, especially to women and children. The reduction of 3 in. in the height of the first step of the Metropolitan cars below

that of the type previously used was the cause of much favorable comment.

TREAD WIDTH

"To decrease the liability to accidents it is also important to provide that the width of the step should equal about the length of the foot, or from 10 in. to 12 in., so that the passenger when alighting is able to rest the entire foot on the step, as against the ladder effect of a narrow step. The Philadelphia pay-within cars are well designed in this particular, as the width of the step is 12½ in. In the other cars considered this width varies from 10 in. to 10¾ in., although in Boston, with the use of three platform steps, it is reduced to 8¾ in. The effect of a narrow tread and a high step upon step accidents is quite noticeable in the case of open cars where, as in the Philadelphia cars, the running board is 7½ in. wide and the steps as high as 20 in. or more. With regard to the kind of tread to be used, the Philadelphia pay-within cars have a hinged step with wooden tread, while standard cars of New York, Brooklyn and Chicago have the 'Universal Safety' or the 'Mason' tread, which is a metal plate with soft metal inserts. The use of a safety tread and also of folding or protected steps is recommended, the latter preventing 'hanging on' when the step is not in use.

PREPAYMENT CARS

"A prepayment system of fares necessitates that the entrance be on the rear platform and that the entrance and exits be controlled by the conductor or motorman. From the standpoint of safety and convenience to the passenger, businesslike methods of fare collection and proper control of the car operation by the conductor, the prepayment plan with the use of operating platform doors is a great improvement in car design. In Philadelphia 726 cars were on order to be equipped with the pay-within system on Sept. 15, 1910.

"The principal difficulty with the Philadelphia pay-within cars seems to be in the use of too small a rear platform and narrow rear platform door, these necessitating the location of the conductor inside the car bulkhead, where he is in the way of free passenger movement and prevents the entrance and exit simultaneously of two lines of passengers.

SINGLE-END CARS

"The usual prepayment plan with entrance and exit from rear platform and exit only from the front platform lends itself especially to the single-end type of car. The objections to the operation of single-end cars would not seem to apply with the usual force to the street railway system of Philadelphia, as 58 per cent of the line is single track practically all operated in one direction. The single-end cars eliminate a certain amount of weight and first cost, besides saving from 2 linear ft. to 3 linear ft. in the amount of track space occupied and about 6 in. in length of rear platform.

SIZE OF PLATFORM

"The rear platform of a prepayment car should be of sufficient size to permit of the independent entrance and exit of passengers at the same time. Allowing a width of 23 in. each in the clear for entrance and for exit means practically a 4-ft. opening at the step. The present opening on the Philadelphia standard car is 34½ in. for a platform 4 ft. 2 in. in length. This compares with a total opening in the New York prepayment cars of from 4 ft. to 5 ft. with platforms from 5 ft. 10 in. to 6 ft. 10 in. in length, and with total openings in the Chicago cars of about 4 ft. 7 in. and platforms from 6 ft. 1½ in. to 6 ft. 3¾ in. in length, all lengths of platform being inside measurements from bulkhead to dash.

"Experience and test have proved that for a 28-ft. to 30-ft. car a platform of from 5 ft. 6 in. to 6 ft. (inside) is of sufficient length to accommodate the usual passenger loads at average heavy stops.

"With the use of the maximum-traction type of truck similar to the New York (Metropolitan) car it would be possible to separate the truck centers sufficiently so that the overhang on the outside of curves with a 28-ft. car having a platform 5 ft. 6 in. (inside) would not be greater than that of the bumper of

the present Philadelphia standard car. This length will provide room for the conductor on the platform.

PLATFORM DOORS

"Another serious objection to the Philadelphia pay-within car is the sliding platform door. This type of door, besides being difficult to keep in line, involves a heavy mechanism usually required to be operated by air. This is expensive, requires frequent adjustment and in case of disarrangement or accident it is difficult for a passenger to release. Probably the most serious objection to the sliding door, however, is the necessary pocket into which it slides in the side of the car, which contracts the space at the car entrance, where congestion is most apt to occur. The combination of this narrowing of the neck of the bottle, together with the location of the conductor at the same point as a stopper, forms, it is believed, the most serious objection to this present type of car.

"On the New York and Chicago prepayment types of car a sliding platform door is used for the right-hand side of the front platform, providing an exit from 24 in. to 27 in. in width and folding doors on the right-hand side of the rear platform locked open while the car is in operation. The front door is opened either by the passenger or by a motorman's hand lever, or automatically by release of foot lever, and is locked shut by the motorman. On the rear platform a pipe stanchion divides the entrance and exit, and a pipe rail separates the exit and shields the conductor from the entering passengers.

"It is recommended that for the Philadelphia standard car folding platform doors be provided similar to those frequently used on the Minneapolis or pay-within types of car and also used recently in connection with the pay-as-you-enter car. These doors should be operated mechanically, the front platform door being operated by the motorman and those on the rear platform either by the conductor or motorman. The operating device should be under the control of the car operatives, and so simple that in case of accident the door could be opened by passengers.

BULKHEAD DOORS

"With the use of the pay-within type of platform door the bulkhead doors may be omitted, as in this case the platforms are closed to the weather. This eliminates some weight and expense and permits a freer movement of passengers. In sleet storms the motorman is sometimes obliged to lower the vestibule sash. This might necessitate a folding cab or shield behind the motorman to protect the passengers.

"In the New York and Chicago prepayment cars, as the rear platform doors are not used in operation, bulkhead doors are required, these in the case of the Chicago pay-as-you-enter cars being single sliding doors providing 23-in. openings, and in the case of the New York prepayment cars being double sliding doors providing openings of the same width.

"In the present Philadelphia standard car the bulkhead passageway is 28½ in. wide, but is, however, as stated, somewhat obstructed by the location of the conductor at this point. It is recommended that the widths of the entrance and exit at the bulkhead be not less than 23 in. each, these two passageways being conveniently separated by a pipe stanchion.

GRAB-HANDLES

"For the safety and convenience of passengers entering and leaving cars, grab-handles are installed in the Philadelphia car on the body and vestibule corner posts of both platforms. In the New York and Chicago prepayment cars a grab-handle is installed on the front vestibule corner post, and for the rear steps of the Chicago cars on the body and vestibule corner posts, the pipe stanchion from platform to hood acting also as an additional grab-handle at this point. On the New York cars there are grab-handles on the rear body corner posts but none on the vestibule corner posts of the rear platform, as passengers entering the car should properly grasp the pipe stanchion at the right hand.

FARE COLLECTION AND REGISTRATION

"With the Philadelphia pay-within car the conductor collects the fare at the bulkhead entrance and makes change in the

usual manner, registering the fare by hand register cord. In the New York prepayment cars the conductor makes change on the rear platform, the fare being placed in a removable cash box. On the Metropolitan car the registering of fares is by hand strap or foot lever, but on the Third Avenue car registration is made by registering fare box. On the Brooklyn car the fares are collected by the conductor without prepayment being required and are registered by hand register cord. On the Chicago car the conductor collects fares on the rear platform, registering by foot lever, with a hand cord for emergency. On the Boston car fares are collected by the conductor without prepayment, cash and ticket registers being provided, operated by hand cords. The location of the conductor on the rear platform and prepayment of fares are recommended, and the method of cash collection and registration should be such as suit the convenience and reliability of the company's accounting system.

SEATS

"Probably the most serious popular indictment against the Philadelphia standard car is the discomfort of the longitudinal seats, caused largely by their dimensions and form. In view of the fact that the car trips in Philadelphia are 50 per cent longer than in other large cities and that the surface car rides of a large number of the passengers are of necessity of great length due to there being few high-speed lines in this large area, comfortable seating arrangements for passengers should be provided.

"In the cross-seat double-truck car at present in use in Philadelphia there are twelve double cross seats for twenty-four passengers and four longitudinal seats seating four each, or a total capacity of forty seats. This car is 8 ft. 6 in. in width over all and, with cross seats 33 in. long, has an aisle 21½ in. wide. When converted into the pay-within type it has a seating capacity of thirty-eight at the usual spacing for longitudinal seats of from 17 in. to 18 in. per seat. The four small longitudinal seats in front of the platform door pockets, however, are extremely uncomfortable, due to their being little more than a shelf 13½ in. wide, with a straight back only 10 in. high. These spaces, representing eight seats out of the thirty-eight, or over 20 per cent of the seating capacity, cannot be much improved without a more serious interference with the passenger movement, but they should never be duplicated.

"The main longitudinal seats in this pay-within car are 18½ in. in height, 17 in. wide, have a slope of 1½ in. and are constructed of spring rattan; the backs are 12 in. high, have a slope of 3½ in. and are made of rattan backed with wood. They are not comfortable, however, due largely to the fact that the backs are too low, are not constructed of spring rattan and neither seats nor backs have the proper slope. If the backs were constructed of spring rattan it would make them more comfortable, although in the New York (Metropolitan) cars, where both seats and backs are constructed of rattan without springs, but backed with felt and wood, a comfortable seat is provided by a proper curvature of seat and back, this tending to prevent slipping.

"One of the most comfortable longitudinal-seat cars ever built is the Philadelphia (People's Traction) 20-ft. box car. If the design of the seats in that car were duplicated for the longitudinal seats of the pay-within car there would be a considerable improvement. These seats are properly sloped and the backs are of spring rattan and 16 in. in height. It is recommended that the longitudinal seats and backs which are retained in the pay-within cars be remodeled along the lines of these or of the Metropolitan seats. By making a moderate expenditure for this improvement the comfort of these cars can be largely increased.

"The standard cars of Chicago, with 32-ft. bodies, seat forty, of which twenty-eight are on cross seats and twelve on longitudinal seats at the ends of the car. In the New York (Metropolitan) car the capacity of seats, all longitudinal, is forty-two, exclusive of five front platform seats, while that of the Third Avenue car, exclusive of three platform seats, is forty-four, of which forty are cross seats and four longitudinal.

The Brooklyn car has thirty-six longitudinal seats and the Boston car fifty-two seats, of which thirty-six are cross seats and sixteen longitudinal. In all of these the seats and backs are made of spring rattan except in the Metropolitan and Boston cars, the former having rattan backed with felt and concave-shaped boards, and the latter having wooden slats. The length of these cross seats varies from 31 in. to 34 in. and the spacing between centers from 28½ in. to 31½ in.

STANDING ROOM

"The standing room of a surface car is considered as the available aisle and platform space. From experience and test of various types of cars it has been found that an available standing space of 4 sq. ft. per standing passenger provides sufficient room for comfort and for free movement through the car. This for a longitudinal-seat car means practically two rows of standing passengers in the car, providing aisle space for passenger movement between. Application of this rule to the Philadelphia pay-within car, with allowance for entrance space on rear platform, would result in thirty-eight standing passengers or the same number as seated, permitting a total load of seventy-six.

"For the Philadelphia cross-seat 28-ft. car (type E-42) this rule would result in twenty-nine standing passengers and forty seated. For the other cars it would result as follows:

PASSENGER CAPACITY			
	Seated	Standing	Total
Metropolitan	42	42	84
Third Avenue	44	26	70
Brooklyn	36	36	72
Chicago	40	36	76
Boston	52	39	91

"Therefore, for a longitudinal-seat car this rule means generally as many passengers standing as seated, while for the cross-seat car the standing passengers will represent from 60 to 90 per cent of the seated passengers. The total seating and standing capacity of the longitudinal-seat car is therefore about 10 per cent greater than that of the cross-seat car of the same dimensions.

"In a 28-ft. cross-seat car body with platforms 5 ft. 6 in. (inside), which for the purpose of this report is assumed as the future Philadelphia standard, the standing capacity would be approximately thirty-six in addition to forty seats. While the standing capacity is based on 4 sq. ft. per standing passenger, the total seated and standing capacity of the interior of the car will equal about 3½ sq. ft. per total seated and standing passenger, which is about the same proportion as exemplified by recent American practice and certain governmental regulations abroad.

STEADYING METHODS

"The steadying methods inside of the Philadelphia standard car consist of thirty-six leather straps, four stanchions at the bulkheads and two conductors' stands. On the Metropolitan and Brooklyn longitudinal-seat cars there are thirty-two and thirty-four leather straps respectively and in the Metropolitan car there are pipe stanchions on front and rear platforms and conductor's rail on rear platform. On the Third Avenue, Chicago and Boston cross-seat cars there are corner hand-holds or grab-handles on the back of each cross seat, with from eight to sixteen leather straps over the longitudinal seats, and in the case of the Boston car fourteen additional leather straps over the cross seats. The height of the leather straps varies from 5 ft. 2 in. to 5 ft. 11 in., a fair average being 5 ft. 7 in., used in Philadelphia and New York.

"It is understood that experiments are now being made by the company on the use inside the car of vertical pipe stanchions, which if used should have sanitary or white enameled coating. Hand-holds or grab-handles should be used on the back of each cross seat and in the case of longitudinal-seat cars careful consideration should be given to the sanitary or white-enameled horizontal hand rail of the Hudson Tunnel car in connection with the vertical stanchions and also to the steady-holds used in place of straps in the latest type of New York subway car. The latter are made of iron, white enam-

eled, and hinged in the direction across the bar but immovable as to the lengthwise direction. They are hung in the same position as the usual leather straps at about the same height, but when not in use a spring draws them somewhat away from the aisle.

"Additional steadying devices are needed in the pay-within car, as is shown by the large number of accidents from passengers falling on platforms and in the car. Some of the above methods should be adopted inside the car, and pipe stanchions, rails or grab-handles installed on platforms.

WINDOWS AND VENTILATION

"Objection has been made to the lack of airiness in the present Philadelphia standard car in summer and also as to poor ventilation in winter. Statistics were collected showing the area of front and side openings of this and other cars available for passage of air as operated in summer. The area of the front opening of the principal types of Philadelphia cars is as follows:

	Area Front Openings (sq. ft.)	Ratio Front Openings to Front Area
Pay-within car	16.2	24.9%
28-ft. cross-seat car.....	6.1	9.4
20-ft. single-truck car.....	5.1	8.4

"The total area of side openings of windows and monitor ventilators on these cars (not allowing for removal of fixed sash) follows:

	Area Side Openings, Windows and Monitors (sq. ft.)	Ratio Total Side Openings to Side Area	Ratio Total Openings to Total Area, Front and Side
Pay-within car	48.0	20.8%	21.7%
28-ft. cross-seat car..	15.6	6.8	7.3
20-ft. single-truck car.	8.2	5.0	5.9

"As these figures show that the pay-within has much larger available window openings than the cross-seat car, it would seem that the apparent lack of air movement is due to the arrangement of the seats. In the cross seat the passenger is facing the front of the car and would notice a current of air which is not perceptible in the longitudinal seat.

"A comparison with the window openings of cars of other cities is as follows:

	Area Front Openings (sq. ft.)	Ratio Front Openings to Front Area	Area Side Window Openings (sq. ft.)	Area Side Monitor Openings (sq. ft.)	Ratio Total Side Openings to Side Area	Ratio Total Openings to Total Area, Front and Side
Metropolitan...	7.6	11.2%	59.2	7.3	25.4%	22.2%
Third Avenue.	7.3	11.0	107.2*	7.8	47.3	39.5
Brooklyn	6.3	9.8	82.6*	10.0	40.3	33.6
Chicago City Ry.	19.2	27.5	76.9	14.0	34.7	33.2
Chicago Rys...	16.4	23.5	55.5	4.0	23.1	23.2
Boston	8.7	13.5	71.2	9.7	28.5	25.7
Philadelphia ..	16.2	24.9	27.3	20.7	20.8	21.7

*Summer operation.

"It should be noted that these figures do not include for the Chicago City car patented ventilators in front and rear monitor, ventilators on floor of car and ventilators on top of hoods; neither do they include the special ventilating system used in the Chicago Railways car, nor the openings in side vestibules of the Boston car.

"The Philadelphia car of type E-41, which is a 28-ft. semi-convertible car changed to pay-within type, has much larger side window opening than the other pay-within cars, this being 53.8 sq. ft., which gives it a ratio of total side and front openings to total area of 27.4 per cent. The area of all window openings of the Philadelphia pay-within car compares favorably with the cars of other cities named, the only cars having an appreciably larger ratio of window opening being the Chicago City, Third Avenue and Brooklyn cars, which last two types have removable sides and windows. With a car having longitudinal seats it is believed to be undesirable to remove the windows in summer, and it would seem that no material improvement can be made on the present pay-within cars in this particular if the use of longitudinal seats is continued. For a new standard car, however, it is recommended that the side window openings be considerably enlarged.

WINDOW GUARDS

"The Philadelphia car uses a double-bar side window guard and the Third Avenue, Chicago and Boston cars all use iron screens from 12½ in. to 2 ft. 6 in. wide. The Metropolitan and Brooklyn cars use no side window guards, the necessity for these being determined by the clearance between cars on double track.

HEATING AND VENTILATION

"The difficulties of surface car ventilation in the winter time are to an extent bound up with the question of car heating. The use of the usual hinged or pivoted monitor window ventilators produces drafts. In some of the recent steam railroad passenger car designs ventilation is accomplished entirely by means of roof or special forms of monitor ventilator. The two Chicago companies have made many experiments on this subject and use several different types of ventilators, none of these types being largely in use in other places. With the limited volume of air in proportion to door area and the frequent opening of doors it is a difficult problem to provide a system of uniform ventilation without draft and at the same time to furnish sufficient heat.

"It is recommended that the monitor windows be fixed and that ventilation be obtained from a sufficient number of automatic roof or monitor ventilators. These provide fixed openings for air to be admitted and discharged. Their use has demonstrated that the car temperature can be kept at the proper point, at the same time providing good ventilation.

"In order to compare the Philadelphia standard car with other Philadelphia types and with cars of the four other cities, all of which are heated by electricity, a ready method is to divide the volume of air to be heated by the number of amperes of current represented by the rated capacity of the heaters used for this purpose. The result is the number of cubic feet of air to be heated per ampere of current. In the Philadelphia pay-within car this is 335 cu. ft. per ampere as compared with 154 cu. ft. for the 24-ft. maximum-traction car and 131 cu. ft. for the 20-ft. single-truck (People's Traction) car. The smaller cars are well heated while the pay-within car is insufficiently heated. Comparative figures for other cars are as follows:

CAR HEATING		
	Volume of Air to be Heated per Ampere (cu. ft.)	Number of Heaters per Car
Metropolitan	146	16
Third Avenue	149	16
Brooklyn	126	6
Chicago City	160	18
Chicago Railways	158	18
Boston	215	22
Philadelphia	335	6

"The number of heaters in a car is important as affecting the distribution of heat throughout the car. It is recommended that the heaters in the pay-within (E-44) type of car be doubled in number and in capacity in order to give the proper distribution and amount of heat.

LIGHTING

"In the Philadelphia pay-within car there are eight incandescent electric lights inside the car, arranged in three clusters in the ceiling. This is the same number and arrangement as in the small 20-ft. single-truck closed car and also in the 24-ft. maximum-traction car. In addition there is one lamp on each platform. The interior lighting of these cars compares with other cars as follows:

NUMBER OF LIGHTS INSIDE CAR	
Metropolitan	16
Third Avenue	15
Brooklyn	16
Chicago	21
Boston	16
Philadelphia	8

"The Philadelphia pay-within car lighting is manifestly insufficient and the number of lamps in the car should be doubled. The lighting will be better distributed by using single socket lamps placed in one row along the monitor ceiling and another row on each side of the lower deck. In order

further to compare the lighting of these cars on a basis of ready approximation, the volume to be lighted inside of the car is divided by the number of lamps times 16 cp, which will give the number of cubic feet to be illuminated per candle. This figure for the pay-within car is 12.2 cu. ft. as compared with 8.4 cu. ft. for the 24-ft. maximum-traction double-truck car and 7.1 cu. ft. for the 20-ft. single-truck car. Comparison with the car lighting in other cities is as follows:

CAR LIGHTING	
	Volume of Space to be Lighted per Candle (cu. ft.)
Metropolitan	6.9
Third Avenue	7.1
Brooklyn	5.9
Chicago City	4.5
Chicago Railways	4.3
Boston	7.3
Philadelphia	12.2

"From one to two lights should be used on each platform, depending on its size, and additional lights are needed for the headlight and the independently illuminated destination signs.

BRAKING

"The Philadelphia cars of all types larger than the single-truck car have both air and hand brakes, the hand brakes being controlled either by vertical wheel or horizontal ratchet handle. The single-truck cars have hand brakes operated by horizontal ratchet handle. The sanding device used on the Philadelphia car is the old-fashioned bucket of sand and scoop, the sand being shoveled out by the motorman and thrown into a hopper. On the single-truck type of car there is apparently no sand equipment used. In the interest of safe operation all cars should be equipped with a sanding device. Either the mechanical or the air sander is satisfactory. The New York, Brooklyn and Boston cars have mechanical sanders, and the Chicago cars air-operated sanders.

FENDERS

"The Philadelphia cars are equipped with an extension fender constructed by the company consisting of a pipe frame inclosing a rope net, the fender being hinged to the car by brackets and suspended by chains from the dash. The fender has a projection of 29 in. from the bumper. These fenders are fairly effective for extension fenders, but are poorly maintained and are unsuitable for operation in the congested streets of large cities, where the use of an automatic wheel guard has been found to be highly effective. The projecting brackets attached to the car for the support of these fenders are also objectionable, as they afford foothold for 'hangers on' at the rear end. The practice in New York and Chicago and in the downtown districts of Brooklyn has been to abandon the projecting fender and in its place to use a patented automatic drop wheel guard. It is recommended that wheel guards of this type should generally replace in Philadelphia the projecting fender for moderate speed operation where pavement and track conditions permit, and that for high-speed operation in the suburbs an approved projecting fender be used in addition.

DRAWBARS

"The drawbars used on the Philadelphia car are of the plain spring non-telescoping type, the projection of the drawhead beyond the bumper being 7 in. and that of the bar 11 in. This form of drawbar is objectionable, as in cases of persons struck, even if the fender acts efficiently, the projection of drawbar or head will often cause injury. On the rear of the car it affords standing space for 'hangers on.' The cars of New York, Brooklyn and Chicago have the fixed-jaw type of drawhead with removable bar, which is usually carried under the side sill. It is recommended that this flush type or a telescoping type of drawhead and drawbar be used on the new standard Philadelphia car, and also on the present cars upon the adoption of wheel guards."

SUBWAY-ELEVATED CABS

But few changes are recommended in the cars used in the Philadelphia subway-elevated system. The principal one is that in future cars longer platforms should be adopted with side-platform door opening at least 47 in.

RECOMMENDATIONS AS TO CARS

The report suggests that the new standard surface car used in Philadelphia should be a 28-ft. two-motor cross-seat prepayment car with platforms measuring 5 ft. 6 in. inside and with windows capable of large opening to make the car suitable for both summer and winter operation. If the width of this car was 8 ft. 4 in. with skeleton sides and 34-in. cross seats, the aisle could be 28 in. wide. The reporting engineers believe that a car of this size, but without a projecting fender, could be used on the company's standard track curve for right-angle intersections in 50-ft. streets.

The report goes on to recommend the operation of the service with three classes of cars, as follows:

1. Use for all-day operation on lines of heaviest traffic the proposed standard two-motor, double-truck cars as far as the number purchased will go, and beyond that the present four-motor double-truck cars.

2. Use for all-day operation on lines of light traffic not running through the delivery district the two-motor single-truck cars now owned.

3. Use as far as practicable for rush-hour tripper service a combination of the present four-motor double-truck car with a specially designed light-weight trailer of large capacity.

The use of trailers is recommended partly for the sake of economy and partly to increase the capacity of crossings.

The report then specifies the following details of these proposed standard surface cars.

DETAILS OF NEW STANDARD SURFACE CAR ESPECIALLY AFFECTING THE TRAVELING PUBLIC

SIGNS

"It is recommended that there be made an entire rearrangement and standardization of the system and nomenclature of line and destination signs. Transparent line signs should be used on the front, rear and sides of the monitor, illuminated from the car. A destination sign, independently illuminated, should be placed in the center of the front and rear vestibules directly under the hood.

STEPS

"The height of first step should be from 14 in. to 15 in., second step 13 in. and third step from 9 in. to 10 in. The first step should be folding or protected. It should be at least 11 in. wide and should be provided with a safety tread.

DOORS

"Folding platform doors should be mechanically operated by motorman or conductor. This mechanism should be so simple that in emergency a passenger can release the door. The entrance on the rear platform and exit from front and rear platforms should be at least 23 in. in the clear. There should be no bulkhead doors, and the entrance and exit through the bulkhead, if separated, should each be at least 23 in. in the clear. Suitable grab-handles should be located on the vestibule corner post at the front exit and on the body post at the rear exit, with a pipe stanchion from step to hood on the rear platform separating the entrance and exit.

FARE COLLECTION

"The conductor should be located on the rear platform behind a suitable separating rail or steadying device.

SEATS

"Cross seats should be 34 in. long and longitudinal seats 36 in. A 28-ft. car with sixteen cross and four longitudinal seats will seat forty passengers. The seats should be 18 in. above the floor and 16½ in. wide, with a slope of 1½ in. for cross seats and 1 in. for longitudinal seats. The height of backs should be 18 in. and 14 in. respectively, and the slope of backs 4 in. and 3 in. Spring rattan properly shaped should be used for both seats and backs. Cross seats should be spaced approximately 30 in. from center to center.

"The standing room in this car, allowing 4 sq. ft. of aisle and platform space per passenger, will accommodate thirty-six passengers, making a total capacity of seventy-six.

"For the use of standing passengers there should be provided grab-handles or hand-holds on the backs of each cross seat and the usual hand-rail straps.

WINDOWS

"Full opening should be given to vestibule windows. Monitors should be fixed shut and there should be provided sufficient roof or monitor automatic ventilators.

HEATING

"There should be installed sixteen heaters of a total rated capacity of 12 amp.

LIGHTING

"Twenty 16-cp incandescent lamps should be used, of which fifteen would be inside of car, one on each platform, two for destination signs and one for headlight. The interior lights should be arranged in single sockets, five on the ceiling and five on each side of the lower deck.

CONDUCTOR'S SIGNALS

"There should be a push button on each side post with electric bell or buzzer on platform.

BRAKING

"Both air and hand brakes should be used, together with mechanical sander.

FENDERS AND WHEEL GUARDS

"Projecting fenders should be used only on cars operating on high-speed lines. Automatic wheel guards should be installed on all cars.

DRAWBARS AND BUMPER GUARDS

"It is recommended that, if practicable, a fixed flush drawhead with movable drawbar be used, otherwise a drawbar of the telescoping type. No projection of any device beyond the bumper should be permitted and dash shields should be used, thus preventing 'hanging on.'

RECOMMENDED CHANGES IN PAY-WITHIN CARS

SIGNS

"It is recommended that the same system and type of illuminated car signs be used as for the new standard car.

DOORS

"A simple mechanical passenger's release for sliding platform doors should be installed for use in emergency. This should be under the proper restriction of the car operatives.

SEATS

"Eight cross seats removed from cars in their reconstruction as pay-within cars should be replaced and located either all on one side or four on one side and four on the other, diagonally opposite, at the same time widening the inside of the car alongside of the cross seats by removing the side linings between posts if feasible. These cross seats, together with the use of a more comfortable, higher, spring rattan back for the longitudinal seats and proper sloping of longitudinal seats and backs, will much improve the comfort of these cars. This arrangement will give satisfactory standing room for thirty-four and a total car capacity of seventy-four.

VENTILATION

"An approved type of automatic roof or monitor ventilator should be installed.

HEATING

"There should be added eight electric heaters of total capacity of 6 amp, giving a total of sixteen heaters with a rated capacity of 12 amp, thus doubling the heating capacity.

LIGHTING

"Twenty 16-cp incandescent lights should be used with the same arrangement as recommended for the standard car. This is twice the present illumination.

BRAKING

"A mechanical sander should be installed.

FENDERS AND WHEEL GUARDS

"Automatic wheel guards should be installed and projecting fenders used only on high-speed lines.

DRAWBARS

"The same type of drawhead and drawbar should be used as recommended for the standard car.

RECOMMENDED CHANGES IN OTHER SURFACE CARS

"All surface cars should be equipped with mechanical sanders, automatic wheel guards and non-projecting drawheads as recommended for standard car. Projecting fenders should be used only on high-speed lines. All cars should be put

through the paint shop and thereafter painted and varnished on a definite schedule.

RECOMMENDED CHANGES IN SUBWAY-ELEVATED CARS

"The present subway-elevated cars are of satisfactory design and no changes in them are recommended. In the purchase of future cars, however, a few suggestions have been made above as to improvements of details."

INVESTMENT REQUIRED FOR ADDITIONAL EQUIPMENT

The report says that the plan outlined, based on the recommended service required for October, 1910, would involve the purchase of 489 large cars. These cars, if motor cars, with equivalent additional capacity of power house and feeder system carhouses and shops, would cost approximately \$15,000 per car for 465 "operating" cars and \$6,300 per car for twenty-four "shop" cars, or would involve a total expenditure of about \$7,126,000. The investment would be less if the general use of trailers in Philadelphia should prove to be practicable. The recommended changes in the present surface-car equipment would involve an expenditure not to exceed \$500,000.

The report recommends the purchase of twelve additional elevated-subway cars besides the 120 now owned. These cars would cost \$12,000 per car.

The report estimates that 100 additional cars per year with power and storage capacity will be needed by the system to provide for additional traffic.

PAPERS PRESENTED BEFORE THE PACIFIC CLAIM AGENTS' ASSOCIATION

As noted on page 967 of the *ELECTRIC RAILWAY JOURNAL* for June 3, the third annual convention of the Pacific Claim Agents' Association was held in Seattle, Wash., May 19-20. The following are abstracts of the several papers presented at this meeting:

STEAM RAILROAD MEMBERSHIP

A. M. Lee, district claim agent Northern Pacific Railway, Seattle, Wash., pointed out the desirability of having the far Western steam railroads become members of the association. At the present time the association represented 75 per cent of the electric and steam railroads on the Pacific coast. Mr. Lee advocated that additional membership should be secured by personal solicitation wherever possible. No company on the Pacific coast could afford to be without membership in the Pacific Association even if it was a member of one of the national claim agents' associations. Many of the local companies were already members of either the steam or electric national bodies and fully recognized the good work which the latter were doing. The principal reason for the existence of a local association was that the claim agents on the Pacific coast are so far away from the center of the country that it was very difficult for them to meet the great body of claim agents at the frequent intervals necessary to insure valuable co-operation. Mr. Lee said that while there was some difference in the claim work of the steam and electric lines, it was not sufficient to interfere with a helpful exchange of ideas. Their interests were often identical, as they were obliged to fight the same class of litigants. Cordial relations between the claim departments of all the lines on the Pacific coast would benefit the railways to an extent vastly beyond the nominal cost of membership and would supply to the members individually in their line of business an asset of good friends not available in any other way.

INDEX INFORMATION BUREAU

E. H. Odell, claim agent Tacoma Railway & Power Company, Tacoma, Wash., presented a paper entitled "Is an Index Information Bureau a Necessary Adjunct to the Claim Department?" The underlying idea which justified the existence of a bureau of information for claim departments was protection from fraud on account of fictitious claims. From sad experience the claim agents of the Pacific coast had found that their territory was permeated with a large number of accident

fakers, who frequently changed their names and their territory of operation. In fact, in this territory, the percentage of gross earnings paid out for claims was larger than in any other part of the United States. It was essential, therefore, that claim agents should co-operate to disseminate and absorb information. If an association was beneficial in exchanging useful data once a year, surely a bureau of information to which all companies could have access every day in the year could be made 365 times as useful as an association. The association should establish such a bureau within itself, but it should be more than an index bureau. He had always made it a point in warning other claim agents about a fictitious claimant not only to give the name, but also the manner of operation used, and wherever possible a photograph was forwarded so that the culprit would be recognized even if he did change his name. An efficient index bureau could be maintained at very little cost. One salaried person in the office of the secretary-treasurer of the association, with the use of a typewriter, record book, index card and photograph apparatus, could do all the central office work necessary for sending out information. The members of the association would be expected to send in from day to day descriptions of such claimants as they believed to be frauds and as they thought were likely to go elsewhere to repeat their tricks. Mimeographed copies of these descriptions and reprints of the photographs would be made at the central office and mailed to each member of the association for future reference. Mr. Odell also discussed the advisability of using the services of the Hooper-Holmes Information Bureau of New York, as suggested by H. V. Drown, president American Electric Railway Claim Agents' Association. He feared, however, that this bureau would be of little value to subscribers so far away as the Pacific coast. In the adjustment of claims time was often the essence of the contract. Quick settlement was usually the most satisfactory. Much valuable time might be wasted in waiting to register claimants in New York and depending upon the uncertain receipt of important information before taking definite action. For this reason he was in favor of a local bureau for the use of claim agents on the Pacific coast.

PREVENTION OF ACCIDENTS BY CLAIM AGENTS

George Carson, claim agent Seattle Electric Company, presented a paper entitled "Prevention of Accidents by Claim Agents." The duty of the claim agent was not limited simply to the adjustment of claims arising out of accidents. It was his further duty to prevent accidents. A claim agent ought to study carefully and to observe the details of every accident on his railway to enable him to suggest some means for preventing repetition. When an accident report indicates a defect in the roadbed, the way department should be informed and the same procedure should apply to the rolling stock and other departments. In communicating this information and any suggestions the claim agent should exercise tact, fairness and firmness. Mr. Carson's practice was to make a daily report of all accidents which had occurred during the previous twenty-four hours and send it to the district manager, general counsel and superintendent of transportation. These reports showed the character and cause of the accident and were written so as to enable the responsible department to take immediate steps to remove the cause of the trouble. Thus one alighting accident was due to poor pavement and another accident was due to a guy wire which interfered with the proper operation of the trolley pole. Further to advise the responsible department of the character and location of the accident, Mr. Carson submitted a daily report showing the accidents for the previous twenty-four hours upon the different divisions. This enabled the proper authorities by daily comparison to see the increase or decrease in the number and kind of accidents upon the different lines. He also submitted a monthly report which showed the increase or decrease of various types of accidents upon the different divisions.

In order that direct influence might be brought to bear upon the employees and inspectors in charge of the different car lines, it was his practice to visit one of the six carhouses

weekly, which meant repeating the visit every six weeks. He was always accompanied by his investigators, the head of the transportation department and other officers of the company. One meeting was held in the evening and another during the day, so that no employees would miss the instruction. The program usually covered a discussion by each investigator of some particular subject, such as the sounding of gongs in the passing of a car, the handling of intoxicated passengers and the preparation of accident reports. The discussion on these subjects had proved of value to both the investigators and the platform men. This work could be made even more valuable if some reasonable allowance was made to the platform men for the time they were required to attend these meetings. It was very desirable also that the talks on accidents should be carried on at periodic intervals to prevent the men from losing interest in the subject.

The other way by which the claim agent could help to prevent accidents was by educating the public. This was a much more difficult task. The claim agent probably would not receive much credit for this work, because his motives would be considered purely selfish. Nevertheless, while the problem of reaching the public was difficult, it was not impossible. During the past school year, since September, 1910, his company had attempted to arouse the public to exercise more care by giving a series of direct talks to the children in the public schools. In Seattle there were about 900 public schoolrooms, 1000 teachers and 30,000 pupils. In addition there were in the private schools 50 teachers and 1500 pupils. Two talks had been given to all of these pupils between Sept. 10, 1910, and April 14, 1911. This meant reaching almost every person in the city, because the children naturally spoke at home about these lectures. To determine the probable effect of these talks along the line of safety, Mr. Carson made a comparison of his office records covering accidents to boys and girls injured through no fault of their own. Between July 1, 1909, and July 1, 1910, there were 157 accidents, or approximately thirteen per month. From Sept. 1, 1910, to May 1, 1911, a period of eight months covering the lecture period, there were thirty-three accidents, or approximately four per month, nine less per month than during the previous period. While the lectures in the public schools were not responsible for all of this reduction they constituted the principal factor. In addition to the lectures the following warning cards were distributed:

STREET CAR DON'TS FOR SCHOOL CHILDREN

Don't play on the car track.
Don't hang on behind the car.
Don't stand on the car steps.
Don't touch a wire; it may be a live one.
Don't put your head or arms out of the car window.
Don't dart across the track in front of an approaching car.
Don't cross immediately behind a passing car. There might be another car or vehicle approaching close in opposite direction.
Stop!
Don't jump on or off a moving car.
Look!
Don't take any chances.
Listen!

Mr. Carson believed that one reason why these talks would prove of permanent value was that the minds of children were much more susceptible to new impressions than those of adults. In conclusion, he said that the courts could also help materially in the reduction of accidents if they were to hold that no one who got off or on a moving car could recover damages. Out of a mistaken sense of kindness the courts had really done the public an injury by allowing too small a degree of care to sustain a recovery.

Mr. Carson's paper was discussed by Mr. Odell, who said that instead of commencing his campaign of education through the schools, as had been done in Portland and Seattle, his first endeavor had been to reach the owners and drivers of vehicles. The proprietors of transfer companies and the owners of wagons employed in delivering express matter were his first pupils. About four years ago he had found, by classifying the accidents reported by his trainmen, that 70 per cent of all collisions were with delivery wagons of all kinds. Many of these collisions appeared to be altogether avoidable. On look-

ing into the matter he found a warfare going on between the motormen and teamsters. The drivers were contending with the motormen for the right of way on the street and were purposely blockading the tracks. The union to which they belonged was so strong that in almost every case the blame for the collision was placed on the motorman. In consequence, the railway had to pay large amounts for repairs to damaged vehicles and even for the deaths of valuable horses. To minimize, if not to prevent, this expense Mr. Odell arranged meetings of the principal employers of teamsters at which methods and measures to obviate these difficulties were discussed. He learned that the owners of teams were as much averse to their property being damaged as were the officers of the railway company. Even if they were reimbursed for the direct damage they were not compensated for the time lost and for the ensuing inconveniences and annoyances. Mr. Odell persuaded them to post notices in their transfer barns warning the drivers against certain accidents which might result from carelessness and explaining how such accidents might be prevented. Many employers also posted a notice to the effect that if a collision occurred between one of their wagons and a street car the driver of the team would be discharged. Within six months after the first conference street-car collisions with wagons diminished 33⅓ per cent and within a year more than 50 per cent.

In Tacoma there were many grades, so that it was almost impossible for teams to stand up, let alone to haul heavy loads in icy weather. The railway, therefore, instructed the motormen to favor the drivers as much as possible when bad weather conditions prevailed. Now, instead of continual warfare between the teamsters and motormen, there was a strong feeling of reciprocity which had resulted in great savings to the street railway and the team owners. Whenever a collision with a truck is reported Mr. Odell and the vehicle owner communicate by telephone at once. He and the owner would then review the statements of all the witnesses, to decide where the responsibility belonged and to take their medicine. He rarely had trouble in adjusting these cases. In the near future he intended to call a meeting at the Tacoma Commercial Club of all the taxicab owners to bring about an understanding whereby taxicabs paralleling street-railway tracks will keep clear of the tracks in foggy weather. The Tacoma company had also given accident instruction lectures in the public schools along the lines explained by Mr. Carson. Much good had resulted therefrom. Persistency, however, was necessary to obtain permanent benefit. The public was prone to forget and it was likely that a lesson learned to-day would not be heeded to-morrow.

REDUCING BOARDING AND ALIGHTING ACCIDENTS

J. N. Hone, claim agent Spokane & Inland Empire Railway, read a paper on "How to Diminish Boarding and Alighting Accidents." This end could be achieved by education alone. His company had started with the 20,000 school children in Spokane. They had become so interested in the subject that he was able to show to the delegates some fifty or sixty essays on accident prevention from all grades in the schools. Many accidents could be prevented if the services of women's clubs and the various lodge and church organizations were enlisted. The claim agent should ask himself this question: "Am I doing all that is within my power to prevent accidents?" Last winter in order to secure the lively interest of the Spokane public he had published an article in the newspapers stating that his company would offer a prize of a \$5 book of car tickets to every fiftieth woman and a \$5 gold piece to every one hundredth woman who got off a street car correctly at certain important corners. While only two \$5 gold pieces and two books of tickets were given away, the amount of advertising from this scheme could hardly be estimated. Many people informed him that they had never before realized how few women got off cars the right way. Mr. Hone then described at length the accident talks to employees as developed by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway. Mr. Hone felt that the officials of many electric railways did not

always get into close enough touch with their platform men. The men should be taken into the confidence of the management, taught how to prevent accidents and be made to feel that each one is an essential and valuable part of the system.

ORGANIZATION OF A MEDICAL DEPARTMENT

T. A. Cole, claim agent Los Angeles Railway, presented some notes entitled "Organizing a Large Medical Department for a Large Street Railway." The first thing to be considered was the selection of a chief surgeon with ample assistance. The whole department should be on friendly terms with local physicians. The duties of the medical department should begin prior to the accident itself—that is, with the examination of the platform men, because it was very important that eyes and ears should always be on the alert. The claim and operating departments should be closely related with the medical department. The latter should have a staff so large that some member would always be available to respond to the first call for aid and to endeavor to minimize the injury as much as possible, thereby easing the way for the claim agent. The representative of the medical department should tell the injured person that if the railway is at fault he will be treated fairly. In case the company was sued the doctor should be prepared to render aid to the claim and legal departments. The medical department's reports, however, should not be such as to mislead the claim agent, who must be governed by them to a great extent. The chief surgeon of the medical department of the Los Angeles Railway is appointed by the general manager. He has full charge of his department and employs his own assistants. Every employee of the company is entitled to medical or surgical treatment, in return for which the company collects 50 cents every month for the fund of the medical department.

SETTLING PHYSICIANS' BILLS.

J. H. Handlon, claim agent United Railways of San Francisco, discussed the subject whether it was advisable to hold out the amount of the physician's bill in making settlements and pay the physician direct. Claim agents should not adhere to a fixed policy in handling these bills for services rendered to claimants in personal injury claims. Usually the best plan was to leave the matter of payment in the hands of the claimant, because when the claim agent endeavored to withhold the amount of the bill in order to pay it directly to the doctor the claimant's antagonism might be aroused. He would naturally assume that his honesty was questioned and might become so angry as to withdraw from the settlement. It was very undesirable to stir up such feeling, as the aggrieved person would spread a prejudiced report among all his friends and acquaintances. However, some effort should be made to comply with the wishes of physicians when they request that the claim agent pay them directly for their services. Of course, this should apply only to cases where the doctor has acted honorably throughout the entire transaction and co-operated in every reasonable way with the company to effect a settlement. The good will of the physician was far more important than the good will of the injured person. Once the claim had been settled there was little likelihood that the claimant would have any future dealings with the company, whereas the physician might have many cases where his continued good will would be of great value to the company.

There are three electric railways in Christiania, Norway, owned by private companies. They were formerly owned and managed by the city. The combined mileage of the three lines is 28.1 miles, and the fare 2.68 cents for adults and 1.34 cents for children under twelve years. Transfers are given free of charge on different branches of two of the lines, while a transfer from one line to another costs 1.34 cents additional. Laborers are carried at half fare at certain hours in the morning. The roads hold their franchises under concessions from the city, which expire in 1924, and as consideration they have to pay the city 10 per cent per annum of all receipts from the passenger traffic. Merchandise is not carried except bundles and hand baggage.

RECEIVERS FOR METROPOLITAN STREET RAILWAY, KANSAS CITY

Receivers were appointed for the Metropolitan Street Railway, Kansas City, Mo., on June 3, 1911, on the application of Alexander New, attorney for the Kansas City Railway & Light Company. The receivers are R. J. Dunham, Chicago, Ill., chairman of the board of directors of the Kansas City Railway & Light Company, and Ford F. Harvey, Kansas City, head of the Fred Harvey System. The appointments were made by Judge W. C. Hook, of the United States Circuit Court, at Kansas City, Mo. Mr. Dunham made the following statement:

"The street railway franchises expire in 1925. More than \$18,000,000 of obligations to creditors mature in September, 1912, and May, 1913. At that time these obligations must be met or refunded upon a short-time franchise. The annual gross street railway earnings are in excess of \$6,000,000. These, if the property be kept together, ought to be ample to meet expenses, maintenance and interest, as well as to accumulate a surplus for these creditors.

"The growth of Kansas City has been phenomenal, both in population and territorial limits, thus requiring much additional service and many new lines, so that, in addition to franchise requirements, the public demands extensive improvements and many additions to the property. Creditors having debts which mature within a year or two are not willing that the earnings should be used for this purpose instead of being applied upon the indebtedness. Therefore, to meet this situation it is necessary to borrow new money. To obtain this security must be given. Such improvements, if made, would fall under the lien of present mortgages which cover existing and after-acquired property. Investors will not lend new money for the improvements unless they can have a first lien upon that which their money creates. With such lien the money can be obtained. To obtain it requires some kind of a new contract with the city.

"More than \$13,000,000 of the bonds were issued prior to the peace agreement of 1902, under franchises expiring in 1925. These bonds are secured by mortgages upon different lines in the down-town districts and heart of the city. These bondholders claim they are not bound by the provisions of the present ordinances as to transfers, extensions or the payment of 8 per cent of the gross earnings. Such a controversy precipitated would threaten and, if maintained, would force a dismemberment of the system. Other bondholders, general creditors, stockholders and the public, particularly the latter, are alike interested in preventing this.

"In order to keep the property together and render that service which the public desires, a receivership became inevitable, much as it is regretted. It is hoped that the court will be able soon to return the property to the stockholders, for in the meantime efforts will be made to adjust all differences between bondholders and refund all obligations, even upon the short remaining franchise period.

"It is possible that out of the situation some arrangement may be made with the city whereby there can at an early date be obtained the new money for all necessary improvements and additions.

"Before outlining any definite policy for the receivership I must confer with my co-receiver, Mr. Harvey, who, I understand, is out of the city. Until that time Mr. Egan will continue as general manager of the street railways and all employees will continue in their positions, subject to his orders and directions as heretofore.

"The proceedings in no way affect the Kansas City Railway & Light Company, but are in the interest of its creditors; nor do they affect the Kansas City Electric Light Company or the Kansas City Heating Company, the securities of which are held by the railway and light company. The earnings of the latter are much in excess of the sums necessary to meet the interest upon all the obligations of all the companies, and it is expected that all interest on the securities will be met and paid when it becomes due."

John M. Egan, president of the Metropolitan Street Railway, will remain in charge of the operation of the road. He issued the following statement:

"Regarding the action taken this day, Mr. Dunham's statement covers the entire ground. Until the receivers meet and outline the policy to be pursued I will operate the road as heretofore, giving the best service possible. The present rules and regulations pertaining to the operation and maintenance of the system will be enforced."

Mr. New said, briefly, that the main purpose of the receivership was to protect the property from being segregated by the bondholders whose interests are in one part of the lines and also to protect the public.

Frank Hagerman, vice-president of the company, said that the receivership would keep the property intact and continue the universal transfer system, which would be destroyed if the creditors of the various lines that were under different ownership prior to 1901 should take possession of the properties. Ultimately extensions will be made and the public will gain as a result of the receivership.

The company represented to the court that "the property of the Metropolitan Street Railway will, if its interests be subserved and the system maintained as a whole, be sufficient to meet all its mortgage bonds, its note indebtedness pledged as aforesaid, pay its general creditors and net a result upon account of its stock." On the other hand, the company asserted "if the Metropolitan Street Railway should be dismembered, or if it should not be operated as a whole, or if the demands secured by the said mortgages or deeds of trust upon its property or the unsecured claims of its general creditors should be separately asserted and enforced, then there will be such sacrifice that all the creditors will not be paid in full and the stockholders will receive nothing."

Negotiations for a new franchise for the Metropolitan Street Railway were begun early in 1909. An ordinance was drawn and submitted to the West traffic way committee of Kansas City in June, 1909, as a basis for negotiations, and was subsequently modified by the sub-committee of the West traffic way committee and submitted to the entire committee. When the franchise came before the Council for consideration it was amended by that body and submitted to the voters of Kansas City on Dec. 16, 1909, for approval. The ordinance was defeated at the referendum election. A digest of the principal provisions of the franchise ordinance which was submitted to the voters was published in the *ELECTRIC RAILWAY JOURNAL* of Dec. 11, 1909, page 1199.

The questions of the improvements to be made by the Metropolitan Street Railway in Kansas City and of financing the needed extensions were referred to at length in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911, page 472, and March 25, 1911, page 530.

REPORT ON WHITE CEDAR

Secretary H. H. McKinney, of the Northwestern Cedar-men's Association, with headquarters at Minneapolis, Minn., has made a report showing conditions governing the present supply of white cedar products and a forecast of the conditions for the remainder of 1911. He says, in part, that at the present time the seasoned stocks of all lengths of poles and posts are unusually low and that dealers are facing a steadily increasing demand for stock with a much smaller source of supply than at this time a year ago. With an increase of consumption of 10 per cent in 1911 over 1910, stocks of all sizes from 7-ft. posts up will practically be wiped out before another logging season is finished. Statistics show that on Jan. 1, 1910, there were about 875,000 more poles from 16 ft. in length up than on Jan. 1 of this year, and the production for the past winter has easily been 20 per cent below the estimate, thus reducing greatly the seasoned stocks on hand. The estimated consumption of white cedar poles from 16 ft. up for 1911 is 2,452,187.

BRIEF OF COMPANY IN MILWAUKEE LOW-FARE CASE

The brief of the Milwaukee Electric Railway & Light Company in the case in which the city of Milwaukee seeks to have a lower fare established has been filed with the railroad commission of Wisconsin. The brief bears the names of Miller, Mack & Fairchild, attorneys, and of Sullivan & Cromwell, counsel for the company.

It is contended that the complainant failed entirely to establish its case. The brief states that if a high rate of profit by a railway should arise from excessive rates, there would be proper reason for public complaint, but if the rates are reasonable when measured by the service rendered, the amount of the profits will depend upon the efficiency of the managers and their ability in being able to operate with a small rather than with a large investment. In a history of the property particular emphasis is laid on the advantages of the consolidation of various properties which was effected at the time of electrification. The opinion of John I. Beggs is quoted to the effect that the consolidation doubled the value of the property, and on the greater economy and efficiency that it made possible, and that it was easier to operate a consolidated property and earn a return on it upon double the capitalization than it would have been to take the separate constituent properties and attempt to earn a return upon them on half the amount. Emphasis is also laid upon the advantages which the city derives from the consolidation.

In regard to the basis of return, the brief states that the record in the case fully justifies the adoption of the capitalization of the company as a basis for computation. The bonds and capital stock were issued under the laws of the State. The franchises were granted with knowledge of capitalization and the capitalization was recognized in the dealings with the city. Further it is stated that the capitalization represents only a fair compensation for the property, including the service of the organizers. It is stated that the capitalization is approximately the same as the actual cost of the railroad on a cash basis, including cash discount, plus the actual cost of making a railway a going concern, but exclusive of any interest on that cost, and that the capitalization is only slightly above the appraisal of the physical property, plus the cost of bond discount and the principal and interest of making the road a going concern. Decisions are quoted to show that the railroad commission of Wisconsin has laid down the doctrine that the actual total investment is, as a general rule, a proper basis on which the return is to be computed. It is stated that when the city granted the franchise for electric traction it involved a recognition on the part of the city that properties suitable for electric traction should be substituted for the horse railway equipment, which had proved unsuitable for that purpose. The existing horse railway equipment was not to be thrown away without compensation.

Taking up the subject of value of the property, the argument says that there is a good reason for not giving consideration to the so-called depreciated value, because the consumer is interested in the mechanism which furnishes the service, and that service, assuming that the plant be kept in good repair, is the same whether the plant is one year old or twelve years old. To give an appraisal of cost of reproduction new any importance as a guide, it must include, the brief says, all the elements that were included in the original railway. In this respect most appraisals have failed. The common form of reproduction value now ignores many elements, such as the work of planning and experimentation in building up the enterprise. The increase of efficiency through a co-ordinated, harmoniously operated whole is appraised by Mr. Beggs generally as increasing the value of the property 20 per cent. The loss of interest during the early years of operation, while the company has obtained some earnings but not sufficient to pay any return on the investment, is the same in principle as the loss of interest during the period of construction when there are no earnings. The sacrifice of interest in both cases is part of the cost of establishing the property.

In the future, if the company is permitted to work its own way out, the benefits of the combination will be retained, but an increase in operating expenses is to be expected as to almost every item involved. Coal, lumber and practically every other item used in operation is increasing in price. Additional burdens are being imposed by statutes or municipal ordinances. Another item of expense that will accrue in the future is license fee. The expense will also be increased by greater liability for injuries and damages, as a result of statutory changes in the law. The company has also in contemplation a plan for a relief fund for the employees and also a system of profit sharing. These will be added burdens to the expense account and are not compatible with reduced earnings. So far as depreciation reserve is concerned, the company, the brief says, should be encouraged to act liberally rather than parsimoniously. Adequate reserves are necessary, not only to furnish means for the purchase of the best and most efficient apparatus, but also for quicker replacements of deteriorated property. Inadequacy is a danger as great as, and perhaps greater than, obsolescence. Efficient operation requires a margin of safety. It is argued that, so far, the company has never had sufficient earnings to be able actually to make a sufficient depreciation reserve and that its present depreciation reserve is inadequate to manage even the existing depreciation of its present physical property.

The dividends actually paid average only 4.06 per cent on both the preferred and common stock for the ten years from 1897. The limited return of the company has postponed capital expenditures for shops and carhouses. Concerning the proper rate of return, the brief says that some reserve for success and good management is necessary, if capital is to be obtained for utility companies. A public utility has the added hazard that it is in the public eye and is subject to exceptional legislative interference.

Another difficulty encountered is the amortization of the franchise. So far, the company has been able to make no provision whatever for the amortization reserve, and its earnings ought to be sufficient to allow it to compensate itself in the remaining years of the franchise. Litigation about rates and service is one of the dangers peculiar to the public calling. The company has already been involved, the brief says, in two wholly unnecessary proceedings regarding its rates. Another burden peculiar to the public service corporation is the continual necessity of increasing the capital. The statement of Mr. Beggs that earnings of from 8 per cent to 12 per cent are necessary to induce capital to enter into street railway enterprises is, the brief says, conservative to the maximum; less than 12 per cent would tend to discourage investors in the enterprise. Such a return would not necessarily involve the distribution of the entire earnings to the stockholders annually. A margin of safety should be provided for losses or unexpected changes in value or poorer business. A larger return should be allowed to the company that is well managed and furnishes good service than to a poorly managed company. Another principle which it is proper to enforce is to permit the company to increase its rate of return with any reduction in its rate of charge.

The only opportunity which the company can have to retrieve the years of loss and of meager profits will be through the possibility of increased earnings from the present time to the expiration of its franchise in 1934. The company sets up in its answer the allegation that any reduction of fares will involve confiscation of the property and will be an impairment to the contract embodied in its franchise, in violation of the constitution of the United States.

Attorney-General Lightfoot of Texas will investigate the books and affairs of the Western Union Telegraph Company, the Postal Telegraph-Cable Company, the Bell Telephone Company, the Southwestern Telegraph & Telephone Company, the Western Electric Company, the General Electric Company, the United States Electric Company of New Jersey and its branches in Texas; also of the Stone & Webster Management Association, of Boston, which operates several public utility corporations in Texas.

HEARING IN REGARD TO INTERPRETATION OF NEW JERSEY LAW

A public hearing was held at the court house in Newark, N. J., recently by the Board of Public Utility Commissioners of New Jersey, principally to hear argument on the question of the interpretation of that section of the new public utility act which forbids "public officials" to accept free transportation from the public service corporations. The Public Service Railway was represented by Frank Bergen, general counsel; the Morris County Traction Company by E. A. Archer, general manager, and the Atlantic City & Shore Railroad and the Central Passenger Railway, Atlantic City, N. J., by J. N. Akarman, general manager.

Mr. Bergen said that the Public Service Railway discontinued the free transportation extended to policemen, firemen and other public officers on the strength of the opinion expressed by him that the law made such practice illegal. It was his opinion that the law applied to all municipalities whether or not they had contracts with street railways for the free transportation of public officials. Mr. Bergen said:

"Those who have been contending that this act does not affect such contracts between municipalities and utility corporations are forgetting that in making these contracts the municipalities were acting merely as the agents of the State and that the State could abrogate those contracts at any time. For that reason I believe that all these agreements are abrogated by this statute.

"We extend the courtesy of this free transportation in practically all the municipalities in which we operate, although we have received no very hearty thanks for it so far as I know. No doubt we would have continued it gladly if it had not been for this law. All that we stand for is that those who have passed the law to forbid the continuance of this privilege should take the consequences and not we. When the court decides the question we shall abide by the decision. But we do not want the company criticised for somebody else's mistake."

Mr. Archer said that the Morris County Traction Company was under contract to furnish free transportation and that it had not discontinued transporting free the public officers designated in its franchise. He expressed a desire to continue to meet the terms of the ordinance under which his company operates.

Mr. Akarman said that the companies which he represented were under contract to carry city officers free. He desired to have the conditions under the old act continue in force. He believed that the board could construe the act so as to permit the company to comply with an obligation which it felt in duty bound to perform.

The representatives of municipalities who were present all contended, in short, that policemen, firemen and members of health departments are employees, and not "public officials."

Charles M. Egan, assemblyman of Hudson County, represented the State Firemen's Association. The new law was the outcome of Mr. Egan's original bill. He said that neither he nor any others of those who were instrumental in the passage of the measure expected that it would affect the firemen and policemen. He said he believed public policy demanded that these officers should be carried free. He called attention to that section of the act which permits the board to fix classifications and to approve contracts, and he thought the board might very well use its power to allow municipalities to contract with public utilities corporations for the free transportation of such officers.

President Williams, of the board, asked that briefs covering the claims set up, and especially covering the question of the interpretation of the term "public official" and also on the matter of the influence of the new law on existing contracts between municipalities and public utilities corporations be submitted to the board.

On June 3, 1911, the board announced its decision as follows in regard to the question of the free transportation of "public officials":

"The board does not regard the free transportation, without discrimination, on behalf of a municipality, of policemen, firemen and inspectors of boards of health in the performance of their public duties as a violation of the provisions of public laws, 1911, Chapter 195."

The board, under date of May 26, 1911, issued the following memorandum in regard to certain published statements made in connection with the offering for sale of public utility securities issued under the laws of New Jersey:

"The attention of the Board of Public Utility Commissioners has been directed to certain published statements made in connection with the offering for sale of certain public utility securities issued under the laws of this State. These statements are so worded as to be capable of misleading the public, and particularly possible investors, by including the belief that this commission confirms or has confirmed the financial and business standing of issuing corporations as a whole, by approving the issue of certain securities by such corporations. As regards the approval of security issues, the statute charges the commission with the duty 'after hearing, to approve of any such proposed issue maturing in more than one year from the date thereof, when satisfied that the same is to be made in accordance with law and the purpose of such issue be approved by said board.' (Laws of 1911, Chapter 195, Section 111.) Such approval, when granted, must not be interpreted as implying more or less than the law specifically requires. Nor does such approval by this board of such proposed issues of securities carry or imply any confirmation of the business or financial standing of the issuing corporation as a whole. All persons who utter, issue, circulate or publish any statement to the contrary will be held to strict accountability for the same."

The board is sending to every public utility in the State a copy of the new law, accompanying it with a circular calling particular attention to certain features of the act. One of the things to which attention is directed is the provision requiring the approval by the board of any grants or privileges to public utilities by municipalities, and also the approval by the board of any issues of stocks or bonds by a public utility, or of any sales, leases, mortgages and transfers of stock by one public utility to another. Attention is also directed to the fact that agents, experts or examiners of the board are empowered to enter upon any premises occupied by any public utility, for the purposes set forth in the act. All such agents will be supplied with proper means of identification by the board.

DIVISION OF FIVE-CENT FARE IN NEW YORK STATE

The following figures on the division of the electric railway nickel were compiled by Curran & Mead, New York, for the Street Railway Association of the State of New York from the reports of all street railway companies in New York State to the Public Service Commission of the First and Second Districts. These figures are based on reports for the year ended June 30, 1909.

	Amount.	Per Cent of Operating Revenues.	Distribu- tion of Five Cent Fares. Cents.
Maintenance of way and structures.....	\$6,386,781	.0678	0.3390
Maintenance of equipment.....	7,584,483	.0805	0.4025
Cost of power.....	10,628,601	.1128	0.5640
Other transportation and traffic expenses.	4,726,506	.0502	0.2510
Conductors and motormen.....	18,228,989	.1935	0.9675
General expenses, including insurance, etc.	3,814,462	.0405	0.2025
Damages and legal expenses.....	4,831,360	.0513	0.2565
Taxes	5,168,278	.0548	0.2740
Rentals	756,873	.0080	0.0400
Interest	25,052,358	.2659	1.3295
	\$87,178,691		
Surplus	7,022,975	.0747	0.3735
	\$94,201,666	1.0000	5.000

The table shows that little over one-third of 1 cent has been left as a surplus for each 5-cent piece when the different costs quoted have been met.

PAPERS READ AT NATIONAL ELECTRIC LIGHT ASSOCIATION CONVENTION

Abstracts of several papers and committee reports presented at the convention of the National Electric Light Association were printed in the *ELECTRIC RAILWAY JOURNAL* of June 3. At the session of the convention on Friday, June 2, two other papers of interest to electric railway officers were read.

FUEL OIL FOR STEAM BOILERS

Herbert A. Wagner, Baltimore, described the system employed by the Consolidated Gas, Electric Light & Power Company in its Westport station for using coal and oil simultaneously for fuel for its boilers. The space under the boiler back of the usual coal grate is made into a large combustion chamber with the oil burners at the extreme rear end. This chamber is separated from the boiler tubes above it by tiling and from the coal grate by a low bridge wall. The coal grates are 14 ft. wide and 8 ft. long. Each furnace is provided with four oil burners. Oil is delivered to the boilers under 20 lb. of pressure per square inch and is atomized in each boiler by means of a steam jet.

Under actual operating conditions the maximum boiler outputs obtained during seven-hour runs have been as follows: With coal used alone, 1188 hp; with oil alone, 702 hp; with coal and oil together, 1445 hp. It was found that a 2000-kw station load could be carried by each boiler when using coal and oil together with as much ease and certainty as 1200 kw per boiler could be carried when coal is used alone. The results indicate a gain in output of 66 2/3 per cent by the use of the oil or a saving of 40 per cent in the cost of the boiler equipment for a given output.

The cost of oil for producing a certain amount of steam is about 33 per cent more than that of coal. In spite of this difference in cost of fuel, the actual cost of banking is less with oil than with coal for the reason that the oil is burned efficiently while the coal is necessarily burned very inefficiently. The author stated that a saving in investment and in labor for peak load was effected by the use of oil. Fuel oil shows its advantages as compared with coal most markedly when used as fuel for operating steam plants in connection with long transmission lines receiving energy from hydro-electric stations.

The paper contained considerable data relating to the use of fuel oil as compared with coal. From this data it was shown that the cost per month for fuel and labor for boilers to keep 10,000 kw in reserve at full steam pressure and ready to take the load equals \$1,600 with oil and \$3,126 with coal.

SCIENTIFIC MANAGEMENT

L. B. Webster, Marion, Ind., gave the results of a scientific study of the labor performed in the power house and in overhead line construction. A considerable portion of a boiler fireman's time is spent in work which, while necessary, puts no coal on the fire. Much of the time, however, he is idle. A careful record was taken of the working terms of eighteen firemen working in three shifts under the most severe load conditions while the boilers were being worked at from 100 per cent to 150 per cent of their rated capacity. Each man fired 600 hp of boilers using the poorest grade of unscreened anthracite. Notwithstanding the overload on the boilers and the poor grade of fuel, the eighteen firemen spent only 47½ per cent of the total time working and were idle 52½ per cent of the time. Such details as the style and number of fire doors caused a variation of from 25 per cent to 30 per cent in the working time of two firemen on the same shift and firing boilers of the same horse-power.

Experiments made to determine the saving in coal and labor effected by forcing a boiler showed that when steaming at 135 per cent of the rated capacity as compared with 80 per cent capacity the water evaporated per pound of coal fired increased from 6.14 lb. to 6.92 lb. When steaming at 118 per cent of capacity as compared with 80 per cent the amount of coal fired per hour increased 60 per cent while the ratio

or working time to total time of the fireman increased from 34.1 per cent to 42.7 per cent. Thus an increase of 60 per cent in the amount of coal fired was made with an increase of only 25 per cent in the working time of the fireman, which still remained less than one-half of the total time of the shift.

Similar observations were made in the engine room. An engineer was found to spend 32 per cent of the time doing his own work, 11 per cent doing the work of low-priced oilers and 57 per cent of the time he was idle. An oiler was observed to spend 37 per cent of his time working and to be idle 63 per cent of the time. Investigation showed that the efficiency of the labor in the plant under observation was equal to, or higher than, that in other plants of the same size. The problem of reducing labor costs in the engine room is to convert that portion of the time which is spent in waiting for something to happen into useful time in which work of real value is being performed.

REPORT OF INDIANA RAILROAD COMMISSION ON SIGNALS DELAYED

The special committee which was to have reported to the Indiana Railroad Commission on June 1, 1911, the results of its investigation of block signal systems proposed for installation on the interurban electric railways of Indiana made a verbal report through A. W. Brady, its chairman, to the effect that progress is being made and asked for more time to consider the merits of the systems installed on several roads for experimental purposes. Chairman Wood, of the commission, said that inasmuch as the adoption of any system or systems would involve large expenditures by the interurban railways the commission felt that the managers should have reasonable time to agree on the merits of the systems proposed and granted the committee until June 23, 1911, to make its final report.

THE LETTER BALLOT ON STANDARDS

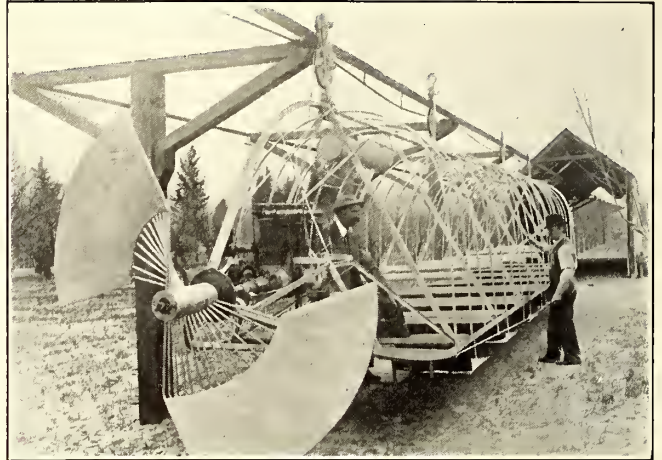
Member companies of the American Electric Railway Association should not overlook the fact that their opinion has been requested by the Engineering Association on the formal adoption of the proposed engineering standards. A plea was published in this paper last week to the members of the association to reply to the request of the committee on city rules of the Transportation & Traffic Association, so that the committee should be guided by the wishes of the association in drafting a standard code of city rules. The letter ballot on the subject of engineering standards is equally important to the members of that association. Under the procedure of the Engineering Association these standards have been considered carefully by the association and by the committee on standards and now need only formal adoption of the association by letter ballot to become actual standards. In behalf of the engineers who have worked on the revision of these standards a full expression of opinion is requested.

LARGE ORDER FOR POWER CABLES

A short note was published in this paper last week in regard to an order for cables recently placed by the Boston (Mass.) Elevated Railway through the Stone & Webster Engineering Corporation, Boston, Mass., with the American Steel & Wire Company, Worcester, Mass. This order is said to be the largest ever placed for underground cables. It covers about 67 miles of No. 0000 three-conductor, paper-insulated, lead-incased cables for 14,000 volts working pressure. These cables are to be installed by the manufacturer and are to be used in connection with the new Boston Elevated power station at South Boston, which is being erected for the Boston Elevated Railway by the Stone & Webster Engineering Corporation. The manufacture of this order calls for about 700,000 lb. of copper, over 165 tons of manila paper and nearly 2,000,000 lb. of lead, and it will require 125 or more cars to transport the finished cables.

AERIAL MONORAILWAY

An aerial monorailway has been projected between Glendale, a suburb of Los Angeles, and Burbank, Cal., a distance of 12 miles. The inventor, J. W. Fawkes, has built an experimental car, and a piece of track 600 ft. long near Burbank and a circular track 1 mile long are being built to test the car at high speeds. The accompanying engraving from a photograph shows the car and its propeller-driving mechanism. The car is built almost entirely of aluminum and seats fifty-six persons. It is supported from the overhead track by four hangers the sheaves of which run on the top edge of the track. At one end is mounted a large two-blade aluminum propeller which is direct-

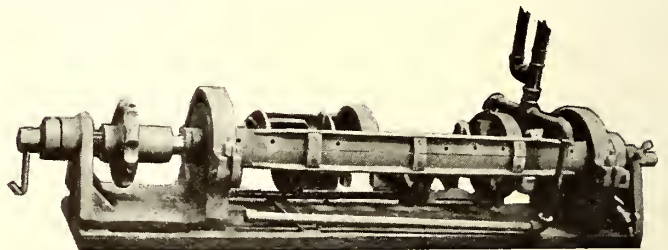


Aerial Car

driven by a four-cylinder, 20-hp gasoline engine. While the engine of the experimental car has been run at only 200 r.p.m. the inventor believes that a speed of 100 m.p.h. is possible with propellers mounted at both ends of the car and revolved at 1600 r.p.m. A company with a capital of \$100,000 has been incorporated in California to promote the construction of lines and to build the cars.

REHEATER FOR SPEED-ROLL INSULATOR

The electrical shop of the Chicago Railways Company repairs and reinsulates the speed rolls of old controllers. A special reheating device has been made to use in setting speed-roll insulation. An illustration of the device is shown. This reheater consists of a cast-iron frame shaped to receive the speed-roll shaft with its sections slipped over it. After the



Reheater for Speed-Roll Insulator

insulation has been inserted a well-distributed gas flame is applied until the insulating compound becomes softened. Then by means of a screw hook at the end of the shaft a collar of the same section as the insulating material is driven against this material to force it into place while all parts of the speed roll are held in their correct positions by the cast-iron framework. This reinsulation of a speed roll requires about one hour. It has been done on more than one-half of the controllers for the 328 cars now being rebuilt in these shops.

A proposal has been made to connect the tramway systems of Johannesburg and Pretoria, South Africa.

NEW LIGHTING TRANSFORMERS

In the new line of lighting transformers which the Allis-Chalmers Company is now placing on the market three cooling surfaces are provided instead of the single surface in the ordinary plain case transformer. This is accomplished by encircling the main case with a jacket and providing for the circulation of oil between the two. Both the tank and the jacket are made of boiler plate. They are connected at top and bottom by short tubes, leaving an air space between the two. All joints are welded, making both the tank and jacket seamless, and absolutely preventing the chance of leakage. In addition to the three radiating surfaces provided, the space between the jacket and the tank forms a flue which causes currents of air to ascend at a considerable velocity, thereby exerting a scrubbing action on the surface which greatly facilitates heat dissipation. This style of tank is used on all lighting transformers of from 20 kva to 50 kva capacity inclusive. The tubes connecting the top and bottom of the tank and jacket provide for a continuous and positive circulation of the oil.

A departure has also been made in the 40-kva and 50-kva sizes by so arranging the coils that there is a ventilating space between them to allow free circulation of the oil. These sizes are wound with two low-voltage and one high-voltage coil, the latter being placed between the other two. The coils are separated from each other and the space between them provides ventilating ducts on each side of the high-voltage coil through which the oil can readily circulate. All of these transformers are supplied with taps which enable normal secondary voltage to be secured, even if the voltage supplied the primary coil is 5 per cent or 10 per cent below normal. These transformers are designed for use on 2200-volt or 1100-volt lines. The use of the taps makes it possible to step down from 2200 volts in nine different ratios and from 1100 volts in six different ratios, thus providing considerable flexibility.



Lighting Transformer

SPOKE TYPE STEEL WHEELS

The Lobdell Car Wheel Company, Wilmington, Del., has been making steel wheels several years with such success that during the past year it has enlarged its plant to meet the increased demand. This steel wheel is of the spoke type, giving the maximum strength for weight of metal used. It is said to be considerably lighter than any other form of steel wheel for the same service. This wheel can be made with a thick tread and turned down several times when necessary; or it can be made with the same thickness of tread as a chilled iron wheel for use as a one-mileage wheel as conditions may warrant. The flange and tread are made exceedingly hard to insure unusually long wear.

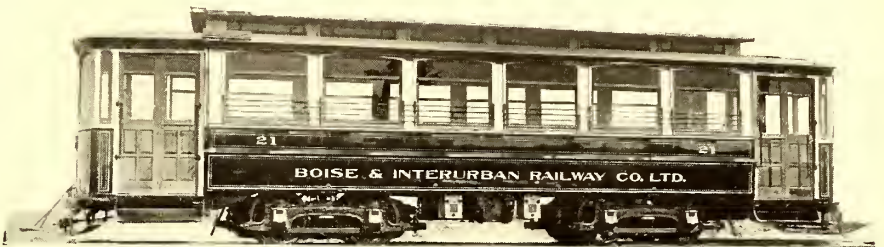
This company has made wheels extensively for the Philadelphia Rapid Transit Company, the Capital Traction Company of Washington, D. C.; the Wilmington & Philadelphia Traction Company, the Cincinnati Traction Company, the Washington & Virginia Railway Company and others. It still manufactures chilled-iron wheels, having a daily capacity of over 600 wheels of this kind.

DOUBLE-TRUCK CITY CARS FOR BOISE & INTERURBAN RAILWAY

The Boise & Interurban Railway Limited, Boise, Idaho, has purchased from the St. Louis Car Company two cars of the type shown in the accompanying illustration. These cars are of the double-end, concave and convex panel type and have six extra large windows per side. The length over the body is 28 ft., over the vestibules 40 ft., over the bumpers 41 ft. The width over the sills is 7 ft. 10 in., and over the posts 8 ft. 3 in.

The bottom framing of each car consists of 4-in. x 7 $\frac{3}{4}$ -in. side sills of long leaf Southern yellow pine. The end sills are of oak. There are four cross sills of oak. Between the side sills and sub-sills there is a steel plate $\frac{1}{8}$ in. x 11 in. for the full length of the car body. The flooring is of long-leaf yellow pine. Under the cross seats there are two layers of flooring with felt paper between. Maple strips are used in the aisle. All posts and longitudinal rails are of white ash. The roof is of the monitor type well braced with six carlines extending across the entire roof and securely fastened to plates. The roof is covered with No. 8 cotton duck. The platform drop from the car body is 9 in. The platforms, which are 6 ft. long, are supported by oak knees. The outside knees are plated with 3-in. x 8-in. plates with 3 $\frac{1}{2}$ -in. x 7-in. x $\frac{1}{2}$ -in. angles. The center of the platform is supported by 4-in. x 4-in. x $\frac{1}{2}$ -in. angles extending through the bolster.

The vestibules have three single drop sash. Each vestibule opening is provided with double folding doors, having a single glass in each door. These doors are so arranged as to be easily removed for replacement by gates. The St. Louis Car Company's standard channel folding gates are furnished with



Double-Truck Car for Boise, Idaho

these cars. All moldings, the mahogany sash and doors are finished in natural color. The design is very plain and is known as "sanitary." All trimmings are of nickel-plated solid bronze. The ceilings are of three-ply mahogany veneer.

The body doors are of the double automatic sliding type. There are two sash to each window opening, the upper being stationary and the lower dropping into a pocket flush with the arm rail. This pocket is covered with a hinged cap. Each car contains eight reversible cross-seats and two longitudinal seats per side, giving seating capacity for forty passengers.

Among the specialties on these cars are Knutson trolley retrievers, Pantasote curtains, St. Louis Car Company's radiating spring drawbars, vertical brake wheel, fenders and illuminated signs. The cars are further equipped with electric heaters, Westinghouse straight air-brake equipments and No. 101-B motors which are mounted on St. Louis No. 47 trucks.

Among the fenders which have recently been tested by the St. Louis Board of Public Improvements is one designed to stop the car in case the fender should strike a person on the track. The fender is the invention of R. S. Mills, of St. Louis. A circuit-breaker is controlled by a solenoid carried on the fender or wheel guard and when the fender or wheel guard is tripped the main circuit of the car is opened, the brakes are applied and the rail is sanded. There is also an emergency switch on the platform by which the motorman can accomplish these three results simultaneously if he sees the object before it strikes the fender.

OUTING CAR OF THE DETROIT UNITED RAILWAY

The outing car "Yolande" of the Detroit United Railway has recently been rebuilt by that company at its Monroe Avenue shops under the direction of Sylvester Potter, master mechanic. The rebuilt car contains many interesting features which were designed by F. W. Brooks, general manager. The "Yolande" is available for hire over any of the company's lines by the hour or day and is always in charge of the same crew. The



Observation and Dining Section of Detroit Outing Car

colored conductor waits at table and in general is at the command of those who engage the car. Although in commission for little over a month the "Yolande" is proving popular as an unusual way of entertaining guests. In fact, A. D. B. Van Zandt, publicity agent of the company, states that it has already been booked for more than half the summer.

As shown in the two accompanying halftone illustrations, the "Yolande" is arranged for preparing and serving meals



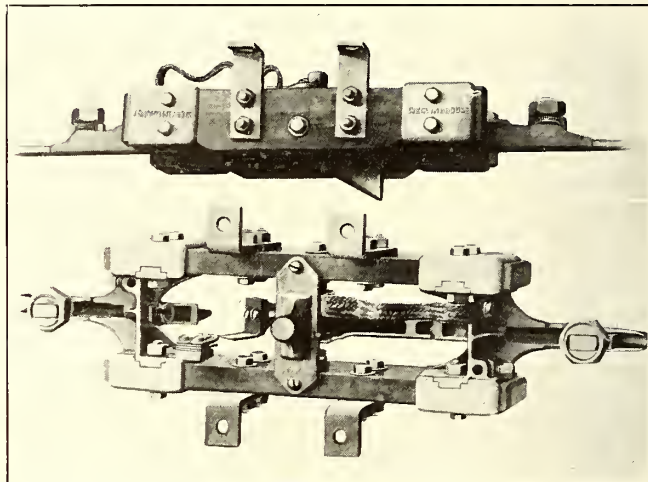
Kitchenette of Detroit Outing Car

en route. It is equipped with hot and cold water, two electric stoves, a kitchenette with a full equipment of utensils and monogrammed tableware and linen. A flush toilet is also provided. Wicker lounging chairs are provided on one side of the car and tables with leather upholstered chairs on the other side. Campstools are also supplied. The car will seat fifty people without the tables and about thirty people when a combination

of chairs and tables is used. The car, which is single-ended, is 51 ft. 3 $\frac{3}{8}$ in. long over the bumpers and 40 ft. 5 in. long over the body. The width over all is 8 ft. 11 in. and the width inside 7 ft. 8 in. The height from track to roof is 13 ft. 2 $\frac{1}{2}$ in. The rear platform is 5 ft. 5 in. long. Two Brill No. 27 trucks of 6 ft. wheelbase carry the body. The operating equipment consists of four Westinghouse No. 56 motors, one K-14 controller, air brakes and Peacock hand brake. The car is heated by electricity.

AUTOMATIC SECTION INSULATORS

The Westinghouse Electric & Manufacturing Company has recently placed upon the market a new type of automatic section insulator similar to its type K. B. section insulator except that a circuit opening and closing arrangement is incorporated in the automatic type. Side bars of impregnated hickory take the tensile stress due to the trolley wires. All metal parts are of either sherardized malleable iron or of a bronze composition. A wedge of the type that has given excellent service on standard trolley frogs is used to secure the trolley wire in each approach. Supplementing the wedge an internally threaded chuck is provided. This, when tapped into its tapered hole, firmly grips the wire. The opening and closing of the circuit is effected by a switch blade, mounted on



Side and Top View of Automatic Line Breaker

a rocker. In one position of the rocker the blade makes connection with spring contactors, and in the other position contact is not made. The action of a spring prevents the rocker from remaining in an intermediate position.

Current is fed to the rocker switch blade through a heavy, flexible, woven-copper bond, which is securely connected at each of its ends. When the trolley wheel is inbound no arc can be drawn across the knife switch and contact because their connection is completed before the trolley wheel leaves the rocker, which is always energized. In returning the trolley does not open the branch line until the wheel has passed onto the rocker.

CHARCOAL CONES FOR GROUNDING

Among the electrical specialties of the Paragon Sellers Company, Chicago, Ill., is the Paragon ground cone, which can be applied for grounding the lightning arresters of railway signal installations, transformer secondaries and telegraph, telephone, power and transmission lines. This article is a hollow cone which is made of pure copper filled with charcoal. The cone is perforated with seventy-five holes to the square inch. The charcoal attracts the moisture and the perforations give the desired ample number of discharge points. The cones are installed simply by dropping them into post holes which are bored for the purpose.

News of Electric Railways

Meeting of the Central Electric Railway Association

The program for the meeting of the Central Electric Railway Association which is to be held in St. Joseph, Mich., on June 22, 1911, is in preparation. The headquarters of the association for the meeting will be at the Edgewater Club. As the accommodations at the Edgewater Club are limited, it is suggested that reservations for rooms should be made at the Hotel Whitcomb, which is across the bridge from the Edgewater Club.

Meeting of Central Electric Accounting Conference

The next meeting of the Central Electric Accounting Conference will be held in Springfield, Ill., on Saturday, June 24, 1911. Henry J. Davies, secretary and treasurer of the Cleveland Railway, will address the conference on the subject "Legislation Affecting Electric Railway Accountants." After adjournment the members will go by special train to St. Louis, where they will be the guests of the Illinois Traction System. The official program of the meeting is now being prepared.

The Master Car Builders' and Master Mechanics' Conventions

The American Railway Master Mechanics' Association will hold its forty-fourth annual convention at Atlantic City, N. J., June 14, 15 and 16, and the forty-fifth annual convention of the Master Car Builders' Association will be held at the same place on June 19, 20 and 21. The exhibits will be placed on Young's Million-Dollar Pier and all the sessions of the two conventions will be held in the Greek Temple on the pier. The sessions each day will be from 9:30 a. m. to 1:30 p. m. Cards for registration will be furnished at the enrolment booth at the entrance to the pier.

The program of the Master Mechanics' convention contains only one committee report which is of general interest to electric railway officers. It is on flange lubrication. The Master Car Builders' Association will have reports on brakeshoes, couplers and draft gear, car wheels, lumber specifications and safety appliances.

Philadelphia Rapid Transit Company's Refinancing Plan Formally Ratified

E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., through whom funds have been provided for the rehabilitation of the physical property of the Philadelphia (Pa.) Rapid Transit Company, was formally elected a director of the company on June 6, 1911. The associates elected to the board with Mr. Stotesbury are Thomas E. Mitten, president of the Chicago (Ill.) City Railway; Charles E. Ingersoll, a director of the Pennsylvania Railroad; C. S. W. Packard, president of the Pennsylvania Company for Insurances on Lives and Granting Annuities, and Horatio G. Lord, of Drexel & Company. The directors who retired from the board are Charles O. Kruger, P. A. B. Widener, George D. Widener, John B. Parsons and August B. Loeb. The new directors, Messrs. Stotesbury, Mitten, Ingersoll, Packard and Lloyd, constitute the new executive committee, of which Mr. Stotesbury is chairman. Mr. Stotesbury was also elected chairman of the board of directors. During Mr. Stotesbury's absence abroad Mr. Mitten will act as chairman of the board. The board of directors of the company as now constituted follows: E. T. Stotesbury, Horatio G. Lloyd, C. S. W. Packard, Charles E. Ingersoll, Thomas E. Mitten, W. H. Sheldermine, J. J. Sullivan, William H. Carpenter, Mayor Reyburn, of Philadelphia, and John S. Phipps. In 1910 George H. Earle, Jr., resigned from the board of directors of the company as a representative of the city, and a successor to him to serve the city on the board with W. H. Carpenter and Mayor Reyburn remains to be elected. The voting trust, composed of Rudolph Ellis, Arthur E. Newbold and George H. McFadden, organized on Feb. 20, 1911, was formally authorized at the meeting. The stockholders of the Phila-

delphia Rapid Transit Company and the Union Traction Company also authorized the \$10,000,000 loan. At the conclusion of the meeting the following official statement was issued:

"Mr. Stotesbury's associates are in full accord with his expressed desire and intention, which is to rehabilitate the physical property of the company and improve its operating methods to the end of developing the best street car service which it is within the financial ability of the Philadelphia Rapid Transit Company to produce, and which he is assured by Mr. Mitten can, within the next five years, be made at least equal to that enjoyed by any other American city. The new capital represented by the \$10,000,000 bond issue now authorized is a very small amount with which to attempt to accomplish such a material change in conditions, and it can only by the exercise of the utmost care be made sufficient to complete the rehabilitation of the present property.

"To insure the proper maintenance and renewal of the property an amount equal to 15 per cent of the gross earnings will be used for that purpose. It is estimated that the expenses of the company, including the aforementioned maintenance and renewals, will be approximately \$1,500,000 in excess of its earnings during the three years ensuing, to meet which deficit the company now has salable securities remaining from the old fire insurance fund. The securities when sold will produce approximately this sum. The remaining two years of the five-year period, it is thought, will result in a small earned surplus, which should continue to grow larger each year thereafter.

"Mr. Mitten's estimate is not based upon a reduced cost of operation, as all of the economies effected will be offset by the larger number of seats necessary to be supplied to the public during the rush hours and the increased wage of one-half cent per hour, approximating \$100,000 per annum, which the company is now under published promise to give to its motormen and conductors on July 1 of each year.

"Mr. Stotesbury has assumed this gigantic task with the limited funds at the company's disposal solely in the hope that the result of his efforts may be of great and lasting benefit to Philadelphia. Under these circumstances Mr. Stotesbury's task becomes a public undertaking, and one in which he now asks and should properly receive the good word and co-operation of the press, the public and the company's employees, as with this assistance only can the result desired by all be most quickly and satisfactorily accomplished. While it is estimated that the greater part of the five-year period will be consumed in bringing the traction system up to the desired degree of efficiency, such improvements as are now possible will be undertaken as rapidly as circumstances will permit.

"New cars can be added only as rapidly as the additional power necessary to their operation can be provided, the experience of the last winter having demonstrated that the company's supply of power is not sufficient to meet snow-storm requirements even with that number of cars which are now in regular operation. Power to be effectively used should be supplied from the company's Delaware Avenue power house, which it is proposed to enlarge. Before any additional power can be produced therefrom, however, the excavations and piling for the foundations must be completed, which, with the time necessary afterward to install the power-producing units, will require from twelve to fifteen months, making no relief possible from this source until the latter part of next year. In the hope of adding at least 200 new cars against the maximum demand of the coming winter, efforts are now being made to purchase a temporary supplying power. The company's Delaware Avenue power house will meanwhile be rapidly pushed to completion.

"Rerouting of car lines will be given careful consideration, and the report of Ford, Bacon & Davis to the State Railroad Commission [Published in part elsewhere in this issue—Eds.] will no doubt be of great assistance. The actual rerouting of cars should not, however, be undertaken in haste, for the reason that the routes of many of the car lines, as now operated, have been in existence for a great many years; the lines

of travel upon them have become established, so that any system of rerouting which would disturb these existing conditions must be given very careful study before any change is made.

"The wages of motormen and conductors are set forth in the company's published notice of April 5, 1910, which provides for a maximum wage of 23 cents per hour for year beginning July 1, 1910; 23½ cents per hour for year beginning July 1, 1911; 24 cents per hour for year beginning July 1, 1912; 24½ cents per hour for year beginning July 1, 1913; 25 cents per hour for year beginning July 1, 1914.

"In addition to the foregoing, an amount of \$500 is paid to the surviving relatives at the death of any motorman or conductor who has been more than two years in the service of the company. Those employees who are more than sixty-five years of age, and who have been in the service twenty-five years, receive a pension of \$20 per month during the remainder of their lives. Twenty-two per cent of the gross earnings, or 22 cents out of every dollar taken in on the company's cars, is now required to pay the present scale of wages. If more than 22 per cent of the gross earnings were to be used for this purpose, the physical property could not be adequately maintained, for the reason that the \$1,500,000 now set aside to meet the deficit of the next three years would then be insufficient for that purpose. The sufficiency of 22 per cent of the gross earnings here used as compared in amount with that used in the most favored American cities in this regard has been given careful consideration.

"Twenty-five per cent of the gross earnings, or 25 cents out of every dollar taken in on the company's cars, is believed to be the largest amount paid by any company in wages to its motormen and conductors in any city of the Middle or Eastern States, and in these cities the average fare, including transfers, approximates only 3 cents per passenger. The 22 per cent of the gross earnings, or 22 cents out of every dollar taken in on the company's cars, now paid in Philadelphia to motormen and conductors is greater per passenger carried than the 25 per cent paid in these other cities, for the reason that the rate of fare in Philadelphia, including transfers, is slightly in excess of 4 cents per passenger; in other words, the motormen and conductors of this company receive more wages per passenger carried than do the motormen and conductors in any of the cities aforementioned.

"The introduction of larger cars and better operating methods, together with proper co-operation between the men and the management, will very materially improve the operating efficiency of the company so that it may compare favorably with that of any of the cities aforementioned, thereby making possible such an increased scale of wages during the intervening years as should result in a maximum wage of 28 cents in the year commencing July 1, 1915, or the fifth year of the Stotesbury management.

"This added increase in wages of motormen and conductors over that promised in the company's published notice of April 5, 1910, must of a necessity depend upon the degree of co-operation displayed by the men in assisting the management in its efforts to improve the methods of operation. Such an increase of wage would necessarily be deferred and perhaps made impossible should the company be put to expense on account of labor trouble with its motormen and conductors, as in that event the costs incident thereto would have to be spread over the remainder of the five-year period and paid out of the 22 per cent of the gross earnings set aside for wages of motormen and conductors, thus consuming the money which would otherwise be available for the purpose of increased wages.

"Summarizing the situation, it can be now well stated that the affairs of the Philadelphia Rapid Transit Company are in the hands of a public-spirited citizen, Mr. Stotesbury, who, actuated by a desire to perform a real service to his native city, is now attempting, with the limited resources at the company's command and with its very heavy expenses as compared with its earnings, to build up a perfect system of transportation and at the same time satisfy the three parties in interest. To the public he promises an adequate system of transportation within a five-year period, but counsels patience during the accomplishment of this object; to the motormen and conductors he promises recognition of their efforts in the way of co-operation by such wages as

the resulting increased efficiency makes possible, but to the stockholders of the Philadelphia Rapid Transit Company he can only promise the building up of their property to the end that it may be a credit to its owners and productive of return upon the \$30,000,000 of capital actually paid in. There can be no hope of dividend upon this stock, however, until good service to the public has become an established fact and the wages of the motormen and conductors have been placed upon a satisfactory basis."

The statement made by Mr. Mitten, which shows the disposition of the fund for rehabilitation which is now available, was published in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, page 682.

Three-Cent Fares in Cleveland

On June 1, 1911, the Cleveland (Ohio) Railway discontinued the charge of 1 cent each for transfers and began the operation of the lines on a straight 3-cent fare within the city limits. This was done in compliance with a notice from G. M. Dahl, street railway commissioner, to the effect that the interest fund had reached \$700,000, or \$200,000 more than the required \$500,000, and that under the Tayler ordinance the fare must be reduced to 3 cents. On the evening of May 29 the City Council adopted a resolution which sustained Mr. Dahl.

The directors of the company met on May 31, 1911, and decided to put the 3-cent fare into effect, but it was stated that something must be done to provide sufficient funds to take care of the business of the company in the future. J. J. Stanley, president of the company, issued the following statement after the meeting:

"On last Monday evening the Council adopted a resolution directing the Cleveland Railway to reduce the fare to 3 cents cash fare, 1 cent for transfer, and 1 cent rebate, commencing on June 1. The directors met Wednesday morning and directed that the fare be so reduced. They have done this notwithstanding that they regard it as poor business policy in the face of the maintenance reserve showing a shortage of \$264,000 and the operating expense showing a shortage of \$121,000, making an actual shortage of \$385,000 instead of any surplus whatever.

"Last June the company applied for an increase of its operating allowance. This request was renewed last January, and was granted by Council recently, to be effective from May 1 and continuing until Jan. 1. It is hoped that the operating deficit will substantially be made good before Jan. 1, 1912. If not, the company will again apply for an increase in the operating allowance.

"As to the \$264,000 shortage in the maintenance and renewal reserve, it may be necessary in the near future to apply for an increase. This should be granted by the Council without any application in order to comply with the principles of good business management, as the board is unable to see the wisdom of directing a reduction of fare at the same time that the shortage in the maintenance and renewal fund is increasing."

The board discussed the proposed amendments to the Tayler franchise, but came to no conclusions upon any of them. Mr. Dahl insists that the company shall not be granted an increase of its maintenance and renewal fund unless it applies to Council. He says that there should be no deficit and that the company should not have spent the money it did until the fund was sufficient to allow it.

At the meeting of the Council committee on street railways on the evening of June 1, 1911, a communication was received from City Solicitor Baker in which he criticised several of the proposed amendments to the Tayler franchise, as indicated in the Kramer ordinance, introduced some time ago. He expressed the fear that the 3-cent fare would be endangered, as well as the city's right to purchase the property, unless these conditions are further safeguarded. He says that no amendment should be adopted to give the suburbs the low fare, as they are admitted without a referendum vote. He also objects to the plan to have the city take over the property at the capital value, in case it is decided to purchase, on the ground that it is holding out temptation to inflate and increase the capital value as a means of discouraging municipal ownership.

Mr. Baker advises that the provision for the city to take over the property should be made specific as to that

portion lying within the city limits. Unless this is done doubt may arise as to the city's right to own and operate a railroad outside of its limits and the company could deny that the city has a right to purchase part of the property without taking it in its entirety. Mr. Baker insisted that no amendments should be passed until the company agreed to allow the city to name immediately a purchaser for the property.

Mr. Dahl charged Mr. Baker with being an obstructionist. He said that opponents of these amendments seem to consider 3-cent fare sacred. Judge Tayler, in framing the ordinance, did not have 3-cent fare in mind, but advocated allowing the people to ride at cost with a profit of 6 per cent to the stockholders of the company. According to Mr. Dahl, Mr. Baker knew that the company would not accept an amendment that would take the property out of its hands. Mr. Dahl also attacked Mr. Baker's opposition to extending the low fare to the suburbs as they are annexed, and said that he feared an attempt to annex all the suburbs in order to make an increase in the fare necessary.

D. C. Westenhaver, one of the attorneys for the late Mayor Tom. L. Johnson and a member of the special committee of the Chamber of Commerce which recommended a number of amendments, stated that no amendment should be adopted without providing for a referendum vote. Mr. Dahl answered that he was not opposed to a referendum vote, but that it was the duty of those who thought that such a vote should be taken to present a petition. If the City Council made provision for such a vote in adopting amendments, it would indicate a desire to shift the responsibility to the people. He said that he would not vote for a referendum, but that he would defend the amendments before the people, if a referendum is had on them.

Commissioner Dahl has requested the company to instruct conductors on the pay-within cars to keep the rear doors of these cars open at all times. This move has been made because of the accidents which have occurred in closing the doors on women's skirts and in other ways.

Transit Affairs in New York

The special committee of the Board of Estimate and Apportionment of New York and the Public Service Commission agreed on June 5, 1911, upon a policy and report on the subway problem. At a conference at the Bar Association the last details were discussed, and at the conclusion of the session President McAneny of the Borough of Manhattan said that an agreement had been reached and that he and Chairman Willcox of the Public Service Commission would have the report in shape for submission to the meeting of the Board of Estimate on June 8, 1911. The city's conferees agreed that nothing should be made public concerning the nature of their recommendations or the policy to be outlined until the report itself is presented.

Despite the fact that it was announced that the recommendations of the committee would not be made public in anticipation of the presentation of the formal reports, the daily papers on Tuesday and Wednesday all said that the report would recommend a division of territory between the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. In brief, it was stated that the report of the transit committee would favor the building of two tunnels under the East River, one for each company, but would recommend the control of all the bridges by the Brooklyn Rapid Transit Company through the assigning of the Centre Street loop to that company. As for the location of the lines, the Brooklyn Rapid Transit Company, so it was stated, would get the loop north to Fifty-ninth Street and across the Queensboro Bridge to Queens and the Interborough Rapid Transit Company would get the Broadway-Lafayette Avenue loop through Brooklyn, connecting with Manhattan by a tunnel under the East River at Fourteenth Street. In detail it was predicted that the committee would report for the Brooklyn Rapid Transit Company in favor of the Pineapple Street tunnel under the East River, this to be extended under Broadway at Liberty Street to Church, there to afford a connection with the Hudson tunnels. From that point it is said that a route north is to be laid out for the Brooklyn Rapid Transit Company under Church Street to Vesey Street, through Vesey Street to Broadway, up

Broadway to Forty-second Street, and thence up Seventh Avenue to Fifty-ninth Street, there to turn eastward to cross the Queensboro Bridge into Queens. This, with the Centre Street loop, would represent the Brooklyn company's share in Manhattan. Along with this it was said that a 5-cent fare would be demanded from the Brooklyn Rapid Transit Company from Fifty-ninth Street to Coney Island. For the Interborough Rapid Transit Company such an arrangement would mean the Eastern Parkway subway in Brooklyn, together with the Broadway-Lafayette Avenue loop, to connect at North Seventh Street with the tunnel under the East River to Manhattan. Added to this would be the Lexington Avenue and Seventh Avenue routes in Manhattan as extensions to the present subway north and south of Forty-second Street.

Governor John A. Dix of New York issued the following statement on June 1, 1911, announcing the appointment of J. Sergeant Cram, chairman of the general committee of Tammany Hall, as a member of the Public Service Commission of the First District of New York to succeed Edward M. Bassett, whose term of office expired in February.

"I know Mr. Cram to be a man of unusual force and ability and of demonstrated courage and independence. He is a man who accomplishes results, the kind of man the New York City rapid transit situation needs at the present time. ***Another reason is that I desire to have on the First District Commission at least one member I personally know and who will be a part of my administration.*** I believe Mr. Cram understands as few men do the rapid transit needs of New York City; that he has complete knowledge of the details of the rapid transit problem and will treat the question from the viewpoint of the entire municipality.

On June 2, 1911, Borough President George McAneny of Manhattan, who is chairman of the transit committee of the Board of Estimate, which is to report on the subway offers, sent Governor Dix a letter protesting against the Governor's action in appointing Mr. Cram to succeed Mr. Bassett, at this time particularly. He suggested that the nomination of Mr. Cram be withdrawn, at least temporarily. Mr. McAneny, after calling the attention of the Governor to the present subway negotiations and their nearness to conclusion, suggested that the injection of a new personality would either delay the matter indefinitely or compel the appointee to vote on the basis of opinions he entertained before he became a member of the commission.

In reply to Mr. McAneny Governor Dix said that he had knowledge of the situation in New York before he nominated Mr. Cram, and that he believed the addition of Mr. Cram to the commission would result in prompt action so far as subway extensions are concerned.

Following the announcement of his appointment Mr. Cram in an interview declared himself in favor of constructing subways first, then of finding an operator for them, of a 5-cent fare to Coney Island, and of the use of Third Avenue instead of Lexington Avenue for the uptown east-side subway.

Mayor Gaynor on May 31, 1911, in a letter to a real estate operator in Brooklyn, criticised the Brooklyn Rapid Transit Company severely for supposed sins of omission. He criticised specifically the type of cars used and the fact that the company had not installed the underground conduit system.

T. S. Williams, president of the Brooklyn Rapid Transit Company, was prompt to reply to the Mayor. In a public statement he enumerated some of the indorsements his company has had from the Public Service Commission and its representatives relating particularly to the condition of the company's equipment and general property, its credit and financial standing, the value behind its securities and its bookkeeping methods. He also said that during the eight years ended June 30, 1910, the Brooklyn Rapid Transit system had expended \$12,658,000 for rolling stock, and during the last ten years had expended upward of \$12,400,000 in maintenance of equipment, making a total expenditure of upward of \$25,000,000 since 1900.

Bureau of Public Utilities Proposed in Pittsburgh.—An ordinance creating a city bureau of public utilities is being prepared by the City Solicitor and will be presented to the new Council of Nine, which has been appointed by Governor Tener.

Another Hearing in Chicago on Subway Plans.—At the meeting of the transportation committee of the City Council of Chicago, Ill., on May 31, 1911, the plan for subways proposed by R. C. St. John, formerly assistant subway engineer under Bion J. Arnold, was considered. An outline of this plan was published in the *ELECTRIC RAILWAY JOURNAL* of May 27, 1911, page 922.

Report on Improvements of Pennsylvania Railroad at Philadelphia.—The accounts published in the newspapers of Philadelphia on June 7, 1911, which purport to give the essentials of the recommendations which are to be made to the Pennsylvania Railroad by the board which is considering the question of terminal improvements in Philadelphia, are declared by the company not to be authoritative. The report by the board is now being prepared and it is expected that it will be presented at an early date.

New York Railway Held to Be a Nuisance.—The Appellate Division of the Supreme Court of New York has reversed a judgment of the Special Term which sustained the demurrer of G. H. Montague, receiver of the Fulton Street Railroad, and dismissed the city's complaint. The suit was brought to have the Fulton Street Railroad's franchise forfeited. The Appellate Division said that on that point of the complaint the demurrer was properly sustained because the action could be brought only by the people acting through the Attorney-General. The court, however, said that an examination of the complaint showed that the action was one to enjoin the maintenance of a nuisance. The court further said: "The worn and defective rails in the streets constitute the nuisance complained of, and an adjudication that they are a nuisance coupled with some provisions for their removal will in no way involve an adjudication forfeiting the franchise for non-user. * * * An adjudication requiring the removal of the rails would still leave the owners of the franchise free to replace the old rails with new and operate the railroad."

LEGISLATION AFFECTING ELECTRIC RAILWAYS CONNECTICUT

Two reports have been prepared for presentation to the Connecticut General Assembly by the judiciary committee, to which the public utilities matter was referred. A majority report, signed by seven of the eleven members of the committee, was in favor of a commission to have charge of all the public service corporations in the State, except the railroads and electric railways, these to remain under the jurisdiction of the present railroad commission. A minority report, signed by the other four, provided for a single commission of three members to have charge of all public utilities. The minority bill is after the form of the State Business Men's Association bill, which Governor Baldwin refused to indorse. It provides powers as to rates, service and capitalization. The reports were to be submitted to the Senate on June 6, 1911.

MASSACHUSETTS

The bill of the Boston & Eastern Electric Railroad, seeking a certificate of public convenience and necessity to authorize it to proceed with construction, reached a third reading in the House during the week ended June 3, 1911. Representative Washburn, Worcester, opposed passing a bill with a penalty clause. The proposed amendment striking out the penalty clauses was lost, and third reading ordered on a voice vote which was practically unanimous. The committee on street railways has reported adversely on the recommitted House Bill No. 522, which provides that scholars' tickets shall be subject to the same penalties for abuse which exist in connection with transfer tickets issued to passengers. A special report has been sent to the Legislature in response to an order requesting the Railroad Commission to determine means to be employed to protect passengers from injury at stations of the Boston Elevated Railway (House 1953). The committee on ways and means has reported in favor of a resolve providing for an investigation of improvements in the subway and transportation system of Boston. The committee on street railways has reported leave to withdraw House Bill 1164, to provide for the issuance of free transfers for the night patrons of the Boston Elevated Railway.

Financial and Corporate

New York Stock and Money Markets

June 6, 1911.

Both trading and prices have been irregular during the week, but there have been only slight recessions from the new levels reached after the Supreme Court decisions. The bond market continues to exhibit strength. The increase in the volume of financing and the fact that money rates have become a trifle higher are regarded as signs of better conditions. Quotations to-day were: Call, $2\frac{1}{4}$ @ $2\frac{1}{2}$ per cent; ninety days, $2\frac{3}{4}$ @ 3 per cent.

Other Markets

The Philadelphia market has been spasmodic, with a firmer tone toward the latter part of the week. Slight advances were made to-day in the transit shares, with the trading marked by the strength of the Lehigh Valley Traction issues.

Fractional gains have been made in the majority of the Chicago elevated issues, and the market has been mildly active. About 9 per cent of the total stock of the various elevated companies, in accordance with the terms of purchase by the Blair syndicate, were deposited up to Monday noon with the Illinois Trust & Savings Bank.

Trading in Boston has been active. Massachusetts Electric common reached 24 and the preferred reached 93. To-day's market was irregular with minor price changes.

The Baltimore market is quiet, with a fair bond demand.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 29.	June 6.
American Light & Traction Company (common).....	a295	a295
American Light & Traction Company (preferred).....	a108	a107
American Railways Company.....	a44½	a44
Aurora, Elgin & Chicago Railroad (common).....	40	a41½
Aurora, Elgin & Chicago Railroad (preferred).....	86	a86
Boston Elevated Railway.....	a127½	128
Boston Suburban Electric Companies (common).....	a15	a14½
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a8½	a8½
Boston & Worcester Electric Companies (preferred).....	a50	a51
Brooklyn Rapid Transit Company.....	80	81¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	85½	86
Capital Traction Company, Washington.....	a130	130
Chicago City Railway.....	a195	a190
Chicago & Oak Park Elevated Railroad (common).....	2	2
Chicago & Oak Park Elevated Railroad (preferred).....	7	5
Chicago Railways, pteptg., ctf. 1.....	a82	a82
Chicago Railways, pteptg., ctf. 2.....	a22½	a23
Chicago Railways, pteptg., ctf. 3.....	a10	a10
Chicago Railways, pteptg., ctf. 4.....	a6	a6
Cincinnati Street Railway.....	a130½	a131
Cleveland Railway.....	98	a97½
Columbus Railway (common).....	a96	a96
Columbus Railway (preferred).....	a101	a101
Consolidated Traction of New Jersey.....	a77	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105½	a105½
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a100	a100
Detroit United Railway.....	71¾	a74
General Electric Company.....	167½	163¾
Georgia Railway & Electric Company (common).....	136½	141
Georgia Railway & Electric Company (preferred).....	92	92
Interborough Metropolitan Company (common).....	18¾	19¾
Interborough Metropolitan Company (preferred).....	53	54
Interborough Metropolitan Company (4½s).....	79¾	79¾
Kansas City Railway & Light Company (common).....	a19	a19
Kansas City Railway & Light Company (preferred).....	a49	a49
Manhattan Railway.....	136¾	a140
Massachusetts Electric Companies (common).....	a21¾	a23¾
Massachusetts Electric Companies (preferred).....	a89½	a91
Metropolitan West Side, Chicago (common).....	a26	a26
Metropolitan West Side, Chicago (preferred).....	a72½	a72½
Metropolitan Street Railway, New York.....	15	*15
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	75	76½
Northern Ohio Light & Traction Company.....	46	46
Northwestern Elevated Railroad (common).....	a27½	a28½
Northwestern Elevated Railroad (preferred).....	a69	a69
Philadelphia Company, Pittsburgh (common).....	57	58¾
Philadelphia Company, Pittsburgh (preferred).....	43½	44
Philadelphia Rapid Transit Company.....	17¾	19¾
Philadelphia Traction Company.....	82½	84
Public Service Corporation, 5% col. notes (1913).....	101	101
Public Service Corporation, cts.....	a107	a107
Seattle Electric Company (common).....	a109½	a110
Seattle Electric Company (preferred).....	a101	a103½
South Side Elevated Railroad (Chicago).....	a77½	a77½
Third Avenue Railroad, New York.....	*12¾	11¾
Toledo Railways & Light Company.....	7¼	a8
Twin City Rapid Transit, Minneapolis (common).....	a110	110
Union Traction Company, Philadelphia.....	a48	49¾
United Rys. & Electric Company, Baltimore.....	a18¼	18¼
United Rys. Inv. Co. (common).....	41½	42
United Rys. Inv. Co. (preferred).....	*72	71½
Washington Ry. & Electric Company (common).....	a34	34
Washington Ry. & Electric Company (preferred).....	a89¾	89¾
West End Street Railway, Boston (common).....	a90½	a90¾
West End Street Railway, Boston (preferred).....	a103½	a103½
Westinghouse Elec. & Mfg. Co.....	78½	77
Westinghouse Elec. & Mfg. Co. (1st pref.).....	118	118¾

a Asked. *Last sale.

ANNUAL REPORT

United Railways Investment Company

The statement for the year 1910 of this company from its investments in San Francisco, Pittsburgh and elsewhere shows the following:

Income:	
Dividends on stocks owned.....	\$2,044,672
Interest on bonds owned.....	3,000
Interest on loans and accounts receivable.....	60,189
Interest on bank balances.....	1,700
Total	\$2,109,561
Expenses and other charges:	
Expenses:	
Salaries	\$30,556
Legal	17,000
Corporation taxes	5,570
Transfer agents', registrars' and trustees' fees.....	3,625
Fees of trust companies for paying coupons, etc.....	1,077
Tax on increase of capital stock.....	1,200
Tax on bonds held in Pennsylvania.....	877
Directors' fees and expenses.....	2,237
Stationery, printing and postage.....	1,284
Traveling	3,053
General	8,544
Total	\$75,023
Other charges:	
Interest on collateral trust sinking fund 5 per cent gold bonds	\$907,500
Interest on 6 per cent convertible gold bonds of 1910..	43,015
Interest on 6 per cent notes of 1908.....	171,000
Interest on loans and notes payable.....	48,777
Interest on dividend certificates.....	80,241
Proportion of discount on 6 per cent notes of 1908....	15,000
Miscellaneous	2,537
Total.....	\$1,268,070
Total	\$1,343,093
Net income for the year.....	\$766,468
Profit and loss—surplus at beginning of year.....	1,602,311
Profit and loss—surplus, Dec. 31, 1910.....	\$2,368,779

The statement of the United Railroads of San Francisco for the year ended Dec. 31, 1910, is as follows:

Gross earnings:	
Passenger	\$7,605,489
Advertising	48,000
Total	\$7,653,489
Operating expenses:	
Maintenance of way and structures.....	\$344,758
Maintenance of equipment.....	633,386
Transportation expenses	2,770,212
General expenses.....	532,814
Total	\$4,281,170
Ratio to gross earnings, 55.94 per cent.	
Taxes and licenses.....	448,100
Ratio to gross earnings, 5.85 per cent.	
Total operating expenses and taxes.....	\$4,729,270
Ratio to gross earnings, 61.79 per cent.	
Net earnings	\$2,924,219
Other income:	
Interest	\$59,213
Rents	4,938
Miscellaneous	26,127
Total	\$90,278
Gross income	\$3,014,497
Deductions:	
Interest on 5 per cent promissory gold notes.....	\$50,000
Interest on income notes (deferred obligations).....	43,015
Interest on equipment notes.....	10,133
Interest on bills and accounts payable.....	56,497
Rentals and leases	73,463
Total	\$233,108
Net income before bond interest charges.....	\$2,781,389
Bond interest:	
United Railroads bonds.....	\$1,013,360
Underlying bonds	799,050
Total	\$1,812,410
Net income before sinking fund charges.....	\$968,979
Sinking funds	367,070
Surplus for period.....	\$601,909

Ernst Thalmann, the president of the United Railways Investment Company, says, in part:

"Since the supply of electric power by the Sierra & San Francisco Power Company began, June 7, 1910, not only has there been a very substantial saving to the United Railroads of San Francisco in the cost of such power, but the supply has been furnished so continuously as to render the operation of its cars most effective.

"The work in connection with the Sierra & San Francisco Power Company has now been substantially completed, and the results therefrom have fully satisfied the expecta-

tions of the directors of your company. While the marketing of the surplus power of the company has necessarily been deferred until completion of its construction work, it is now expected that a considerable part of this surplus will be disposed of during the present year throughout the territory served and its income materially increased.

"The statement of the earnings of the Sierra & San Francisco Power Company furnished by its officers to the president of your company from Oct. 1, 1910, when the permanent power contract with the United Railroads of San Francisco became operative, to March 31, 1911, a period of six months, is as follows: Gross earnings, \$390,377; operating expenses and taxes, \$133,812; net earnings, \$256,565; interest on first mortgage bonds, \$157,274; net income, \$99,291.

"It is gratifying to note the continued improvement in the earnings of the Philadelphia Company. The gross earnings for the year ended Dec. 31, 1910, show an increase of \$2,005,238 over the year 1909. Dividends upon the common stock of the Philadelphia Company were paid during the year 1910 to the amount of 7 per cent, which included an extra dividend of 1 per cent, declared June 7, 1910, the regular dividend being 6 per cent.

"During 1910 many permanent improvements have been made to the physical properties of the Philadelphia Company and those of its subsidiary and controlled companies.

"About March 20, 1911, 200,000 shares of the common stock of the Philadelphia Company were officially listed upon the parquet of the Paris Bourse. Your directors believe that the result of this action, which was accomplished only after prolonged negotiations, will be beneficial not only to the holders of the securities of the Philadelphia Company, but to the stockholders and security holders of your company.

"Since Dec. 31, 1910, an additional instalment of the 6 per cent notes of 1908, amounting to \$200,000, was paid at maturity, Feb. 15, 1911, thus reducing the outstanding amount of such notes to \$2,500,000."

The statement of assets of the company shows the following securities owned: 50,000 shares of first preferred stock, 200,000 shares of preferred stock and 80,014 shares of common stock of the United Railroads of San Francisco, of a par value of \$100 each; 484,000 shares of common stock of the Philadelphia Company, of a par value of \$50; 55,000 shares of the capital stock of the Railroad & Power Development Company, of a par value of \$100 a share, and other securities to the extent of \$362,910, totaling to \$61,295,981.

Chicago (Ill.) Elevated Railways

The merger committee, consisting of F. A. Vanderlip, Henry A. Blair and Samuel McRoberts, has given notice to the stockholders of the South Side Elevated Railroad, the Metropolitan West Side Elevated Railway and the Northwestern Elevated Railroad that they are prepared to receive deposits of the stock of the companies with the National City Bank of New York and the Illinois Trust Savings Bank, Chicago, under terms of the merger agreement. Deposits must be made prior to July 1, 1911. As previously stated in the ELECTRIC RAILWAY JOURNAL, the National City Bank, New York, N. Y., has agreed to purchase the \$30,000,000 of three-year 5 per cent mortgage notes and \$16,000,000 of 6 per cent cumulative preferred stock. The merger will be effective if sufficient assents are received by purchasing the shares of depositing stockholders with cash, or cash and securities in accordance with the terms of the deposit agreement.

The salient feature of the plan calls for the organization of the Chicago Elevated Railways as a voluntary association along the same lines as the Mackay Companies, Massachusetts Electric Companies, Massachusetts Gas Companies and the Chicago City & Connecting Railways. The new company will issue \$30,000,000 of three-year 5 per cent collateral notes, 160,000 shares without par value to be called 6 per cent cumulative preferred shares, and 250,000 shares to be called common shares. The cash requirements, if cash only is given for stocks, will aggregate \$44,500,000, as follows: \$18,000,000 to pay bonds of the Northwestern Elevated Railroad due on Sept. 1, 1911; \$3,022,000 to pay floating debt, accrued interest, taxes, etc.; \$21,202,312 for stocks (100 per cent basis) of the Northwestern Elevated Railroad,

Metropolitan West Side Elevated Railway and the South Side Elevated Railroad; \$2,275,688 for working capital and expenses of plan and of organization.

The basis of the cash option is \$75 a share for the stock of the South Side Elevated Railroad, \$75 a share for the preferred stock and \$27.50 a share for the common stock of the Metropolitan West Side Elevated Railway and \$70 a share for the preferred stock and \$30 a share for the common stock of the Northwestern Elevated Railroad. On this basis \$6,530,925 would be required to retire the \$8,707,900 of outstanding preferred stock of the Metropolitan West Side Elevated Railway and \$2,052,627 to retire the \$7,464,100 of common stock of the company; \$3,461,080 would be required to retire the \$4,944,400 of preferred stock of the Northwestern Elevated Railroad and \$1,484,130 to retire the \$4,947,100 of common stock of the company, and \$7,673,550 to retire the \$10,231,400 stock of the South Side Elevated Railroad.

Reorganization of Companies at Lexington, Ky.

The reorganization of the Lexington & Interurban Railway, Lexington, Ky., has been concluded. The Kentucky Securities Corporation was incorporated in Virginia with an authorized capital stock of \$5,000,000, of which \$2,500,000 is 6 per cent preferred, and took over as the parent holding company the securities on deposit in the name of the Lexington & Interurban Railway.

The Kentucky Traction & Terminal Company was organized with an authorized capital stock of \$2,500,000 and has taken over as the operating company the Lexington Railway, the Bluegrass Traction Company and the Central Kentucky Traction Company. The Kentucky Traction & Terminal Company has filed a new first and refunding mortgage dated May 18, 1911, to the Commercial Trust Company, Philadelphia, Pa., as trustee, to secure an authorized issue of \$7,500,000 of thirty-year 5 per cent bonds. These bonds are guaranteed as to principal and interest by the Kentucky Securities Corporation. Of these bonds the unsold portion of a total of \$1,871,000 was offered for public subscription on June 1, 1911, at 94 and interest. The proceeds of \$800,000 of this issue will be expended to construct a new power plant and provide other improvements and the remaining \$1,071,000 will be used to refund underlying bonds.

The Kentucky Securities Corporation has announced the payment in full of \$850,000 of secured loans taken over from the Lexington & Interurban Railways. Of these loans \$750,000 were extended for one year from May 20, 1911, but the holding company was enabled to anticipate the payment of the loans owing to the rapid sale of the bonds of the Kentucky Traction & Terminal Company. This leaves the Kentucky Securities Company without any bonded or floating debt, and a cash balance of \$700,000 is also available for the Kentucky Traction & Terminal Company for betterments and improvements.

The Kentucky Traction & Terminal Company has organized as follows: President, Percy M. Chandler, Philadelphia, Pa.; vice-president, F. W. Bacon, Lexington, Ky.; secretary, T. D. Murray, Lexington, Ky.; assistant secretary, James K. Trimble, Philadelphia, Pa.; treasurer, J. Will Stoll, Lexington, Ky.; assistant treasurer, James W. McMeekin, Lexington, Ky.; general manager, I. L. Oppenheimer, Lexington, Ky.; general counsel, R. C. Stoll, Lexington, Ky.; general solicitor, Col. John R. Allen; R. C. Stoll, J. E. Bassett, Desha Breckinridge, C. N. Manning, F. W. Bacon, Lexington, Ky.; Senator V. M. Arnett, Nicholasville, Ky.; Col. Charles E. Hoge, Frankfort, Ky.; Johnson N. Camden, Versailles, Ky.; John R. Downing, Georgetown, Ky.; Percy M. Chandler, Howard A. Loeb, J. Levering Jones, John A. McCarthy, John B. McAfee and Gustavus W. Cook, Philadelphia, Pa., directors.

American Railways Company, Philadelphia, Pa.—The American Railways Company states that the report is incorrect that it is negotiating for the purchase of the Joplin & Pittsburgh Railway, referred to in the *ELECTRIC RAILWAY JOURNAL* of June 3, 1911, page 992.

Joliet & Southern Traction Company, Joliet, Ill.—At the conclusion of a meeting of the bondholders and creditors of the Joliet & Southern Traction Company in Chicago recently to consider the affairs of the company, which is

now in the hands of H. A. Fisher and Daniel Peterkin, receivers, the following statement was made by Mr. Fisher: "We discussed affairs pertaining to the organization of the company and Mr. Reynolds was empowered to appoint a bondholder committee to devise means for this end. The committee is to consist of five members, possibly seven. They will meet with Mr. George M. Reynolds, of the Continental National Bank, Chicago, Ill., and other parties interested and consider ways and means for the reorganization and the changes necessary for the economic management of the road."

J. G. White & Company, Inc., New York, N. Y.—J. G. White & Company, Inc., have issued their eighth annual report, for the fiscal year ended Feb. 28, 1911. The surplus for the year shows an increase from \$391,394.15 to \$485,529.04. The other important changes are a decrease in deferred charges and plant and tools and equipment, less depreciation, from \$331,160.45 to \$148,902.74, and an increase in securities owned and syndicate participations from \$1,765,816.19 to \$2,317,959.33. J. G. White, president of the company, says in part: "Nearly all of the properties in which your company is interested have shown during the past year substantial and satisfactory increases in earnings, and some of them have also increased their rate of dividends, so that the income from securities owned is gradually and substantially increasing. While in general there is not great activity in engineering and construction lines, it is pleasant to report that your company has recently secured a considerable amount of new work, and has fair prospects of securing considerably more work of this sort in the near future."

Massachusetts Electric Companies, Boston, Mass.—At the special meeting of the stockholders of the Old Colony Street Railway and the Boston & Northern Street Railway it was unanimously voted to merge. The capital of the Boston & Northern Street Railway will be increased by 7767 preferred and 80,041 shares of common stock, valued at \$780,800, to be exchanged for preferred and common stock respectively of the Old Colony Street Railway.

New Orleans Railway & Light Company, New Orleans, La.—Time for the deposit of the preferred stock and common stock of the New Orleans Railway & Light Company in accordance with the plan to merge the company and the American Cities Railway & Light Company was extended until June 7, 1911.

Northwestern Railways Company, Meadville, Pa.—The Northwestern Railways Company, which took over the Meadville Traction Company, Meadville & Conneaut Lake Traction Company and the People's Incandescent Light Company, Meadville, as noted in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1911, page 478, has concluded negotiations to take over the Meadville & Cambridge Springs Street Railway on July 1, 1911.

Rhode Island Company, Providence, R. I.—The New York, New Haven & Hartford Railroad, through the Rhode Island Company, has concluded leases for 999 years of the Providence & Danielson Railway, Providence, R. I., and the Sea View Railroad, Wickford, R. I., both of which are controlled by the same interests, the majority interest in the Sea View Railroad having recently passed to D. F. Sherman, president of the Providence & Danielson Railway, as noted in the *ELECTRIC RAILWAY JOURNAL* of March 4, 1911. The leases date from June 30, 1911. In the case of the Providence & Danielson Railway the lessee company is to pay 1 per cent upon the stock of \$1,000,000, interest upon the bonds, taxes and all other fixed charges. Thirty thousand dollars is to be paid immediately to the Providence & Danielson Railway as interest for the past year on bonds which are in default. In the case of the Sea View Railroad, the lessee company is to pay 1 per cent upon the \$700,000 of capital stock of the company on June 30, 1912 and 1913; 2 per cent at the same date in 1914, 1915 and 1916; 3 per cent upon the same date in 1917, 1918 and 1919; 4 per cent upon the same date in 1920 and 1921, and 5 per cent in 1922 and after years. D. F. Sherman, president of the Providence & Danielson Railway and the Sea View Railroad, issued a statement in regard to the leasing of the roads in which he said in part: "As an independent organization the Providence & Danielson Railway is and has been operated at a disadvantage; it has not paid a dividend nor earned all the

interest on its bonds and it seems doubtful if it can be made to earn sufficient revenue above current expenses to maintain its property in good condition and to provide for improvements and betterments and against depreciation which will necessitate the purchase of new cars and equipment when in the course of time present property is worn out. As a part of a large system many economies can be made and a plan has been devised and agreed upon whereby the holders of the securities of the company are to contribute about \$250,000, to be expended upon the property, thus insuring a more economical and efficient operation of the road. Under those conditions the Rhode Island Company became willing to lease the property for a long period and pay as rental the interest on outstanding bonds and a nominal dividend on the stock, and in connection with such lease assurances have been required protecting the Southern New England in the use of any portion of the property of the Providence & Danielson Railway it may later find it convenient or desirable to use in connection with the extension of the Grand Trunk System into this State." On June 3, 1911, it was announced that the Rhode Island Company had leased the Narragansett Pier Railroad for ninety-nine years and would electrify the road and operate it in connection with the Sea View line.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland, receiver of the Yonkers Railroad, to issue \$91,000 in receiver's certificates, the proceeds to be used to construct the Nepperhan Avenue line, which the commission has authorized to be built.

MONTHLY ELECTRIC RAILWAY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Apr. '11	\$130,914	\$76,037	\$52,577	\$35,571	\$17,306
1 " " '10	120,384	71,150	49,234	33,310	15,924
10 " " '11	1,421,542	822,187	599,355	344,264	255,091
10 " " '10	1,302,282	726,760	575,523	307,266	268,257

BROOKLYN RAPID TRANSIT SYSTEM.

1m., Feb. '11	\$1,591,046	*\$1,138,373	\$452,672
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CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

1m., Apr. '11	\$26,573	*\$14,672	\$11,901	\$8,172	\$3,729
1 " " '10	25,207	*14,019	11,188	7,931	3,257
4 " " '11	94,814	*55,125	39,690	32,692	6,998
4 " " '10	90,062	*51,441	38,621	31,678	6,944

DALLAS ELECTRIC COMPANY.

1m., Mar. '11	\$129,528	\$83,936	\$45,592	\$27,617	\$17,976
1 " " '10	114,849	77,240	37,608	26,347	11,261
12 " " '11	1,515,221	959,920	555,301	311,960	243,341
12 " " '10	1,359,384	864,695	494,689	330,458	164,231

HUDSON & MANHATTAN RAILROAD.

1m., Feb. '11	\$235,947	*\$112,651	\$123,297
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INTERBOROUGH RAPID TRANSIT COMPANY.

1m., Feb. '11	\$2,433,469	*\$1,174,870	\$1,258,599
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LAKE SHORE ELECTRIC RAILWAY.

1m., Apr. '11	\$91,958	*\$53,207	\$38,751	\$34,614	\$4,137
1 " " '10	86,915	*48,513	38,402	34,903	3,500
4 " " '11	339,314	*200,518	138,797	138,814	†18
4 " " '10	322,770	*193,470	129,300	138,823	†9,323

METROPOLITAN STREET RAILWAY.

1m., Feb. '11	\$975,696	*\$775,138	\$200,557
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NORTHERN OHIO TRACTION & LIGHT COMPANY.

1m., Apr. '11	\$200,015	*\$114,762	\$85,253	\$45,116	\$40,137
1 " " '10	173,763	*103,683	70,080	43,291	26,789
4 " " '11	748,886	*437,384	311,502	178,232	133,270
4 " " '10	658,339	*389,855	268,483	173,166	95,316

TAMPA ELECTRIC COMPANY.

1m., Mar. '11	\$56,804	\$28,252	\$28,552	\$6,256	\$22,295
1 " " '10	54,061	28,083	25,978	4,566	21,412
12 " " '11	596,621	327,574	269,047	69,559	199,487
12 " " '10	607,394	344,248	263,146	55,907	207,239

THIRD AVENUE RAILROAD.

1m., Feb. '11	\$259,867	*\$145,309	\$114,558
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TOLEDO RAILWAYS & LIGHT COMPANY.

1m., Apr. '11	\$267,547	\$163,420	\$104,127	\$79,225	\$24,901
4 " " '11	1,047,335	667,677	379,659	317,130	62,528

TWIN CITY RAPID TRANSIT COMPANY.

1m., Apr. '11	\$620,672	\$319,940	\$300,732	\$140,079	\$160,653
1 " " '10	584,378	268,045	316,332	140,229	176,103
4 " " '11	2,441,711	1,290,471	1,151,240	560,317	590,924
4 " " '10	2,303,698	1,157,069	1,146,628	560,916	585,711

UNION RAILWAY, NEW YORK.

1m., Feb. '11	\$150,858	*\$131,078	\$19,780
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*Includes taxes.
†Deficit.

Traffic and Transportation

No-Seat-No-Fare Ordinance in Portland, Ore.

It is proposed in Portland, Ore., to submit to the voters at the next regular city election an initiative petition in regard to the following proposed no-seat-no-fare ordinance:

"Section 1.—All companies, corporations or persons operating street railways within the limits of Portland are hereby required to run within the city limits a sufficient number of cars between 6:30 a. m. and 9 a. m. and 4:30 p. m. and 7 p. m. to provide with a seat every passenger from whom a fare is demanded, and it shall be unlawful between and during the hours aforesaid to demand any fare from any passenger until a seat has been provided.

"Section 2.—It shall be unlawful for any company, corporation or person operating street railways or a street railway within the limits of Portland to permit any person to board or remain upon any car between the hours of 6:30 a. m. and 9 a. m. and 4:30 p. m. and 7 p. m. unless there is a seat in such car for such person, and no person or persons shall be permitted at any time to crowd the aisle or platforms of this street car.

"Section 3.—That such companies, corporations or persons shall run a sufficient number of cars within this city during the hours of 6:30 a. m. to 9 a. m. and during the hours of 4:30 p. m. to 7 p. m. that persons desiring transportation thereon shall not be kept waiting longer than five minutes after being unable to secure a seat in a car.

"Section 4.—All ordinances or parts of ordinances heretofore existing and in conflict with any of the provisions of this ordinance are hereby repealed.

"Section 5.—Any company, corporation or person charged with the general operation of a street railway who shall violate any provision of this ordinance shall upon conviction thereof be punished by a fine not less than \$25 and not exceeding \$100 for each offense, and the acts of the agents and employees shall be deemed the acts of the company, or person, within the meaning of this ordinance.

"An ordinance providing that during certain hours each passenger of a street car operated in Portland from whom a fare is demanded shall be furnished a seat in such car and making it unlawful to demand such fare until a seat is provided, and making it unlawful during certain hours to permit any person to board or remain upon any street car in which no seat is available for such person."

B. S. Josselyn, president of the Portland Railway, Light & Power Company, issued a statement in regard to the proposed ordinance in which he said:

"That title, 'no seat, no fare,' is a misnomer, because the measure would not permit anyone to ride on the cars without paying fare. It would simply mean that only persons whom it would be possible to provide with seats could ride.

"The measure provides that a person shall not be kept waiting longer than five minutes for a car with a seat, a provision impossible to carry out because it is a physical impossibility during the rush hours, to which hours the proposed law is intended to apply.

"To make operative this law would result in riot that would disrupt completely the service and give the people no alternative but to walk. It would be unlawful for us to permit anyone to board a car unless that person could be provided with a seat.

"The company would be arrested if it carried people not provided with seats and people boarding cars and not finding a seat would make themselves liable to arrest and fine. The result would be a mix-up that could never be straightened out and it would never meet with public approval.

"I think it well that the people be warned against the misleading title of this proposed measure, for I feel confident that the general belief is that it means no seat, no fare, whereas it means no seat, no ride."

In order to bring the fallacy of the ordinance forcibly to the attention of its patrons, the Portland Railway, Light & Power Company is using the backs of its transfers to point out the discomfort that will result to its patrons if the measure is enacted. Paragraphs follow which have appeared recently on transfers:

"If you and your wife want to take the same car and but one seat is vacant, you can take that—she can come along in the next car."

"How would the people attending the baseball games get home? Apply the 'no-seat-no-ride' proposition to your own business. Could you furnish enough help to keep patrons from waiting all the time?"

"Would this [meaning the proposed ordinance] be unreasonable for a department store? If so why is it not unreasonable as it stands?"

Accidents in New York City in March

The Public Service Commission of the First District of New York has issued the following comparative summary of accidents during March, 1909, 1910 and 1911, on the street railways which come within its jurisdiction:

March.	1909.	1910.	1911.
Car collisions.....	77	79	78
Persons and vehicles struck by cars.....	923	969	1,380
Boarding	571	759	741
Alighting	509	679	570
Contact electricity.....	16	24	23
Other accidents.....	1,618	1,782	1,782
Totals	3,714	4,292	4,574
Passengers	1,531	1,965	1,840
Not passengers.....	505	513	478
Employees	246	289	330
Totals	2,282	2,767	2,648
Serious (included in above):			
Killed	13	12	17
Fractured skulls.....	16	10	4
Amputated limbs.....	4	..	3
Broken limbs.....	29	34	21
Other serious.....	98	118	89
Totals	160	174	134

The grand total of revenue passengers carried by the companies in March, 1909, was 118,768,565; in March, 1910, 131,760,785, and in March, 1911, 135,040,000, while the grand total of revenue car miles was 23,059,533 in March, 1909; 24,697,510 in March, 1910, and 25,191,000 in March, 1911.

Employees in Denver Exchange Transfer Ideas

The *Tramway Bulletin* for May, 1911, which is the official organ of the Tramway Mutual Aid Association, which is composed of employees of the Denver (Col.) City Tramway, contains a series of communications from conductors of the company in which they express their ideas in regard to transfers. One of the conductors, J. C. Black, in reviewing his method of dealing with passengers who present old or defective transfers gave some very pertinent advice to his fellows. He said in part:

"When a passenger hands me a transfer that is not acceptable on my line for any reason I lower my voice and as privately as possible I tell that passenger the transfer cannot be accepted and take the time to show him why. I find that about three-fourths of them will pay me; to the others, when I find they will not pay, I tell that if I accept the transfer I must have their name and address, as I must send it in with the transfer so the company can investigate if it sees fit. I give them the impression that their name and address must accompany the transfer if it is turned in to the company, as it is imperative with me.

"Some people are naturally timid about giving their names and will pay instead. Some, if they are telling a lie about their transfers, will pay if they think there is a chance of the company investigating the matter. Others will say, 'Oh, well, if you have to go to all that trouble I'll just pay you; here is 5 cents.'

"Others will not pay under any consideration, so I just take their names and addresses and give them the impression that these will be sent to the office with the transfer. You may ask what good it does to go to all that trouble of getting names, etc. It does a great deal of good; if the person was honest and it was the carelessness of the conductor issuing the transfer, then that person will likely watch the next transfer he accepts, for in all probability that person's mind was a thousand miles off when he accepted the transfer. You all see such people every day; they get on the car, sit down, don't know they have to pay until the conductor taps them on the shoulder; they don't know they want a transfer until the conductor suggests it to them;

they take the transfer without looking at it and carefully fold it six times and stick it away in some nook or corner of their pocket. That person gets on the next car and can't find his transfer, or forgets he had a transfer, pays a cash fare and just before getting off the car comes to you with the transfer and asks you if you can refund his fare.

"On the other hand, if that person was not honest and telling you a lie, we know he would like to beat the company well enough, but when it comes to telling a lie and then virtually signing that lie, that is a different thing; he will be careful. Some people will pay if they think the conductor will be the loser; there isn't a conductor on the system who has not heard people express this sentiment, as not desiring to beat the conductor, but the company. Such people are not our friends and will bear watching at any and all times.

"So far I have never failed to get either 5 cents or name and address, and when I succeed in getting only the name and address I feel as though I have accomplished something."

Increase in Wages in Allentown.—The Lehigh Valley Transit Company, Allentown, Pa., has announced an advance in wages of conductors and motormen 1 cent an hour beginning July 1, 1911. Present wages are 21 cents to 24 cents per hour, according to the period of service.

Suburban-Elevated Operating Agreement in Chicago.—Preliminary negotiations are reported to have been completed between the receivers of the Chicago & Milwaukee Electric Railroad and the elevated railroad merger syndicate by which the Chicago & Milwaukee Electric Railroad will operate into Chicago over the Northwestern Elevated Railroad.

Sterling, Dixon & Eastern Electric Railway to Abandon Park.—The Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., has decided to abandon Electric Park, midway between Sterling and Dixon, as the property has not been profitable. The east end of the road at Dixon serves a Chautauqua assembly park and near the west end of the road at Sterling is Minerva Springs Park.

Limited Service on Indiana Line Discontinued.—The Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has discontinued its through limited service between New Castle and Indianapolis by way of Duneith. The company will continue to operate the spur line between New Castle and Duneith to connect with the main line to Richmond and Indianapolis.

Fare Complaint Against a Long Island Company.—A complaint has been filed with the Public Service Commission of the Second District of New York asking that the New York & Long Island Traction Company be required to reduce its fare between Belmont Park and Front Street and Main Street in Hempstead from 10 cents to 5 cents. Under the terms of a franchise granted to a predecessor corporation, complainant states the company should not exact more than 5 cents for a ride five miles or less within the town of Hempstead.

Long Island Railroad Asked to Reduce Local Fare.—The Public Service Commission of the First District of New York has requested the Long Island Railroad to answer a complaint order as to why the company should not extend the 5-cent fare zone on its line between Flatbush Avenue, Brooklyn, and Jamaica, from Warwick Street, Brooklyn, to Railroad Avenue, Brooklyn. A bill to require the company to reduce the fare between Flatbush Avenue and Railroad Avenue was passed by the Legislature, but Governor Dix vetoed the measure on the ground that it tended to usurp the authority of the Public Service Commission.

New Jersey Board Modifies Operating Order.—The Board of Public Utility Commissioners of New York has modified two orders, one of Dec. 21, 1909, the other of July 26, 1910, granting permission to the North Jersey Rapid Transit Company to cross certain streets and highways at grade. One of the conditions upon which permission was granted was that the company should operate its cars singly and not in trains. This condition has been modified so as to permit the operation of trains with three cars as a unit, but only on occasions when the usual one-car service is

insufficient for the traffic, or when special conditions require the transportation of church, fraternal and other organizations.

Gates Give Satisfaction in Louisville.—Officials of the Louisville (Ky.) Railway are pleased with the operation of the safety gates which were installed on the cars of the Portland Avenue line as an experiment a few months ago. It has been possible to maintain the same schedules; the number of accidents has been appreciably reduced and no difficulty has been encountered in the operation of the device. While no decision has been made as to the equipment of the other lines with similar barriers, it is expected that this will be done in the near future. The gates are divided into four parts, the central two swinging from a common center, which is the guide post for the pay-as-you-enter system, and the other parts hinging respectively on the back of the platform and the body of the car.

Auto Races Increase Traffic.—The interurban electric railways which enter Indianapolis operated 122 extra trains into the terminal station at Indianapolis and the same number of extra trains out of the station on May 30, 1911, the day on which the automobile races were held on the Indianapolis speedway, making the total movement 725 trains. It is estimated that these trains carried 60,000 passengers. Not an accident has been reported. The Indiana Railroad Commission has commended the interurban railways for handling so successfully the large crowds which attended the races on May 30, 1911. Chairman Wood, of the committee, said: "We found the companies obeying the rules of the commission to the letter. We were particularly interested in ascertaining if any of the motormen permitted passengers in their compartments, and we found no instances where the rule against passengers in such compartments was violated."

Traffic Arrangement Between New York Suburban Line and City Company.—The Public Service Commission has approved the terms of an agreement entered into between Leslie Southerland, receiver of the Yonkers Railroad, and Frederick W. Whitridge, receiver of the Union Railway, by which cars of the Yonkers Railroad will be run over the Union Railway so that passengers can reach the up-town terminal of the Third Avenue elevated line of the Interborough Rapid Transit Company, the Ninth Avenue elevated line of that company, or the Broadway branch of the subway. Passengers will thus be able to reach any part of Manhattan from Yonkers for 10 cents, whereas before the fare was 15 cents. This arrangement has been in operation for some time under an informal agreement between the two companies, but heretofore passengers have only been able to reach the Broadway extension of the subway. The arrangement by which they reach the elevated is new.

Traffic at Little Rock During Confederate Reunion.—The reunion of Confederate veterans, which was held in Little Rock, Ark., in May, was the most successful in point of number in attendance which has ever been held. The reunion lasted four days, and during that time the Little Rock Railway & Electric Company handled an average of 200,000 passengers a day without a serious accident. The company had available for service sixty-five cars, thirty-five of which were single-truck cars. Of the single-truck cars ten were ten-bench open cars and twenty-five were side-seat closed cars. D. A. Hegarty, vice-president and general manager of the company, received unstinted praise from the newspapers and from those in attendance at the reunion for the service furnished by the company and the able and courteous treatment of strangers by the employees of the company. In recognition of the work of the employees during the reunion, Mr. Hegarty addressed the following letter to the men: "It is with great pleasure and pride that we extend to you the congratulations of the officers of the company for the faithful, efficient and especially polite service rendered during the Confederate veterans' reunion, as a more trying situation on your patience could not have been possible, and to move this vast crowd of people without a serious accident has been a marvelous record of which the officials of this company and the employees of the same have good reason to feel proud. To further show their appreciation of your good and loyal services, the officers of the company have granted to each employee a monetary bonus equal to three days' pay."

Personal Mention

Mr. R. J. Dunham, who has been appointed a receiver of the Metropolitan Street Railway, Kansas City, Mo., with Mr. Ford Harvey, is the confidential representative of Mr. J. Ogden Armour. He is chairman of the board of directors of the Kansas City Railway & Light Company, president of the Sioux City (Ia.) Traction Company and president of the Stock Yard Company in Ft. Worth.

Mr. John Leisenring, signal engineer of the Illinois Traction System, Peoria, Ill., has been placed in charge of the overhead department of the company, including the transmission line, telephone lines, automatic signals and Blake signals and trolley wire. All employees of this department have been instructed to report to Mr. Leisenring instead of to Mr. Patterson, who has been relieved of these duties.

Mr. J. B. Rowray, whose resignation as superintendent of the north division of the Pacific Electric Railway, Los Angeles, Cal., to become superintendent of the Northern Electric Railway, Chico, Cal., was noted in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, was presented with a diamond ring by his associates in the Pacific Electric Railway when he retired from the company.

Mr. Ford Harvey, who has been appointed a receiver of the Metropolitan Street Railway, Kansas City, Mo., with Mr. R. J. Dunham, was born in Leavenworth, Kan. After he left college Mr. Harvey entered the service of his father and is now president of the Fred Harvey system, which operates a system of restaurants on the Atchison, Topeka & Santa Fé Railway from Chicago to the Pacific Coast and to the Gulf of Mexico.

Mr. Frank H. Sommer, whose term of office as a member of the State Board of Public Utility Commissioners of New Jersey expired on May 1, 1911, has been retained as counsel to the commission in accordance with the provision of the new utility law which gives the board authority to engage counsel. Heretofore the commission has referred to the Attorney-General of the State all questions which required an expression of legal opinion.

Mr. J. Sergeant Cram has been appointed a member of the Public Service Commission of the First District of New York to succeed Mr. Edward M. Bassett, whose term of office expired in February, 1911. Mr. Cram was born in New York City in 1852. He was educated at Exeter Academy and at Harvard. He entered public life in the time of Mayor Hugh Grant. Later he was appointed head of the Dock Board of New York. Mr. Cram is chairman of the general committee of Tammany Hall.

Mr. Edward M. Bassett, whose term of office as a member of the Public Service Commission of the First District of New York expired in February, 1911, will retire from the commission now that Governor Dix has announced the appointment of Mr. J. Sergeant Cram as his successor. Mr. Bassett's greatest service to the commission has been in connection with framing the new rapid transit law and in pushing the elimination of dangerous grade crossings. Mr. Bassett will return at once to the law firm of which he is a member and resume the practice of his regular calling.

Mr. Frank S. Gannon, formerly vice-president of the New York City Railway, has opened an office in New York and will devote himself to technical work in examinations and appraisals of railway properties and as advisory counsel. Mr. Gannon was recently president of the Norfolk & Southern Railroad. He was born in Spring Valley, N. Y., and began railway work in November, 1868, as a telegraph operator on the Delaware division of the Erie Railroad. Later he served on the New Jersey Midland Railroad, now a part of the New York, Susquehanna & Western Railroad; the Long Island Railroad; the Baltimore & Ohio Railroad; the New York City & Northern Railroad, now a part of the New York Central & Hudson River Railroad, and the Staten Island Rapid Transit Railroad. In January, 1897, Mr. Gannon was elected third vice-president and general manager of the Southern Railway, and from March, 1902, to November, 1902, he was third vice-president of the company. From 1905 to 1909 he was vice-president of the Atlantic & North Carolina Railroad and president of the Norfolk Southern Railroad, which succeeded the Atlantic & North Carolina Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Clear Lake Railroad, Lakeport, Cal.**—Incorporated in California to build a 44-mile electric railway from Hope-land to Lakeport, with branches to Upper Lake and Kelseyville. Surveys will be begun at once by C. R. Rankin. Capital stock, \$500,000. Directors: L. H. Boggs and M. M. Gopcevic, Kelseyville; C. M. Hammond, Upper Lake; Duville Howard, H. V. Keeling, Joseph Levy, M. S. Sayre, Z. T. Spencer, A. H. Spurr, all of Lakeport; S. E. Brooks, Hopeland; C. C. McMahon, Bartlett Springs.

***San Joaquin Delta Railroad, Stockton, Cal.**—Incorporated in California to build an electric railway from Stockton across the Delta country to a point in Contra Costa County. Capital stock, \$500,000. Directors: E. S. Wood, L. H. Wood, W. P. Plummer, I. L. Borden, F. A. West, E. L. Wilhoit and M. E. Cerf.

***Central Terminal Railway, Chicago, Ill.**—Application for a charter has been made by this company in Illinois to build a railway from Forest Park to Chicago. Capital stock, \$2,000,000. Incorporators and first board of directors: Donald R. McLennan, Charles E. Vroman, Joseph W. Hiner, Fayette S. Munro and John C. Vroman, all of Chicago.

***Cicero & Southwestern Railways, Chicago, Ill.**—Incorporated to build electric railways in Illinois. Capital stock, \$1000. Incorporators: Emil R. Rosenthal, Louis Cohern and Augustus J. C. Timm.

***Northern Illinois Industrial Company, Waukegan, Ill.**—Incorporated in Illinois to build an electric railway from North Chicago to Waukegan. Headquarters, Waukegan. Capital stock, \$50,000. Directors, C. E. Saylor, S. Schwartz, J. P. Arthur, Theodore H. Durst and M. H. Hussey, all of Waukegan, and John Sherwin, James T. Hayes, Dr. L. B. Jolley and M. C. Decker, all of North Chicago.

***Gary (Ind.) Connecting Railways.**—Application for a charter has been made in Indiana by this company to build an interurban railway through Porter and Lake Counties from Goodrum to Gary and Hammond; also to a point on the State line between Illinois and Indiana south to Hobart. Capital stock, \$500,000. Incorporators: V. O. Ward, I. A. Wheeler, P. W. Fitzhue, H. L. Ikes, W. L. Pollock, T. Persson and Richard D. Green, all of Chicago, Ill.

***Indianapolis, Chicago & Meridian Railway, Indianapolis, Ind.**—Application for a charter has been made by this company in Indiana to build an interurban railway to connect Indianapolis, Sheridan, Flora, Monticello, Francisville, Koutz, Valparaiso, Hobart, Wheeler, Gary, Hammond, Warsaw, Columbia City and Ft. Wayne and connecting with interurban lines near Hammond, Ill. Headquarters: Indianapolis. Incorporators: John A. Shafer, M. J. Moreland, Charles Beilheimer, Hoover Holton and M. B. Killer.

Western Kentucky Electric Railways, Owensboro, Ky.—Application for a charter will soon be made by this company in Delaware to build a 230-mile electric railway to connect Owensboro, Calhoun, Central City, Madisonville, Earlington, Nortonville, Dawson Springs, Bowling Green, Niagara, Sturgis, Calhoun, Ky., and Rockport, Ind. Preliminary arrangements are being made and \$25,000 is being subscribed for surveys and reports. The company will furnish power for lighting purposes. Capital stock authorized, \$2,000,000. Capital stock, issued, \$25,000. The H. U. Wallace & Company, 923 Marquette Building, Chicago, Ill., are the engineers. E. F. Wheaton, Owensboro, fiscal agent. Organization committee: Lee D. Ray, J. Ed. Guenther, D. C. Stimson, Dr. D. M. Griffith, George A. Cox, C. W. Wells and Haewes B. Eagles, all of Owensboro. [E. R. J., May 27, '11.]

Pottstown & Phoenixville Railway, Pottstown, Pa.—Incorporated in Pennsylvania to build an electric railway 1 mile long from Pottstown to Sanatoga Station. Capital stock, \$6000. George N. Malsberger, president; H. F.

Swinehart, Pottstown; C. Taylor Leland and Harry C. Case, Newtown, and C. W. Rambo, Spring City. [E. R. J., May 13, '11.]

FRANCHISES

Bakersfield, Cal.—The San Joaquin Light & Power Corporation has asked the Council for a franchise on North Chester Street to the city limits.

Lodi, Cal.—The Central California Traction Company, San Francisco, has asked the City Trustees for a franchise on Sacramento Street in Lodi.

San Diego, Cal.—The San Diego & El Cajon Valley Interurban Railway has asked the Park Board for a franchise through the city park of San Diego.

Turlock, Cal.—The Tidewater & Southern Railroad has asked the City Council for a franchise to build its tracks through Turlock. The company has a similar application pending in Modesto. This line will connect Stockton, Modesto, Atlanta, French Camp, Turlock and Merced. K. C. Brueck, Stockton, president. [E. R. J., May 6, '11.]

***Florence, Col.**—B. F. Foor, representing the Florence Interurban Electric Company, has asked the City Council for a franchise to build an electric railway in Florence. This is part of a plan to construct an electric railway between Florence, Williamsburg, Rockvale and Coal Creek. Surveys are being made and most of the right-of-way has been secured.

Kissimmee, Fla.—The Citrus Southern Electric Railway, Sanford, has asked the City Council for a franchise in Kissimmee. This is part of a plan to build a 45-mile railway between Kissimmee, Sanford and Orlando. J. J. Brophy, Winter Park, general manager. [E. R. J., May 16, '11.]

Atlanta, Ga.—The Georgia Railway & Electric Company has received a franchise to extend its tracks three miles from Atlanta to the Brookhaven Country Club.

Shelbyville, Ky.—The Louisville Railway, which controls the Louisville & Interurban Railroad, has offered to pay \$15,000 for a franchise on Main Street, Shelbyville.

New Iberia, La.—The Southwestern Traction & Power Company, New Orleans, has received a twenty-five-year franchise from the City Council of New Iberia. The company has also asked the City Council of Jeanerette for a similar franchise to build its tracks over certain streets in Jeanerette. F. W. Crosby, Tenegre Building, New Orleans, president. [E. R. J., May 20, '11.]

Housatonic, Mass.—The Berkshire Street Railway, Pittsfield, has received a franchise from the Council for an extension in Housatonic.

Red Wing, Minn.—The St. Paul Southern Electric Railway, St. Paul, has received a franchise from the Council to build through Red Wing. [E. R. J., June 3, '11.]

Tulsa, Okla.—The Sand Springs Interurban Railway, Tulsa, has received a franchise from the Council to extend its tracks through Tulsa. This line will be extended to Collinsville and Oologah, where connection will be made with the Iron Mountain division.

Hubbard, Pa.—The Mahoning & Shenango Railway & Light Company, New Castle, has asked the Council for a franchise to double track its line through Hubbard, between the westerly village limits and Hubbard Junction.

Lehigh Coal & Navigation Company, Philadelphia, Pa.—The company states that it is not planning to build an electric railway from Summit Hill to Mauch Chunk, as stated in the issue of this paper last week.

Providence, R. I.—The Rhode Island Company, Providence, has received a franchise from the City Council to extend its tracks on Reservoir Avenue to the city limits in Providence.

Spartanburg, S. C.—The Greenville, Spartanburg & Anderson Railway has asked the City Council for a franchise through Spartanburg.

Houston, Tex.—The Galveston-Houston Electric Railway, Houston, has asked the City Council for a franchise authorizing it to change its route into Houston.

***Tyler, Tex.**—Thomas O'Hara and R. E. Hosket, Dayton, Ohio, have received a fifty-year franchise from the City Council to build an electric railway in Tyler.

Blaine, Wash.—The Nooksack Valley Traction Company, Bellingham, has received a fifty-year franchise from the City Council to build through Blaine. [E. R. J., May 27, '11.]

Wheeling, W. Va.—The Pan-Handle Traction Company, Wheeling, has received a franchise from the County Commissioners to build a third rail from the city limits of Wheeling to a point beyond Glennova.

Janesville, Wis.—The Janesville Traction Company, Madison, will ask the City Council for a franchise to extend its tracks on Main Street to its new freight office in Janesville.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—Robert Sherer & Company, Los Angeles, has been awarded the contract by this company to build the 4½-mile extension from Glendale to Burbank.

Oakland (Cal.) Traction Company.—This company will double track its Northbrae line from University Avenue and Grove Street to the southern boundary of the Spring estate, in Berkeley.

***San Mateo, Cal.**—Percy L. Shuman, W. M. Roberts, San Mateo, and associates are interested in a plan to build a proposed electric railway between San Mateo and San Francisco, via Hillsboro. Capital for the construction of the line is ready if the right-of-way can be secured through Hillsboro and San Mateo for \$20,000.

Watsonville Railway & Navigation Company, Watsonville, Cal.—This company advises that it will let a contract at once for a concrete dock at Port Watsonville, on Monterey Bay, to cost \$100,000. It has 6 miles of track now in operation and will begin to build 8 miles of extensions in July. The line will connect San Francisco, Los Angeles, Watsonville, Freedom, Corralitos and Vega. It is securing franchises for other towns. The power house and repair shops are located at West Third Street, Watsonville. Capital stock, authorized, \$200,000. Capital stock, issued, \$150,000. Officers: F. E. Snowden, 311 California Street, San Francisco, president and general manager; W. F. Crosby, Watsonville, vice-president and superintendent; Clarence A. Shuey, 311 California Street, San Francisco, secretary, and H. Reeland, Watsonville, electrical engineer. [E. R. J., June 3, '11.]

Georgia Railway & Electric Company, Atlanta, Ga.—Work will be begun at once by this company to double track its Forrest Avenue line from Peachtree Street to Boulevard Street.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—It is reported that this company will improve its lines soon by eliminating many of its curves, reconstructing bridges and laying new ties.

Sterling, Dixon & Eastern Electric Railway, Dixon, Ill.—This company is planning to rehabilitate its tracks in Sterling, beginning at once. The work will be done under the jurisdiction of Clement C. Smith, president. Throughout the length of the city the present joint plates will be removed and the rail joints all cast-welded by the Falk process. The ties will be renewed where necessary and the paving relaid, using special grooved brick next to the rails and grouting with Portland cement. East of the business district new paving is to be laid and the grade of the tracks will be raised by inserting additional ballast of crushed stone and by laying a concrete foundation for the paving.

Pekin & Petersburg Interurban Railway, Pekin, Ill.—This company advises that it has begun the construction of its 7-mile electric railway to connect Pekin and Petersburg. Its repair shops will be located at Pekin and it will purchase power. The company will operate to cars. Capital stock, authorized, \$50,000. Bonds, issued, \$50,000. Officers: J. E. Melick, president, and G. A. McIntire, secretary, both of Springfield. [E. R. J., Jan. 7, '11.]

Peoria Northern Railway, Peoria, Ill.—This company advises that it has not decided when construction work will be begun on this electric railway to connect Peoria, Mossville, Rome, Chillicothe, Sparland, Henry and Bureau. Capital stock, authorized, \$2,500. Officers: H. E. Chubbuck, Peoria, president and general manager; H. J. Vance, La Salle, vice-president; W. H. Carnahan, Champaign, secretary, and W. J. Achelpohl, treasurer. [E. R. J., Feb. 29, '10.]

***Quincy & Terre Haute Railroad, Quincy, Ill.**—This company advises that it expects to procure a new charter in June after which contracts will be let for grading a 56-mile line to connect Quincy, Liberty, Beverly, Kingston and Baylis. The motive power will be gasoline or electricity. Capital stock, authorized, \$1,680,000. Bonds authorized, \$1,680,000. Officers: William C. Fick, 501 Ohio Street, Quincy, president; H. C. Simon, Virden, vice-president; F. W. Knollenberg, Quincy, secretary, and S. P. Landcraft, treasurer.

***Waterloo, Ia.**—A survey is being made for the construction of a second interurban line to Eagle Center, via Geneseo, Traer and Crystal.

***Houlton, Me.**—A new electric railway will be built this year between Woodlawn and New Sweden. It may later be extended to Caribou.

Berkshire Street Railway, Pittsfield, Mass.—This company has completed and placed in operation its 6-mile extension from Great Barrington south to Sheffield.

Towson & Cockeysville Electric Railway, Cockeysville, Md.—This company advises that it has awarded the contract to James H. Harlan Company for the grading and construction of its 7½-mile electric railway to connect Towson and Cockeysville via Lutherville, Timonium, Texas and Marble Hill. Construction has been begun. Capital stock, \$100,000. Officers: J. Alexis Shriver, Belair, president, general manager and purchasing agent; William H. Wright, vice-president, and James S. Nussear, secretary and treasurer. [E. R. J., May 13, '11.]

Michigan United Railways, Lansing, Mich.—Work will be begun at once by this company on the extension to connect Lansing, Owosso, and Saginaw. Right-of-way has been secured from Owosso to Swan Creek.

Pine Brook Electric Railway, Caldwell, N. J.—Alexander Dallas, president of this company, has deposited \$25,000 with the State Treasurer of New Jersey, which guarantees the construction of its 11-mile electric railway to connect Caldwell, Montville, Hanover, Fox Hill and Denville. This new line will be the last link in the electric railway between New York and Lake Hopatcong. [E. R. J., April 8, '11.]

Yonkers (N. Y.) Railroad.—The Public Service Commission, Second District, has granted its permission to the Yonkers Railroad to exercise franchises granted by Yonkers on April 4, 1911, for the construction of a line on Nepperhan Avenue in Yonkers from the intersection of Lake Avenue northerly to the north city line.

Charlotte (N. C.) Rapid Transit Company.—The contract has been awarded to W. J. Oliver & Company, Knoxville, by this company to build its line from the present terminus in Elizabeth Heights in Charlotte eastward to the Mecklenburg Country Club. Messrs. Flyler & Reid, Misenheimer, have been awarded the contract for 10,000 cross ties. Cameron Morrison, Charlotte, is interested. [E. R. J., Sept. 3, '10.]

Carolina Light & Power Company, Raleigh, N. C.—A preliminary survey has been made by this company to build a 3-mile extension from the Glenwood terminal of the Raleigh Street Railway to the Raleigh Country Club.

Columbus Railway & Light Company, Columbus, Ohio.—This company has placed an order for 1100 tons of girder rails with the Lorain Steel Company.

Toronto (Ont.) Railway.—Work has been progressing steadily on the extension of this company's lines within Toronto, started last fall. The special intersection work has been laid at Yonge and Adelaide Streets, Spadina and Adelaide Streets, and Spadina and Harbord Streets. Service on the latter street will be commenced as soon as the street is widened for vehicular traffic. The Wilton Avenue line is completed from the Don River to Church Street, and work is proceeding on the laying of the tracks over the Wilton Avenue bridge at the Don River.

Willamette & Molalla Valley Railway, Canby, Ore.—This company advises that it is closing final survey work and is securing right-of-way and will begin construction within ninety days on its 12-mile electric or steam railway from Canby through the Molalla Valley. W. J. Lee, Canby, president and general manager. [E. R. J., June 3, '11.]

Erie (Pa.) Traction Company.—Work has been begun by this company on a cut-off between Cambridge Springs and a point $2\frac{1}{2}$ miles north of Cambridge Springs. This change is for the purpose of eliminating bad curves and shortening this line one-half mile.

Northwestern Pennsylvania Railway, Meadville, Pa.—This company, which has taken over the Meadville & Cambridge Springs Street Railway, will rehabilitate the entire line.

***Allegheny & Northwestern Street Railway, Pittsburgh, Pa.**—This company has filed for record at Pittsburgh a mortgage in favor of the Guaranty Title & Trust Company, Pittsburgh, as trustee, to secure an issue of \$700,000 of 5 per cent bonds, for a period of fifty years. This 27-mile railway will connect Evans City, Harmarville and Mars. Work was begun last fall by John Schaffner, Butler. It will connect with the Allegheny Valley Street Railway, Tarentum, at Harmarville.

Rhode Island Company, Providence, R. I.—It is announced that the Rhode Island Company, which has just arranged to lease the Narragansett Pier Railroad, $8\frac{1}{2}$ miles long, will equip the road with electricity and operate it in connection with its Sea View line.

Anderson, S. C.—M. N. Patterson has secured right-of-way and a new survey will be made within ten days for the construction of a 30-mile electric railway to connect Anderson, Abbeville and Antreville. [E. R. J., May 6, '11.]

Elizabethton, Milligan & Johnson City Electric Railway, Johnson City, Tenn.—Preliminary surveys have been completed and work will be begun at once by this company on its 8-mile electric railway between Johnson City, Milligan, Oak Grove and Elizabethton. W. G. Payne is interested. [E. R. J., April 15, '11.]

Bryan-College Interurban Railway, Bryan, Tex.—A 2-mile extension will be built by this company at once from its present terminal on Caldwell Street out by the Allen Academy and as far as the Villa Maria Ursuline Convent. O. E. Gammill, Bryan, will do the grading.

Marshall (Tex.) Traction Company.—This company has completed and placed in operation its extension from Marshall to East Marshall.

Mt. Mansfield Electric Railroad, Stowe, Vt.—Work has been begun by this company on its extension from Stowe to Morrisville.

Yakima Valley Transportation Company, North Yakima, Wash.—Work has been begun by this company on its extension from North Yakima to Moxee City.

***Seattle, Wash.**—Plans are being considered for the formation of a company to build an electric railway from Lake Crescent through Port Angeles, Port Townsend and Irondale to some convenient point on Hood Canal, from which point fast boat service will be established to Seattle. Among those interested are: A. O. Powell, J. M. Sparkman, Jesse A. Frye, W. G. Anderson, John C. Walling and Rufus R. Wilson.

Tacoma Railway & Light Company, Tacoma, Wash.—This company has completed and placed in operation its 2-mile extension into the business section of Bismarck.

Middle Island Railroad, Middlebourne, W. Va.—This company has been voted a bond issue in Lincoln district of \$200,000 to be used in building its 60-mile electric railway to connect Sisterville, Kidwell, Middlebourne, Shirley and Clarksburg. John F. Shore, Middlebourne, secretary. [E. R. J., March 11, '11.]

Tyler Traction Company, Clarksburg, W. Va.—This company will soon begin the construction of its railway to connect Sisterville, Middlebourne and Shirley. It has organized by electing the following officers: H. W. McCoy, president; R. Broadwater, vice-president; W. J. Neuenschwander, treasurer, and John Kinkaid, secretary. [E. R. J., April 22, '11.]

Hot Springs Street Railway, Thermopolis, Wyo.—This company advises that it has not decided when it will begin the construction of its 4-mile electric railway in Thermopolis. The company will operate two cars. Capital stock authorized, \$100,000. Officers: S. A. Broadwell, Omaha, Neb., president; C. C. Kindel, Omaha, vice-president; C.

Broadwell, secretary and treasurer, and J. J. Conlon, Thermopolis, superintendent. [E. R. J., Oct. 9, '09.]

SHOPS AND BUILDINGS

Tampa (Fla.) Electric Company.—Work has been begun and is progressing rapidly by this company on its new carhouse on the Hillsborough River, between Sixth Avenue and Ross Avenue, in Tampa. [E. R. J., April 29, '11.]

Rockford & Interurban Railway, Rockford, Ill.—Plans have been completed and bids will soon be asked for by this company to build its new carhouse in Rockford. The structure will be 1-story high, 65 ft. x 240 ft., with a brick bay 33 ft. x 100 ft. The cost is estimated to be about \$20,000. [E. R. J., March 18, '11.]

Indiana Union Traction Company, Anderson, Ind.—This company is said to be considering plans to build a new freight station in Bluffton.

Cincinnati (Ohio) Traction Company.—McGarvey & Company, Cincinnati, has been awarded the contract by this company to build its new carhouse at Winton Place in Cincinnati. The new buildings will cover nearly two acres of ground.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans have been completed by this company for a new carhouse on Fortieth Street and Cold Spring Avenue, in Milwaukee. The structure will be two stories high and 180 ft. x 370 ft. The framework will be of structural steel and the walls of brick and concrete construction. The roof will be a concrete slab.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company has closed a contract with the General Electric Company for electrical machinery and equipment, including the following: Four motor-generator sets, each consisting of one M. P. C. 8, 1000-kw, 500 r.p.m., 600-volt, d.c. generator, direct connected to one A. T. I. 12, 1120-kw, 2200-volt, 50-cycle, 3-phase synchronous motor; three motor-generator sets, each to consist of one M. P. C. 6, 600-kw, 750 r.p.m., 600-volt, d.c. generator, direct connected to and mounted on the same base with one I. 8, 900-hp, 750 r. p.m., 2200-volt, 50-cycle, 3-phase induction motor; nine 450-kw, water-cooled transformers and nine 300-kw, water-cooled transformers, all designed for 15,000 volts for primary and 2250 volts secondary.

Kentucky Traction & Terminal Company, Louisville, Ky.—This company, which has succeeded the Lexington & Interurban Railways, has purchased two acres of land north of Limestone Street, between Seventh Street and the Belt Railway, in Louisville, adjoining the present power house of the Lexington Railway, upon which it will build a new power house.

Biddeford & Saco Street Railway, Biddeford, Me.—It is stated that the deal pending between the Biddeford & Saco Street Railway and the York Light & Heat Company has been consummated, and that the latter will furnish the former with electricity for power as soon as the necessary apparatus can be installed. The railroad will keep its power plant intact for emergency use.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company is reported to be purchasing flowage rights at Eagle Rapids, eight miles from Chippewa Falls, with a view to developing 20,000-hp.

Springfield (Mo.) Traction Company.—The Federal Light & Traction Company, New York, N. Y., which owns the Springfield Traction Company, is planning to double the capacity and efficiency of its power plant in Springfield. Plans and specifications are being made by L. A. Shattuck and W. A. Haller, of New York.

Delaware & Hudson Railroad, Albany, N. Y.—This company has ordered from the General Electric Company one 8000-kw, 2300-volt turbo-generator, one 100-kw, 125-volt turbo-exciter and four 2500-kva, 2300-volt step-up transformers for its Mechanicsville substation.

Northwestern Pennsylvania Railway, Meadville, Pa.—This company is installing additional boilers and a feedwater purification system in its power plant in Meadville. C. L. Murray, Meadville, general manager.

Manufactures & Supplies

ROLLING STOCK

Springfield (Mass.) Street Railway has ordered three closed cars from the Osgood Bradley Car Company.

Meadville & Cambridge Springs Railway, Meadville, Pa., will soon be in the market for new trucks and motors.

York (Pa.) Railways have ordered four 26-ft. semi-convertible motor car bodies from The J. G. Brill Company.

Portland, Eugene & Eastern Railway, Portland, Ore., has ordered two Brill 27-G-1 trucks from the American Car Company.

Worcester (Mass.) Consolidated Street Railway has ordered fifteen closed cars from the Osgood Bradley Car Company.

Denver & Intermountain Railroad, Denver, Col., has ordered four Brill 27-GE-1 trucks from the American Car Company.

Montgomery (Ala.) Traction Company has ordered six Brill 21-E trucks and four Brill 27-G1 trucks from The J. G. Brill Company.

Woodlawn & Southern Street Railway, Woodlawn, Pa., has ordered two 20-ft. closed motor cars and four 33-ft. 9-in. motor cars from the G. C. Kuhlman Car Company.

Pacific Electric Railway, Los Angeles, Cal., has ordered fifty quadruple GE-210, 60-hp railway motor equipments with type M control from the General Electric Company.

Columbia Railway, Gas & Electric Company, Columbia, S. C., has ordered through J. G. White & Company, New York, N. Y., six semi-convertible cars from The J. G. Brill Company.

St. Joseph Railway, Light & Power Company, St. Joseph, Mo., has ordered from the Westinghouse Electric & Manufacturing Company ten No. 307 split-frame interpole railway motors.

New York & North Shore Traction Company, Roslyn, N. Y., has purchased four quadruple GE-88 motor equipments with air brakes and whistles from the General Electric Company.

Metropolitan Street Railway, Kansas City, Mo., has ordered twenty-five quadruple equipments of No. 306 motors with K-35 control from the Westinghouse Electric & Manufacturing Company.

San Antonio (Tex.) Traction Company has purchased twenty double equipments of No. 92-A interpole railway motors with type K-28 control from the Westinghouse Electric & Manufacturing Company.

Erie & Suburban Railway, Erie, Pa., has ordered forty Brill 39-E trucks from the G. C. Kuhlman Car Company. The company has also ordered twenty GE-80 two-motor equipments from the General Electric Company.

Seattle-Everett Traction Company, Bellingham, Wash., has ordered a quadruple equipment of No. 304 railway motors with HL non-automatic unit-switch control from the Westinghouse Electric & Manufacturing Company.

Syracuse (N. Y.) Rapid Transit Railway has ordered twelve 31-ft. 11-in. semi-convertible pay-as-you-enter cars and twelve Brill 27-F-1 trucks without wheels from the G. C. Kuhlman Car Company. They will be equipped with GE-216 motors.

Toledo & Indiana Traction Company, Toledo, Ohio, has ordered from the Westinghouse Electric & Manufacturing Company one Baldwin-Westinghouse 8-4E locomotive equipped with four No. 304-A interpole railway motors and type L-4 control.

Pittsburgh (Pa.) Railways has ordered fifty-three quadruple equipments of No. 306-CD box-frame railway motors with type K-43-B control, also an additional 160 motors of the same type, from the Westinghouse Electric & Manufacturing Company.

Tri-State Railway & Electric Company, East Liverpool, Ohio, noted in the ELECTRIC RAILWAY JOURNAL of May 20, 1911, as being in the market for several cars, has ordered through J. G. White & Company, New York, N. Y., four open single-truck cars from the Cincinnati Car Company.

Great Falls & Old Dominion Railroad, Washington, D. C., has purchased three quadruple equipments of No. 93-A2 railway motors with HL non-automatic unit-switch control arranged for both ground and metallic return with special change-over switches from the Westinghouse Electric & Manufacturing Company.

Arkansas Valley Railway, Wichita, Kan., reported in the ELECTRIC RAILWAY JOURNAL of April 8, 1911, as having ordered five combination interurban motor cars of the steam-coach type from the St. Louis Car Company, has specified the following details for this equipment:

Seating capacity.....	53	Couplers	MCB radial
Weight (car body).....	30,000 lb.	Curtain fixtures....	C. S. Co.
Bolster centers, length..	27 ft.	Curtain material....	Pantasote
Length of body.....	36 ft. 7 in.	Gongs	12-in. pedal
Over vestibule.....	45 ft. 3 in.	Hand brakes	Peacock
Width over sills.....	9 ft. 3/4 in.	Heaters	Cooper
Over all	9 ft. 2 in.	Journal boxes	MCB
Height, rail to sills....	41 ft. 3/8 in.	Motors	4-West. 307
Sill to trolley base....	10 ft. 3 in.	Motors	inside hung
Body	wood	Sanders	St. L.
Interior trim..mahog. & oak		Sash fixtures....	Edwards
Roof	monitor	Seats	St. L. stationary
Air brakes	West.	Trolley	Knutson
Axles....4 1/4-in. journal steel		Trucks	St. L.
Cables	West.	Varnish	Murphy
Car trimmings	bronze	Wheels	rolled steel 34-in.
Control...single end, type K			

TRADE NOTES

Gold Car Heating & Lighting Company, New York, N. Y., has elected Ambrose L. O'Shea a director to succeed W. W. Butler.

McKeen Motor Car Company, Omaha, Neb., recently shipped a third 70-ft. gasoline motor car to the Ann Arbor Railroad.

Penn Steel Castings & Machine Company, Chester, Pa., has elected Walter S. Bickley president of the company to succeed the late Mortimer H. Bickley.

General Vehicle Company, Long Island City, N. Y., has purchased a block of fifty lots on Borden Avenue, Long Island City, on which it is rumored the company will erect a branch plant.

H. A. Hunt has been appointed Eastern sales agent of the Edgar Allen American Manganese Steel Company, with headquarters at New Castle, Del. This appointment was made to fill a vacancy caused by the resignation of V. W. Mason, Jr.

Lee Machine Company, New Haven, Conn., has been chartered with a capital stock of \$150,000 to manufacture the Lee steam turbine. The incorporators are Henry B. Lee, New London; Winthrop G. Bushnell and Samuel C. Morehouse, New Haven.

Greenlee Brothers Company, Rockford, Ill., has removed its general offices from Chicago to Rockford, Ill., where the factory and accounting departments are located. The Chicago office is in charge of James A. Lounsbury, the vice-president of the company.

Page & Hill Company, Minneapolis, Minn., has appointed William Underwood to take charge of its pole preserving plant at Minnesota Transfer. Mr. Underwood is a graduate of the Forestry School, University of Minnesota and is an expert in wood preservation.

Philadelphia Locomotive Company, Philadelphia, Pa., which is said to be a reorganization of the Baldwin Locomotive Works, has increased its proposed capital from \$40,000,000 to \$50,000,000. Common stock is increased from \$20,000,000 to \$25,000,000, and 7 per cent preferred increased to the same amount.

Lord Manufacturing Company, New York, N. Y., reports the receipt during the last year of some large contracts calling for both American and foreign shipments, and its business has grown in volume to such an extent recently that the company has been compelled to increase the output of its factory by placing orders for new machinery.

J. G. White & Company, Inc., New York, N. Y., gave a dinner at the Hotel Astor during the convention of the

National Electric Light Association in New York in honor of the officials connected with the companies of which J. G. White & Company, Inc., are operating managers, who attended the convention of the association. The dinner was attended by nearly fifty officials of J. G. White & Company, Inc., and of the operating companies, including J. G. White, F. H. Reed, J. H. Pardee, R. B. Marchant, H. S. Collette, W. R. W. Griffin and E. C. Deal.

Pennsylvania Steel Company, Steelton, Pa., has appointed G. S. Vickery superintendent of the frog and switch department of the company. Mr. Vickery has been acting superintendent of that department since Oct. 22, 1910. He has been connected with the Pennsylvania Steel Company in an engineering capacity since 1898, during which time he has been in close touch with the policy which has brought the frog and switch department to its present high efficiency. He is a native of Maine and a graduate of the University of Maine. For four years he was city engineer of Bangor, Maine, and his wide experience in the engineering field makes him well fitted for the position.

Ackley Brake Company, New York, N. Y., announces the formation of a new company to look after the manufacture and sale of Ackley brakes in France and colonies, Spain, Morocco, Tunis, Algiers and Egypt. This new company has been incorporated under the name of Compagnie Française des Freins Ackley, with offices at 62 rue Saint Lazare, Paris. G. S. Albanese, who has been the representative of the Ackley brake interests in the above countries since the introduction of the Ackley brake to the European trade, two years ago, has been made managing director of the new company. Mr. Albanese is an engineer of high standing and of wide acquaintance with tramway officials throughout Europe. This new French company is the third European Ackley company to be established within the past year, the others being the British Ackley Brake Company, of London, and the Deutsche Ackley Bremsen Company, m. b. H., of Berlin. These companies operate under the Ackley patents and control the manufacture and sale of the Ackley brakes in most of the European and North African countries, while the Ackley Brake Company, of New York, controls the manufacturing and sales rights for export to the remaining countries of the world outside of the United States, Canada, Mexico and the Hawaiian Islands. The establishment of the above companies was made imperative by the increasing popularity of the Ackley brakes, so that the demands of the European trade could be more expeditiously supplied.

Electric Service Supplies Company, Philadelphia, Pa., has moved to its new office and factory building at Seventeenth and Cambria Streets, North Philadelphia. The new building takes the place of the old factory at Keokuk, Ia., and the Philadelphia office and warehouse formerly at 1020-24 Filbert Street. There is a siding in the property which connects with the passenger and freight station of the Pennsylvania and Philadelphia & Reading Railroads, which are only five blocks away. The building, which is the first of a group to be erected on the site, is a six-story, monolithic reinforced concrete structure, fireproof in construction and equipped with an automatic sprinkler system. On the first floor are located the receiving and shipping departments and store-room. On the second floor are located the general offices of the company, with the exception of the offices of the factory manager and the shipping department, which are on the fifth and first floors respectively. The remaining four floors are devoted to manufacturing purposes exclusively. On the fifth floor are located the machine shops, factory stock rooms, assembling racks for such specialties as the automotoneer, Garton-Daniels lightning arresters, Keystone portable lamp guards, trailer connectors, trolley pick-ups and others. On this floor space is also set aside for designing and experimental work. The electrical equipment of the building consists of three distinct services, all of which are brought underground to a general meter and distributing board located on the first floor.

ADVERTISING LITERATURE

Electric Storage Battery Company, Philadelphia, Pa., has issued a 16-page catalog on its Exide battery and Hycap-Exide battery for electric vehicles.

Weston Electrical Instrument Company, Newark, N. J.,

has issued a folder in which is illustrated a complete line of Weston a.c. switchboard indicating instruments.

National Surface Guard Company, Chicago, Ill., has issued two booklets which describe and illustrate its stock guards and the National ratchet track wrench respectively.

Conduit Machine Company, New York, N. Y., is distributing to the trade a small pocket set of wiring formulæ tables, together with other valuable data. The company is also mailing two circulars on its C-M fishing and threading machine.

Toch Brothers, New York, N. Y., have issued a booklet which discusses the merits of cement filler and cement floor paint. It also contains specifications for applying this material, and calls attention to another material known as pigment cement filler.

Hill Publishing Company, Ltd., London, Eng., has issued a new catalog of technical and scientific books on mining, railway, chemical, electrical and other subjects. This company also acts as sole English agent for the McGraw-Hill Book Company, New York, N. Y.

Stone & Wester Engineering Corporation, Boston, Mass., is mailing a booklet which contains views showing the rapid progress made on the two reinforced concrete shop buildings which it erected recently for the General Electric Company at Schenectady, N. Y.

Q M S Company, Plainfield, N. J., is mailing a circular on its car wheel grinding machine. In connection with this circular the company is sending a reprinted page from the STREET RAILWAY JOURNAL of Feb. 22, 1908, which describes and illustrates this type of car wheel grinding machine.

Electric Service Supplies Company, Philadelphia, Pa., prints in the May issue of the "Keystone Traveler" an announcement of the merger of the Pay-As-You-Enter Car Corporation and the Pay-Within Car Company into the Prepayment Car Sales Company, also a description of its new factory, office and warehouse building in New Philadelphia.

Western Electric Company, New York, N. Y., has issued Bulletin No. 1080, entitled "Railroad Telephone and Selective Apparatus." It contains fifty-six pages and lists a great variety of apparatus. A 4-page insert is devoted to the Western Electric selector, with photographs of the installations of this apparatus on three of the large trunk line railroads.

Ohmer Fare Register Company, Dayton, Ohio, has issued a leaflet which calls attention to the satisfactory record of Ohmer registers on the cars of the Syracuse (N. Y.) Rapid Transit Railway, and to the paper delivered on the subject by J. E. Duffy, superintendent of that company, at a meeting of the New York State Street Railway Association held in Syracuse on March 22, 1911.

Standard Underground Cable Company, Pittsburgh, Pa., has issued a 32-page booklet in which the merits of Colonial copper-clad wire, bare and insulated forms, are discussed. A set of data tables are printed at the end of the booklet. Another booklet issued by the company describes and illustrates Davis open air terminals for protection of outdoor ends of lead-covered underground cables.

NEW PUBLICATION

Motion Study: A Method for Increasing the Efficiency of the Workman. By Frank B. Gilbreth. New York: The D. Van Nostrand Company. 116 + xxiii pages; illustrated. Price \$2.

This is an exposition of the theory and practice of "efficiency engineering" as applied to bricklaying. After a general discussion the author discusses the variables of the three varying elements concerned in the laying of bricks, namely, the worker, the surroundings and the motion, and then the effect of these variables upon the establishment of an efficiency program. Briefly the principle involves the reductions of the motions made by all employees, but particularly of the highest paid, during their work, with the purpose of increasing their effective output. The book is well illustrated and contains an introductory note by William Kent, editor of *Industrial Engineering*, in which the series of articles composing this book originally appeared.

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CONTENTS.

A Canadian Meeting.....	1045
Making a Closed Car Comfortable for Summer.....	1045
Steel Motor Cars.....	1046
The Pacific Coast Claim Agents.....	1047
The New York Subway Report.....	1047
Southern Pacific Electrification at Oakland, Cal.—Rolling Stock and Repair Shops.....	1048
New Steel Motor Cars of the Long Island Railroad.....	1054
Pennsylvania Commission Report on Philadelphia Rapid Transit Company.....	1063
Proposed Relief for Traffic Congestion in Newark.....	1068
Arnold Report on Providence.....	1069
New York Subway Report Submitted.....	1070
Railings at Boston Elevated Stations.....	1072
New Committees of Central Electric Railway Association.....	1072
Meeting of Executive Committee of Manufacturers' Association.....	1072
Appointment of Insurance Expert by American Electric Railway Association.....	1073
Newspaper Handling on the Detroit United Railway.....	1073
Indicating Steam-Flow Meter.....	1074
One-Side Convertible Cars for Northern Ohio Traction & Light Company.....	1074
Locking Device for Wire Grip.....	1074
Derrick Car for Third Avenue Railroad, New York.....	1075
Electric Railway Legal Decisions.....	1076
News of Electric Railways.....	1079
Financial and Corporate.....	1084
Traffic and Transportation.....	1087
Personal Mention.....	1089
Construction News.....	1090
Manufactures and Supplies.....	1093

A Canadian Meeting

The Canadian Street Railway Association has just held a profitable annual meeting, and the businesslike way in which the sessions were conducted is worthy of commendation. This association has on its membership roll the names of all the larger roads in Canada and nearly all of the smaller roads. Its members are enthusiastic in association work. This is evidenced by the attendance and by the earnest discussion of the well-prepared papers which were presented at the Windsor meeting. Nearly every member company had one or more representatives at the meeting, notwithstanding the fact that the territory of the association is about 4000 miles long. There were delegates from St. John, N. B., and from Victoria, B. C. The Canadian roads for the most part are located in rapidly growing territory and have to strive to keep up with the expansion requirements. The problems confronting the association include that of formulating a standard code of rules, and it has appointed a committee to consider the choice of a set of operating rules for presentation to the governmental authorities. It is to be hoped that these rules may be made to conform to the rules used in the States and approved by the American Electric Railway Association, of which body a great many of the Canadian roads are members.

Making a Closed Car Comfortable for Summer

A constructional feature of many of the semi-convertible cars now in operation which tends to impair their popularity for summer riding is the use of stationary sash for the end panels of the car body and in the vestibule framing. The older types of these cars, such as the accelerator design, have only a single end door, which, when closed, does not permit a good draft in the car. Where the platforms are not vestibuled relief can be obtained merely by opening the doors and keeping them open with a retaining catch of some kind. On fully inclosed platforms, however, the vestibule should be equipped with drop or sliding sash so that they may be open as well as the car doors. It would be much more expensive, of course, to remodel into drop or sliding sash the fixed windows at the end of the car body, but it may be worth while to do this in spite of the cost. On one line that we have in mind it is not unusual to see the semi-convertible cars carrying barely half a dozen persons each, while the convertible and open-bench cars on the same route are crowded. An excellent design for summer use is a convertible cross-seat car with exit and entrance doors which slide into a central bulkhead. This arrangement permits two-thirds of the front to be wide open whenever such a condition is found desirable. On the Lehigh Valley Transit System in Easton, Pa., cars of this design are giving even more satisfaction than the open-bench rolling stock formerly considered indispensable for summer.

STEEL MOTOR CARS

The steel motor cars of the Long Island Railroad and the Southern Pacific Company which are described elsewhere in this issue were built for substantially similar services. Both types of cars are being operated in multiple-unit trains on recently electrified suburban lines of steam railroads. A comparison of the two designs, however, shows that they differ widely in nearly every important structural detail, in seating and platform arrangements and in general dimensions and weight. These differences are indicative of the present state of the art of steel passenger car design. As yet there is no agreement among designers of steel cars as to the general principles of unit stresses, factors of safety, economical distribution of material and other basic points. In the matter of details such as floors, post sections, roof construction and interior finish the almost unlimited possibilities of making light pressed sections in all conceivable shapes invite each designer to incorporate special patterns of his own invention.

The first steel passenger cars were built only six or seven years ago, and perhaps it is too early to expect much progress toward standardization such as has taken place in other branches of car design. The builders of steel passenger cars, as a rule, have not been responsible for the designs from which the cars were built and, therefore, they have not been able to develop standard details and methods of construction. In fact, the manufacturing facilities at different plants of the same builders are quite as varied as the cars which they turn out. Steel passenger cars are emerging from the experimental stage, and some degree of standardization with a resulting decrease in manufacturing cost undoubtedly will take place as the demand for such cars increases and actual service develops the good and bad features of the different types now in use.

In comparing the Long Island and Southern Pacific cars the most noticeable points of difference are the unit weights and the framing details. The Long Island cars were designed for strength rather than light weight, although their weight per foot of length is little greater than that of the first steel cars built for that road in 1905, while the weights per square foot of floor area and per passenger seat are considerably less than in the old cars. As compared with the unit weights of the Southern Pacific motor cars, however, the Long Island cars are much heavier. The Southern Pacific cars are 72 ft. 10½ in. long over buffers and weigh 109,400 lb. The Long Island cars are only 64 ft. 5¾ in. long and weigh 107,100 lb. The weights per foot of length are respectively 1500 lb. and 1660 lb., while the weights per square foot of floor area are 148 lb. and 168 lb. Although the Southern Pacific cars are only 6 in. wider at the eaves than the Long Island cars and have a center aisle of the same width, their seating capacity is increased 25 per cent by the use of three-passenger seats on one side of the aisle. On this account the relative weights per passenger seat show large differences. The mild climate of California permitted the omission of inside lining and dead-air space in the sides of the Southern Pacific cars so that the clear width inside was increased about 8 in. This additional space and the extra width of 6 in. at the eaves provided the necessary 14 in. for the additional seats on one side of the aisle. The weight per seat in the case of the Southern Pacific motor cars is only 943 lb. as against 1488 lb. for the Long Island cars. Based on the combined weights of a train unit consisting of a motor and

a trailer car, the Southern Pacific cars weigh only 761 lb. per seat. This compares favorably with the weight per seat of the lightest wooden double-truck street cars.

The low weight of the Southern Pacific cars is due principally to the very light construction of the bodies. The heaviest members used in the body framing are the 7-in., 9.75-lb. channel center sills and the cast-steel bolsters. Most of the floor load between bolsters is carried by the plate girder sides below the windows. Without going into an analysis of stresses in these side girders it would appear from an inspection of details of construction that the sides of the Long Island cars are heavier and stronger than the sides of the Southern Pacific cars, while the distance between points of support on the cantilevers is only 26 ft. 6 in. as compared with a distance between bolster centers of the Southern Pacific cars of 45 ft. The center sill in the Long Island cars is a box girder composed of two 9-in., 15-lb. channels with top and bottom cover plates, and of itself is a much stronger backbone for the underframe than the two light channels used in the Southern Pacific cars. Furthermore, the equal distribution of load on the center sill of the Long Island cars by the use of cantilever cross members insures a minimum vertical deflection.

In high-speed multiple-unit cars stiffness is as essential as strength in the underframing on account of the heavy weight of the control and brake apparatus suspended under the car between the bolsters. If the car body framing is not stiff enough to prevent vertical oscillations at the center the impact of the suspended mass, weighing from 7000 lb. to 10,000 lb., in falling through even a short distance will produce severe stresses which in turn must certainly rack the car body. Experience alone can determine the effect of this vibration and resultant impact on the riveting and on the structure of the metal itself. The effect will be more severe in long cars with great amplitude of vibration than in short cars.

The Long Island cars with inclosed platforms and monitor deck roofs resemble an ordinary steam railroad coach in exterior appearance, while the Southern Pacific cars are of distinctive design with arched roofs, open platforms and wire mesh gates over the steps. The wide steps divided by a partition rail which are a feature of the Southern Pacific car platforms tend greatly to accelerate the entrance and exit of passengers. Without a partition railing it is almost impossible to load and unload passengers simultaneously, and although the saving in time at each station stop is small the aggregate saving per trip in local suburban service where the stops are close together may amount to several minutes on a run of 15 miles or more. If the time thus saved at stations were utilized in coasting, the reduction in power consumption would amount to a considerable sum in the course of a year.

The simplicity of construction and the light weight of an arch roof as compared with a monitor deck roof are well illustrated in these two types of cars. The roof framing of the Southern Pacific cars consists of one-piece carlines pressed from 1/16-in. steel plate. A much more complicated construction, including malleable iron deck posts, is used in the Long Island cars. The deck sashes in the Long Island cars are glazed with green pebbled glass which does not admit any useful light to the interior, and they are pivoted horizontally so that they do not act efficiently as ventilators. The monitor deck seems to have been retained largely out of respect to past standards of wooden car construction.

THE PACIFIC COAST CLAIM AGENTS

The account of the third annual convention of the Pacific Claim Agents' Association which was published in our issue of last week presents ample internal evidence that the members of this organization are imbued with the most progressive ideas despite their enforced isolation from the great majority of their fellow-workers. The large number of railway accident swindlers in the Far West makes intimate co-operation between the claim agents in neighboring territories an absolute necessity. Furthermore, it is much more inconvenient for a claim agent to spend several days in traveling to and from a national convention than it would be for an engineer, transportation man or even an executive. The latter can usually postpone immediate consideration of the problems for which they are held responsible if need be, but the claim agent, like the physician, is subject to the call of duty at any moment. Confronted by these conditions it was but natural that the steam and electric railway claim agents on the Pacific coast should join hands in a local organization although they also appreciate highly the work of their respective national bodies, to which many of them belong. At present about 75 per cent of all the steam and electric railways on the Pacific slope are members of the local association. It is possible that its scope will be widened to include a central bureau of information about the accident fakery who operate in the Pacific Coast States.

Of the papers which were read at the May convention, the most important were those describing the efforts of the Tacoma, Seattle and Spokane companies to acquaint the public with the principles of accident prevention. Every live claim agent knows that much good can be accomplished by tactful suggestions to the rank and file as well as to the officers of the operating and maintenance departments. Most adjusters, however, are too diffident to go before the people, either in person or in writing, to explain how many accidents are due to the negligence of the passenger and to tell how their repetition can be avoided. Such a perfunctory sign as "Don't get off until the car stops" suffers the contempt bred by familiarity and hardly can be offered as educational literature. The most effective appeal to the public has been made by means of classroom talks to school children. In Seattle alone the negligence accidents in which children were involved decreased from thirteen to four per month after the campaign of instruction was well under way. This method of going to the children has two important advantages—it reaches those most impressionable to new ideas, and it reacts favorably on the parents, who cannot help approving this work even if they do feel that they, as adults, are able to take care of themselves in platform and running-board gymnastics. More recently the Portland (Ore.) Railway, Light & Power Company, one of the pioneers in this movement, has sent out letters on this subject to the school authorities in many large cities giving an account of its own methods and experiences.

In Tacoma the education of the public began with the owners and drivers of vehicles. There, too, tangible results are shown by a 50 per cent decrease in collisions after one year's agitation. At first thought it would seem almost impossible to place such traditional enemies as drivers and motormen on a friendly footing. Nevertheless, this end was successfully attained. The vehicle owners were persuaded that it was to their interest to order their men to keep clear of

the tracks under specified conditions, while the motormen were instructed to help teamsters whenever possible, especially in pushing their trucks along ice or sleet-covered tracks. The Seattle company has succeeded in interesting its patrons in still another phase of accident prevention by offering prizes to every fiftieth and one hundredth woman who was seen to alight from a car face front at certain important intersections. In this case the humorous aspect of a serious question resulted in observation and discussion on the part of many people who otherwise would have paid little or no attention to this matter.

THE NEW YORK SUBWAY REPORT

The long-expected report of the committee of the Board of Estimate and of the Public Service Commission, First District, on proposed subway lines was made public on the afternoon of June 13. As indicated in the semi-official announcements printed in this paper last week, it provides for two extensive systems, one to be operated by the Interborough Rapid Transit Company and the other by the Brooklyn Rapid Transit Company, both to serve Manhattan Borough from the Battery to Fifty-ninth Street, and with three new East River tunnels. An outline of the general features of the proposed system is published elsewhere in this issue. The total outlay of the extensions, as at present proposed, amounts to over \$257,000,000. This makes the proposed work of construction commensurable in magnitude with the Panama Canal, whose estimated cost for construction and engineering is \$298,000,000; the rest of the estimated cost of the Panama Canal of \$375,000,000 represents the cost of administration and sanitation, the purchase of the rights of the old French company and other expenses not connected with the actual construction and engineering. The system now proposed in New York embodies the two principles which were stated in these columns last week to be most important in this undertaking, namely, to provide rapid transit facilities on a sufficiently large scale and to provide easy access for a single fare from all parts of the city to the main business districts of Manhattan and Brooklyn. In the selection of routes the committee has shown excellent judgment.

Of equal importance in the proposed plan with the routes to be constructed are, of course, the terms under which the companies will be allowed to make these extensions and the future transit policy of the city. Under the proposal important franchises are offered to both companies under a contract which provides for the division with the city of the cost and profits of the new lines and under which the interest on the city bonds issued to defray the cost of construction is to be taken out of the net profits only after the payment of the actual annual charges of the operator for carrying the cost of equipment and such portion of the cost of construction as is not met from the funds of the city. On the other hand, the companies are required to give up important rights now owned and to agree to somewhat rigorous provisions for the sale of portions of their properties to the city. We are glad to see that the city representatives have met the transportation situation in a broad and comprehensive way, even to the extent of recommending third tracks on the Manhattan elevated lines, and we only hope that their treatment of the financial phases of the proposal will be found upon careful analysis to be upon an equally broad basis so that the plan, as outlined, will prove to be financially possible to the companies.

SOUTHERN PACIFIC ELECTRIFICATION AT OAKLAND, CAL.—ROLLING STOCK AND REPAIR SHOPS

The work of equipping the Oakland, Alameda and Berkeley suburban lines of the Southern Pacific Company for electric operation with direct current at 1200 volts is nearing completion, and on June 1 the Alameda line was opened. The Fruitvale power station of the company which will supply electricity for the operation of these suburban lines was described in the *ELECTRIC RAILWAY JOURNAL* of Feb. 4, 1911. This article will describe the new steel cars which have been built for this service, and also the repair shops which are located at West Alameda.

CARS

The initial rolling stock equipment for the Alameda line consists of ten combination coach and baggage motor cars, twenty motor coaches and thirty trailer coaches, all built at the St. Charles (Mo.) plant of the American Car & Foundry Company. All three types of cars are of the same general design and dimensions. The combination cars have the vestibule omitted at one end and 15 ft. of the body has been utilized for a



Southern Pacific Electrification—End View of Steel Motor Car, Showing Roller Pantograph

motorman's and baggage compartment with sliding doors in each side. Each motor car has sufficient motor capacity to handle a trailer car, and the trains will be made up of from three to six cars, in general composed of a combination motor car and an equal number of motor and trailer coaches. The combination coach and baggage cars will be used at the head end of trains.

The cars are built entirely of steel and are 72 ft. 10½ in. long over buffers. In order to provide the maximum number of seats to accommodate passengers during the rush hours of the ferry service to and from San Francisco the bodies were designed with a width of 10 ft. 4 in. over side sills. This permits the use of three-passenger cross-seats on one side of the 25¾-in. aisle and two-passenger cross-seats on the other side, thereby increasing the seating capacity 25 per cent. The motor and trailer coaches will seat 116 passengers and the combination cars will seat 88 passengers. No lavatories are provided in the motor and trailer coaches, but the combination cars have a single lavatory fitted with a dry hopper.

UNDERFRAMING

The bodies are of very light weight and the principal members of the framing are of unusually small size considering the length of the cars. The center sills are 7-in., 9.75-lb. channels spaced 15½ in. apart, and the side sills are 7-in. x 3½-in. x 7/16-in. angles. No intermediate longitudinal sills are used. The bolsters are cast steel and the end sills are pressed in channel section out of 3/16-in. plate. Between the bolsters are four body transoms made of 5-in. x ¾-in. plates, one passing over and one under the center sills, and both being securely riveted to the angle side sills. These members serve to transmit the principal weight of the flooring between bolsters to the side frames. The side sills and center sills are further tied together by bridging pieces 5 in. deep pressed to channel section from 3/16-in. plate. These pieces are inserted between the sills at intervals of 3 ft. 7 in., and they carry the light Z-bar longitudinals which support the corrugated steel floor plates. The clear space of 2 in. below the bridging pieces facilitated the installation of piping and conduits. The floor is composed of Keystone corrugated plates, on which a layer of Flexolite composition flooring is applied.



Southern Pacific Electrification—Interior of Steel Car Showing Two and Three-Passenger Cross Seats

SIDES AND ROOF

The sides of the car below the windows form plate girders 3 ft. deep, and they are depended upon to carry most of the load between bolsters. The belt rail under the windows is composed of a ¾-in. x 4-in. flat plate on the outside and a 2-in. x 2-in. x ¼-in. angle on the inside between the posts. The posts were pressed out of 1/16-in. steel plates and were subjected to the sherardizing process before being put in place in order to prevent corrosion. An angle 4 in. x 3½ in. x 5/16 in. rests on top of the posts and forms the side plate. On the outside of this angle is riveted a ½-in. x 12½-in. letter-board plate, which is lapped 2 in. by the bottom edges of the roof sheets.

The roof is arched on a flat curve and is supported by carlines pressed from 1/16-in. steel plates which rest on side plate angles directly over the side posts. The roof sheets also are 1/16-in. steel plates.

PLATFORMS

The motor and trailer coaches have platforms at each end 6 ft. 3 in. long. All the members of the platform underfram-

ing are 7-in. channels. The four sills are extended back to the bolsters, where they are securely riveted. The step openings on each side are 4 ft. 4 in. wide and are divided in the center by a pipe partition rail. Both the platform floor and the step treads are covered with carborundum safety tread.

The vestibules are arranged so that a completely inclosed motorman's compartment may be formed by opening three doors and lowering a trap door over one-half of the step opening. The door which forms the outside of the cab is hinged to the vestibule corner post and the door which forms the rear of the cab is hinged to it. The door which forms the inside of the cab is made in three sections hinged together. When not in use the three doors and the trapdoor which forms the floor fold up against the end of the vestibule flush with the step pocket and inclose the controller and brake valve. Each motorman's cab is provided with an adjustable folding seat the details of which are shown in an accompanying drawing.

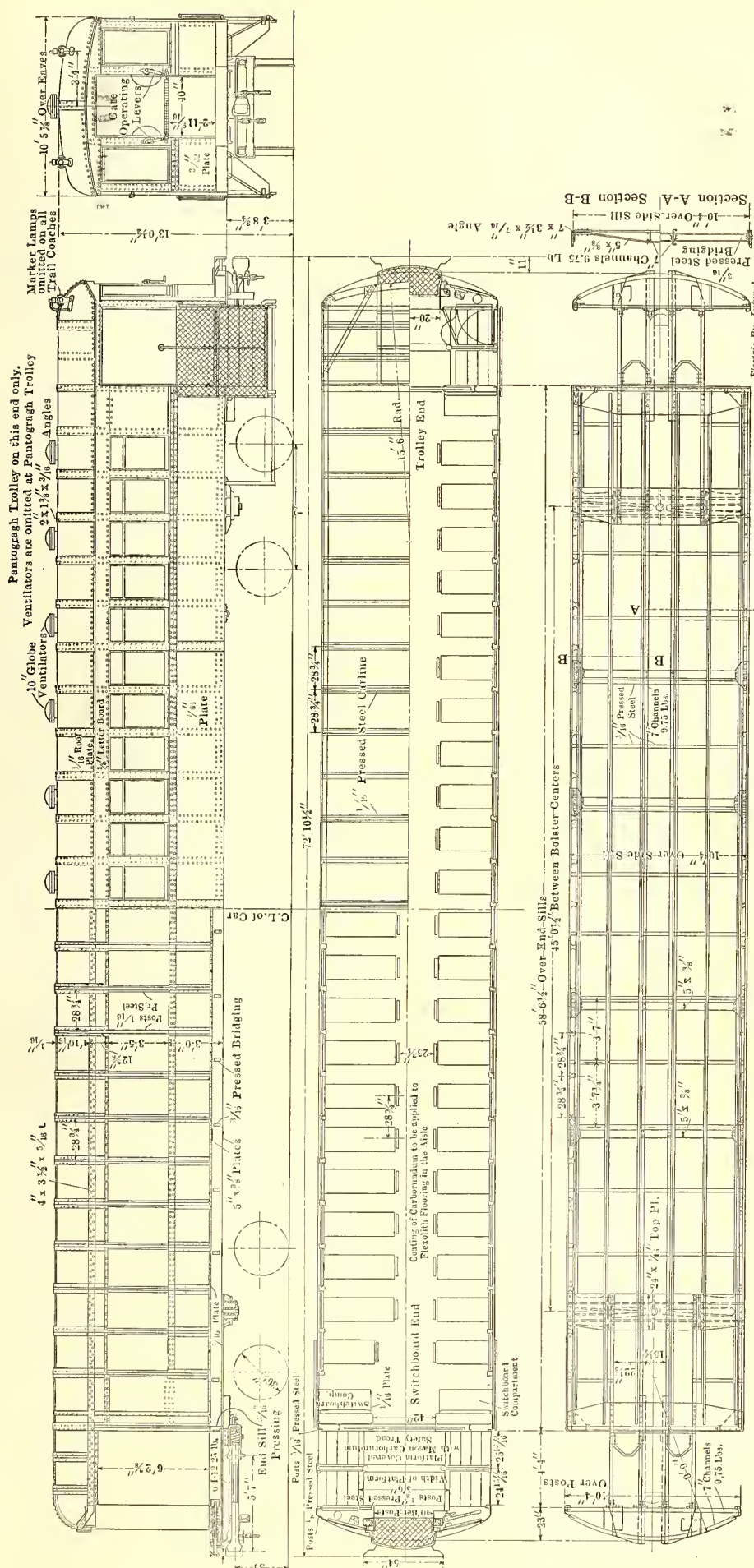
The step openings are closed by sliding wire-mesh gates which are hand-operated by levers mounted on the outside of the vestibule end door posts. The movement of the operating levers is transmitted through a set of bevel gears to a vertical staff and crank which are connected to the back edge of the gate just under the side sill by means of a tie rod and suitable floating lever. A movement of the operating levers, which have a radius of only 11 in., through an arc of 180 deg. causes the gate to move the entire width of the double step pocket. The gate-operating mechanism was furnished by the Pitt Car Gate Company.

The cars are equipped with Janney M. C. B. couplers and three-stem buffers which form a continuous platform between cars. Two safety coil springs extending between the cars and fastened to the vestibule posts on each side of the doorways serve as hand rails for passengers passing between cars. On the end cars these springs are used to close the end door openings by hooking them across the openings.

SPECIAL EQUIPMENT

The motor cars have ten 10-in. Globe ventilators inserted in the crown of the roof, and trail cars have twelve ventilators of the same size and type. Ohmer fare registers are mounted on all cars, and a continuous rod with a total of six indicators runs from end to end of each car. All the steel doors and window sashes were furnished by Forsyth Brothers Company. The seats

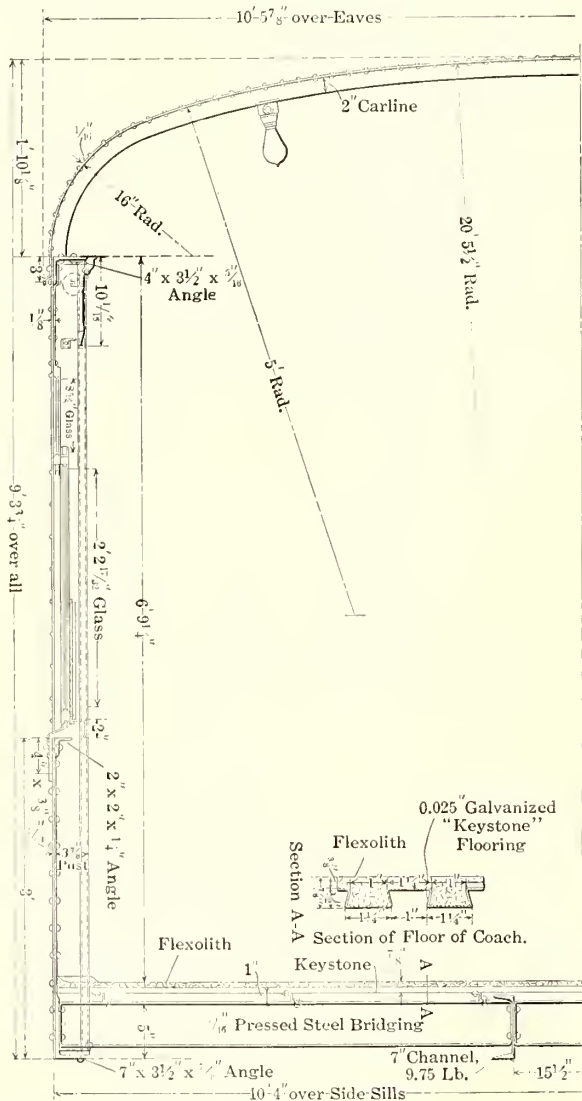
Southern Pacific Electrification—Elevations, Plan and Details of Underframing of Steel Motor Car



are Hale & Kilburn Walkover pattern, with rattan backs and bottoms.

PAINTING

The outside of the cars is painted dark olive color, which is common standard for all passenger equipment of the Harriman lines. The interior finish is dark bronze with a light bronze color for the inside of the window sashes. An écru-colored ceiling gives the cars an exceedingly light appearance. The steel work of the cars was thoroughly sandblasted, both inside and out, before any painting was done. The painting was done in accordance with specifications issued by the railroad company, which require substantially the following method:



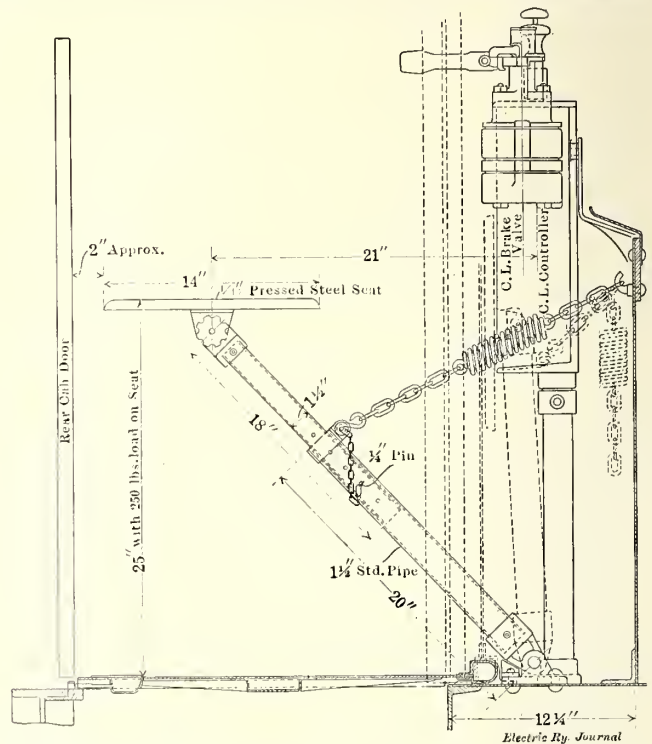
Southern Pacific Electrification—Half Cross-Section of Steel Motor Car

	No. of Hrs. Drying.
First primer.....	72
Second primer.....	48
First surfacer.....	24
Second surfacer.....	24
Putty	24
Third surfacer.....	24
Glazing composition.....	24
Rubbing	—
First coat body color, dark olive.....	12
Second coat body color, dark olive.....	12
Lettering	—
First coat varnish.....	48
Second coat varnish.....	48
Third coat varnish.....	48

The interior side finish was applied the same as for the outside except that two coats of special ground color were applied with one coat of dark bronze color. The headlining was painted the same as the outside except that three écru color coats were applied and then two coats of varnish.

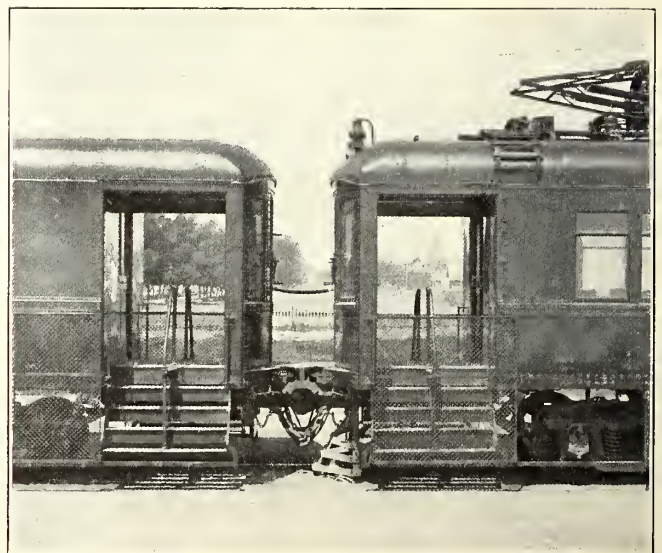
TRUCKS

The trucks under the motor cars are of the two-bar equalizer type, made by the Baldwin Locomotive Works. They have a wheelbase of 7 ft. and a capacity for a center plate load of 40,000 lb. The axles are of Taylor iron 6 1/2 in. in diameter at the center and having journals 5 in. x 9 in. The wheels are 36 1/2 in.



Southern Pacific Electrification—Folding Motorman's Seat

in diameter and are of the steel-tired type with cast-steel spoke centers. One of each pair of wheels has an extended hub to receive the gear, which is shrunk on. The trailer trucks are very similar to the motor trucks, except that they are of somewhat lighter construction, being designed for a center plate load of only 35,000 lb. The journals are 4 1/4 in. x 8 in., and the wheels

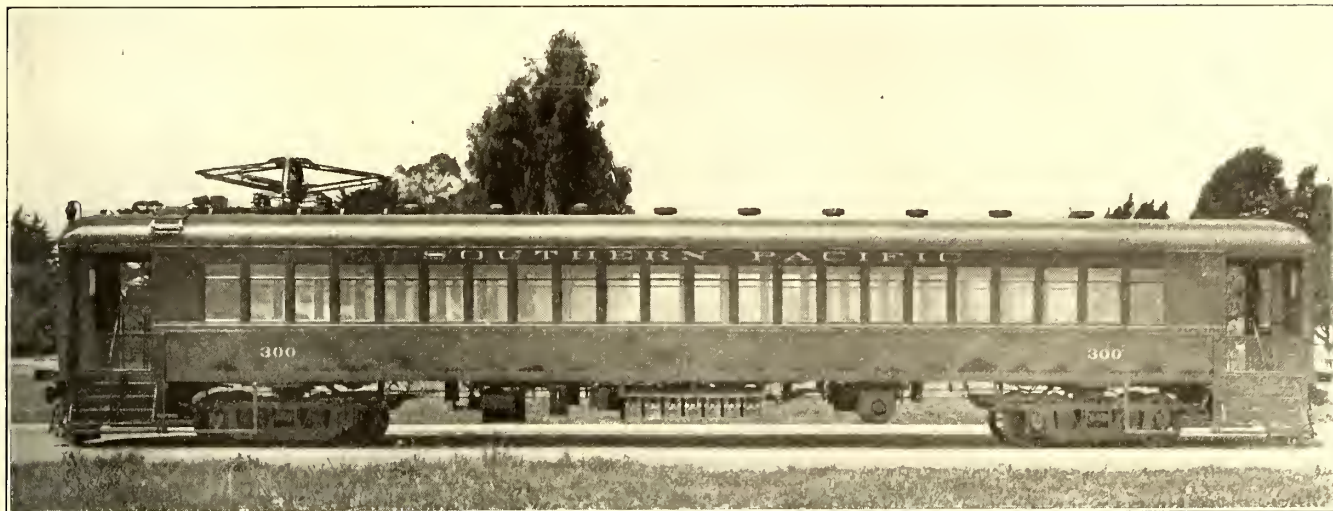


Southern Pacific Electrification—Platform Gates and Couplings

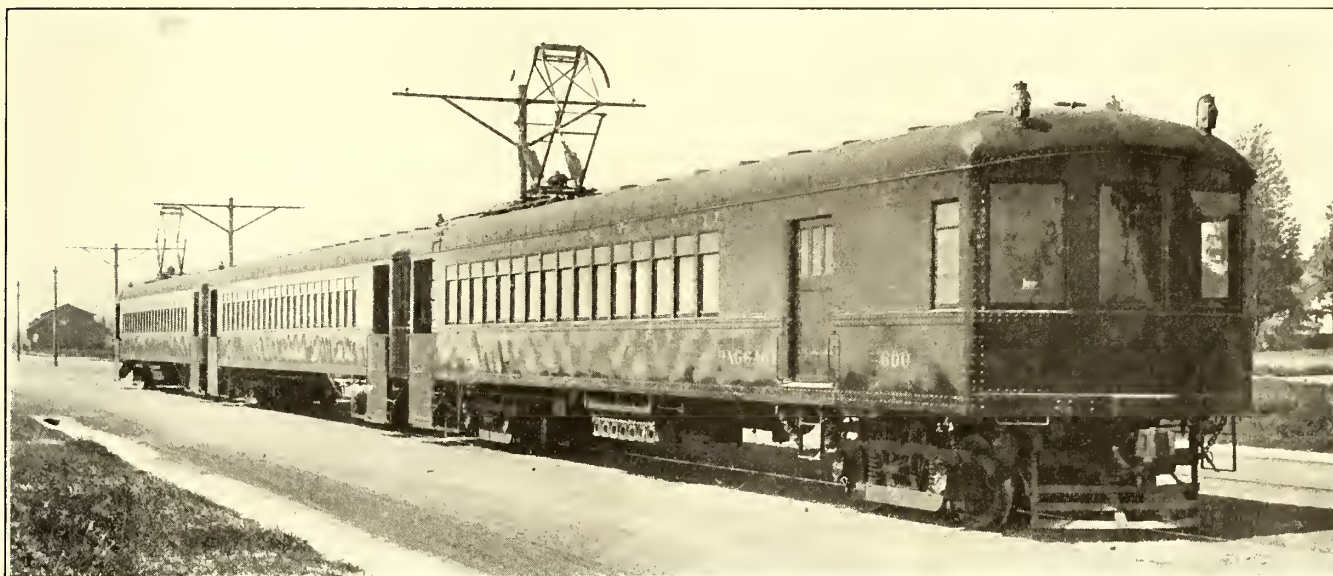
are rolled steel 33 in. in diameter. The motor trucks weigh 15,000 lb. without motors and the trailer trucks weigh 10,000 lb.

WEIGHT

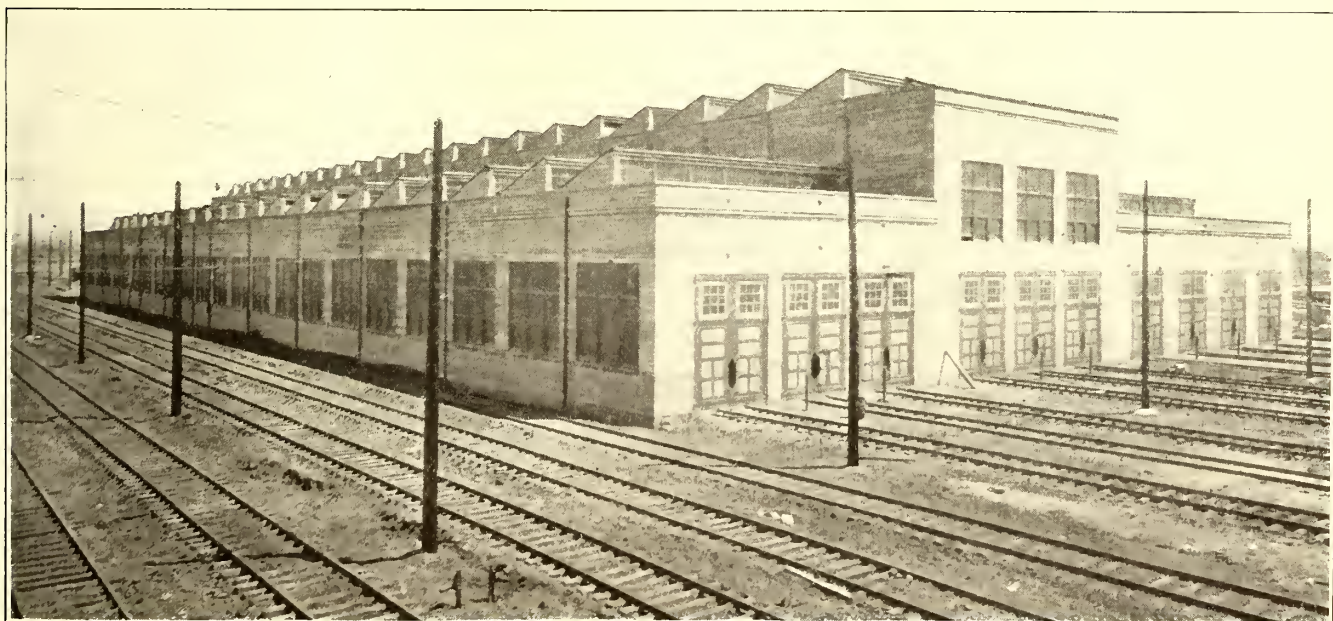
The motor coaches when completely equipped and ready for service weigh 109,400 lb. and the trailer coaches weigh 67,200 lb. The weight per passenger seat, based on the combined seat-



Southern Pacific Electrification—Steel Motor Passenger Car



Southern Pacific Electrification—Three-Car Train



Southern Pacific Electrification—Repair Shops at West Alameda

ing capacity and weights of a motor coach and a trailer coach, is 761 lb. Omitting the weight of the seats, draft gear and spring buffers the car bodies alone weigh only 47 lb. per square foot of floor area, or 486 lb. per linear foot.

BRAKES AND MOTORS

The cars are equipped with Westinghouse pneumatic train signals and schedule A M L automatic air brakes having the features of quick service, quick recharge, graduated release and high pressure in emergency applications. The air brake compressor is operated by a motor wound for 1200 volts. It has a capacity of 35 cu. ft. of free air per minute and is controlled by an automatic governor, which maintains the main reservoir pressure between 85 lb. and 100 lb.

Each of the motor cars is equipped with four GE-207-A motors of 125 hp each. The motors are geared to give a maximum speed of 40 m.p.h., although the schedule speed is only 20 m.p.h. The two motors on each truck are permanently connected in series. The control apparatus is the Sprague-General Electric, Type M. Current at 600 volts for the control and lighting circuits is supplied by a dynamotor mounted on each motor car. A pneumatically operated roller pantograph trolley is used to collect current from the overhead contact wire.

REPAIR SHOPS

The inspection and repair shops for the Oakland, Alameda and Berkeley lines are located in West Alameda at the junction of the Oakland and Alameda lines running to the Alameda Mole. The main building is of steel frame and concrete construction. It is 460 ft. long and is divided into three bays. A saw-toothed roof extends the full length of the building over each bay.

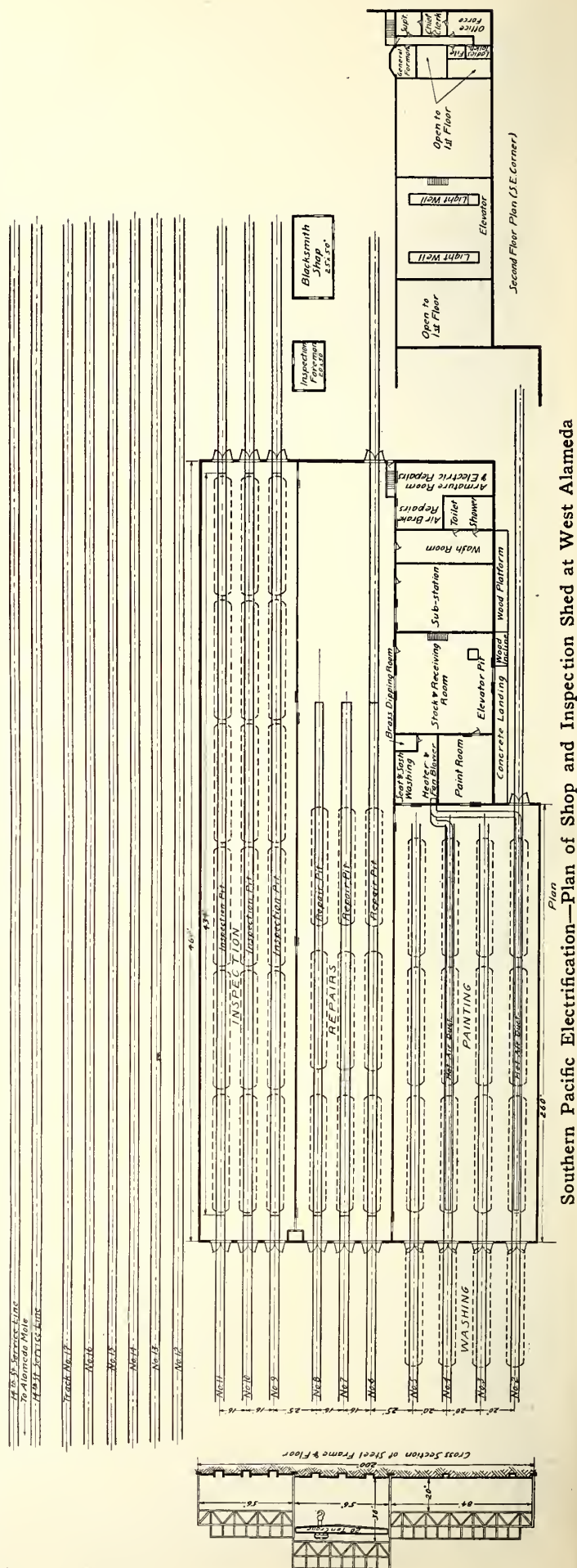
The north bay or inspection shed has three through-running tracks with pits 38 in. deep under their entire length. The pit tracks are laid on 10-in. x 12-in. longitudinal timbers which raise the top of the rails about 14 in. above the main floor. Each pit is equipped with a compressed air line for blowing out apparatus, a 600-volt d.c. testing line, and the 220-volt a.c. lighting circuit for the pit lighting. All pit lights, plug receptacles and compressed air taps are recessed in the pit walls so that they are less liable to damage and offer no obstructions in the pits. Each track will accommodate a six-car train. A total of eighteen cars may be placed in the house at one time for inspection.

The overhead trolley is run through the inspection shed. The section of trolley wire over each track is controlled by a manually operated switch which energizes the wire while the switch is held closed. When the switch is released it returns to the "off" position and cuts off the current and grounds the trolley wire which it feeds. This arrangement affords a protection to shopmen working on the collectors on the car roofs while cars are in for inspection, as the trolley wires are always grounded except when it is desired to move a train out of the house after inspection is completed.

In addition to the pit lamps the inspection shed has two rows of four four-light incandescent clusters suspended from the roof girders about 20 ft. apart. There is also a row of two-light clusters on each side wall.

The middle bay constitutes the repair shop and machine shop; the repair shop occupies the west end, while the machine shop is located in the east end. There are three tracks in this shop. Two stub tracks lead in from the west end and one track runs through the shop. These tracks have repair pits 24 in. deep occupying one-half of the length of the shop, so that nine cars may be handled at one time for general repairs. The east end of this bay is used as a machine shop. A wheel lathe, boring mill and wheel press are located at the extreme end with four short tracks for wheel storage just outside the building. These machines are provided with individual motor drive.

A 20-ton traveling crane runs the entire length of the building in this bay and is used for lifting cars, trucks and motors, also for handling wheels and axles and heavy work around the machines. The crane runway is of sufficient height to permit trucks to be lifted and moved over the tops of the car bodies.



The lighting in this shop is the same as in the inspection shed except that the ceiling clusters have ten lights instead of four on account of the increased height required by the crane.

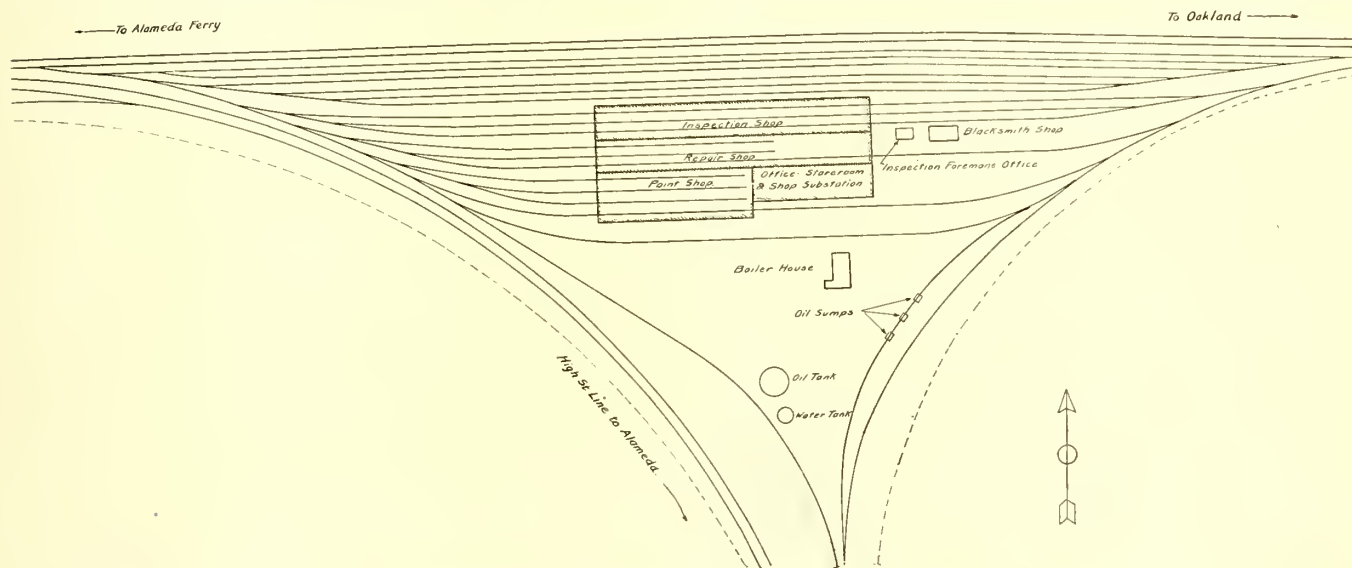
The paint shop occupies the west end of the south bay, the other end being utilized for a storeroom, lavatory, substation, etc.

There are four tracks in the paint shop, one of which runs through the east wall and parallels the storehouse loading platform. The paint shop will hold twelve cars. Portable scaffolds set in the floor may be located at any point alongside the cars and at any desired height required for painting. The paint shop is heated with hot air forced through ducts

In addition to the main shop building there are three small concrete buildings, the boiler house, blacksmith shop and motorman's headquarters. The boiler house is located just south of the main building and contains one 100-hp marine boiler, a 500-gal. capacity fire pump and a 250-cu.-ft. air compressor for supplying compressed air to the shops. The blacksmith's shop, located just east of the main shop, is equipped with a 1000-lb. steam hammer, punch and shears and two forges. Adjacent to it is a two-story concrete building containing headquarters for motormen and also the inspection foreman's office.

ENGINEERING

All of the work described in this article was carried out under



Southern Pacific Electrification—Storage Yard and Shops at West Alameda

underneath the floor by a fan blower. Leading off from the paint shop are the paint stock and mixing room and the seat washing and brass dipping rooms.

The storehouse is located in the center of the south bay. It is served by a track running parallel to the building on the outside, from which freight may be unloaded on a receiving platform. A mezzanine floor and elevator add considerably to the storage capacity of the stockroom. Part of the storeroom is utilized for oil storage. Seven large tanks fitted with Bowser self-measuring pumps have been installed.

SUBSTATION

Next to the storeroom is a substation, to which current is delivered from the Fruitvale power station at 13,200 volts. This substation is primarily used to supply alternating current and direct current at different voltages required by shop tools and equipment. The equipment includes:

Three 100-kva transformers, which transform the incoming line voltages of 13,200 volts to 220 volts, for shop-lighting system and a.c. motor-driven shop tools.

Two 50-kw motor-generator sets, which furnish 220 volts for the d.c. motor-driven shop tools.

One 26-kw 1200-600-volt dynamotor for supplying the 600-volt d.c. line in the pits for testing out car control apparatus.

One 50-kw frequency changer, which transforms 25 cycles at 220 volts to 60 cycles at 2300 volts, to furnish current for lighting station buildings, yards, etc.

Two 25-kva, 13,200-2300 volt transformers for supplying current for the interlocking and block signal system.

The equipment also includes a concrete bus structure and an eleven-panel switchboard containing the necessary instruments and switches for the control of the above apparatus.

Next to the substation is the washroom and locker room for the shop force, which is very complete in its equipment, including several shower and tub baths. The armature room, electric repair shop and the air brake repair shop are located in the extreme east end of the south bay. The offices are in a second story of the south bay, directly over the armature room.

the general direction of E. E. Calvin, vice-president and general manager, Southern Pacific Company. The cars and shops were designed and built under the supervision of A. H. Babcock, electrical engineer, Harriman Lines, who delegated to H. W. Clapp the immediate responsibility for the details. Mr. Clapp was assisted by P. B. Pendill on the cars and shops.

The annual report of the chairman of the County Council of London, England, states that 30 miles of electric tramway were opened in 1910. On Dec. 31, 1910, there were 136 route miles, of which 119 miles are electric. Through running arrangements have been completed between the Council's tramways and a number of tramways on the outskirts of London. During the year conciliation boards were adopted to deal with the differences between the tramway staff and the committee in regard to rates of wages and general conditions of labor. No case in which a decision is rendered by a conciliation board can be reopened for twelve months, and the plan of conciliation is to be in force until six months after notice has been given by one side to the other of a desire to terminate it, but no such notice is to be given before Oct. 31, 1912. The average daily number of cars in operation is 953 electric cars and 120 horse cars. During the year 451,439,216 passengers were carried; 210,000,000 of these passengers paid penny fares. The number of car miles run was 43,160,186. The total capital expenditures on the undertaking up to March 31, 1910, were £10,709,504. The total receipts were more than £2,023,000, and the operating expenses were £1,234,000, so that there was a balance of about £789,000. After allowing for debt and other charges, the surplus carried to appropriation account was £192,109, of which £123,231 was carried to the renewals fund and £59,978 to the general reserve fund.

The St. Louis, Springfield & Peoria Railway of the Illinois Traction System has been advised by the secretary of the American Railway Association that its application for associate membership has been approved.

NEW STEEL MOTOR CARS OF THE LONG ISLAND RAILROAD

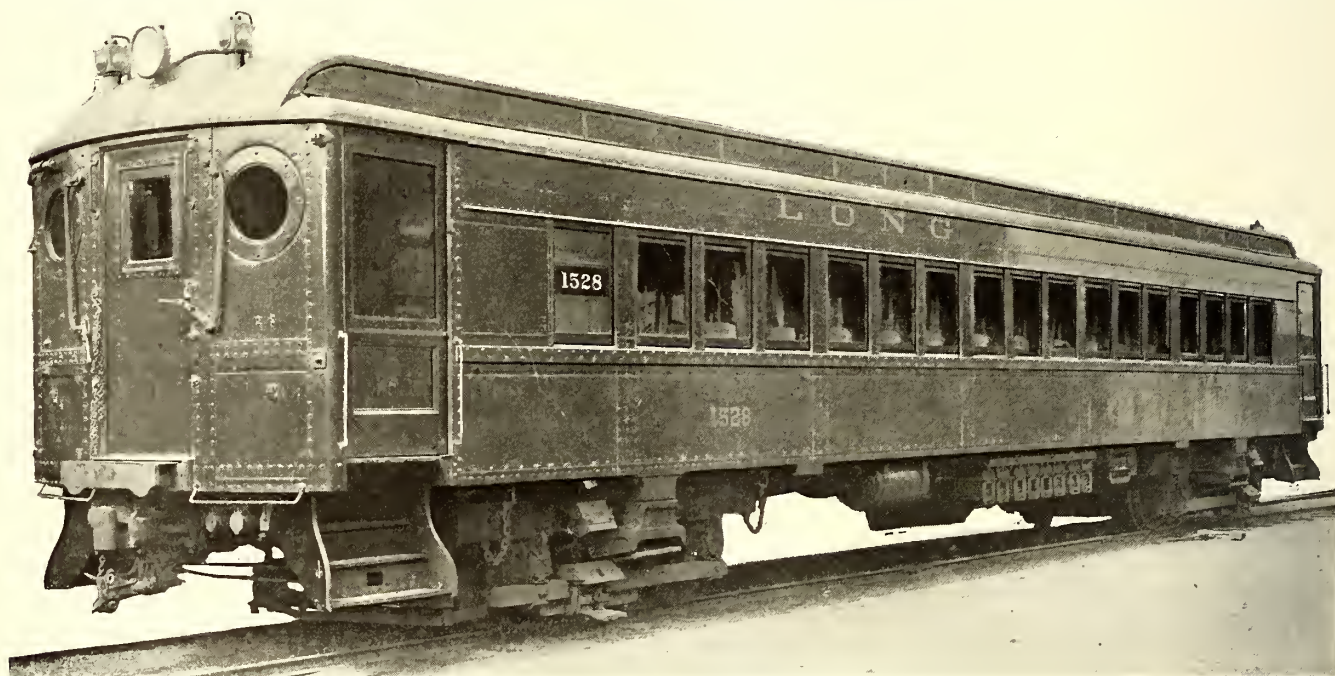
The first steel motor cars put in service on the electric division of the Long Island Railroad between Flatbush Avenue and Jamaica were built in 1905. They were designed by George Gibbs, chief engineer of electric traction, Long Island Railroad, who also designed the first steel cars for the New York subway, which were built about the same time. As the two services were very similar, the structural features of Long Island cars differed from the subway cars in only a few details of platform construction and other minor parts. The 134 cars of this type which were built during 1905 and 1906 were sufficient to handle the suburban service operated from the Flatbush Avenue terminal in Brooklyn, but in anticipation of the opening of the Pennsylvania Terminal and the operation of electric trains between New York, Jamaica and points beyond, orders were placed with the American Car & Foundry Company during 1909 and 1910 for 200 new steel passenger motor cars, 15 steel combination passenger and baggage motor cars and 7 steel baggage motor cars. The first of the new passenger cars were received from the builders early in 1910 and most of the 150 cars included in the original order were wired, equipped and

operated in the same trains with the 41-ft. motor cars or the wooden trailers now in use.

The 41-ft. cars have four cross seats in the center on each side and longitudinal seats at each end with a total seating capacity for 52 passengers. They have no toilet facilities, as the runs in which they are used are of comparatively short length. In the 54-ft. cars reversible cross seats were used. There are 32 double seats and 4 single corner seats, giving a total seating capacity for 72 people. A toilet room containing a dry hopper is built in one end of most of the passenger and combination cars.

UNDERFRAMING

The distinguishing feature of the underframing of the 54-ft. cars is the use of a heavy box girder center sill to which the load carried by the sides is transmitted by two cantilevers which take the place of body bolsters. These cantilevers are box girders with continuous top and bottom plates which pass over and under the center sill. They are spaced 13 ft. 3 in. from the center of the car and the overhang beyond them to the end sills is 13 ft. 10 $\frac{7}{8}$ in. The vertical load on the center sill, therefore, is very evenly distributed, as are also the loads carried by the sides. The box girder center sill is built up of two 9-in. 15-lb. channels spaced 16 $\frac{3}{4}$ in. apart, a top plate $\frac{1}{4}$ in.



Long Island Steel Car—Side View

placed in service by the end of the year. Fifty additional motor passenger cars are now being built. The baggage and combination cars also have been received and placed in service.

The new steel cars differ from the older cars in many important details of design and equipment. In the following description frequent references to differences between the old and new cars will be found. For a complete description of the old cars the reader is referred to the issues of the STREET RAILWAY JOURNAL for Aug. 11 and 18, 1906. As the old cars are 41 ft. long over body corner posts and the new cars are 54 ft. 6 $\frac{3}{4}$ in. long, they will be referred to respectively as the 41-ft. cars and the 54-ft. cars in making comparisons.

The 54-ft. cars are the new Pennsylvania Railroad standard design for suburban passenger service with some slight modifications in the vestibules and other details to permit the installation of the necessary electrical equipment. They are 9 ft. 11 $\frac{1}{2}$ in. wide over eaves and 13 ft. high from rails to top of roof as compared with a width of 8 ft. 8 in. and a height of 12 ft. $\frac{3}{4}$ in. for the 41-ft. cars, but they can be operated over all of the electrified tracks of the Long Island Railroad without encroaching on the clearance limits. Owing to differences in the couplers and platform height the 54-ft. cars cannot be

x 26 in. and a bottom plate $\frac{3}{8}$ in. x 24 in. Between the cantilevers and the end sills the center sill is reinforced by an additional bottom plate $\frac{3}{8}$ in. x 24 in., so as to stiffen it at the points of support on the center plates. The cantilevers are built up of $\frac{3}{8}$ -in. x 15-in. top and bottom plates, between which are riveted two webs pressed out of $\frac{1}{4}$ -in. plate. Cross ties formed of 5-in. channels connect the bottom of the side framing with the center sill at a number of points. These serve as supports for the apparatus hung under the car body and prevent the sides from bulging. The center sill extends out to the platform end sills and the draft gear is supported in a cast-steel housing which is riveted on the under side. The body center plates are truncated cones of cast steel 13 $\frac{3}{4}$ in. deep riveted on the under side of the center sill and the side bearings are also steel castings which are riveted to the bottom angles of the car sides. They bear on the truck side bearings which are supported on the ends of the truck bolsters projecting beyond the truck side frames. The body end sills are made of cast steel in two pieces and they perform the same structural functions as the channel cross ties.

SIDE FRAMING

The sides are formed of a 5-in. x 3 $\frac{1}{2}$ -in. x 5/16-in. bottom

flange angle and plates 3 ft. wide by 0.11 in. thick. These plates come together on the outside of the main posts, which are spaced 8 ft. 6 in. apart and the butt joints are concealed by cover plates 8 in. wide which are carried up to the eaves on the faces of the posts. Just under the windows is a continuous belt rail formed of a $\frac{1}{2}$ -in. x 4-in. plate having the top edge slightly beveled. The window sills are formed of a bent plate lapping over the side sheets under the belt rail and turned down on the inside over the top edge of the inside lining. The six main window posts on each side are pressed from steel plates 0.11 in. thick in the shape of the letter U with the flange formed on the inside face. A panel plate 0.06 in. thick is riveted on these flanges, and the rows of rivets are concealed by the overlapping edges of the pressed plates which form the sash guides. These guides are supported by malleable iron filler castings, attached to the sides of the post. The main posts are continuous up to the deck sill, but they do not have exactly the same contour as the lower deck roof, being bent in toward the center of the car on a radius of 13 in. A $6\frac{1}{2}$ -in. plate forms the outside window lintel and its lower edge is crimped to form a water table so as to prevent water from running down on the windows. Above this is a 12-in. letter-board plate, the top edge of which is lapped by the lower deck roof sheets. The intermediate window posts rest on the belt rail and are continued up to the deck sill. Like the main posts they are pressed in the shape of the letter U, but they are of smaller size with the projecting flanges on the outside and are covered by a plate $5\frac{3}{8}$ in. wide. The thin plate which surrounds the post on the inside and forms the sash stops is pressed with raised corners to give the appearance of a narrow panel, conforming to the panels on the main posts.

Below the windows the thin steel plates forming the inside lining are supported at the top and bottom by continuous angles riveted to the flanges of the main posts. A dead-air space of

The inside frieze above the windows is made up of two thin plates pressed to form suitable ornamental moldings at the top and bottom. Above the frieze is the lower deck headlining which is curved to the contour of the underside of the main and intermediate posts. The headlining is formed of



Long Island Steel Car—Interior View

sheets of composite board which are confined at the bottom by the frieze molding and at the top by the deck sill molding.

FLOOR

The floor is composed of square corrugated steel sheets on top of which is a layer of "Monolith," $\frac{5}{8}$ in. thick. In the center of the car the floor sheets are supported on furring strips laid on the top plate of the center sill and at the sides they rest on a continuous angle $2\frac{1}{2}$ in. x $2\frac{1}{2}$ in. x $\frac{3}{16}$ in. which is riveted to the flanges of the main posts. In the 41-ft. cars the floor is composed of waved corrugated steel on top of which is a layer of "Monolith" plastic flooring. Maple floor strips are used in the 41-ft. cars, but in the 54-ft. cars the surface of the composition floor is not so protected.

Below the main floor of the 54-ft. cars is a false floor composed of thin steel sheets covered on top with a layer of asbestos burlap. This floor is secured by clips so that it can be removed easily to get at the main floor above.

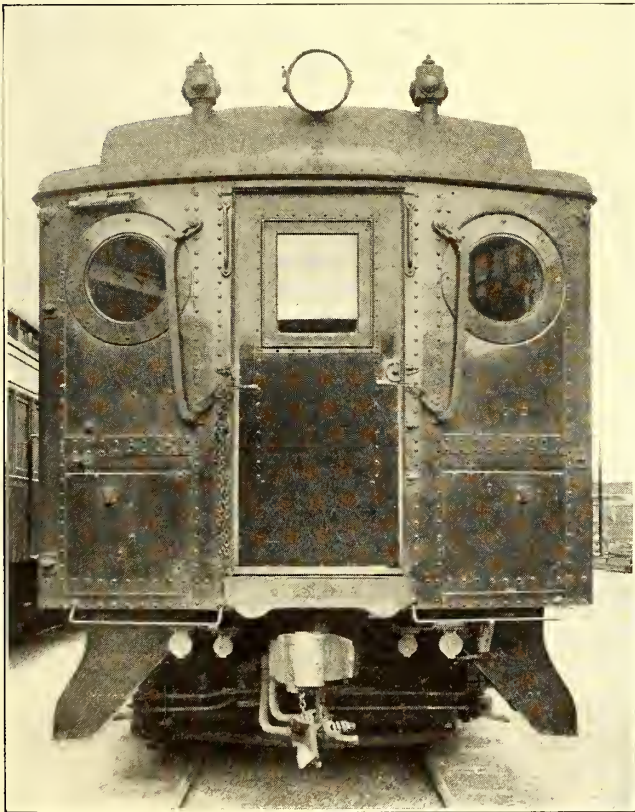
ROOF

The lower deck roof is made of steel sheets 0.06 in. thick with the joints welded by the oxy-acetylene process. These sheets are supported at the eaves by a pressed channel riveted on the main posts. At the deck sill they are turned up behind and riveted to the malleable iron deck sash frames. Resting on top of each main post is a malleable iron deck post which supports the upper deck overhang. A steel sheet bent around the tops of these deck posts forms the deck apron, below which is inserted a row of ventilator screens.

The upper deck is made of steel sheets 0.09 in. thick which are also welded together. They extend out over the deck posts and are supported on pressed channel carlines spaced to correspond with the posts in the car sides. Sheets of composite board, $\frac{3}{8}$ in. thick, are attached on the underside of the carlines with moldings to cover the joints, leaving a dead-air space of 2 in. between the roof sheets and the headlining. The upper deck is continued out over the vestibules and terminates in curved ends which are carried down to the vestibule hood bows. The deck sashes have wooden frames and are glazed with green pebbled glass. They are pivoted to open on a horizontal axis.

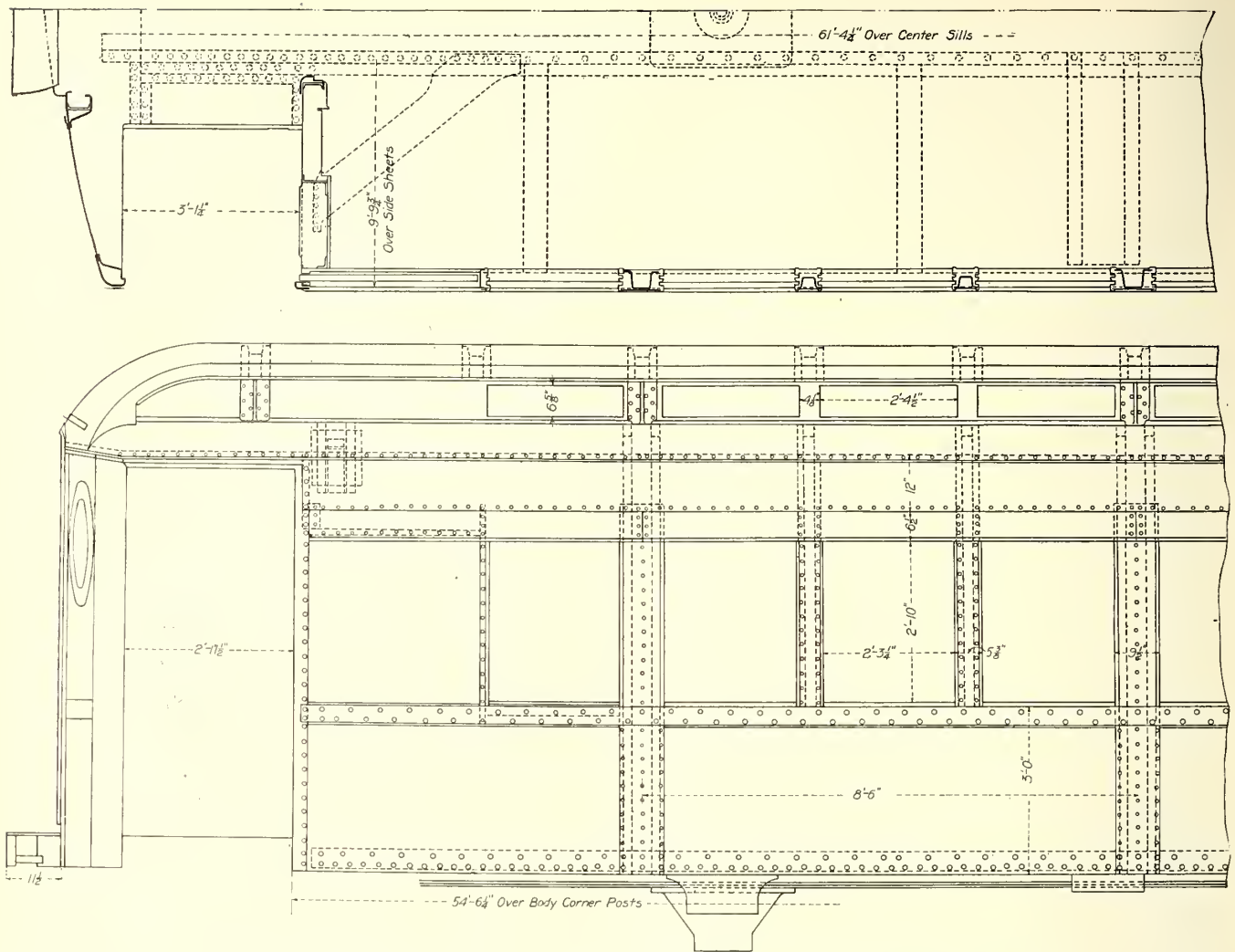
VESTIBULES

The vestibules of the 54-ft. cars differ in a number of particulars from those of the 41-ft. cars. The side doors slide

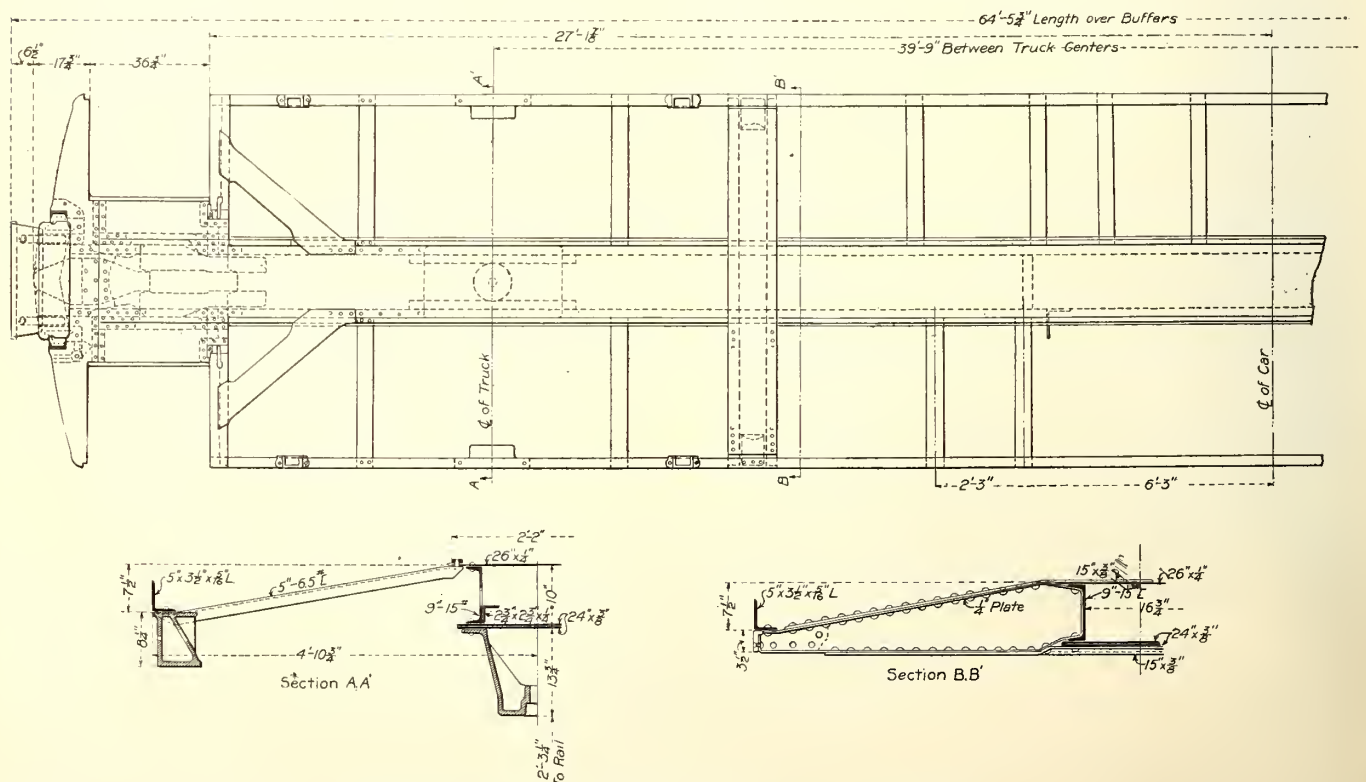


Long Island Steel Car—End View

4 in. is thus formed between the lining and the side sheets. The bottom supporting angle which is $8\frac{1}{8}$ in. above the floor line forms a shelf to which is attached the top plate of the heater box. The wall seat end supports are also carried on this angle, the supporting plate being concealed back of the lining.



Long Island Steel Car—Half Side Elevation and Section Through Window Posts



Long Island Steel Car—Plan and Sections of Underframe

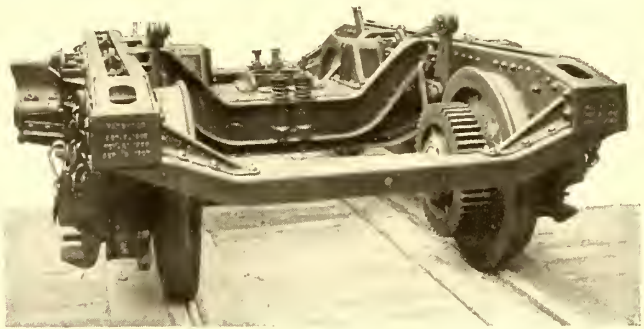
back into pockets in the side of the car body and are opened and closed by the Gibbs mechanical door-operating device as in the older cars. The trap doors over the steps are hinged against the end of the body and extend out flush with the side of the car. They have a coil spring on the hinge rod which is strong enough to raise the door when the floor catch is released. In the 41-ft. cars, which are narrower, the trap door overlaps the platform floor plates when closed and is arranged to slide out on the hinge rod beyond the side of the car so as to bridge the space between the car and the platform of those stations where the platform is level with the floor of the car.

The 41-ft. cars have square windows in the ends of the vestibules, but the new cars have circular windows resembling the portholes in the side of a ship. The glass in the window on the left-hand side is fixed in a solid malleable iron frame, but on the right-hand side, where the motorman stands, the iron frame is hinged to open inwardly and is locked shut with a special clamping device. The end door opens inwardly and folds back against the master controller and the brake valve, which are mounted on the right-hand side of the vestibule end. The switchboard is mounted on the left-hand side of the end bulkhead of the car at the motor truck end. It is inclosed by a one-piece pressed-steel door. Double sliding doors with a mutual operating device are used in the end bulkhead. The ceiling of the vestibules is formed of steel plates in which is inserted a removable manhole plate to permit access to the wiring for the marker lamps and headlight on the roof. The floor is covered with a pebbled rubber tread.

COUPLERS AND DRAFT GEAR

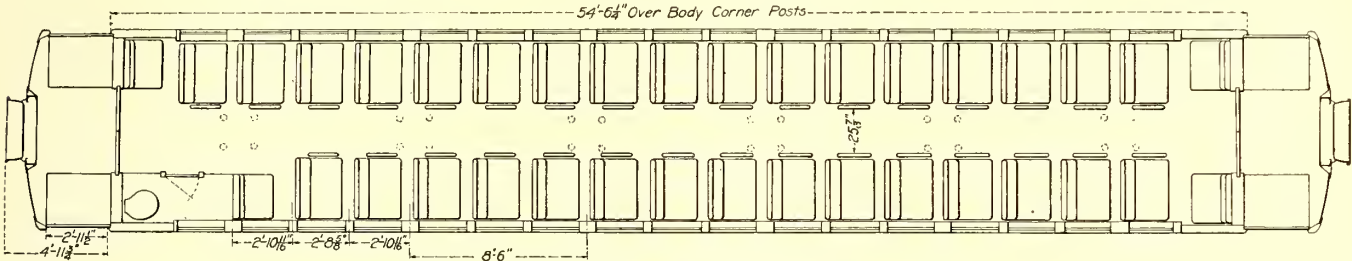
The 41-ft. cars are equipped with Van Dorn couplers and draft gear, but the new cars have M. C. B. type couplers, West-

TRUCKS
The car bodies are mounted on a motor truck and a trailer truck of the same general design, which is the standard for all new cars of the Pennsylvania Railroad and its affiliated lines. The trailer trucks were illustrated and described in the ELEC-



Long Island Steel Car—Motor Truck

TRIC RAILWAY JOURNAL of June 27, 1908, page 177. The motor trucks, one of which is illustrated, differ from the trailer trucks only in the use of cast-steel transoms for supporting the motors. As will be seen from the engraving, the side frames consist of a pair of channels to which the pedestals are riveted. The load on the side frames is carried by pedestal springs and no equalizers are used. The pressed-steel bolster passes under the side frames and is supported at each end by a sextuple elliptic spring which is carried by hangers attached between the side frame channels. The side bearings are carried on the ends of the bolster outside of the side frames. End play of the



Long Island Steel Car—Floor Plan of Passenger Coach

inghouse friction draft gear and spring buffer plates so that they can be operated in trains with standard coaches. They are also equipped with Westinghouse automatic air couplers. The draft gear is attached under the center sill in a cast-steel housing and the coupler is pivoted so that it has some lateral movement within the limits of the spring centering device which is used.

INTERIOR FINISH

The interior of the cars is finished in a dark green color with pale green headlining and plain gold striping in the window post panels. The seats are Hale & Kilburn, No. 195, with pressed steel frames. They are upholstered in rattan. Figured Pantasote curtains are hung at the windows. The electroliers in the upper deck are ornamental bronze of an

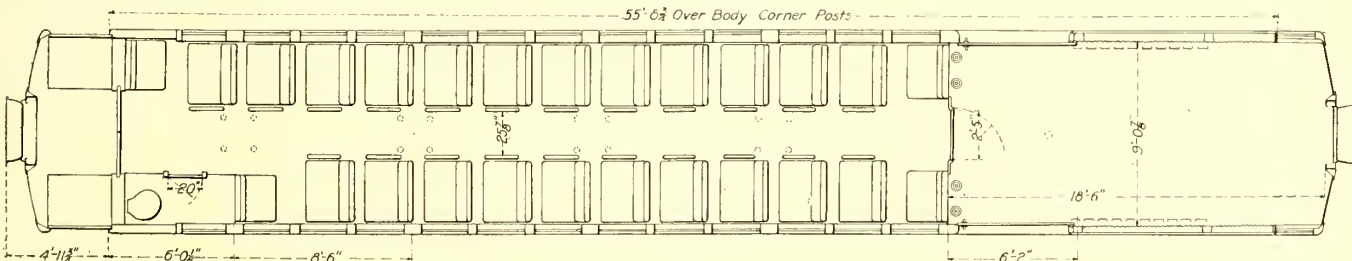
bolster is limited by coil springs inserted between the side bearings and the truck frame. The steel frame pilot is attached to the truck end piece instead of to the vestibule underframing, as in the 41-ft. cars.

WEIGHT

The following table shows the comparative weights of the old and new cars:

	54-ft. Cars.	41-ft. Cars.
Weight of body.....	54,332	44,424
Weight of trucks.....	33,168	23,284
Weight of electrical equipment.....	19,600	14,430
Total weight.....	107,100	82,138
Weight per foot of length.....	1,660	1,600
Weight per passenger seat.....	1,488	1,580
*Weight per sq. ft. floor area.....	168	185

*Total weight divided by product of length over vestibules multiplied by width over all.



Long Island Steel Car—Floor Plan of Combination Passenger and Baggage Car

artistic pattern. Some of the cars have continuous rod basket racks on both sides, but most of them have none. On the outside the cars are painted Tuscan red with gilt lettering and a minimum amount of striping.

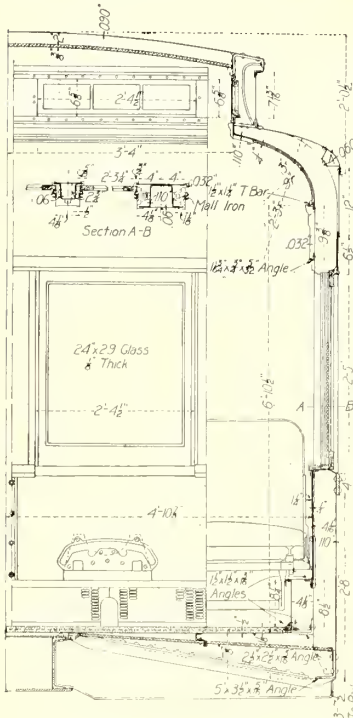
MOTORS

As the new cars are intended primarily for a combination of local and express service in and out of the Pennsylvania Terminal Station in New York, the motor equipment required was

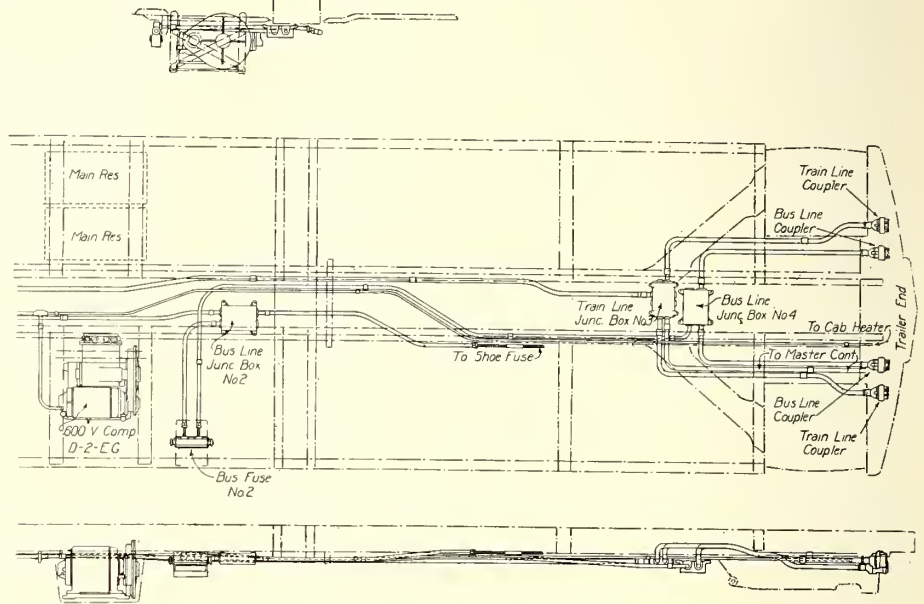
somewhat different from that used on the 41-ft. cars, which are lighter but are used in local service where the distance between stops is from 1 to 1.5 miles and the average speed, including thirty-second stops, is about 25 m.p.h. The 41-ft. cars were equipped with two Westinghouse No. 113 motors rated at 200 hp each. These were the largest practicable motors which could be applied to the 6-ft. wheel-

hp as against 800 hp in a train weighing 197,722 lb. light, and made up of two 41-ft. steel motor cars and a wooden trailer. The No. 308 motors are geared for a maximum speed of not less than 55 m.p.h. on 600 volts, the ratio being 25:48.

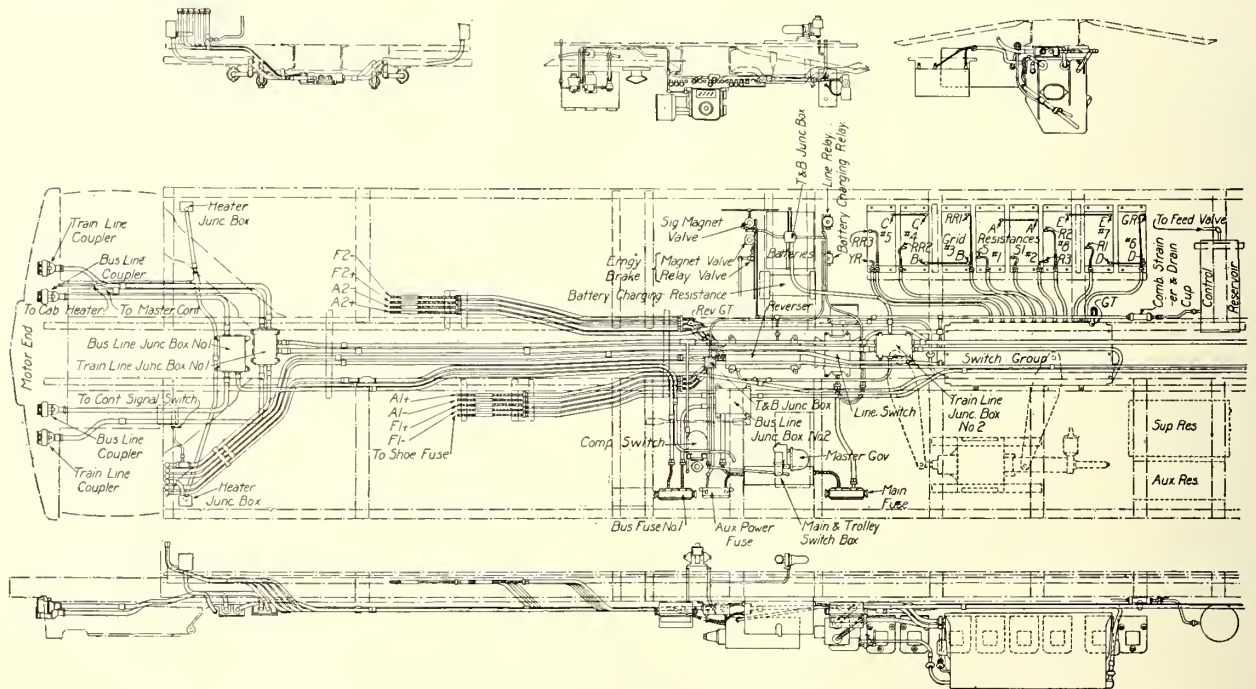
The characteristic curves of the No. 308 motors are shown in one of the engravings on page 1061. The insulation is designed so that the limiting rise in temperature under service conditions is 20 deg. C. from 75 deg. C. The continuous capacity is 225 amp at 350 volts with forced ventilation and



Long Island Steel Car—Half Cross-Section



Long Island Steel Car—Location of Piping and Electrical Apparatus Under Trailer Truck End



Long Island Steel Car—Location of Piping and Electrical Apparatus Under Motor Truck End

base trucks used under these cars. Four of these motors under a three-car train with 36-in. wheels and a gear ratio of 25:58 give an average acceleration of about 1 m.p.h.p.s. and a maximum speed of 45 m.p.h.

The 54-ft. cars are heavier, but they are operated in all-motor-car trains, so that the size of motors required is but little larger than for the 41-ft. cars. On each motor truck are mounted two box frame, interpole Westinghouse No. 308 motors, rated at 215 hp each. A three-car train weighing 312,000 lb. light, therefore has a total motor capacity of 1290

140 amp at 300 volts with natural ventilation. The ratio of continuous capacity to one-hour capacity with forced ventilation is approximately 29:39.

BLOWERS

The motors on all of the new cars are designed for forced ventilation by means of a motor-driven blower set mounted under the truck bolster. The motor is of 1½ hp and runs at 2000 r.p.m. on 600-volt current. At each end of the motor armature is a Sirocco type blower 9 in. in diameter. The hollow bolster in which the blower set is mounted forms an

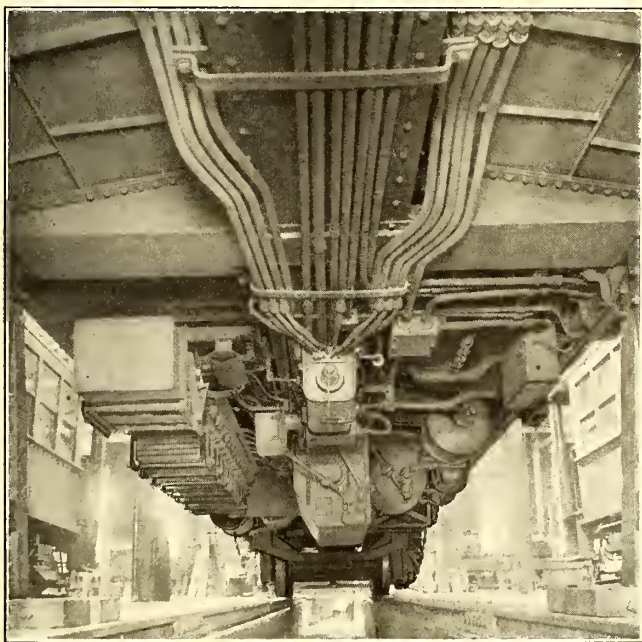
inclosed box and openings covered with fine-mesh wire screen are cut in the top of the bolster to form inlets for the air which is passed through the blowers. The blowers exhaust through flexible bellows tubing into the bottom of the motor frames at the pinion end and the air blast passes through and around the armature and out through the perforated inspection covers at the commutation end. Each fan has a capacity of 600 cu. ft. of free air per minute.

The purpose of the blowers is to increase the continuous capacity of the motors by limiting the temperature rise. The increased capacity due to their use is between 50 per cent and 60 per cent. Without them it would be impossible to maintain the desired schedules with the size of motor which is used.

CONTROL

The control system is of the Westinghouse unit-switch type using storage batteries for energizing the control circuits. Except for a few slight modifications it is the same on the 54-ft. cars as on the 41-ft. cars and the equipments on both types of cars could be made to work together by using special compromise jumpers if it should be necessary to do so. The principal differences in the control equipment of the two types of cars are the omission of motor cut-outs, the provision for connecting an overhead trolley to the bus line if necessary at some future time, and the location of the main switch under the side of the car instead of on the vestibule switchboard. In addition the control line consists of ten wires instead of seven wires as in the old cars. One of the extra wires is for the master governor synchronizing circuit, another is for the electropneumatic train signal circuit and the third is a blank wire available for operating a direct-current pantograph trolley.

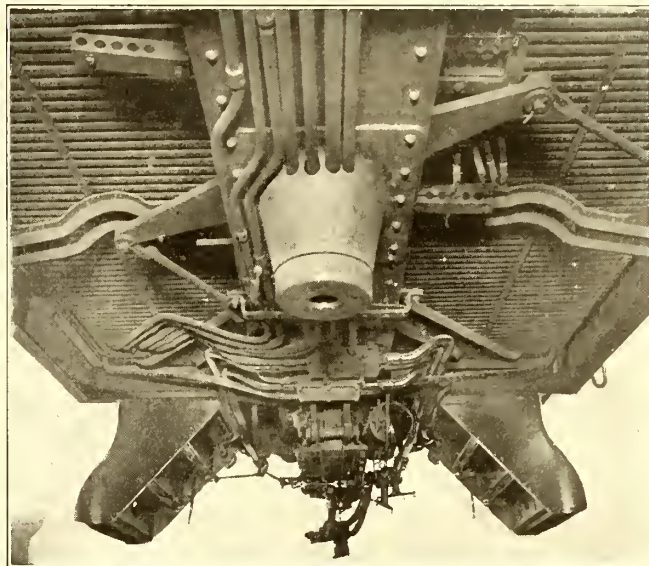
The motor cut-out in the 41-ft. cars consists of a drum switch mounted in the car body under one of the cross seats. This switch, when turned, breaks the control circuits of those unit-switches not required to be closed for the operation of one or the other motor. As one motor is so seldom cut out this feature in the control equipment of the new cars was eliminated.



Long Island Steel Car—View Under Car Looking Toward Center from Motor Truck End

The sequence of the unit-switches and the method of making the motor connections is the same in the old and new equipments. A schematic diagram of the circuits is shown on page 1060. Current from the third-rail shoes passes through the shoe fuses to the bus line and thence through the main switch and main fuse to the line switch. The first step of the master controller closes the line switch and switches M_1 and JR . This throws the two motors in series with all the resistance in cir-

cuit. The second step closes switch S and cuts out the first section of resistance. From steps 3 to 8 the resistances are cut out in succession until the two motors are running in series without external resistance. The next three steps in the transition from series to parallel connections follow each other automatically. Switch J closes, thus completing a second path for the current flowing through No. 1 and No. 2 motors. Then switch JR opens and all the resistance switches open, after which switches M_2 and G close and complete separate paths to



Long Island Steel Car—View Under Car Looking Toward End from Center of Car

ground through each of the motors and half of the resistance. The bridging connection through switch J then opens and the next three steps cut out the three groups of resistance in the circuit of each motor. A no-voltage line relay and a current limit relay are used as in the 41-ft. car equipments to open all contactors in the event of current going off of the bus line and to prevent the further progression of the contactors when the current passing through No. 1 motor exceeds a safe value. The line switch circuit-breaker cut-out and reset circuits and the emergency brake or "dead man" circuits are exactly the same as in the old cars.

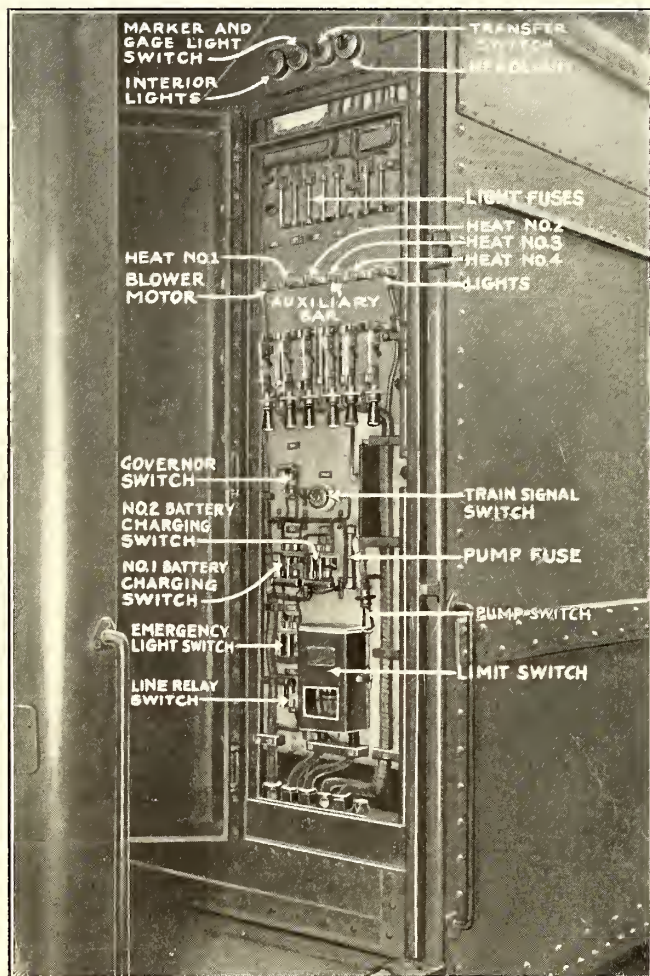
SWITCHBOARD

The switchboard is placed in the vestibule at the motor truck end of the car. On it are mounted the current limit relay, line relay, cut-out switch, battery-charging switches, emergency light switch, pump and air signal switches and the light, heating and blower motor cut-out switches and inclosed fuses. The wiring is run in from the bottom and is all mounted on the front of the board. A No. 4 wire leads to the switchboard from the bus line through the busbar of the main switch and an auxiliary fuse mounted under the car. This wire is connected to an auxiliary busbar on the switchboard and from this busbar are fed the blower motor, heaters and lights, each circuit being separately fused on the board. A spare conduit leads to the board through which the auxiliary circuits could be connected to the overhead trolley circuit if a trolley ever was required. The switchboard is of slate made in two halves for convenience in installing. As the circuits broken on the switchboard with the exception of the air compressor motor circuit carry only small currents, only one arc shield or barrier is required, between the pump switch and the bundle of wires leading to the heater circuit fuses. All of the wiring is heavily taped and impregnated and is securely held in place with clips bolted through the board.

BRAKES

The 54-ft. cars are equipped with Westinghouse air brakes, schedule A M L, and the Westinghouse governor synchronizing system. The A M L equipment differs from the A M R

equipment used on the 41-ft. cars in several important respects. In the A M R equipment a control pipe is used in addition to the brake pipe to provide the quick recharge and graduated release features. The brake pipe pressure is vented into the brake cylinders at the beginning of an emergency application, but the brake cylinder pressure in an emergency application is only slightly higher than in a full service application. With the A M L equipment a supplementary reservoir is used and no control pipe is required. This equipment has the quick serv-



Long Island Steel Car—Switchboard

ice, quick action, quick recharge and graduated release features and the additional feature of high cylinder pressure in emergency applications which can be obtained even after a full service application. From 85 to 100 lb. main reservoir pressure is carried and all the main reservoirs in a train are connected to a continuous main reservoir pipe. The brake pipe pressure is 70 lb. and it is maintained through a feed valve mounted on the base of the motorman's brake valve. Only the feed valve mounted on the base of the brake valve which is in use is operative. In making a service application air is admitted from the auxiliary reservoir to the brake cylinder in the ordinary manner by reducing the brake pipe pressure. The pressures in the brake cylinder and the auxiliary reservoir equalize at about 50 lb. An equalizing piston and a double reservoir are combined with the brake valve so that it is impossible to reduce the brake pipe pressure below 50 lb. in making a service application. When the brake valve handle is moved to the emergency position the brake pipe pressure is vented direct to atmosphere through a large port, and as soon as the brake pipe pressure falls to 30 lb. or below the emergency feature in the type L-3-9 triple valve becomes operative, opening communication between the supplementary reservoir and the brake cylinder and at the same time cutting off the auxiliary reservoir. In addition to this the brake pipe is vented to atmosphere through the triple

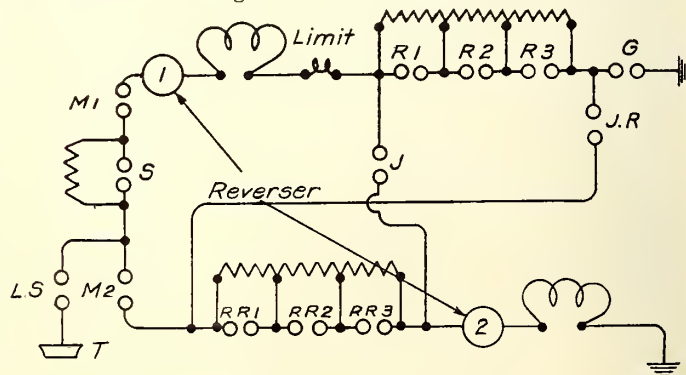
valve, thus assuring the propagation of quick action through the train very rapidly. The supplementary reservoir pressure of 70 lb. then equalizes with the brake cylinder pressure of 50 lb. obtained by full equalization with the auxiliary reservoir, and the resultant pressure in the brake cylinder rises to 65 lb. This gives 30 per cent increase of braking power in emergency without affecting the flexibility of service operation. The 54-ft. cars have 16-in. cylinders while the 41-ft. cars have cylinders only 12 in. in diameter. The A M L equipment is equally suitable for single car operation or the operation of trains up to twelve or more cars.

The governor synchronizing system which is used on the 54-ft. cars causes all the air compressors in a train to start and stop simultaneously. The main reservoirs, of which there are two on each car, are connected to a main reservoir pipe which is continuous throughout a train, so that it is desirable to keep the pressure in all reservoirs equalized and not overwork the compressor on the car on which the brake valve is being operated. The synchronizing apparatus consists of a master governor and an electro-pneumatic compressor switch on each car and a synchronizing wire in the control train line. The master governor resembles the Westinghouse type J pump governor and is operated by the air pressure in the main reservoir of the car on which it is mounted. One of the contacts is connected to the positive wire of the control storage batteries and the other is connected to the synchronizing wire. When any master governor is closed by a fall of main reservoir pressure the synchronizing wire throughout the train is energized with battery current. The compressor switch on each car consists of the switch portion of a type J governor with the addition of an electromagnet valve controlling the admission of air to the operating cylinder. The switch is opened by admitting air to the operating cylinder and returned to its closed position by a spring when the air is exhausted.

The admission of air to the cylinder is accomplished by de-energizing the magnet and the air is exhausted by energizing the magnet. The electromagnet is connected on each side to the synchronizing wire and on the other side to the negative wire of the control storage batteries. When the synchronizing wire is energized through any master governor the electromagnet valves of all the compressor switches in the train are closed and the compressors operate. As soon as the synchronizing wire is de-energized by the opening of all the master governors the compressor switch magnet valves open and admit air under the operating pistons. This opens the compressor motor circuits and stops the compressors.

LIGHTING

The interior lighting of the cars consists of five ceiling electroliers of five lights each and two end electroliers of three



Long Island Steel Car—Diagram of Control Connections

lights each over the end doors. In addition to these lights there are at each end of the car two dome lights above the vestibule side doors, two marker lights, a gage light and the headlight. The ceiling electroliers each have four side lights, which are on four separate circuits fed from the third rail and a center light which is connected in multiple on an emergency light circuit supplied from the control storage batteries. One knife switch on the switchboard connects the auxiliary bus with a short bus,

to which are connected the headlight circuit, the marker and dome light circuit and a third wire leading to a snap switch. When this switch is closed the short bus is connected to another short bus from which five interior lighting circuits are led. Each of these circuits is separately fused at the bus. Four of the circuits run through the ceiling electroliers and the fifth includes two of the three lamps over the end door at the switchboard end and the three lamps over the end door at the opposite end. From the short bus the headlight circuit branches and is carried through a snap switch and suitable resistance at each end of the car to the headlight at that end. The headlight at either end of the car may be turned on or off independently of all other lights.

The marker, dome and gage lights at both ends of the car are supplied from the short bus through a common fuse. The circuit passes through a cut-out snap switch and thence through a two-way transfer switch mounted beside the cut-out switch. At the other end of the car is another transfer switch. In one position of the transfer switch at the switchboard end the two marker lights and the gage light at that end are lighted, and at the other end either the two dome lights or the marker and gage lights, depending on the position of the transfer switch at that end. One of the three lights in the electrolier above the end door at the switchboard end is connected in this circuit and is always lighted when the marker and dome light cut-out switch is closed, regardless of the positions of the two transfer switches.

All the light wiring is run in iron pipe conduit on the outside of the roof and all connections are made in weatherproof junction boxes.

HEATERS

The interior of the car is heated by thirty-six Consolidated electric heaters mounted in the heater boxes built along the floor of the car against each side. The heaters are of the double-coil type and are arranged in two groups of two circuits each with four heater switches to give two degrees of heat. Each circuit is separately fused on the switchboard. The vestibules are heated by cab heaters which are turned on or off by a special switch mounted on the floor below the master controller. When the current is on a knob projects out of the heater switchbox and if the vestibule end door is opened it strikes this knob and automatically sets the switch to the off position.

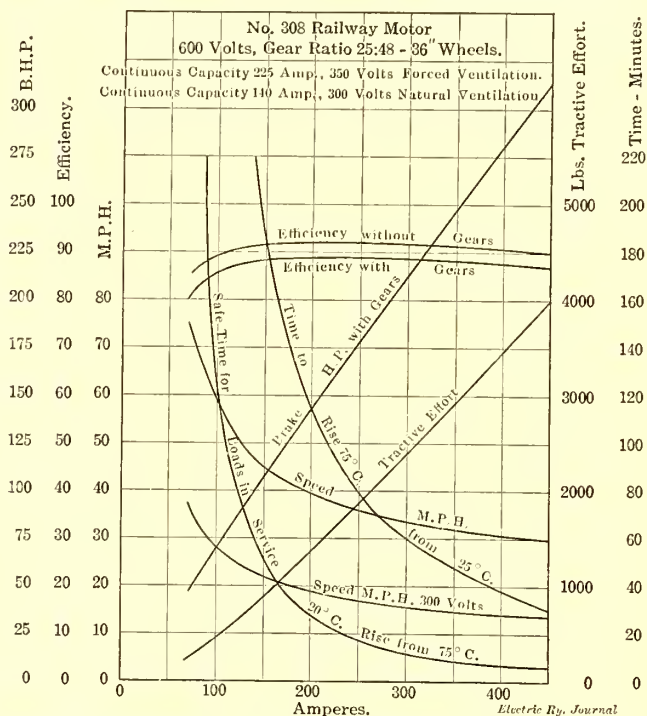
TRAIN SIGNAL

All the new cars are equipped with the Westinghouse electro-pneumatic train signal apparatus. This consists of a conductor's signal switch operated by the signal cord which runs through each car, an electro-pneumatic signal valve and a small whistle in each vestibule which is supplied with air from the

in each vestibule. In case it is not desired to blow the signal whistle on any intermediate car the signal valve can be cut out by turning a snap switch on the switchboard which is inserted in the local battery circuit.

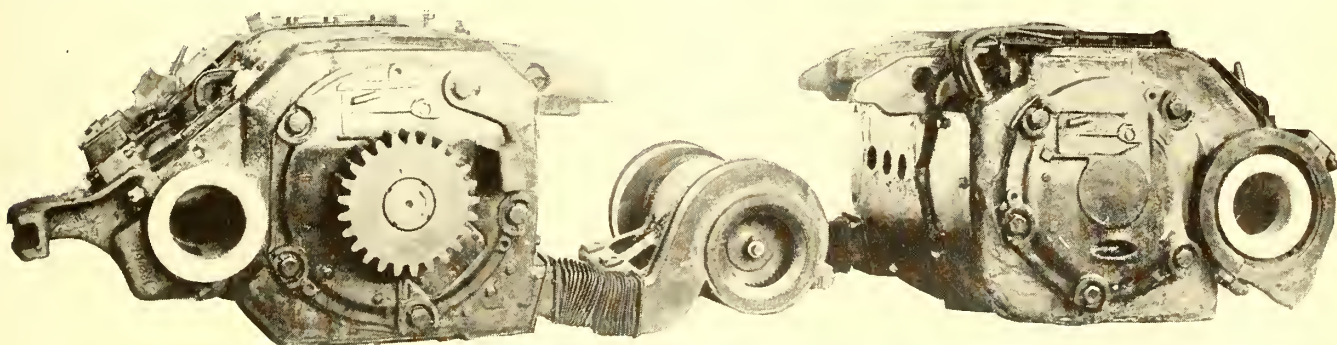
WIRING AND EQUIPPING CARS

The cars were received from the Berwick plant of the American Car & Foundry Company on their own trucks but without motors, control apparatus or conduit piping. They were fully



Long Island Steel Car—Characteristic Curves of No. 308 Motor

equipped at the Morris Park shops of the Long Island Railroad by the railroad company's shop force, which was considerably augmented to carry on the work. Before the first car was received a preliminary study and layout of the apparatus and piping under the car was made, but this was entirely changed, and the final layout was determined by trial on an actual car. As will be seen from the accompanying drawings and engravings from photographs of the under side of a car, the electrical apparatus is located between the cantilevers, and the conduit is concentrated under the center sill so as to prevent damage in case the car is "side-wiped" or is overturned. The reverser,



Long Island Steel Car—Motors with Blower, Which Is Carried Inside Bolster

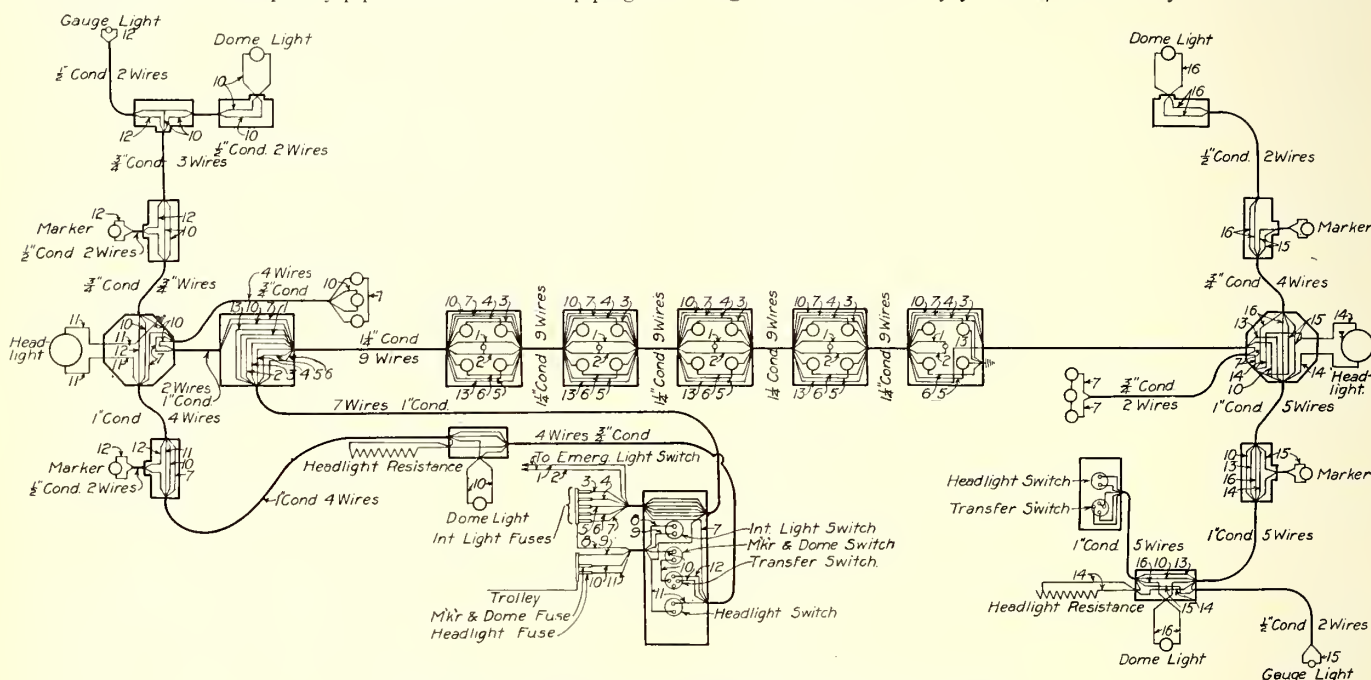
brake system when the signal valve opens. A single wire in the control line runs throughout the train and all the signal switches and valves are connected on one side to this common wire. The signal switch on each car is connected to the positive side of the control storage battery on that car and the signal valve is correspondingly connected to the negative side of the battery. When the signal switch on any car is closed current flows through the wire in the control line and opens all the signal valves in the train, thereby sounding the whistles

line switch and switch group are mounted under the center sill, the reverser being nearest to the motor truck so as to reduce the length of the motor leads to the minimum. The bus line has four junction boxes, one at each end where the four-point jumper socket connections are taken off, one beside the reverser in which the third-rail shoe connection on the motor truck, the bus-fuse connection and the main switch connection are made, and one just inside the cantilever at the trailer truck end in which the trailer truck third-rail shoe connection is made.

The main switch, trolley switch, main fuse, auxiliary fuse and bus fuse are grouped on one side near the reverser. On the same side are the brake cylinder, auxiliary reservoir, supplementary reservoir and the air compressor. On the opposite side of the car are mounted the duplicate control storage batteries, line relay, signal magnet valve, emergency brake valve, battery-charging relay, battery resistance, grid resistances, control reservoir and two main reservoirs. Above the floor under the seats are mounted the compressor switch and master governor. This arrangement of apparatus distributes the weight evenly and permits of a direct system of piping and wiring.

All wiring throughout the cars is run in iron-pipe conduit. After the details of the layout of apparatus had been decided on the first car was completely piped and wired. The piping was

minutes of the meetings held during the past year and the progress made by the association. This matter was presented by Acton Burrows, publisher of the *Railway and Marine World*, who has been secretary of the Canadian Association for a number of years. At the first session A. D. B. Van Zandt, publicity manager Detroit United Railway, presented a paper entitled "Let the Public Know," which brought forth a very interesting discussion on the subject of publicity for public service corporations. Other papers presented during the day ably treated the subjects of the comparative cost of steam and hydroelectric power, the distribution of power for electric railway operation and accounting methods in the repair shop. At the conclusion of the first day's session all the men attending the convention enjoyed a 14-mile trolley ride and a short



Long Island Steel Car—Diagram of Lighting Circuits

cut and bent as required by successive trials. It was then taken down and each length was painted red to serve as a master template for cutting and bending the pipes for all other cars. The various pipes were cut and bent in quantities in advance of their installation so that the work of wiring the cars proceeded rapidly after they were brought into the shop. The cables were also made up in advance. They were cut to the exact length and one terminal soldered on before drawing through the conduit. The switchboard wiring was cut, bent and wrapped by boys working at a bench. For this purpose a template was made up with pegs inserted in it around which the wires were formed to the proper shape. The work of equipping a car and its trucks complete required six days.

ANNUAL MEETING CANADIAN STREET RAILWAY ASSOCIATION

The Canadian Street Railway Association held enthusiastic and profitable meetings at Windsor, Ontario, on June 6, and at Detroit, Mich., on June 7. On the former day the association was entertained by its newly elected president, James Anderson, of Windsor, and on the latter day the association members were the guests of the Detroit United Railway.

About thirty members of the association responded to the roll call and the business sessions were presided over by James Anderson, general manager Sandwich, Windsor & Amherstburg Railway, who has been vice-president of the association during the past year. Duncan McDonald, general manager Montreal Street Railway Company and president of the association, could not be present.

The first session was largely devoted to consideration of the

steamer ride to Bois Blanc Island in the Detroit River, where they were the guests of the Sandwich, Windsor & Amherstburg Railway at a dinner given under the guidance of James Anderson.

The second day's session was held at the Ponchartrain Hotel in Detroit and was occupied largely by the presentation and discussion of a paper on "Street Railway Track," by John Kerwin, superintendent of track of the Detroit United Railway. At this session new officers were elected for the ensuing year as follows: President, James Anderson, general manager Sandwich, Windsor & Amherstburg Railway; vice-president, Patrick Dubee, secretary Montreal Street Railway; secretary-treasurer, Acton Burrows, *Railway and Marine World*, Toronto; assistant secretary, Aubrey Burrows. Executive committee: Edward P. Coleman, Hamilton; H. M. Hopper, St. John; J. E. Hutcheson, Ottawa; C. B. King, London; Martin N. Todd, Galt.

At the conclusion of the morning session of the second day the members in a body inspected a Kerwin rail-grinding machine which had been brought to the track adjacent to the hotel and was in regular operation.

About twenty railway men were guests of Elmer J. Smith, of the Peter Smith Heater Company, on an automobile ride and at a luncheon given at the Detroit Boat Club.

At 3:30 in the afternoon forty association members and guests were taken to Toledo over the high-speed Detroit, Monroe & Toledo line of the Detroit United Railway system. Several of the operating heads of the road acted as hosts. On arrival at Toledo the party was met by several officials of the Toledo Railways & Light Company and all were entertained at a banquet at the Boody House, given by the Detroit United Railway.

PENNSYLVANIA COMMISSION REPORT ON PHILADELPHIA RAPID TRANSIT COMPANY

An abstract of a portion of the report on the property of the Philadelphia Rapid Transit Company made to the Pennsylvania State Railroad Commission by Ford, Bacon & Davis, New York, was published in the last issue of the *ELECTRIC RAILWAY JOURNAL*. The report also discusses operating statistics as follows:

OPERATING STATISTICS

It states that the business of the company during 1909 was affected by a strike which lasted from May 29 to June 6 and that of 1910 by a strike from Feb. 19 to April 2. The traffic of the surface system in 1908 was largely affected by the inauguration of the subway-elevated service. While the primary statistics for the last two years are affected by the strikes, no extraordinary strike expenses are included in the operating expenses and, in general, the service was reduced as well as the traffic. There was a decrease on the surface lines between 1907 and 1910 of 18 per cent in passengers carried and of 17 per cent in car miles run. Including the elevated-subway line there was a decrease of 12 per cent and 13 per cent respectively. Excluding the strike period of 1910 the average passengers per day on all lines decreased 3.2 per cent between 1907 and 1910.

PASSENGER RECEIPTS

In 1907 the company sold six tickets for 25 cents; free transfers were issued on cash fares or tickets at many points of intersection, and at others 3-cent exchange tickets good until used were sold. In 1908 the sale of six-for-a-quarter tickets was discontinued, a time limit was enforced on the exchanges and transfers were issued only on cash fares. This resulted in an increase in average rate of fare, and therefore the decrease in passenger receipts is not so great as in total passengers carried, being only 8 per cent for the surface lines and 0.6 per cent for the entire system. The passenger receipts of the surface system increased from 22.2 cents per car mile in 1907 to 24.8 cents in 1910.

Thirty-three lines out of the total of 89 have receipts per car mile in 1910 greater than the average of 24.84 cents. Lines having the largest receipts per car mile in 1910 were:

Seventeenth and Eighteenth Streets.....	45.2 cents
Twelfth and Sixteenth Streets.....	42.4 cents
Nineteenth and Twentieth Streets.....	41.6 cents

Twelve lines have receipts less than 14 cents per car mile, which represents the average cost of operation without taxes in 1910 as reported by the company.

The passenger receipts per mile of route were \$14,920 for the surface system in 1910. The lines to South Philadelphia produced the largest earnings per mile of route, amounting to \$28,800. The long lines from the north suburbs to the delivery district produced \$11,200 per mile and the suburban lines produced only \$2,738 per mile. The subway-elevated earned \$98,900 per mile of route in 1910.

CAR MILEAGE

While the total passengers carried on the surface system decreased by 18.3 per cent from 1907 to 1910, the company decreased its car mileage by 17.4 per cent. The greatest reduction was on the group of double-end lines running from Northeast to South Philadelphia, which were more seriously affected by the strike.

The mileage of trailers in 1910 constituted only 0.1 per cent of the whole; the mileage of freight cars 0.06 per cent; that of mail cars 0.39 per cent. The subway-elevated line carried 8 per cent of the passengers and operated about 6 per cent of the car miles. The company considers that 0.52 per cent of the car mileage was non-revenue-producing, this being the mileage of cars from the depots to the nearest points on the lines on which they run.

OPERATING EXPENSES AND NET EARNINGS

With a decrease from 1907 to 1910 of 18.3 per cent in passengers and 8 per cent in earnings, the operating expenses of

the surface system decreased 6.8 per cent. The net earnings of the surface system decreased 6.3 per cent in three years. The net earnings of the surface and subway-elevated systems combined show an increase of 4.2 per cent in three years.

SURFACE OPERATING STATISTICS

The 3-cent exchanges were used by 42,467,617 passengers in 1910, whereas before the enforcement of the time limit they were used by 115,995,631 in 1907. The number of free transfers at the same time decreased 8.2 per cent, while the total revenue passengers decreased 19.8 per cent. The deadheads or passes, representing complimentary passengers and employees, constitute an unusually small proportion, being about 0.6 per cent. The fact that the average maximum cars operated (being the average for the year of the maximum number of cars in use at one time in each month) decreased less than the car miles indicates that base-schedule cars were taken off to a greater extent than were rush-hour cars. There has been a small increase in track mileage of 5.2 miles.

SURFACE OPERATING STATISTICS BY UNITS

The average fare per revenue passenger, including exchanges, increased gradually during the three years, from 4.26 cents to 4.88 cents, while the operating expenses per revenue passenger increased from 2.38 cents to 2.76 cents. The ratio of operating expenses to gross earnings declined from 55.1 per cent in 1907 to 53.1 per cent in 1908, and further to 50.7 per cent in 1909, but rose to 54.9 per cent in 1910.

Maintenance of way, structures and line per mile of single track operated declined from \$2,506 in 1907 to \$1,714 in 1910, in part on account of the release from paving obligations. Maintenance of equipment per average maximum car operated was slightly larger in 1910 than in 1907, but was about 10 per cent smaller in 1908. The cost of power distributed increased from 0.55 cent per kw-hour in 1907 to 0.72 cent in 1909 and 1910. Platform wages (motormen and conductors) have increased from 41.7 cents to 46 cents per car hour, or 10.3 per cent.

Free transfers were used by 15 per cent of the revenue passengers in 1907, 18.5 per cent in 1908, 13.5 per cent in 1909 and 17.2 per cent in 1910. Three-cent exchanges were used by 27.5 per cent in 1907, 17.8 per cent in 1908, 10.2 per cent in 1909 and 12.5 per cent in 1910.

The service has been such that the total passengers of all classes vary little per car mile, per car hour, or per round trip. The average speed has remained stationary at practically 8 m.p.h. The average length of round trip has increased slightly from 12.3 to 12.5 miles. The power consumption per car mile rose from 2.3 kw-hours in 1907 to 2.7 kw-hours in 1910, due to increase in size and number of motors.

SUBWAY-ELEVATED OPERATING STATISTICS

The subway-elevated operating statistics are chiefly interesting when compared with those for the surface system, the subway-elevated having been in full operation only two years. The passenger receipts are 34 cents per car mile, against 24.8 cents for the surface system in 1910, and \$4.40 per car hour against \$1.98. The report says, however, that the operating expenses cannot be fairly compared in all particulars because the general expenses common to both systems have not been apportioned and because the subway-elevated equipment is new. The transfer passengers represent about the same percentage as on the surface system. The average schedule speed was 12.9 m.p.h. in 1910, against 8 m.p.h. on the surface. The current consumption was 5.3 kw-hours per car mile, against 2.7 for the surface cars, and 0.67 kw-hours per passenger carried, against 0.45 kw-hours per passenger on the surface system.

COMPARATIVE STATISTICS WITH OTHER CITY SYSTEMS

Table I shows comparative statistics with New York, Brooklyn, Boston and Chicago. The New York statistics cover Manhattan and the Bronx only and in all of the cities except Boston the figures relate only to the surface traffic. In Boston the figures involving earnings and expenses, except maintenance of equipment, include the elevated system. In the statistics on the number of passengers the Philadelphia figures include the

3-cent exchanges; and in Philadelphia and Chicago the transfer passengers include complimentary and employees' tickets. These are omitted in New York, Brooklyn and Boston. It should be borne in mind that in New York, Brooklyn and Chicago a much larger proportion of the long-distance, high-speed traffic is carried by the elevated railways and subways than in Philadelphia.

SEATS PER PASSENGER

The report states that by a count of passenger miles it was found the average mile per surface passenger (all classes) in Philadelphia was about 2.3 miles. This is less than one-half of the seat miles per passenger ride. In other words, there

TABLE I.—SHOWING COMPARATIVE OPERATING STATISTICS OF STREET RAILWAYS IN NEW YORK CITY, BOSTON, CHICAGO AND PHILADELPHIA.

	New York	Brooklyn	Boston	Chicago	Philadelphia
Population					
U. S. 1910 Census (in thousands)...	2,762	1,634	1,043	2,185	1,604
Increase over 1900, per cent.....	34.7	40.1	20.4	28.7	20.3
Land area served in sq. miles, 1900..	62.59	77.63	87.35	179.58	169.73
Population (in thousands) per sq. mile, 1900.....	44	21	12	12	9.5
Number of dwellings (in thousands), 1900	100	113	117	193	249
Population per dwelling, 1900.....	20.4	10.2	7.4	8.8	5.3
Track					
Surface track, miles.....	494.62	512.05	410.04	572.93	545.74
Subway and elevated track, miles....	199.97	103.79	24.09	149.22	14.65
Ratio, subway and elevated, to total, per cent	28.8	16.8	5.5	20.7	2.6
Proportion of line, double track, per cent	87	96	85	95	42
Population served per mile of track....	5,585	3,191	2,545	3,814	2,940
Miles of track per sq. mile of area served	7.9	6.6	4.7	3.2	3.2
Car Miles Operated					
Car miles (in millions).....	68.96	55.45	43.59	81.47	66.68
Car miles (in thousands) per mile of track	139	108	106	142	122
Car miles per capita.....	25	34	42	39	42
Average Speed					
Average speed (miles per hour).....	7.43	8.00	9.76	....	7.96
Average Length of Trip					
Average length of round trip, miles... ..	8.89	8.38	9.24	....	12.50
Average Maximum Cars Operated					
Average maximum cars operated.....	2,464	1,709	1,600	....	1,776
Average maximum cars per mile of track	5.0	3.3	3.9	....	3.3
Population served per average maximum cars operated.....	1,376	956	652	....	903
Seats per Car					
Average seats per car.....	38.7	45.0	....	....	34.1
Seat Miles					
Seat miles operated (in millions)....	2,668	2,495	....	....	2,274
Seat miles per capita.....	966	1,527	....	....	1,418
Seat miles per passenger ride.....	4.5	5.6	....	....	5.7
Passengers					
Revenue passengers, in millions.....	430.67	298.70	236.37	429.09	338.52
Transfer passengers, in millions.....	160.53	149.00	115.08	310.90	60.50
Transfer passengers, per cent of revenue passengers.....	37.3	49.9	41.0	72.5	17.9
Passengers per Service Unit					
Per car mile.....	8.6	8.1	8.1	9.1	6.0
Per round trip.....	....	71	75	....	75
Passengers (all classes) in thousands, per mile of track.....	1,195	874	857	1,292	732
Rides per annum per capita.....	214	274	337	339	249
Fares per annum per capita.....	156	183	227	196	211
Power					
Kw-hours distributed per car mile....	2.90	....	....	3.49	2.71
Station load factor, per cent.....	37	35	39	44	37
Total Gross Earnings					
Total gross earnings, in millions of dollars	22.95	15.12	14.49	21.95	17.04
Gross Earnings per Unit					
Per passenger (all classes) in cents... ..	3.88	3.38	3.66	2.97	4.27
Per car mile, in cents.....	33.3	27.3	28.4	26.9	25.6
Per mile of track, in thousands of dollars	46.4	29.5	33.7	38.3	31.2
Per capita, in dollars.....	8.31	9.26	13.88	10.05	10.63
Passenger Receipts					
Per revenue passenger, in cents.....	4.98	4.87	4.99	4.96	4.88
Per passenger (all classes) in cents....	3.63	3.25	3.54	2.88	4.14
Receipts per Operating Unit					
Per car mile, in cents.....	31.1	26.2	27.4	26.2	24.8
Per seat mile, in cents.....	0.80	0.58	....	....	0.73
Operating Expenses per Unit					
Per cent of gross earnings.....	68.4	64.8	65.1	64.1	54.9
Per revenue passenger, in cents.....	3.65	3.28	3.35	3.29	2.76
Per car mile, in cents.....	22.8	17.7	18.4	17.3	14.0
Maintenance of Way and Structures					
Per mile of track, in dollars.....	5,870	2,507	2,445	2,694	1,695
Per car mile, in cents.....	4.21	2.32	2.30	1.89	1.39
Per cent of gross earnings.....	12.7	8.5	10.1	7.0	5.4

Maintenance of Equipment

Per average maximum car, in dollars..	706	874	525	....	524
Per car mile, in cents.....	2.52	2.69	1.93	1.48	1.40
Per cent of gross earnings.....	7.6	9.9	7.1	5.5	5.5

Total Maintenance

Per car mile, in cents.....	6.73	5.01	4.23	3.37	2.79
Per cent of gross earnings.....	20.2	18.4	17.2	12.5	10.9

Cost of Power

Per kw-hour distributed, in cents....	1.22	0.43	0.74	0.83	0.65
Per car mile, in cents.....	3.55	2.58	2.39	2.89	1.43
Per cent of gross earnings.....	10.6	9.4	8.5	10.7	6.8

Platform Wages

Per car hour, in cents.....	46.7	41.6	63.2	....	46.0
Per car mile, in cents.....	6.28	5.20	6.47	6.80	5.77
Per cent of gross earnings.....	18.9	19.1	26.8	25.2	22.6

Total Operation of Cars

Per car hour, in cents.....	63.2	59.2	83.4	....	53.5
Per car mile, in cents.....	8.50	7.39	8.22	7.88	6.72
Per cent of gross earnings.....	25.6	27.1	29.0	29.2	26.3

Damages and Legal Expenses

Per cent of gross earnings.....	7.3	5.9	5.8	7.4	6.7
Per 1000 passengers (all classes), in dollars	2.85	1.98	2.13	2.21	2.88
Per car mile, in cents.....	2.44	1.60	1.66	2.00	1.72

Other General Expenses

Per cent of gross earnings.....	4.7	4.0	4.6	4.3	4.2
Per car mile, in cents.....	1.56	1.09	1.29	1.16	1.06

Total General Expenses

Per cent of gross earnings.....	12.0	9.9	10.4	11.7	10.9
Per 1000 passengers (all classes), in dollars	4.67	3.33	3.80	3.48	4.65
Per car mile, in cents.....	4.00	2.69	2.95	3.16	2.78

Fatal Accidents (Surface)

Car miles operated, in thousands, per person killed	801.8	924.2	1381.8	....	952.6
Passengers carried, in millions, per person killed.....	6.87	7.46	10.70	....	5.70
Passengers carried, in millions, per passenger killed	49	29	35	....	57

Personal Injuries (Surface)

Total persons injured, in thousands... ..	14.64	8.65	3.11	....	7.24
Car miles, in thousands, per person injured	4.70	6.40	16.42	....	9.21
Passengers carried, in thousands, per person injured	40.37	51.74	127.27	....	55.08

Payments for Injuries and Damages

Amount, in thousands of dollars....	1,682	884	844	....	1,149
Per car mile, in cents.....	2.44	1.60	1.66	....	1.72
Per 1000 passengers, in dollars.....	2.85	1.98	2.13	....	2.88
Per cent of transportation revenue....	7.84	5.98	6.00	....	6.95

are operated in Philadelphia an average of two and one-half times as many seats as passengers. This ratio of seats per passenger is larger in Philadelphia than in New York or Brooklyn, where the firm has also conducted passenger-mile counts.

EXCHANGE PASSENGERS, RUSH-HOUR SERVICE AND POWER

The number of 3-cent exchange passengers in 1910 in Philadelphia was 42,467,617. In that city also the maximum number of cars operated in rush hours is approximately 39 per cent to 45 per cent greater than on the base-schedule during the middle of the day. In some of the other cities twice as many cars were operated at the rush hours as during the middle of the day. The low figure of 2.71 kw-hours per car mile in Philadelphia is due somewhat to smaller and lighter cars in the city.

GROSS EARNINGS PER UNIT

Due to the small number of free transfers and 3-cent exchanges, the earnings per passenger are largest on the Philadelphia system and smallest in Chicago, where they are 30 per cent less. On the other hand, due to small cars and the large car mileage operated, the gross earnings per car mile are smallest in Philadelphia.

RECEIPTS PER PASSENGER MILE

A division of the passenger receipts by the average length of ride per revenue passenger, as ascertained by count, shows that the average passenger receipts per passenger mile on the surface system in Philadelphia are approximately 1.75 cents. From the count of passenger mileage made by Ford, Bacon & Davis in some of the other cities in this list and in similar cities, it is believed that these receipts per passenger mile in Philadelphia are higher than in any of the other cities named, in some of which the receipts per passenger mile are believed to be as low as 1.25 cents, and they compare favorably with those of other large street railway systems in this country.

OPERATING EXPENSES PER UNIT

In referring to the low percentage of operating expenses to gross earnings and the operating expenses per revenue passenger and per car mile the report says:

"From this will be noted that the reported operating ex-

penses, exclusive of taxes, of the Philadelphia system, are lower than those of any of the other systems by almost 10 per cent of the gross earnings. This ratio of operating expenses is largest in New York and in the other three cities averages about 65 per cent. The large difference in favor of the cost of operating the business of the Philadelphia system is accounted for by the large average receipts per passenger and per passenger mile, the comparative cheapness of cost of power and car operation and the small amount spent and charged to operating expenses for maintenance and renewals of physical property. * * * In operating expenses per car mile, the Philadelphia system is again lowest, due partly to the same causes which reduce its operating ratio, and partly to the smaller and lighter cars."

MAINTENANCE OF WAY AND STRUCTURES

In discussing this figure the report says that the New York figures are high owing to the underground trolley construction, and that in Chicago a large portion of track reconstruction had

TABLE II.—COMPARISON OF ACCIDENTS REPORTED FOR PAY-WITHIN AND OTHER CARS OCCURRING DURING YEAR TO JUNE 30, 1910.

Class of Accident.	FOR PAY-WITHIN CARS.		FOR OTHER SURFACE CARS.		TOTAL FOR SURFACE CARS.	FOR SUBWAY-ELEVATED CARS.
	Number of Accidents.	Ratio to Total Surface Car Accidents of Same Class.	Num. Accidents.	Ratio to Total Surface Car Accidents of Same Class.	Number of Accidents.	Number of Accidents.
Boarding cars.....	431	16.0%	2,261	84.0%	2,692	95
Leaving cars.....	297	6.5	4,244	93.5	4,541	56
Station.....	...	.....	.....	.....	.....	265
Passengers falling from cars.....	15	3.0	485	97.0	500	...
Passengers falling on cars.....	438	36.6	757	63.4	1,195	...
Pedestrians struck...	412	27.6	1,084	72.4	1,496	...
Collisions with cars...	623	24.4	1,939	75.6	2,562	...
Collisions with cars, vehicles, etc.....	3,384	28.4	8,538	71.6	11,922	...
Miscellaneous.....	373	16.7	1,852	83.3	2,225	...
Other reports of slight occurrences.	2,270	31.8	4,866	68.2	7,136	134
Total.....	8,243	24.0%	26,026	76.0%	34,269	550
	Pay-Within		Other Surface		Total	
	Num-ber.	Per Cent. of Total	Num-ber.	Per Cent. of Total	Surface.	
Cars operated as per schedule at June 30, 1910.....	478	25.9%	1,368	74.1%	1,846	

TABLE III.—CAR MAINTENANCE RECORDS IN PHILADELPHIA.

Total Pull-Ins.	1907.	1908.	1909.	1910.
Number.....	5,874	3,805	2,293	2,713
Schedule car days per pull-in.....	112	169	247	209
Car miles operated, in thousands, per pull-in.	13.74	20.84	30.49	24.58
Pull-Ins Caused by Failure of Equipment.				
Number.....	2,736	1,733	1,186	1,325
Schedule car days per pull-in.....	241	370	478	428
Car miles operated, in thousands, per pull-in.	29.50	45.77	58.96	50.32
Car Inspection and Repair Men.				
Number.....	889	813	824	884
Schedule car days per man.....	743	788	688	642
Car miles, in thousands, per man.....	90.79	97.56	84.86	75.43
Cost of Car Maintenance.				
Amount, in thousands of dollars.....	863.56	783.49	796.27	864.68
Per scheduled car day, in dollars.....	1.31	1.22	1.40	1.52
Per car mile, in cents.....	1.07	0.98	1.14	1.30
Car Painting.				
Cars completely painted.....	455	448	473	568
Cars partly painted and varnished.....	786	535	755	1,359
Total cars painted.....	1,241	983	1,228	1,927
Car Cleaning.				
Average number of cleaners.....	212	164	145	175
Cost of cleaning, in thousands of dollars.....	133.54	107.06	97.83	103.91
Cost per 1000 car miles, in dollars.....	1.65	1.35	1.40	1.56

been charged to capital. The expense of maintenance of way and structures for Brooklyn and Boston is believed to be more nearly normal, and in these two systems averages about 2.3 cents per car mile, or about 9 per cent of the gross earnings, as compared with 1.39 cents per car mile and 5.4 per cent of gross earnings in Philadelphia. On the other hand, as stated, the Philadelphia track construction is of a heavier, more substantial character than the average of these other cities, which should result in lower cost of maintenance.

In discussing the percentage of maintenance of equipment and total maintenance to gross earnings, the report says that

both are too low and that the company should increase the latter by about 7 per cent more of its gross earnings.

POWER

The cost of power per kw-hour and per car mile is low. The former is due to low cost of production and the latter in part to the light weight of the car equipment and in part to good operating efficiency in this particular.

ACCIDENTS

The total annual number of claims made for damages on the Philadelphia surface system has decreased from 19,373 in 1907 to 7,665 in 1910. During the same period the ratio of claims disposed of to claims presented increased from 64.6 per cent to 86.1 per cent.

The report states that the pay-within car has materially reduced the number of alighting and boarding accidents, as shown in Table II. On the other hand, the report says that a large proportion of accidents occurring on these cars from passengers falling shows the necessity of additional steadying devices both inside the car and especially on the platform.

In discussing the subject of car maintenance, the report gives the statistics published in Table III and points out that the number of pull-ins is much smaller in Philadelphia both in total and per unit of service than with other large railway systems. The rule has been to keep the cars out in operation as long as practicable.

PARTS RENEWED

The number of pairs of wheels changed has decreased from 13,547 in 1907 to 8,120 in 1910. The number of gears renewed decreased from 724 in 1907 to 277 in 1909, increasing again to 807 in 1910. The number of pinions renewed decreased from 4187 to 2901 in 1910, while the number of armatures removed increased from 7006 in 1907 to 10,860 in 1910, and the number of fields removed increased from 1321 in 1907 to 5263 in 1909, decreasing to 4319 in 1910. This indicates that the amount of electrical repairs has considerably increased in this period both in total and per unit of service.

CAR PAINTING

The report says that at an average of one partial painting and varnishing in fifteen months the present 3292 cars should go through the paint shop at the rate of about nine cars per working day. During the past four years 379 cars have gone through the paint shop, or an average of 4.5 cars per working day. The average amount of painting for this period has, therefore, been just about half as much as usual practice would dictate. This condition improved somewhat in 1910, however, as 1927 cars were put through the paint shop, or an average of 6.4 cars per working day.

The report states that the number of car cleaners and cost of car cleaning given in Table III should be sufficient to keep the cars in good condition, as these amounts are larger in proportion to the service operated than on other large systems.

TRAFFIC AND SERVICE

Systematic observations of traffic and service were made during the period from July 12, 1910, to Feb. 1, 1911. These observations on all parts of the system comprised:

(1) Preliminary car-riding observations, from July 12 to September 1, to determine (a) characteristics of traffic and (b) principal time points.

(2) Preliminary rush-hour street observations between 4 p. m. and 7 p. m., from July 15 to Aug. 26, 1910, to determine (a) number of passengers carried past or away from each important point, (b) regularity of schedule and (c) car loading.

(3) General passenger count of entire system, being a 24-hour car riding count of an average of 12 per cent of the cars of each line by selected groups, made on week days except Saturdays, Sundays and holidays, between Aug. 29 and Sept. 22, to record (a) passengers on and off at each stop, and (b) time of car at schedule points.

From these records in connection with counts of transfers and exchanges for the same days the engineers determined for each line and for the system the following:

(a) Average length of ride per passenger, (b) number of

passenger miles operated, (c) average rate of fare per passenger mile, (d) proportion of passengers originating and delivered in each section, (e) approximate destination and routes of passengers, (f) points of maximum loading, (g) load zones, and (h) balancing of traffic on double-end lines.

(4) Rush-hour street observations at boundaries of delivery district between 4 p. m. and 7 p. m. to determine (a) number of passengers carried into and out of delivery district, (b) regularity of schedule and (c) car loading.

This count was made daily by selected groups of lines from Aug. 29 to Sept. 22, also simultaneously for all lines on Oct. 5 and 6, also daily by selected groups of lines for a composite day of the period from Dec. 19 to Dec. 23, inclusive.

(5) Street observations of car equipment from July 15 to Oct. 1, to determine (a) type of cars used on each line and (b) condition of car maintenance.

(6) Street observations between 10 a. m. and 2 p. m., from Dec. 1, 1910, to Feb. 1, 1911, to determine (a) adequacy of non-rush or base schedules, and (b) regularity of schedule.

GENERAL PASSENGER COUNT

The general passenger count was conducted by observers placed on one car in every eight of each line for 24 hours to record the number of passengers on and off at each stop. As about 1,800 cars were operated, it was not feasible to cover the entire system in one day, and therefore the count was made by groups of related or adjacent lines, extending from Aug. 29

or seating capacity provided. The receipts per seat mile were high where the average ride was short and the traffic heavy. The report also calls attention to the fact that the elevated system shows receipts per seat mile only 5 per cent less than the average for the surface systems.

AVERAGE WEIGHTS CARRIED

The average weight of empty cars on the surface system was 13.8 tons or 700 lb. per seat, this being equivalent to 1930 lb. per passenger carried. The average weight of cars and passengers carried on the surface system was 2120 lb. per passenger, and on the subway-elevated line 3420 lb. per passenger.

RECEIPTS AND OPERATING EXPENSES PER PASSENGER MILE

These two figures are given in columns 7 and 8 of Table IV. In these figures the suburban lines have not been shown as their operating expenses vary greatly from the average for the surface system. The report says: "It is interesting to note that the length of routes and density of traffic are such that the length of a passenger's ride may exceed the length of haul for which operating expenses equal receipts on five lines out of seven to the northeast, on thirteen lines out of nineteen to North Philadelphia, on all lines to the north suburbs, on one line out of seventeen to South Philadelphia, on seventeen out of seventeen to West Philadelphia and on twenty-three out of twenty-six crosstown lines. This means that on sixty-five lines out of ninety-two, counting double-end lines as two each, many passengers ride who do not pay operating expenses, without con-

TABLE IV.—STATISTICS OF TRAFFIC AND SERVICE PHILADELPHIA RAPID TRANSIT COMPANY.

	Average Length of Ride Per Passenger (All Classes) (Miles).	Cash Receipts Per Passenger Mile.	Passengers per Car.		Receipts per Seat Mile.				Receipts and Operating Expenses, per Passenger Mile.		
			Average	Percent of	Seats per Passenger.	Ratio to Average.	Receipts per Seat Mile.	Ratio to Average.	Passenger Receipts (for Composite Day of Riding Count Aug. 29, Sept. 22, 1910)	Operating Expenses (Based upon Average per Car Mile for Year to June 30, 1910)	Per Cent Expenses to Passenger Receipts
Lines from delivery district to:											
Northeast	2.57	1.61c	16.1	115	2.6	93%	0.63c	102%	1.61c	0.87c	54%
North Philadelphia.....	2.24	1.95	14.6	104	2.7	96	0.72	116	1.95	0.96	49
North Suburbs.....	3.72	1.09	18.0	129	2.3	82	0.48	77	1.09	0.78	72
South Philadelphia.....	1.86	2.33	14.0	100	2.7	96	0.85	137	2.33	1.00	43
West Philadelphia.....	2.47	1.78	13.3	95	3.0	107	0.60	97	1.78	1.05	59
Average delivery district lines..	2.42	1.72	15.0	107	2.7	93	0.65	105	1.72	0.93	54
Crosstown lines:											
West	1.34	2.20	10.6	76	3.7	132	0.60	97	2.23	1.32	59
South	1.42	2.35	9.8	70	4.1	146	0.60	97	2.35	1.43	61
North	1.98	1.87	11.6	83	3.5	125	0.54	87	1.88	1.21	64
Average crosstown lines.....	1.74	1.98	11.1	79	3.6	128	0.56	90	1.98	1.26	63
Suburban lines.....	8.72	1.57	9.5	68	3.8	135	0.41	66			
Average, surface system.....	2.31	1.75	14.0	100	2.8	100	0.62	100	1.75	1.00	57
Subway-Elevated	3.27	1.27	22.6	161	2.1	75	0.59	95	1.27	0.62	49

to Sept. 22, 1910. No observations were taken on Saturdays, Sundays or holidays.

The records made on the cars were combined, giving the net number of passengers between stops. These numbers multiplied by distance equal the passenger miles carried. The average length of ride per passenger was then obtained by dividing the total passenger mile as above by the number of passengers counted. From this unit calculated for each line, the total passenger mileage for all passengers carried was obtained.

The average length of ride by groups of lines is shown in the first column of Table IV. The average length of ride as given is for passengers of all classes, whether riding on tickets, cash, 3-cent exchanges or free transfers. The average length of ride per revenue passenger (including 3-cent exchanges) was 2.71 miles on the surface system and 3.96 miles on the subway-elevated, or an average of 2.79 miles on the entire system.

PASSENGERS PER CAR MILE

The number of passengers per car mile for all different lines was also obtained. It varied from 13.4 on the Fifty-second Street line to 1.07 on the Zoo line.

SEATS PER PASSENGER AND RECEIPTS PER SEAT MILE

Excluding less important lines, the seats per passenger (all classes) varied from 5.3 on the Dickinson line north of Market Street, to 1.5 on the Fox Chase line south of Market Street.

The receipts per seat mile are shown in column 5 of Table IV and, as will be noticed, the seats per passenger varied inversely as the length of ride and directly as the number of cars

sidering in the cost of operation, taxes, interest and depreciation on the investment required in their service."

RUSH-HOUR CORDON COUNTS

On Wednesday and Thursday, Oct. 5 and 6, between the hours of 4 p. m. and 7 p. m., "cordon" counts were made of passengers traveling on all lines into and out of the main delivery district in Philadelphia. These figures were carefully taken from the average carloads passing the cordon at different times. Similar information in regard to steam railroad and ferry traffic was obtained from the railroads. It was found that the total passengers carried on all service cars from 4 p. m. to 7 p. m. constituted 24 per cent of the passengers carried one way in twenty-four hours on the lines operating in the delivery district.

RUSH-HOUR PROBLEM

The report says: "The problem of determining the proper way of caring for this traffic involves the determination of a reasonable standard of car service for the rush hours, and the definition of practicable rules for car loading. The extreme limits of such service would be, on the one hand, to provide seats for all passengers, and on the other to continue the mid-day car service through this busy period. The maximum number of cars which can be operated is absolutely limited by track and crossing capacity, and the necessity of providing sufficient employment for the extra car men.

REASONABLE CAR LOADING

"From careful studies of car capacities, it has been found

that 4 sq. ft. of aisle and platform space per standing passenger allows comfortable standing space. This would mean, for the Philadelphia pay-within car, two rows of standing passengers with sufficient space for passage between, and a total capacity of seventy-six, of whom thirty-eight would be seated and thirty-eight standing. In other words, for a car with longitudinal or lengthwise seats, the standing capacity would equal the seating capacity. For a cross-seat car like those now operated in Philadelphia with seating capacity of forty, the standing capacity would be twenty-nine and the total sixty-nine. If the usual large prepayment platforms are used on the cross-seat car it would accommodate thirty-six standing passengers, or with the seated passengers a total of seventy-six. Therefore, applying this rule to the cross-seat car, the standing capacity would equal from 60 per cent to 90 per cent of the seating capacity. This standing load is practically within the limits used by other American street railway companies which have given attention to this subject, and as prescribed in some cases by governmental regulations abroad.

"This is believed to be a reasonable limit of car loading and has been used in the calculations and recommendations for rush-hour service."

LIMITS TO INDIVIDUAL CAR LOADS

To prevent or lessen periodical overcrowding caused by the bunching of cars or passengers, the report says that it is desirable to limit the loading of cars to the standard capacity determined. This under ordinary conditions of operation can be accomplished with platform doors or gates, which close the entrance and exit when the car is in motion, together with the use of the "car full" sign.

The reasonable use of the individual car limit and the "car full" sign has been found beneficial by the American companies that have adopted it. Efforts to restrict car loading to standards sometimes used abroad have met with objection because the limit has been placed at or near the seating capacity. This is impracticable under American conditions. During the non-rush hours, however, seats should be provided for all passengers. As the traffic increases at the beginning of the rush hours sufficient cars to furnish seats should be added until the maximum schedule is in operation. The report therefore recommends that rush-hour service in accordance with the standards outlined above should be furnished, and that individual car loads should be limited on a practicable plan with allowance for extraordinary conditions.

IMPROVED SERVICE PRACTICABLE IMMEDIATELY

The report continues: "As the present rush-hour service is considerably below the standard recommended, this plan cannot be put into effect until additional cars and power are secured. During the time of construction of additional equipment, it is recommended that the company operate a service, as far as the number of present cars and the capacity of its power system will permit, which will provide on each line during the busiest half-hour an average car loading equal to the recommended standard of maximum car capacity."

MAXIMUM CAR CAPACITY

In discussing this point the report says: "Experience in other cities has demonstrated that under ordinary conditions three single cars per minute per track can be passed over delivery district trackage. * * * The maximum number of cars passed over a crossing of single track with double track as observed in Philadelphia was at the rate of 390 cars per hour, or 108 on the single-track line and 141 on each track of the double-track line. In other cities as many as 180 cars per hour per track pass over intersections with equal vehicular congestion. The straight track capacity and not the crossings, therefore, would limit the track capacity in Philadelphia."

DEVICES FOR IMPROVING THE SERVICE

After as many cars as can be reasonably required for the rush-hour traffic, or as many as the track on delivery district streets will accommodate, have been put in use, the engineers suggest that the service can be reinforced by the following devices: (1) Careful timing of trippers to meet heavy loads.

(2) Trailers. (3) Turnbacks. (4) Special return routes for trippers. (5) Through routing.

TRAILERS

The report considers the relative advantages and disadvantages of trailers and discusses this point as follows:

"Trailers afford the greatest equipment resource for relieving rush-hour pressure. Track capacity can be increased by as much as 50 per cent, depending on the proportion of trailers used. More seats and standing capacity can be furnished for the same investment in equipment. The weight of equipment per passenger is less, so that the power and distribution requirements are less. For a given number of extra platform men a greater number of cars can be operated. Trailers should have a passenger capacity equal to or greater than the motor cars and should be provided with air brakes and proper safety appliances.

"The chief objections to trailers are that they are considered more liable to step accidents, and that they appear to obstruct the streets to a greater extent than individual cars. This greater liability to step accidents can be corrected with gates or doors which close the platforms while the cars are in motion. Collision accidents which vary with the car mileage should be largely reduced by the use of trailers. As to street incumbrance, it is clear that the same number of individual cars starting, moving and stopping require more room than if run in pairs. There are objections and limitations to the use of trailers from an operating standpoint, largely on account of track clearance conditions and coupling difficulties on curves at narrow street intersections. On some of the Philadelphia lines trailers can undoubtedly be used. Alterations in routes might be warranted in some cases in order to use trailers, or special trailer routes might be operated during the rush hour to avoid difficult curves. The solution of this problem might necessitate equipping the trailer with motors and designing a special type of car which would increase the passenger space per extra operative. It is best practice to use trailers with tripper cars only, as two-car tripper trains may thus be kept coupled while out of service. The use of trailers at the rush hours is especially desirable on long lines.

"The operating economy of trailers in tripper service is demonstrated by the following estimates of earnings and expenses. In the first column is shown the annual income account of a single motor car, and in the second column the corresponding result for a trailer. It is estimated that each tripper makes two round trips in the morning and two in the evening, carrying a full load one trip and a seated load one trip with allowance for the smaller volume of business at the morning rush.

TABLE V.—ESTIMATE OF COMPARATIVE ANNUAL INCOME ACCOUNT OF TRIPPER CARS.

	Motor Car.	Trailer.
Receipts	\$2,664	\$2,664
Operating expenses.....	1,884	1,375
Net earnings.....	\$780	\$1,289
Interest, taxes and depreciation (10 per cent. on cars, power plant, carhouses and shops)	1,500	920
Income (exclusive of return on investment in track and line).....	\$720 (Loss)	\$369 (Profit)

"It is thus seen that if motor cars alone are used only a few hours per day they would operate at a loss which must be made up in some other direction, while a small profit is indicated for trailers."

ROUTING

The report concludes with a chapter of twenty-eight pages illustrated with many maps on routing.

Matanzas Terminal Railroad has been incorporated at Kittery, Maine, to build and operate a steam or electric railroad at Matanzas, Cuba, and engage in any other transportation, agricultural, mining, manufacturing or mercantile business in Cuba. The authorized capital stock is \$50,000. Horace Mitchell, Kittery, is president and clerk of the company.

PROPOSED RELIEF FOR TRAFFIC CONGESTION IN NEWARK

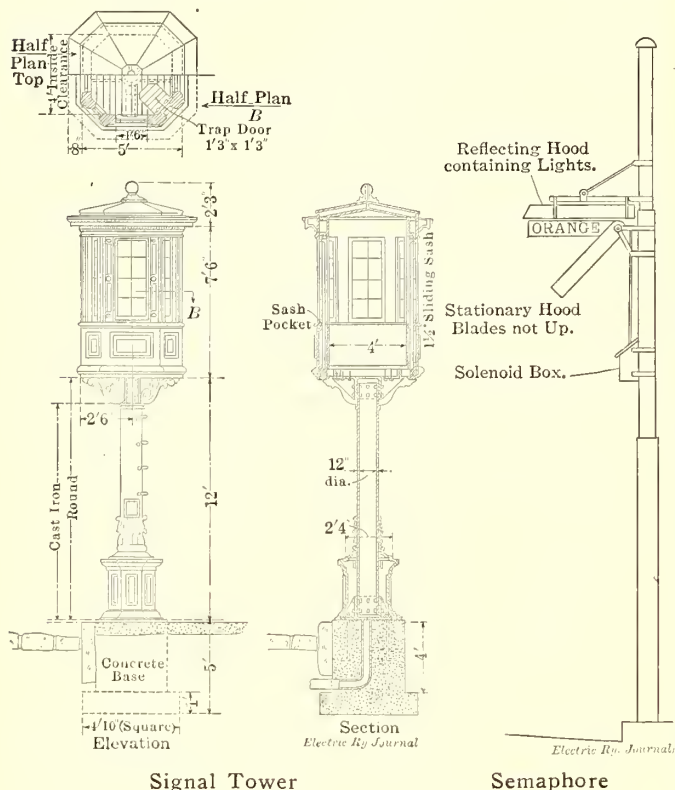
The corner of Broad and Market Streets, Newark, N. J., is the most congested portion of the system of the Public Service Railway. Here two double-track lines intersect and a traffic officer is on duty at that point at all times of the day to signal

should be employed to indicate positively the points at which those who wish to board the cars on the different routes should congregate. As a solution of this problem R. E. Danforth, general manager of the Public Service Railway, recently submitted to the authorities the plan outlined below. This plan is now under consideration by the city.

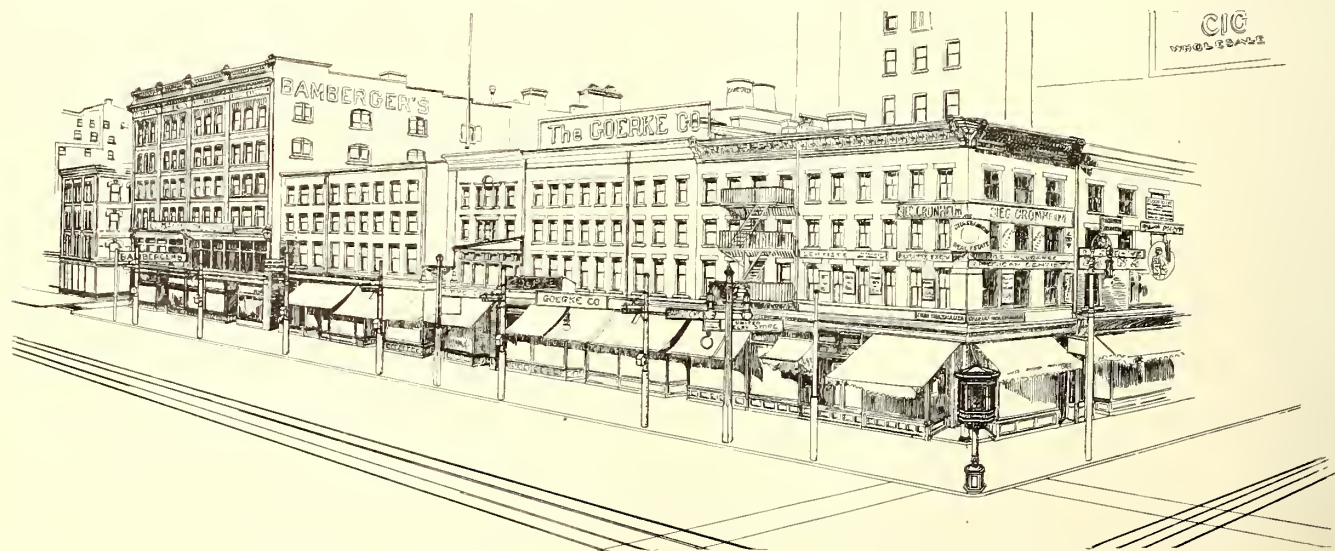
Mr. Danforth has suggested that the system described should be installed first on the block on Market Street west of Broad Street. Here at least six fixed stopping points are to be established, and each point is to be marked by a semaphore placed on a pole set at the curb line. Each semaphore will be provided with a number of signal arms and each signal arm will be marked with the name of one of the routes of the cars passing that place. There will be as many signal arms on each semaphore as there are routes to be indicated, and the signal arms will be suitably illuminated at night by means of lights placed in a reflecting hood. Three of these semaphores will be mounted on trolley poles now in place, the other three upon poles to be set in the proper position. The semaphores are to be controlled by an operator placed at the corner of Market Street, from which point he will have a clear view of the cars as they approach from the east. The type of semaphore suggested is illustrated in detail in one of the accompanying engravings.

The semaphores will be operated electrically from a switch tower at the corner of Market and Broad Streets. The proposal of the Public Service Railway suggests that the switch tower should be similar to that used for the control of switches and signals in front of the Union Station, Washington, D. C. This tower was illustrated in the *ELECTRIC RAILWAY JOURNAL* of April 17, 1909, and a line drawing of it, as designed for the Newark conditions, is published herewith.

The operation of the system would be as follows: After a group of cars on Market Street had crossed Broad Street, the traffic officer at that point would decide how many cars he would permit to cross in the next lot of cars to cross Broad Street and would signal this number to the operator in the tower. The latter would then notice the routes of the cars waiting to cross and, while traffic was being moved north and south on Broad Street, he would set the correct signals for this number of cars on the different semaphores. This would give a minute or more for those persons waiting to board the cars to assemble in the proper places. When these cars were



cars across the intersection. During the non-rush hours the cars are sent across the crossing singly or in pairs, but during the rush hours some time is saved by sending them across in groups of three or more. The only drawback to this plan is that people who board the cars at the farther crossing cannot



Proposed Car Signal System—View Showing Signal Tower and Six Semaphores

tell in advance the points at which particular cars will stop. For instance, after a group of four or more cars going west on Market Street have crossed Broad Street an intending passenger may find the car which he wishes to board at any point in the block beyond the intersection.

As the traffic at this point is increasing the Public Service Railway and the city authorities have realized that some method

ready to start the operator would drop the semaphore blades so as to be ready to re-set them for the next lot of cars. As will be seen, the system is very flexible. Any number of cars up to six could be allowed to pass the crossing at once. During those hours when cars crossed the intersection singly a semaphore would be displayed on the pole nearest the crossing, indicating that all cars stopped at that point.

The proposal of the company to the city said that, while it was desirable to use a signal tower to carry out this plan, the operating mechanism for the semaphores might be installed in a switch box which would be no larger than the United States letter box and that it might then be placed on a trolley or lighting pole near the corner. But if the mechanism was located in a tower the operator would be able to see the cars standing in Market Street east of Broad Street above the vehicle and other traffic. He would thus be able to see the names of the lines on the decks of the cars and to set the signals prior to the passage of the cars over Broad Street. If the operator was located on the street he would not be able to see over pedestrians and vehicle traffic in the street and would therefore not be able to set the semaphores before the cars started to cross the intersection. Hence the company strongly recommended the use of the tower.

ARNOLD REPORT ON PROVIDENCE

On June 1 B. J. Arnold transmitted to the joint special committee on railroad franchises of the City Council of Providence a report on service and transportation conditions in that city. This report was made at the request of the council, as expressed in its instructions dated Jan. 7, 1911. In his letter of transmissal, Mr. Arnold says that he has not attempted to investigate the corporate relations or the finances of the Rhode Island Company. His purpose has been simply to study the traction situation as it exists, to make recommendations for improvements and to give some idea of the magnitude of the problems of the future. He makes special acknowledgment of the courtesy and assistance rendered him in this study by the officials of the Rhode Island Company. The report submitted June 1 is of a preliminary character only. The complete report will be quite comprehensive and will contain some 200 pages, with numerous tables and some forty maps and diagrams. It will probably be submitted during the early part of July.

GENERAL CONDITIONS

The report says that the present service rendered by the Rhode Island Company of Providence is not constitutionally bad. In some respects it is better than in other cities and the present deficiencies can be largely and almost immediately overcome by carrying out a co-operative program in which both the city and company would participate for effective results.

The report then dwells on the inadequacy of the present streets, which, especially in the center of the city, are cramped. The city should create new or enlarged streets for double track operation and should co-operate with the company in re-routing the lines in the terminal district. There should be intelligent city planning in the suburbs and this should not be intrusted to accidental development or snap judgment. A special effort should be made to improve the approaches to the east side. In recent years Providence has grown rapidly and the traffic even more rapidly, but the increase in car equipment has not kept pace with this traffic. In 1910 the Rhode Island System as a whole earned about \$9.70 per capita.

TRAFFIC IN THE TERMINAL DISTRICT

A count was made during March at the maximum loading point of the nine outlet routes of travel from the terminal loading district. These counts showed 14,730 passengers and 11,036 seats outbound between 5:30 p. m. and 6:30 p. m. During the heaviest ten-minute period nearly one-quarter of the traffic occurred. In the heaviest twenty-minute interval the loading varied from 89 per cent to 164 per cent on individual lines and from 123.6 per cent to 141 per cent for the system. Monthly records show that the traffic during February and March is the minimum of the year.

SERVICE IMPROVEMENTS

Among important improvements of service needed is an increase in schedule speed, which approaches now only 7.96 m.p.h.; entirely too low for a city with radial thoroughfares. Some of the lines average a little more than 6 m.p.h. or less. The speed of the cars is limited by city ordinance for the

greater part of the city, outside of the business district, to 9 m.p.h. Automobiles are permitted to operate at 15 m.p.h. This condition should be changed, because cars operating on a fixed track with air brakes and fenders can obviously run with safety at least as fast as undirected vehicles.

In the city districts of Providence white posts approximately 250 ft. apart indicate stopping points. These should be spaced 500 ft. apart. Other means for increasing the speed are promptness in dispatching, installation of double tracks and electric track switches, and express service to certain suburbs.

Trolley freight should be excluded from the lines during rush hours, and separate routes should be reserved as far as possible for this service, with the ultimate establishment in mind of a central interurban freight terminal.

EQUIPMENT IMPROVEMENTS

The present rolling stock is about equally divided between summer and winter types. Of the winter equipment about 28 per cent are single truck cars, but these represent only 21 per cent of the seating capacity. After a suitable east side approach is determined upon, these cars should be retired for larger equipment.

Prepayment operation should be introduced. This can be done by increasing the present length of platforms, and the city ordinances which restrict the length of cars should be changed. A seating arrangement in which at least half of the seats are cross seats should be adopted for the city cars and all of the long-haul suburban cars should have cross seats. Convertible cars should be gradually put in service in place of the present open-bench open cars. Single-ended operation is recommended for routes with heavy traffic. The old carhouses should be remodeled for double-ended carhouse operation. New substations for maintenance of the voltage on the long lines should be built and more track should be laid.

Mr. Arnold also suggests the appointment of a supervising local engineer by the city in case a State public service commission is not authorized.

RE-ROUTING

The report also suggests re-routing a number of lines. In general the cars should be routed as directly through the business district as possible until a street of suitable width is reached. Long-haul suburban lines should be looped back if possible just outside the center of the city in order to save delay.

OTHER RECOMMENDATIONS

Among other recommendations Mr. Arnold makes the following for the city or company:

Regulation of transfer use.

Reorganization of destination sign system.

Amend speed ordinance permitting street cars the same running speed, subject to suitable precautions within the loading district, as automobiles.

Vehicle traffic ordinance regulating size of vehicles.

Right-of-way ordinance giving street cars a second right-of-way over all other vehicles except fire, police and ambulance vehicles.

Provide shelters at loading and transfer points.

He also submits the following suggestions to the public:

Cultivate prompt movement so that both public and company may benefit.

Have exact fare ready, if possible, before entering the car to facilitate a prepayment plan of fare collection.

Form the habit of moving forward in a car.

Investigate complaints and company's rules before criticising.

Render complaints to company first, newspapers second.

Assist in re-routing with arguments and data based on knowledge rather than assumption.

Forego the convenience of a private stop in front of home or office, if necessary, for the execution of effective re-routing plans.

Avoid round trip riding on a single fare by means of transfers.

Avoid boarding or leaving cars in motion.

NEW YORK SUBWAY REPORT SUBMITTED

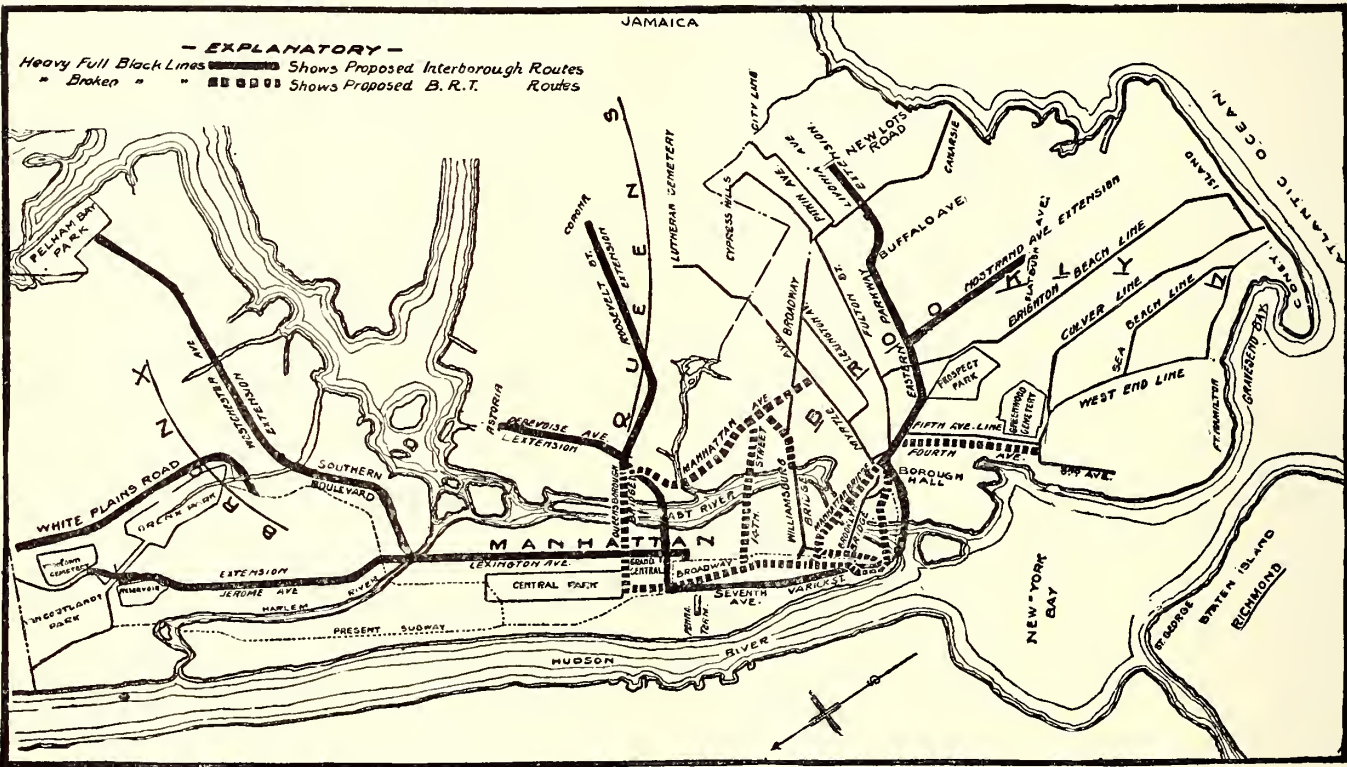
The special committee of the Board of Estimate and Apportionment of New York and of the Public Service Commission of the First District of New York presented to the Board of Estimate and Apportionment on June 13, 1911, its report with relation to the pending proposals submitted by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company for the construction, equipment and operation of rapid transit lines in New York and upon the general transit situation in New York. The report contains eighty-nine printed pages. It includes the several proposals of the two companies, tables which show the cost of the projected lines under the adjustment proposed by the committee, cost of the lines under the proposal of the Brooklyn Rapid Transit Company, the cost under the proposal of the Interborough Rapid Transit Company, the comparative mileage and trackage to be operated at a 5-cent fare with universal transfers under the adjustment proposed, similar data under the pending proposals, tables

case both decline the city is to proceed to advertise for bids for the construction and operation of the triborough subway.

EXPENDITURES DEMANDED

The report estimates that the city will invest \$58,400,000 in the construction of lines offered to the Brooklyn Rapid Transit Company for operation, in addition to \$27,800,000 already contracted for or spent on the Fourth Avenue, Brooklyn, subway and the Centre Street Bridge loop. The Brooklyn Rapid Transit Company's contribution is \$26,400,000 for construction and \$24,000,000 for equipment, a total of \$50,400,000.

On the lines to be jointly constructed with the Interborough Rapid Transit Company the city proposes an outlay, including an allowance of \$3,000,000 for finishing the Steinway tunnel, of \$109,600,000. This is to be shared, half and half, by the city and the company, and in addition the Interborough Rapid Transit Company is to spend \$21,000,000 for equipment, making an aggregate expenditure for that company of \$75,800,000 and an aggregate expenditure by the city of \$123,200,000, or \$131,200,000 if \$8,000,000 additional allowance for the city's share of the



Map Showing Proposed Division of Rapid Transit Routes in New York

showing the probable period of construction, the population and density of areas tributary to the proposed routes, etc.

The report is unanimous. As had been predicted, it recommends a division of territory between the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company, and it is suggested that the city proceed with the construction of the proposed triborough rapid transit line laid out by the Public Service Commission if the companies fail to agree to the financial and operating conditions which are proposed in the report. In transmitting the report the conferees suggest that the time allowed for the reception of "definite answers from the companies be limited by resolution of the board, and that the final action of your board be taken at the earliest practicable date." The report will be considered by the Board of Estimate and Apportionment on June 21, 1911.

The report of the committee does not contain a map showing the lines allotted to the two companies, but from the printed schedules the New York Herald has prepared the accompanying map showing the proposed routes of each company.

The report provides the course to follow in case either or both companies decline to accept the routes offered. In general, these declined by one are to be offered the other, or in

real estate to be acquired be added in. The previous figure of \$123,000,000 included an allowance of \$10,000,000 for the proposed South Brooklyn lines.

The total outlay, exclusive of real estate, which cannot be estimated definitely, would be, if all lines are included:

	Construction.	Equipment.	Total.
By the city.....	\$131,200,000		\$131,200,000
By the Interborough.....	54,800,000	\$21,000,000	75,800,000
By the Brooklyn Rapid Transit..	26,400,000	24,000,000	50,400,000.
Total.....			\$257,400,000

Upon the basis of figures furnished by the officials of the city, the amount of available credit, above the constitutional margin of indebtedness of the city, during the next five years would be as follows:

Margin on June 30, 1911, general.....	\$15,000,000
Special credit for transit purposes on June 30, 1911, reserved under the recent constitutional amendment exempting self-supporting investments.....	60,000,000
Ten per cent of the additional assessed valuation of the city, becoming effective July 1, 1911.....	80,000,000
Ten per cent of the estimated increase of assessed valuation during the four years following.....	120,000,000
Proportion of the current city debt paid annually through taxation.....	50,000,000
Total.....	\$235,000,000

CONCLUSIONS OF THE COMMITTEE

The enumeration of the conclusions of the conferees follows in part:

"That the location of particular routes should be determined by the city, for the city's reasons, and not necessarily to conform to plans proposed by operating companies.

"That the occupation of lines in the hands of private operators should be kept within the city's control, and that the city should always have the power to retake the component parts of a system capable of independent operation at any time that it may deem such a measure necessary.

"That the city should have a full and fair share in all profits derived from the operation of new lines not only as a matter of the rightful enjoyment of the fruits of its own franchises, but as a means of hastening the release of its self-supporting investments from the constitutional debt limit and of the construction of additional transportation facilities.

"That the actual operation of the lines should continue under strict control and that the contracts for operation should embody not only the essential provisions of the Public Service act, but such other guarantees of the character of equipment furnished or the adequacy of operating service as the city may exact.

PROPOSED OPERATING TERMS

"That the rate of fare for one continuous ride over any part of the system operated by a single operator, including transfers, shall be 5 cents.

"That all contracts for the operation of lines title to which is vested in the city, whether such lines be constructed by the city or by the company, or upon a basis of division of cost between the city and the operator, shall fix the term of the lease at forty-nine years from the date of beginning of operation; except that the so-called bridge loop lines in Manhattan, if the contract for their operation is given to the Brooklyn Rapid Transit Company, may be leased for twenty years, with the privilege of renewal, upon an adjustment of terms, for twenty years in addition.

"That the city retain its right to take over, after ten years of operation, if it so elects, the line or lines covered by any forty-nine-year operating contract upon the payment by the city of the amount of the operator's money investment, if any, in construction, plus 15 per centum—which total sum shall decrease as the term continues and the investment is amortized—and the then reasonable value of the equipment attaching to the line or lines.

"That the city, in the event of any such recapture, may, upon its option, either 'pay from its own funds the amount required to reimburse the operator, or require a transfer of lines to a second operator upon the payment of the necessary amount directly by such other operator.'

DIVISION OF PROFITS

"That the receipts and operating expenses of all lines operated under the new contracts shall be ascertained as follows: Receipts shall consist of the value of the tickets collected at stations, miscellaneous earnings from stations, a pro rata of advertising and other general receipts. The fixed cost of operation shall include: Station expenses, maintenance of way and structure, damages for accidents, and taxes, if any, attaching to the particular line.

"All other operating expenses, divided on a cost-per-passenger basis—or other basis equally acceptable to the city—to be determined according to unit costs on the entire system for a single fare, as follows: Transportation costs; maintenance of equipment, renewals and depreciation; cost of power; general and administration expenses, and general taxes, if any.

"That the net profits derived from the operation of all lines shall be divided equally between the city and the operator, after provision has been made for carrying charges in the following order:

"(1) The actual annual charges of the operator for carrying the cost of equipment; with provision for a sinking fund not to exceed three-fourths of 1 per centum per annum to meet obsolescence.

"(2) The actual annual charges of the operator for carrying any portion of the cost of construction not met from the funds of the city; with provision for a sinking fund thereon (including brokerage charges, not to exceed 3 per cent) of not more than 1 per centum per annum.

"(3) Interest on bonds issued by the city to defray costs of construction or costs of real estate or easements, which provision for a sinking fund is not to exceed 1 per centum per annum; provided,

"(4) That if the gross income in any year, after providing for operating charges, shall be insufficient to cover interest and sinking fund upon the operator's bonds, the deficit for such period shall be borne by the operator solely; and provided further,

"(5) That if the gross income in any year, after providing for all charges, including interest and sinking fund on the operator's bonds, shall be insufficient to meet the interest and sinking fund upon the city's bonds, the deficit sustained for any such period shall be treated as cumulative and be a charge in the city's favor against future profits, to be made good before any equal division of profit shall proceed between the city and the operator; and

"(6) All of the city's proportion of profits remaining after the payment of operating expenses and carrying charges, and all the operator's proportion of such profit, over and above an additional allowance of 3 per cent annually upon his total investment in construction and equipment, shall be applied to the reduction of deficits arising from the operation of extensions, so long as such deficits exist, before the further division of profit proceeds.

OPERATION OF EXTENSIONS

"That each contract shall contain a clause under which the operator agrees to operate additional lines as part of the single fare system, whether built now or hereafter, upon the following conditions:

"That such new line, whenever accepted as part of the general system by both the city and the operator, shall be governed by and included in all of the general provisions of the contract with relation to operation and the division of profit and loss;

"That where such new line is required by the city, but not accepted by the operator as an original line, it shall be operated as part of the general system, but carried on a separate financial basis, with separate accounting of receipts and operating expenses; and

"That the deficits on extensions operated separately shall be treated as cumulative and discharged, so far as practicable, from the surplus receipts of the general system, as heretofore provided."

TERMS APPLYING TO THE BROOKLYN COMPANY

In the case of the Brooklyn Rapid Transit Company it is provided,

"That, in lieu of all earnings on its existing lines, the company reserves to itself annually, before the payment of interest and sinking fund charges either upon its own or the city's bonds for new construction and equipment, a sum representing its net profits from operation of the existing lines included in the agreement during the year ending June 30, 1911, proper deductions having been made for current depreciation; all receipts of the existing lines above the sum so stipulated to be pooled with the receipts of the city-built lines, for distribution in accordance with the general terms agreed upon.

"That the company incorporate with its existing lines, in such manner as the Public Service Commission may approve, such subsidiary lines as it now holds under lease, and that no allowance be made under the head of operating expenses for further rental of any such leased lines."

The workmen's compensation department of the National Civic Federation has sent to the Governor of each State recommendations for improvement in State inspection of factories in the interest of prevention of accidents, and its committee on that subject is now working upon a "model safety act" for uniform legislation.

RAILINGS AT BOSTON ELEVATED STATIONS

A report has just been rendered by the Massachusetts Railroad Commission to the Legislature on the subject of the proposed installation of railings at stations of the Boston Elevated Railway. The commission was instructed on April 20 by the Legislature to investigate this subject. Its conclusions are that it is inadvisable at the present time to order the installation of such railings. The subject was given careful consideration and some of the conclusions are of general interest.

Among other things the board says: "Investigations here and elsewhere and a careful study of traffic conditions upon the platforms of elevated, subway and tunnel stations tend to show that the likelihood of injury sustained by falling or being pushed off the platforms into the pit is very remote. Experience of other cities as well as Boston confirms this view. On the other hand, it is of course possible that extreme and unusual conditions, arising from panic among passengers upon crowded platforms, might result in accidents by falling into the pit. The practical question, therefore, is whether all platforms should be protected by guard rails solely as an element of safety. The installation of guard rails would in itself introduce to some degree an element of danger, by reason of their proximity to the cars and also by tending to congest traffic in the spaces where the guard rail must of necessity be open to move traffic. This situation would be especially true with respect to open cars in the subway. From these facts the board concludes that guard rails have been installed as a traffic device more than as a safety device."

Testimony secured by the board shows that only fifteen people have received serious injury at these points in Boston since the opening of the subway and elevated systems in that city. Vice-president Sergeant estimates that the total number of persons using these stations during this time was 1,364,956,732, so that the proportion of those injured to the total number carried is 1 to 97,496,909. A list of serious accidents indicates that of the fifteen at least eight were suicides or attempted suicides.

Mr. Sergeant also included in his testimony a letter from H. A. Pasho, superintendent of the company, stating that in his tour of inspection of transportation systems abroad with General Bancroft in 1904 they found that railings were not used on the platforms of the European rapid transit lines inspected. Such railings are employed at a few of the elevated and subway stations in New York, but Mr. Pasho said he believed that the railings at the Forty-second Street subway station prolonged rather than decreased the length of the stops.

MEETING OF EXECUTIVE COMMITTEE OF MANUFACTURERS' ASSOCIATION

A special meeting of the executive committee of the American Electric Railway Manufacturers' Association was held at the Railroad Club in New York on June 9. At this meeting Henry C. Ebert, of the Cincinnati Car Company, was elected to fill the vacancy on the executive committee caused by the retirement of K. D. Hequembourg. Mr. Hequembourg also occupied the position of vice-president in charge of exhibits, but no appointment to this vacancy has yet been made.

Secretary Keegan presented a preliminary draft of the proposed exhibit space on the pier for the convention. The draft was approved and the secretary was instructed to issue notices to the member companies of the association in regard to applications for space. This notice will be issued from the office of the association soon. It was decided by the committee that applications should be requested by June 30.

The committee also authorized the president to appoint a committee on transportation to consist of five members. This committee was subsequently announced by President Castle and will consist of Messrs. Baker, Peirce, Martin, Sisson, Ebert and Blewett.

NEW COMMITTEES OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

Secretary Neereamer, of the Central Electric Railway Association, has issued to the members of the association a list of the 1911 committees. The list is being sent in such form that it can easily be inserted in the "Brown Book" of the association. The personnel of the committees follows:

Standing Auditing.—Walter Shroyer (chairman), auditor Indiana Union Traction Company; L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company; E. L. Kasemeier, auditor Ohio Electric Railway.

Interchangeable Mileage Ticket.—F. D. Norviel (chairman), G. P. & F. A. Indiana Union Traction Company; W. S. Whitney, G. P. & F. A. Ohio Electric Railway; O. H. Murlin, G. P. A. Dayton & Troy Electric Railway.

Interline Baggage.—C. O. Sullivan (chairman), T. M. Western Ohio Railroad; R. W. Waite, treasurer Louisville & Northern Railway & Lighting Company; O. H. Murlin, G. P. A. Dayton & Troy Electric Railway.

Joint Passenger Tariffs.—W. S. Whitney (chairman), G. P. & F. A. Ohio Electric Railway; F. D. Norviel, G. P. & F. A. Indiana Union Traction Company; C. J. Laney, T. M. Toledo, Bowling Green & Southern Traction Company.

Joint Freight Tariffs.—L. D. Johnson (chairman), G. F. A. Dayton & Troy Electric Railway; A. A. Kartholl, G. P. & F. A. Ft. Wayne & Northern Indiana Traction Company; C. B. Kleinhans, auditor Toledo & Indiana Traction Company; S. Riden, G. P. & F. A. Indianapolis, Crawfordsville & Western Traction Company; C. A. Floyd, G. P. & F. A. Grand Rapids, Holland & Chicago Railway.

Insurance.—H. N. Staats (chairman), American Railway Insurance Company; F. W. Coen, G. M. Lake Shore Electric Railway; H. B. Clegg, president Dayton & Troy Electric Railway.

Lightning Arresters.—Edward Heydon (chairman), superintendent O. H. C. Terre Haute, Indianapolis & Eastern Traction Company; F. T. Bundy, M. M. Ohio Electric Railway; Fred Heckler, M. M. Lake Shore Electric Railway; C. E. Morgan, G. M. Indianapolis, Crawfordsville & Western Traction Company; H. D. Murdock, superintendent Indianapolis & Louisville Traction Company.

Compensation for Handling United States Mail.—A. W. Brady (chairman), president Indiana Union Traction Company; F. W. Brown, G. P. & F. A. Michigan United Railways; George Whysall, receiver Columbus, Marion & Bucyrus Railroad; W. A. Carson, G. M. Evansville Railways.

Publicity.—George S. Davis (chairman), *Electric Traction Weekly*; L. E. Gould, *ELECTRIC RAILWAY JOURNAL*; E. B. Grimes, vice-president Ohmer Fare Register Company.

Standardization.—H. H. Buckman (chairman), M. M. Louisville & Northern Railway & Lighting Company; Walter Silvas, superintendent equipment Michigan United Railways; W. H. Evans, S. M. P. Indiana Union Traction Company; F. J. Foote, M. M. Ohio Electric Railway; E. Youngs, M. M. Detroit, Monroe & Toledo Short Line Railway; F. R. Fox, M. M. Toledo & Indiana Traction Company; L. M. Clark, M. M. Terre Haute, Indianapolis & Eastern Traction Company; R. N. Hemming (secretary), G. M. Ohio & Southern Traction Company.

Subjects.—George Whysall (chairman), receiver Columbus, Marion & Bucyrus Railroad; H. A. Nicholl, G. M. Indiana Union Traction Company; C. D. Emmons, G. M. Chicago, South Bend & Northern Indiana Railway; J. Jordan, G. M. Cleveland, Painesville & Eastern Traction Company; G. W. Parker, G. F. A. Detroit, Monroe & Toledo Short Line Railway; C. O. Sullivan, T. M. Western Ohio Railroad; Will H. Bloss, Ohio Brass Company.

Official Interurban Map.—G. M. Patterson (chairman), T. M. Toledo & Chicago Interurban Railway; J. H. Crall, G. P. & F. A. Terre Haute, Indianapolis & Eastern Traction Company; O. H. Murlin, G. P. A. Dayton & Troy Electric Railway;

C. C. Trees, auditor Kokomo, Marion & Western Traction Company; W. S. Whitney, G. P. & F. A. Ohio Electric Railway.

Official Interurban Guide.—C. O. Sullivan (chairman), T. M. Western Ohio Railroad; W. S. Whitney, G. P. & F. A. Ohio Electric Railway; J. H. Crall, G. P. & F. A. Terre Haute, Indianapolis & Eastern Traction Company; F. D. Norviel, G. P. & F. A. Indiana Union Traction Company; R. J. Thompson, T. D. Indianapolis & Louisville Traction Company.

Booster.—F. D. Norviel (chairman), G. P. & F. A. Indiana Union Traction Company; C. O. Sullivan, T. M. Western Ohio Railroad; J. H. Crall, G. P. & F. A. Terre Haute, Indianapolis & Eastern Traction Company; O. H. Murlin, G. P. A. Dayton & Troy Electric Railway; J. H. Pound, G. P. & F. A. Benton Harbor-St. Joe Railway & Light Company.

APPOINTMENT OF INSURANCE EXPERT BY AMERICAN ELECTRIC RAILWAY ASSOCIATION

President Arthur W. Brady has issued the following announcement to member companies regarding the appointment of Henry N. Staats as insurance expert of the American Electric Railway Association:

"Your attention is called to the fact that Henry N. Staats, of Cleveland, has been appointed expert on fire insurance of the American Electric Railway Association. The duties of the expert will be to advise and assist such member companies as may desire to avail themselves of his services on all subjects relating to fire insurance, including forms of policies, appraisals of property, schedules of rates, the elimination of unnecessary commissions, the construction and improvement of properties with a view to the lessening of fire hazards, and the adjustment of losses, and to represent member companies, upon request, before inspection and rating bureaus. The expert will also, in connection with the committee on insurance, have in charge the gathering of insurance data and the distribution of such information in connection with fire insurance matters as may seem desirable. This work will, so far as possible, be done through the office of your secretary. No new expense to the treasury of the association, except for additional printing, postage and other incidental matters, will be entailed. This appointment represents a new departure on the part of the association, and has been made only after full discussion and deliberation. Recent movements in the insurance field have seemed to make it important that the association take immediate action in the direction stated. It is the hope and belief of your officers and executive committee that the appointment will bring about results of practical benefit to the member companies. Every member company has the right, at its option, to avail itself of the services of the expert upon all matters relating to the insurance and protection of its property against fire, the basis of compensation in such case to be as follows:

"(a) In the case of companies having annual gross receipts of \$500,000, or less, a payment by the company of \$50 a year, payable quarterly, plus railway fare of expert and assistants. (b) In the case of companies having annual gross receipts of more than \$500,000 a payment by the company of \$10 per year for each \$100,000 of gross receipts, payable quarterly, plus railway fare of expert and assistants.

"You are earnestly requested to co-operate by replying promptly to such requests for data as may be sent to you. No data will be requested that are not regarded as necessary for the accomplishment of the desired ends. The first essential to securing results in the way of reducing the cost of insurance and the losses by fire is accurate information on a broad scale. This information is already in the hands of the insurance companies with which we deal, and we must be at a decided disadvantage in our negotiations with them unless we also have it. There is good ground for the belief that there is no field of electric railway work where more valuable results may be produced by co-operation than in that of insurance and protection against fire."

A PROBLEM OF THE TROLLEY RETURN CIRCUIT

In a recent Franklin Institute paper Dr. C. P. Steinmetz said that the electric railway presents an unexplored phenomenon of every-day occurrence. Referring to the case of a 500-volt direct-current system, he said that while the car passes along the track the current flows from the wheels down into the rails, and then in the rails to the station. At the first contact point the current enters the rail from the wheel. To the left of this point it flows toward the left. To the right of the first contact point it is supposed to flow toward the right, and at this contact point the current in the rail thus is supposed to reverse. However, the current cannot instantly reverse in the entire rail section, but the same screening effect of the magnetic field in the conductor which causes unequal current distribution with an alternating current makes it impossible for the current inside of the conductor to reverse instantly; and in the first movement the reverse current thus flows only on the very top surface of the conductor, and only gradually penetrates deeper into the conductor, and before the current flows uniformly throughout the entire rail section in the new direction the car has moved hundreds or even thousands of feet. Thus the current distribution in the rail behind the moving car in the successive sections can be considered as flowing in an area parallel to the contour of the rail and gradually increasing in thickness. The obvious result is an increase of the effective resistance of the rail return, which immediately, behind a high-speed car, may be very considerable. Dr. Steinmetz remarks that this phenomenon, which occurs hourly all over the country, has never been investigated, and its existence has not even been recognized.

NEWSPAPER HANDLING ON THE DETROIT UNITED LINES

The freight and express department of the Detroit United Railway obtained revenue last year amounting to more than \$1,000 a month from handling newspapers on the suburban lines within a radius of 50 miles of Detroit. No newspapers are handled on city cars and they are carried only on express and local suburban cars. Effort is made to confine the newspaper handling to the express equipment, but at certain times of the day newspapers must be carried on local passenger cars because of the need for fast transportation. The newspaper publishers club together and on every Sunday morning charter four special cars to distribute their large Sunday editions over four separate branches of the Detroit United system. Within the city of Detroit newspapers are distributed by automobiles.

A few years ago the public entered a protest with the Michigan Railway Commission against motormen handling the newspapers, and so now the papers are carried only to stations where the company has a regular waiting room and an agent who can look after the unloading. If the newspaper publishers wish papers carried to other stops they put a messenger on the car and pay his fare. This newspaper service is given the year round.

The Manchester (Eng.) Tramways committee recently adopted the estimates for the coming year. In the year just closed 17,367,200 car miles were recorded, while 17,400,000 are estimated for the coming twelve months. Last year's traffic expenses were estimated at £228,375, and are now placed approximately at £227,741, while the revenue from traffic was estimated at £795,225, and is now expected to produce £807,265. The net income from parcels traffic is put down at £2,423. The expected cost of the department for the present year is estimated at £810,800, including the payment of £75,000 to the city fund in relief of the rates; this being a sum similar to that paid over last year. The capital account estimate for £78,000 in 1911-12, £56,000 of this being for permanent way, new lines, etc. Last year's estimate under this head was £24,550 and the expenditure £22,605.

INDICATING STEAM FLOW METER

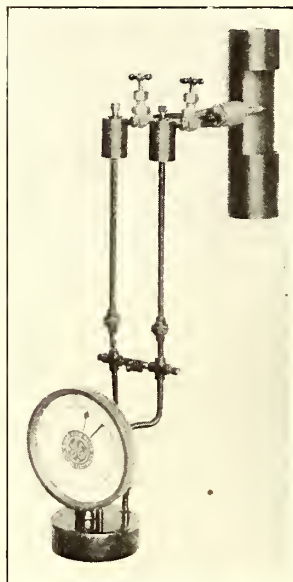
The new FS-2 steam flow meter developed by the General Electric Company provides a means for determining the efficiency in the method of stoking and for ascertaining the correct feed-water regulation. It also enables the equalization of load on individual boilers, the determination of the loss in efficiency of a boiler due to scale, and the discovery of internal leaks in boilers as shown by the difference in the water input and the steam output. The meter indicates the steam generated by the boiler plant in pounds per hour or in boiler horse-power. In the latter case the unit of calibration represents 30 lb. of steam per hour.

The complete apparatus consists of a nozzle plug of the type used with the other steam, air and water flow meters made by this company, the meter proper and the pipe connections between the nozzle plug and the meter. The nozzle plug is inserted in the steam pipe and the difference of pressure caused in the leading and trailing sets of orifices in the plug is communicated to the two legs of the U-tube in the meter, thereby causing the mercury in the well of the U-tube to rise in one of its legs to a height proportional to the difference of pressure. This leg of the U-tube contains a small float, which, resting upon top of the mercury, is carried up and down according to the fluctuations in velocity pressure communicated from the nozzle plug. The motion of the float is in turn transmitted by means of a silken cord to a pulley, the shaft of which carries a horseshoe magnet with its pole faces near and parallel to the inside of a copper plug screwed into the body of the meter. A similar magnet is attached to the pivoted end of the indicating needle with its pole faces near and parallel to the outside surface of the copper plug. Its axis is in line with the axis of the magnet on the pulley shaft, and the mutual attraction of the magnets compels them to move in unison, thus serving to transmit the motion of the mechanism inside the meter to the indicating needle on the outside without any mechanical contact between them. This method eliminates the troubles usually experienced with packed joints.

The meter can be calibrated for pressures ranging from 0 lb. to 250 lb. gage; for quality from 4 per cent moisture to 260 deg. Fahr. superheat and for pipe diameters of 2 in., 3 in., 4 in., 6 in., 8 in., 10 in., 12 in. and 14 in. Meters calibrated for pipes larger than 14 in. diameter are of special design and are made to order.

The meter can be installed without necessitating any changes in existing steam pipes. The nozzle plug is inserted in a small hole drilled and tapped in a straight vertical or horizontal run of pipe of at least twelve pipe diameters in length and connected with $\frac{1}{4}$ -in. iron piping to the meter. The latter may be located in any desired position, so long as it is kept below the nozzle plug, its distance from the nozzle plug being immaterial. The dial scale is 8 in. in diameter, marked on a white surface with heavy flow lines and large figures, for easy reading. A target of conspicuous size is provided for designating a certain flow on the scale. This target can be easily set from the outside.

The Washington Water Power Company, Spokane, Wash., has equipped its Hillyard line with pay-as-you-enter cars and proposes to establish service with cars of this type on its Broadway and Union Park lines in the near future.



Steam Flow Meter

ONE-SIDE CONVERTIBLE CARS FOR NORTHERN OHIO TRACTION & LIGHT COMPANY

The accompanying illustration shows one of the latest designs of one-side convertible cars built for the Northern Ohio Traction & Light Company, Akron, Ohio, by the G. C. Kuhlman Car Company. The new cars have a maximum seating capacity of sixty-five. The principal dimensions are as follows: Length over all, 44 ft. 6 in.; length of body, 35 ft. 6 in.; bolster centers, 23 ft. 6 in.; width over all, 8 ft. $5\frac{3}{4}$ in.; width over the sills, 7 ft. $11\frac{1}{4}$ in.; height from rail to sills, 2 ft. $8\frac{3}{8}$ in.; height from the sill to the trolley base, 9 ft. 8 in. The underframing and body are of wood, with artificial lumber



One-Side Convertible Car with One-Half of the Convertible Side Open

headlining and cherry interior trim. The bumpers are made up of angle irons. The sash fixtures are of the full convertible and drag sash types, with Forsythe Brothers cable fixtures and Pantasote curtain material. The seating is of rattan, and is composed of interchangeable stationary cushions and backs.

The bodies are carried on No. 27-F-1 trucks with 33-in. diameter wheels. These trucks are equipped with outside-hung Westinghouse No. 101-B motors. Other equipment on this car includes Peacock hand brakes, Ohio Brass Company's sanders, Eclipse fenders, Neal headlights, Mason safety treads and the Peter Smith hot-blast heaters.

LOCKING DEVICE FOR WIRE GRIP

The Western Electric Company has recently placed on the market an improved "Buffalo" wire grip with a special locking feature. In Fig. 1 the new grip is shown with the jaw held open by the locking device. A turn of the handle locks the jaw

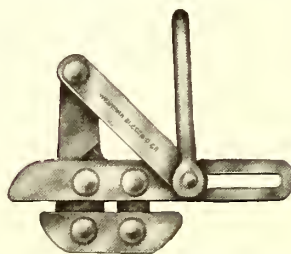


Fig. 1—Grip Jaw Held Open by Lock

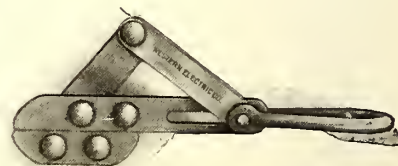


Fig. 2—Grip Jaw Closed in Position

in any position and enables the lineman to insert the wire in the grip easily and quickly. When the handle is pushed down, as shown in Fig. 2, the wire is held in a tight grip. The grip is made in various sizes for handling both bare and insulated wire, and can be supplied both with and without pulleys for use as a "come-along."

A device which prevents a car from being started when a passenger is mounting or dismounting is being tested on the lines of the Portland Railway, Light & Power Company, Portland, Ore. It consists of a hinged step which depresses about $\frac{1}{2}$ in. when a weight of from 5 lb. to 10 lb. is placed upon it. This breaks an electric circuit connected with the contactor so that the contactor fails to close. The device is arranged, however, so that the motorman is able to reverse his car regardless of the condition of the step. The device has been patented by local inventors.

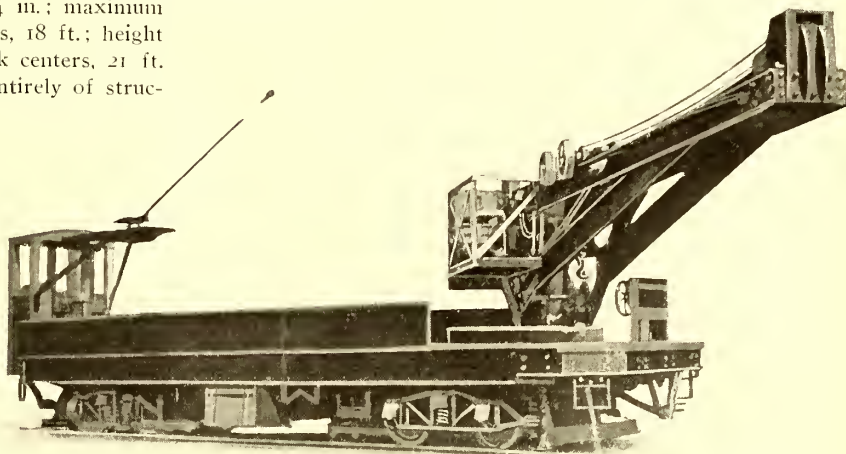
DERRICK CAR FOR THIRD AVENUE RAILROAD, NEW YORK

The accompanying illustrations show the 6-ton work and derrick car which the Third Avenue Railroad has just received from the McGuire-Cummings Manufacturing Company, Chicago. Eli T. Ryder, engineer maintenance of way, Third Avenue Railroad, was responsible for the general design of the car and crane.

The general dimensions of this car are as follows: Extreme height over highest part of derrick, 11 ft. 2¾ in.; maximum swing of derrick, 20 ft. 8½ in.; effective radius, 18 ft.; height over trolley board from rail, 10 ft. 9 in.; truck centers, 21 ft. 5 in. The underframe of the car is built up entirely of structural steel of commercial shapes. The side sills between the bolsters and the extension beyond the bolster on the derrick end are of two 15-in., 33-lb. riveted channels set back to back, having a 7-in. x ¾-in. cover plate on the top and bottom. The bolsters are two 15-in., 33-lb. channels set back to back with four 7-in. channel spacers between and a 15-in. x ¾-in. cover plate riveted on the top and bottom and connected to the side sills with angles. The end sills are 10-in., 15-lb. channels. The end cross beam which carries the 10-in., 15-lb. center sills, which extend from the bolster to the end sill to carry the cab, is a 10-in., 25-lb. I-beam. The floor beam carriers, four in number, are 6-in., 8-lb. channels which support the five 4-in. x 6-in. yellow pine floor stringers. The floor beams are secured to the side sills with angles. The end sills are riveted to the side sills with a 15-in. x ¾-in. splice plate on the inside and with a 7½-in. x ¾-in. splice plate on the outside. The center plates fastened to the bolster are of cast steel. The side bearings are of 4-in. x 1⅞-in. wrought iron, of a suitable radius to allow the car to round a 35-ft. radius curve. The flooring of the car is 2-in. yellow pine. The body is mounted on McGuire-Cummings M. C. B. trucks.

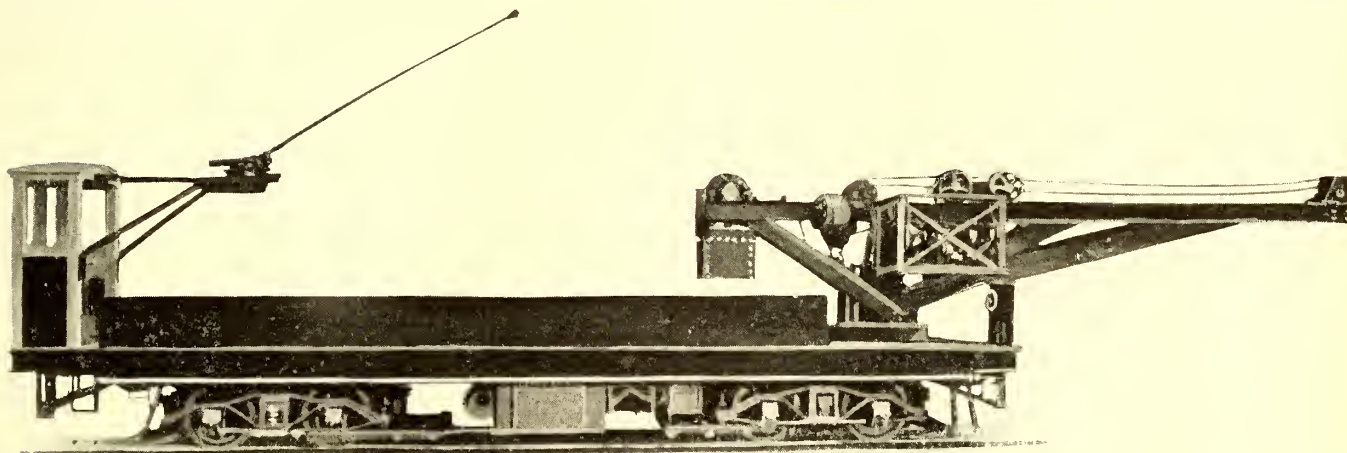
National Brake Company's hand brake, which is used in addition to the air-brake equipment. Two 20-ton standard locomotive jack screws, which are arranged to fold up under the car when not in use, are located on the end under the derrick.

The car is equipped with an incandescent headlight on each end of the car, gongs, steps, grab handles, sand boxes and wheel guards. A tool box 4 ft. long is placed under the car at the center. It runs the full width of the car and has a door and lock at each end.



Derrick Car for Third Avenue Railroad

The derrick is of the Whiting Foundry Equipment Company's standard make. It is of the three-motor electric pillar type, having a capacity of 6 tons, and an effective radius of 18 ft. The extreme radius of the boom is 20 ft. 8½ in. and the distance from the highest point of the hook when raised to the base of the pillar is 5 ft. 7 in. The crane is equipped with 500-600-volt d.c. motors and controllers. It is supplied with flat bar gear guards on all exposed gears. The worm gearing is covered with cast-iron gear cases. The operator's platform is near the counterweight box. An 11-hp motor is used for hoisting



Derrick Car for Third Avenue Railroad, New York, with the Derrick Down

The car is equipped with sideboards which are 24 in. high. The stakes on the side of these boards are arranged so that when the car is on a curve the maximum clearance is within the required width of 8 ft. 3½ in.

The cab for the electrical equipment on the end of the car opposite the derrick is of rectangular shape, having an opening in the back without a door. The front and side of the cab have drop sash. The cab posts are protected with 4-in. x 5/16-in. angles. There extends from the rear of this cab a running board braced by angle irons to carry the trolley board. A five-light lamp cluster is carried under the trolley board.

Each end of the car is equipped with a drawbar and the

and for the rack and swing a 3-hp motor, which will give the following speeds: For hoisting, 13 ft. per minute; rack, 40 ft. per minute; swing, 1½ r.p.m. The pillars of the crane are cast iron and the framework is of structural steel. The crane can rotate in a complete circle. A slip arrangement is provided to prevent breakage of parts through the sudden stopping of gearing.

The Supreme Court of the United States has upheld the constitutionality of the city ordinance passed by the Council of New York which prohibits the company which operates the buses on Fifth Avenue from carrying outside advertisements.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES.

Indiana.—Eminent Domain—Right to Condemn Land.

A corporation organized under the Voluntary Associations Act of March 9, 1901 (Acts 1901, Ch. 127), as amended by act March 7, 1903 (Acts 1903, Ch. 93), providing for the organization of corporations generally, authorized to promote and operate a street and interurban railroad, and to promote plants for the creation and distribution of electric and other heat, light and power, was authorized to condemn land required for railroad purposes by Acts 1901, Ch. 207, providing that any street railroad company heretofore or hereafter organized under the laws of the State of Indiana desiring to construct or acquire any street railroad, or interurban street railroad, may condemn real estate, etc. (*F. W. Cook Inv. Co. v. Evansville Terminal Ry.* (No. 21,771), 93 N. E. Rep., 279.)

Indiana.—Franchises—Construction—Specific Performance—Indefinite Contracts.

An assignment of a franchise to operate a street railway within C., a city, recited as a consideration that the assignees would construct an electric line to, within and into contiguous territory beyond C., and also a line connecting T. and C. It further recited an "intention" of the assignees to construct another interurban line. Held, that the assignees are not required to build the line recited as "intended" to be built.

An obligation of assignees of a street railway franchise to build "into contiguous territory beyond" a city is too indefinite to be specifically performed. (*Morey et al. v. Terre Haute Traction & Light Co. et al.*, 93 N. E. Rep., 710.)

Michigan.—Jurisdiction of Federal Courts—Diversity of Citizenship—Suit by Mortgagee—Rights Acquired by Franchise—Power of City to Revoke.

A mortgagee of all of the property of a street railroad company as trustee for bondholders has a right of action in equity in its own right to enjoin a city from unlawfully depriving the company of its franchise and to compel the company to comply with all lawful ordinances and regulations of the city essential to preserve the franchise and, where it is a citizen of another State, may maintain a suit therefor in a federal court against both the city and company which are citizens of the State in which the suit is brought, its interest, while in some respects the same as that of the company, being separate and distinct therefrom, and such as it has the right to protect independently.

Under a franchise granted by a city to a street railway company which provided that, on default by the company, its rights should cease and be forfeited and the city might take possession of the streets and also of the tracks and cars of the company as security for the leaving of the streets in good condition, a forfeiture could not be declared ex parte by the city, but only judicially. (*Knickerbocker Trust Co. v. City of Kalamazoo et al.*, 182 Fed. Rep., 865.)

Missouri.—Ingress and Egress of Abutting Owners—Permitting Obstruction.

A city cannot authorize a street railroad so to use a street with its tracks and cars as materially to obstruct the right of ingress and egress of an abutting owner, thus constituting a private nuisance. (*Zimmerman v. Metropolitan St. Ry. Co.*, 134 S. W. Rep., 40.)

New York.—Regulation by Public Service Commission—Jurisdiction.

Laws 1907, Ch. 429, creating a public service commission to regulate the management and operation of carriers, does not confer authority on the commission to abate a nuisance affecting the health and comfort of the locality where a terminal freight yard of a railroad is located, since the power to abate such nuisance is conferred on the department of health, created by Greater New York Charter (Laws 1901, Ch. 466), with power to abate nuisances, defined to be whatever is dangerous to human life or detrimental to health or renders the air unwholesome, and providing that the powers shall be exclusively exercised by the department of health; for the commission cannot act concurrently on a subject within the jurisdiction of the department of health. (*People ex rel. New York, N. H. & H. R. Co. v. Willcox et al.*, Com'rs, 94 N. E. Rep., 212.)

Oklahoma.—Franchises in Streets—Exclusiveness.

An ordinance of a municipal corporation granting to a person or corporation authority to use the streets and highways of a city for the purpose of constructing and operating a street railway system confers privileges which are exclusive in their nature against all persons upon whom similar rights have not been conferred. Any person or corporation attempting to exercise such rights without legislative authority or sanction invades the private property of the person or corporation to whom such franchise has been granted and may be restrained at the instance of the owner of the franchise. (*Tulsa St. Ry. Co. v. Oklahoma Union Traction Co.*, 113 Pac. Rep., 180.)

Texas.—Contracts—Consideration—Consolidation—Liabilities.

Where the construction of a street car track over the tracks of a railroad company created a common danger, imposing an obligation of care on both the railroad and street railway companies, a contract between them that when the city required a watchman, extra guard, lights or gates the expense of maintaining them should be equally divided between the railroad company and the street car company was based on a sufficient consideration.

Where defendant street car company, on taking over all the property and franchises of a prior company except its right to be a corporation, undertook to assume all the debts of the company consolidated, it rendered itself liable under a contract of such company with the railroad company providing for the division of the cost of maintaining lights at a crossing of the street car tracks over the tracks of the railroad. (*Beaumont Traction Co. v. Texarkana & Ft. S. Ry. Co.*, 123 S. W. Rep., 124.)

Utah.—Regulation—Depots—Discrimination—Remedy.

Under ordinary circumstances no inherent power is vested in the courts to control a carrier in its determination of the number of depots or stopping places that it will establish or maintain, or in the selection of the places where it will establish and maintain them along its line of railroad, but the matter is for legislative regulation.

Where a carrier refuses permission to one person to enter or alight from its cars at a place where under similar circumstances it extends the privilege to others the carrier is guilty of discrimination against the former and the court may by mandamus prevent it. (*State ex rel. Skeen v. Ogden Rapid Transit Co.*, 112 Pac. Rep., 120.)

LIABILITY FOR NEGLIGENCE

California.—Negligence—Contributory Negligence—Jury Questions.

One in great peril, where immediate action is necessary to avoid it, is not required to exercise that carefulness required of a prudent man under ordinary circumstances, and the reasonableness of his effort to escape injury after discovering the danger is for the jury. (*Hoff et ux. v. Los Angeles-Pacific Co.*, 112 Pac. Rep., 53.)

Georgia.—Electricity—Companies Liable—Joint Liability.

Where the wires of an electric railway company and those of a telephone company are strung to the pole of the former, and the wire of the latter breaks and falls to the street below across the wire of the former, therefrom becoming charged with a high current of electricity, and a horse, while being driven along such highway with due care, is killed because of contact with such wire, both companies are jointly liable for such damage where it is the result of the concurring negligence of the two companies and would not occur in the absence of negligence on the part of either. (*Eining v. Georgia Ry. & Electric Co. et al.*, 66 S. E. Rep., 237.)

Illinois.—Negligence—Danger from Machinery—Attractive Nuisances.

The owner of unguarded premises which contain dangerous machinery attractive to children holds out an implied invitation to children so as to be liable for injuries to them therefrom, though they are technical trespassers. (*Strollery et al. v. Cicero & P. St. Ry. Co. et al.*, 90 N. E. Rep., 709.)

Illinois.—Passengers—Injuries—Contributory Negligence—Intoxication.

That a street car passenger was intoxicated would not

prevent a recovery for injuries caused by derailment, his intoxication not contributing thereto.

In a street car passenger's action for personal injuries caused by a derailment a request to charge that if plaintiff was negligent in riding upon the front platform of the car he could not recover was properly refused where plaintiff got upon the platform by the conductor's direction, which fact the instruction ignored. (*Coburn v. Moline, E. M. & W. Ry. Co. et al.*, 90 N. E. Rep., 741.)

Illinois.—Right to Use of Streets.

Though street cars have a superior right of way to general travel on the streets at places other than crossings, the general public have the right to use and travel on the entire street, including that portion of it on which the car tracks are laid, and are in no sense to be treated as trespassers for so doing. (90 N. E. Rep., 209.)

Iowa.—Injury to Person Boarding Car—Duty of Conductor—Excessive Injuries—Personal Injuries.

If a street car conductor stood at the partly open gates while a person was attempting to open them so that he could enter, and saw his efforts, it was the conductor's duty, when the car started with the person's arm caught between the gates, to signal the motorman to stop the car, and if he knew that the car had been stopped for the purpose of permitting the person to enter it and that the gates were only partially open, it was his duty to see that they were released and opened so that the person could enter without danger, and a failure in that regard would be negligence.

Plaintiff, while attempting to board a street car, was injured, resulting in the loss of his left foot. At the time of the injury he was twenty-eight years old. Prior to his injury he was strong and healthy, able to work every day, and was earning \$15 a week at his trade as a furniture upholsterer. His injury did not totally disable him. Held, that a recovery of \$12,500 was excessive, and should be reduced to \$6,000. (*Blades v. Des Moines City Ry. Co.*, 123 N. W. Rep., 1057.)

Kentucky.—Personal Injuries—Punitive Damages—Excessive Damages.

Where street car men knowingly operated on a steep incline a car with a useless brake, and relied entirely on reverse electric current, and a collision occurred because the current was cut off while the car was descending the incline, a verdict awarding \$1,000 as punitive damages was not excessive. (*Lexington Ry. Co. v. Johnson*, 122 S. W., Rep., 830.)

Massachusetts.—Admissibility of Accident Blank Evidence of Person Since Deceased.

Defendant wrote a letter to R., July 25, 1905, inclosing a blank to be filled up by him, containing his statement of the facts surrounding an accident. R. filled and returned the blank on the succeeding day. Plaintiff brought suit on March 7, 1906, and before trial R. died. At the trial defendant offered the statement signed by R., in which he stated the time and place of the accident, that he saw the same, the speed of the car alleged to have caused it, and how it occurred. Held, that the paper, taken in connection with the manner of obtaining it, showed that the answers were made on R.'s personal knowledge, and that it was admissible, under Rev. Laws, Ch. 175, Sec. 66, providing that the declaration of a deceased person shall not be objectionable as hearsay if the court find that it was made in good faith, before the commencement of the action, on the declarant's personal knowledge. (*White v. Boston Elevated Ry. Co.*, 94 N. E. Rep., 278.)

Massachusetts.—Running Board—Contributory Negligence—Injury to Licensee—Regulations—Waiver.

That plaintiff was riding on the running board of a street car when negligently injured does not necessarily preclude recovery by him.

A municipal fireman, permitted to ride free on the platforms of street cars, while riding on the running board of a car in violation of a known rule, was at most a licensee, to whom the company owed no duty except to refrain from intentionally injuring him.

A street car conductor cannot waive a rule prohibiting persons from riding on a running board. (*Twiss v. Boston Elevated Ry. Co.*, 94 N. E. Rep., 253.)

Massachusetts.—Injury to Passenger—Negligence—Evidence.

Evidence in an action by a passenger for injuries received by slipping on the muddy step of the car while alighting held sufficient to sustain a finding that it was the duty of the conductor under the carrier's rules to clean the step and put sand or sawdust on it, whenever necessary, so as to render the company liable for injuries due to his failure so to do. (*Kingston v. Boston Elevated Ry. Co.*, 93 N. E. Rep., 573.)

Massachusetts.—Master and Servant—Assumption of Risk—Latent Danger.

An experienced telegraph lineman does not assume the risk of injury from a splice negligently made by his employer in one of its cables, where nothing on the outside of the cable indicates any defect in the splice. (*Greene v. Boston Elevated Ry. Co.*, 93 N. E. Rep., 837.)

Massachusetts.—Injuries to Passengers—Negligence—Evidence.

The constant starting and stopping of a car to avoid collisions with carriages crossing ahead of the car, or because of cars ahead of it, does not show negligence of the motorman in the operation of the car. (*Craig v. Boston Elevated Ry. Co.*, 93 N. E. Rep., 575.)

Massachusetts.—Electricity—Care Required.

Electricity being a highly dangerous servant, those employing it are held to a correspondingly high degree of care in its use. (*O'Donnell v. Boston Elevated Ry. Co.* *Ford v. Same.* *Reid v. Same.* 90 N. E. Rep., 977.)

Massachusetts.—Standing on Front Platform—Contracts—Validity.

In an action under St. 1907, Ch. 392, for death of a street car passenger, evidence that plaintiff's intestate had ridden almost every day on defendant's car for twelve years, that he always stood on the front platform, even when there was plenty of room inside, and that he had knowledge of the signs erected and maintained in the front of the cars for more than a year prior to the accident, stating that passengers riding on the front platform did so at their own risk, was not admissible on the question of the due care of the intestate, since, the statute being penal in its nature, the lack of due care on his part was not material.

A street railroad cannot, by contract made in advance, exempt itself from the penalties provided by St. 1907, Ch. 392, for the death of a passenger. (*Jones v. Boston & N. St. Ry. Co.*, 90 N. E. Rep., 1152.)

Massachusetts.—Concurrent Negligence of Carrier and Third Person.

Where an injury to a street car passenger resulted from the concurrent negligence of the motorman and the driver of a wagon, the passenger could recover from the street railway company. (*Doherty v. Boston & N. St. Ry. Co.*, 92 N. E. Rep., 1026.)

Missouri.—Appeal and Error—Presentation of Questions in Lower Court—Physical Examination—Damages—Amount of Judgment—Excessiveness.

Where the court of its own motion selected a competent physician to make a physical examination of plaintiff, but refused to appoint the one suggested by defendant, if defendant desired to preserve a tangible objection, it should have presented its reasons and evidence showing the impropriety of the appointment made, and where it abandoned its attempt to procure an examination there was nothing left for the Court of Appeals to review.

In an action against a street railroad company for personal injuries, where plaintiff, aged thirty-eight, had suffered severely, but it was doubtful whether her kneecap had been fractured, and it was probable that her injuries would be limited to some stiffening of the knee and some lameness, a judgment for \$5,500 was excessive and should be reduced to \$3,500. (*Dent v. Springfield Traction Co.*, 129 N. W. Rep., 1044.)

Missouri.—Injuries to Passenger Alighting from Car.

When plaintiff, a passenger on defendant street railroad's car, was promised by the conductor that the car would stop at a usual stopping place and on the car's slowing down stood on the step holding to the handrail, but through a sudden jerk of the car resulting from acceleration of speed was

thrown to the ground and injured, defendant was liable, plaintiff being entitled to rely on the conductor's invitation to be prepared to alight. (*Chalmers v. United Rys. Co. of St. Louis*, 131 S. W. Rep., 903.)

New York.—Elevated Roads—Personal Injuries—Question for Jury.

Plaintiff, a girl aged twenty, was seated with other girls at a window trimming hats. Defendant operated its elevated trains directly in front of the premises, with the tracks three or four feet from the window. While thus seated, plaintiff heard three loud reports and saw flame and smoke coming from under a train. The building shook, and the flame and smoke entered the room. All the operatives, including plaintiff, ran toward the stairs at the rear of the room, and in the confusion and panic plaintiff was thrown down the stairs, trampled upon and injured. The evidence showed that there was a defect in the electrical apparatus or in the handling thereof. Held, that the questions whether defendant's negligence was the proximate cause of the injury and whether plaintiff was guilty of contributory negligence were for the jury. (*Schachter v. Interborough Rapid Transit Co.*, 127 N. Y. Sup., 308.)

Virginia.—Passengers—Carrier's Duty—Alighting Passengers.

A carrier owes to actual and constructive passengers a higher degree of care than to travelers at highway crossings.

That while crossing double tracks to a station shed in the night time an alighting electric railway passenger was struck by a train running in the opposite direction without headlight displayed or giving warning does not show contributory negligence on his part, as a matter of law, though he failed to look and listen after alighting from his train. (*Washington, A. & Mt. V. Ry. Co. v. Vaughan*, 69 S. E. Rep., 1035.)

Washington.—Crossing Accident—Contributory Negligence.

Plaintiff endeavored to drive over certain street car tracks at a crossing in front of an approaching car, and was struck before he got across. The track approaching the crossing was on a heavy down grade, and the car which struck him was from 100 ft. to a block away when he got on the track, and was approaching at the rate of 60 m. p. h., in violation of a city ordinance limiting the speed to 12 m. p. h. Held, that plaintiff had the right to assume that the car was under control, and when it was that far away that he would be in no danger, and was therefore not negligent as a matter of law. (*Nappli v. Seattle, R. & S. Ry. Co.*, 112 Pac. Rep., 89.)

Washington.—Ejection of Passenger—Instructions.

In an action for the death of an intoxicated passenger because of his having been put off at a dangerous place, it appeared that he was permitted to alight upon a trestle along the shore of a lake, on a dark night where there were no guards or barriers, and that subsequently his body was found in the lake, and the court instructed that a common carrier of passengers is required under the law to exercise toward its passengers the highest degree of care and prudence practically consistent with the operation of its road in the carrying of persons and in letting them on and off its cars. Held, that the instruction was not erroneous as inapplicable to the issues. (*Bennett et al. v. Seattle Electric Co.*, 105 Pac. Rep., 825.)

Washington.—Self-Serving Declaration—Conductor's Report of Accident.

In an action against a railroad for personal injuries from falling over a projection above the floor of a car, the report of the accident made in writing by the conductor of the car immediately after the accident and very soon thereafter given to defendant in compliance with its rules was inadmissible for defendant as being self-serving, being made for the very purpose of facilitating the defense to any action for injuries caused thereby. (*Conner v. Seattle R. & S. Ry. Co.*, 105 Pac. Rep., 634.)

Washington.—Master and Servant—Liability of Master—Assumption of Risk.

A master is not answerable for dangerous situations of which he has no knowledge, or of which he cannot acquire knowledge by ordinary diligence, nor is he answerable for a failure to avoid peril that could not be foreseen by one in like circumstances by reasonable care.

A servant of ordinary intelligence and of experience in

sawmills and steel roller mills and of six years' experience as a lineman on electric current wires is chargeable with knowledge that sawing iron lugs creates iron dust, which will fly with the wind or will be thrown by the movement of the saw, and that such flying dust will enter the eyes when sufficiently near, and that such dust, entering the eyes, may result in serious injury, and he assumes the risk of any injury to the eyes caused by such dust flying into them when sawing the lugs on insulators carrying a trolley wire. (*Nordstrom v. Spokane & Inland Empire R. Co.*, 104 Pac. Rep., 809.)

West Virginia.—Master and Servant—Who Are Fellow Servants?—"Passenger."

A servant employed to labor by the day in the power house of a railway company and who is furnished with a free pass under a rule of the company which entitles him to ride on any of the company's cars at any time and about his own business, during the continuance of his employment, is a "passenger" when riding either to or from his place of labor and not a fellow servant of the motorman in charge of the car, and is entitled to the same rights as a passenger for hire. (*Harris v. City & E. G. R. Co.*, 70 S. E. Rep., 859.)

MISCELLANEOUS

Alabama.—Release—Disaffirmance—Grounds.

One cannot disaffirm a release of a claim for injury in an accident without returning money received thereunder, though asserting that the release covered a claim for money lost in the accident and not for the personal injury sued on.

A release binds, in the absence of fraud or misrepresentation inducing it, though given under an honest mistake as to its terms. (*Birmingham Ry., Light & Power Co. v. Jordan*, 54 So. Rep., 280.)

Indiana.—Witnesses—Privileged Communication.

The result of the personal examination of one injured in a street car accident by the company's physician in the performance of his duties was privileged, so that he could not testify as to the result of such examination in an action for such injuries. (*Louisville & S. I. Traction Co. v. Snead*, 93 N. E. Rep., 177.)

Massachusetts.—Passengers—Misconduct of Agents—Joint Torts—Discharge of One Tortfeasor—Effect.

One entering the subway station of an elevated railway company and paying his fare, with the intention of becoming a passenger, is lawfully on the premises; and if, while passing through the turnstile to take a car, its servants unlawfully molest him by physical restraint the company is liable for the injury.

Where a tort is joint and the person injured discharges one of the wrongdoers he may not hold the other.

Where the servant of a carrier, acting as a special police officer under St. 1898, Ch. 282, is not liable to one for false imprisonment or for assault and battery, or he has been released from liability, the carrier is exonerated from liability. (*Horgan v. Boston Elevated Ry. Co.*, 94 N. E. Rep., 386.)

North Dakota.—Relation of Carrier and Passenger.

The relation of carrier and passenger may exist while the passenger is entering the car or vehicle and before he is seated therein. The fact that no ticket has been purchased does not necessarily prevent such relation arising. An implied acceptance may arise without the purchase of a ticket or other acceptance in express terms. (*Messenger v. Valley City Street & Interurban Ry. Co.*, 128 N. W. Rep., 1023.)

Washington.—Refusal to Pay Fare—Breach of Contract—Excuse.

Though passengers on an electric railway were entitled to be carried to their destination for a 5-cent fare, and the company refused to carry them beyond a certain point, when they voluntarily left the car in which they were riding they ceased to be passengers and could only become such on another car by the payment of another fare.

That a number of persons boarded a car on which plaintiff was a passenger and demanded free transportation, which the railroad company was under no obligation to give them, and that the company's employees were unable to eject them because of their number, did not excuse a breach of the contract of carriage between the company and plaintiff. (*Leclair v. Tacoma Ry. & Power Co.*, 113 Pac. Rep., 268.)

News of Electric Railways

Program of Annual Meeting of Street Railway Association of the State of New York

The following program of papers has been announced for the twenty-ninth annual convention of the Street Railway Association of the State of New York, which is to be held at the Hotel Otesaga, Cooperstown, N. Y., on June 27 and 28, 1911:

JUNE 27, 1911.

FORENOON SESSION—10.00 A. M.

Reading of minutes of previous meeting. President's address. Report of executive committee. Report of treasurer. Report of secretary. Reports of committees: (a) Interurban rules, (b) Amending Section 192 Railroad Law, (c) Joint use of poles, (d) Standard franchises.

Paper, "The Edison-Beach Storage Battery Car," by R. H. Beach, president of the Federal Storage Battery Car Company, New York.

Paper, "The General Electric Gas-Electric Car," by W. B. Potter, railway and traction department, General Electric Company, Schenectady, N. Y.

Miscellaneous business.

AFTERNOON SESSION—2:30 P. M.

Reading of communications.

Paper, "Automatic and Electro-Pneumatic Brakes," by W. V. Turner, chief engineer of the Westinghouse Air Brake Company, New York.

Paper, "Tariffs," by Robert M. Colt, general passenger agent of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Paper, "Reduction of Car Failures," by J. P. Barnes, electrical engineer of the Syracuse Rapid Transit Railway, Syracuse, N. Y.

Miscellaneous business.

Appointment of nominating committee.

JUNE 28, 1911.

FORENOON SESSION—10:00 A. M.

Reading of communications.

Paper, "Single End vs. Double End Car Operation," by Herman Hicks, supervisor of schedules of the New York State Railways, Rochester, N. Y.

Paper, "Maintenance of Way Matters," by C. A. Alderman, chief engineer of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y.

The following program of entertainment has been announced for the convention:

June 26—10:30 a. m. Golf and swimming at country club. Clock golf at hotel.

3:30 p. m. Informal reception in hotel rotunda.

8:00 p. m. Evening trip on Otesaga Lake.

10:30 p. m. Informal dance in hotel ballroom.

June 27—10:30 a. m. Clock golf for ladies and gentlemen on hotel lawn.

2:00 p. m. Ladies' bridge whist, hotel parlor.

4:00 p. m. Annual baseball game, managers vs. manufacturers.

8:00 p. m. Annual banquet.

11:00 p. m. Dance in ballroom in hotel.

June 28—10:30 a. m. Automobile ride for visiting ladies.

2:00 p. m. Luncheon at golf club.

The speakers at the banquet, which will be held Tuesday evening at 8 p. m., will be Frank W. Stevens, chairman of the Public Service Commission of the Second District of New York; F. W. Whitridge, receiver of the Third Avenue Railroad, New York; Oscar T. Crosby, president of the Wilmington & Philadelphia Traction Company, Wilmington, Del.; Rev. Ralph Birdsall, Cooperstown, N. Y., and others.

Honorable, active and associate members of the association, their guests and ladies will be provided with banquet tickets. Each allied member will receive one ticket. Extra tickets will be sold at \$5 each. Members are requested not to forget to bring their badges, otherwise a charge of \$1 each for badges will be made. Extra bars to the badges will be provided without charge by H. M.

Beardsley. Applications for hotel accommodations at the Hotel Otesaga should be sent to Joseph K. Choate, Hartwick, N. Y. The hotel will be opened on June 24. No general provision has been made for an exhibit of appliances and apparatus by allied members, but arrangements for any such exhibits can be made direct with the manager of the Hotel Otesaga.

J. K. Choate and Bertram Berry, of the transportation committee, have arranged for special transportation to the convention. A special sleeping and buffet car will leave New York over the New York Central & Hudson River Railroad at 12:25 on Sunday night, June 25, for Herkimer, where a special car on the Otsego & Herkimer Railroad will be waiting to convey the party to Cooperstown, arriving there about 10:30 a. m. Monday. A buffet breakfast will be provided in the sleeping car up to 8:33 a. m., which is arriving time at Herkimer. Those who desire reservation in this special sleeping car should notify Bertram Berry, 516 West Thirty-fourth street, New York, N. Y., at once.

Program of Meeting of Central Electric Railway Association.

The following program has been announced for the meeting of the Central Electric Railway Association, which is to be held at the Edgewater Club, St. Joseph, Mich., on June 22, 1911:

Business session and reports of special committees.

Report of standardization committee.

Discussion and final disposition.

Paper, "The Advantages to Electric Traction Companies of the Use of Treated Timber," by C. P. Winslow, of the Forest Service Department, United States Department of Agriculture, Madison, Wis.

Illustrated talk, "The Application of Low and Mixed Pressure Turbines to Existing Electric Power Plants," by M. B. Carroll, representing the General Electric Company, Cincinnati, Ohio.

Paper, "Overhead Construction," by Edward Heydon, superintendent of overhead construction of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Entertainment for the members of the association will be provided by various transportation interests at St. Joseph as follows:

Excursion on Lake Michigan by Graham & Morton Transportation Company, 3:30 p. m. June 21.

Excursion to Eden Park Springs, House of David, via lines of Benton Harbor-St. Joe Railway & Light Company, 8 p. m. June 21.

Excursion to Paw Paw Lake for the ladies, via lines of Benton Harbor-St. Joe Railway & Light Company, 9 a. m. June 22.

Luncheon for the ladies at the Edgewater Club, 1 p. m. June 22.

Two special cars will be run to the meeting. The Indianapolis, Crawfordsville & Western Traction Company will run a special car from Indianapolis at 7 a. m. on June 21, running over the line of the Indiana Union Traction Company to Peru, over the Winona Interurban Railway to Goshen, the Chicago, South Bend & Northern Indiana Railway to South Bend and the Southern Michigan Railway to St. Joseph, arriving at 2:45 p. m. The Louisville & Northern Railway & Lighting Company will run a car from Louisville, Ky., at 6:45 a. m. over the Louisville lines and thence over the same route as the other car, arriving at St. Joseph at 7 p. m.

Program of Meeting of Central Electric Accounting Conference.

The following program has been announced for the meeting of the Central Electric Accounting Conference at the St. Nicholas Hotel, Springfield, Ill., on June 24, 1911, to which reference was made in the ELECTRIC RAILWAY JOURNAL of June 10, 1911, page 1031:

MORNING SESSION.

9 A. M.—Meeting of the executive committee, St. Nicholas Hotel.

9:30 A. M.—Regular business session and reports of committees.

11 A. M.—Address, "Legislation Affecting Electric Railway Accountants," by Henry J. Davies, secretary and treasurer of the Cleveland Railway.

Discussion.

12 Noon—Adjournment for luncheon—guests of the Illinois Traction System at the St. Nicholas Hotel.

AFTERNOON.

There will be no session of the conference in the afternoon, as the members and guests will be given a trip by special train over the Illinois Traction System to St. Louis, returning to Springfield with as many of the members as wish to begin their return journey from that point.

Walter Shroyer, secretary-treasurer of the conference, in a letter to the members urging them to attend the meeting, says:

"Each member of the conference is earnestly requested to attend this meeting, as some very important matters will be brought up for consideration, one of the most important being the matter of merging the conference with the Central Electric Railway Association.

"While the program of this meeting is not lengthy, it will no doubt prove to be an interesting one. Not a single one of us can afford to miss hearing the address to be given by Henry J. Davies, secretary and treasurer of the Cleveland Railway, on the subject of 'Legislation Affecting Electric Railway Accountants,' and the discussion that will follow.

"As stated in the program, members will be guests of the Illinois Traction System upon adjournment of the meeting. After luncheon at the St. Nicholas Hotel, a special train will be furnished for a trip to St. Louis, thus affording an opportunity to see a portion of one of the largest electric railway systems in the world."

Kansas City Receivers Qualify

Ford F. Harvey, who, with R. J. Dunham, has been appointed receiver of the Metropolitan Street Railway, Kansas City, Mo., as noted in the *ELECTRIC RAILWAY JOURNAL* of June 10, 1911, page 1024, was not in Kansas City when the appointment was made, and did not return for several days. It was not until June 7, 1911, that he and Mr. Dunham qualified as receivers. Each of them is bonded for \$50,000. Mr. Harvey made public the following statement:

"After careful consideration, I have decided to accept the receivership of the Metropolitan Street Railway. I appreciate fully the responsibility of the position, the high honor conferred by the appointment, and the exact nature of the duties required. The court, without my knowledge or solicitation, selected me as its representative. I shall do my best to be faithful to that trust, but am not and must not be considered as the representative of any interest."

As soon as Mr. Harvey had qualified and had made public the statement mentioned previously he conferred with Mr. Dunham, John M. Egan, general manager under the receivers; Frank Hagerman, counsel for the receivers, and Charles W. Armour, resident representative in Kansas City of the Armour interests. Subsequently Mr. Harvey and Mr. Dunham conferred with Mayor Brown and other representatives of the city administration. As a result of the conference the receivers and the Mayor decided to join at once in asking Judge W. C. Hook of the United States Circuit Court at Kansas City to permit the company to pay the city \$150,000, which is approximately the amount due the city as 8 per cent of the company's gross annual revenue for the year ended May 31, 1911. It was also decided by the receivers and the Mayor to urge the City Council at its meeting on June 12, 1911, to pass an ordinance to authorize the receivers to build a part of the crosstown north and south line on Prospect Avenue north of Fifteenth Street to Independence, where it would connect with Chestnut Avenue.

Mr. Dunham and Mr. Harvey on June 7, 1911, issued the

following statement outlining their immediate purpose:

"1. The purpose of the appointment of the receivers at the present time was to prevent a dismemberment of the system because of (a) the inability to obtain money with which to make the many additions and improvements which the phenomenal growth of the city required; and (b), the claim of the holders of \$13,000,000 of early maturing underlying bonds that they are not bound by the provisions of the peace agreement as to transfers, payment of 8 per cent of the earnings, and the making of extensions. To this end, until otherwise directed by the court, the street railways will be operated as one system, without any change in the method of transfers. Whether the system shall be dismembered, and if so, when, or what are the separate franchise rights of each dismembered part, are questions for the court's future determination.

"2. Until such questions are determined the receivers will operate the property to the best of their ability, and render to the public the best service that can be given consistent with the various obligations which it will be necessary to meet from the earnings.

"3. The receivers will join with the city in asking the court to order the payment of the 8 per cent and any other sums about to become due under the franchise from the two cities.

"4. Doubt has been expressed as to whether an old franchise authorizes the construction of the Chestnut Avenue line partly upon Prospect Avenue. For the convenience of the public, as well as for economy in operation, the change from Chestnut to Prospect south of Independence Avenue should be made. Work has been commenced upon the line, and it will be finished, provided the city passes an ordinance authorizing the change of the line to Prospect Avenue, so as to remove that doubt.

"Materials are here and work has been commenced (in many instances nearing completion) upon the Eleventh Street loop between Wyandotte Street and Broadway, Fifteenth Street from Grand Avenue to Main Street, and Woodland Avenue from Missouri Avenue to Fifteenth Street, in Kansas City, Mo.; the loop around the public square in Independence; Eighteenth Street from Minnesota Avenue to Central Avenue, and the extension of the Chelsea Park line from Twenty-fifth Street to the city limits in Kansas City, Kan. In view of the action of the company in starting these improvements, the receivers feel that they are morally bound to complete them. This will be done.

"5. What, if any, other extensions or additions to the property shall from time to time be made, or how the payment therefor shall be met, will be matters for the court's future determination.

"6. The receivers have selected Frank Hagerman as their counsel. John M. Egan will act as general manager, in charge of the operation. The other employees will continue to perform their present duties."

Paul Shoup on Pacific Electric Railway Development

Paul Shoup, vice-president of the Pacific Electric Railway, Los Angeles, Cal., and affiliated companies, is quoted in part as follows in an interview in the *Los Angeles Examiner*:

"We will start work immediately on the cut-off between the Pacific Electric Railway's four-track Long Beach line and the Los Angeles & Redondo Railway. If further right-of-way difficulties do not intervene, we will have a standard gage short line to Redondo in about sixty days, with a marked reduction in time between Los Angeles and that resort. The Burbank extension from Glendale is well under way; I should think in about sixty days the Burbank people could begin planning trolley rides. In the 10-mile San Fernando Valley extension the cars should be in Van Nuys by midsummer. The reconstruction of the Hollywood line and the short line west of the city limits to Venice is nearly completed. The line to Venice from the city limits west has been practically rebuilt, while the Hollywood line has been rebuilt and paved.

"Our new route to Venice and Santa Monica from the Pacific Electric Railway terminal via University is ready for operation. We have applied to the city for the necessary permit. In Santa Monica we are about to begin a new city line of which the first mile will be built at once; over

in Pasadena we have some projects under consideration, and in Riverside we are planning considerable new work. The improvements actually under way will cost the electric railways more than \$1,750,000. In addition we are spending \$500,000 for power improvements.

"The city must have good interurban service if it is to prosper; it cannot shut its gates against interurban cars nor choke their passage, with any more fortune than could a city of old shut its gates against the caravans. I have seen no strong disposition here to dispute this idea. The next step is to provide separate tracks for interurban and city traffic. I am sure the Main Street traffic problem can be solved. The subject has been studied, but I do not care to comment on it now. If it be necessary for the electric railways in time to invest some millions of dollars in overhead or subway construction, or both, to give this separate interurban service and to give greater momentum to the growth of this wonderful city, do not overlook the position of the man whose dollar is to be spent in such work, who is to spell his faith in the community with his cash. He is as worthy of protection as any other investor.

"Where great passenger terminals have been built I think you will find perpetual rights or very long-time franchises have been granted; it is an easy matter to ascertain what has been done elsewhere. Certainly the city and its environs have much to gain through such an expenditure.

"I believe the public is just, when it knows the facts; otherwise there would be no civilization. Feeling that the public will be fair in dealing with us if it thoroughly understands the question at issue makes it incumbent upon us to aid by giving fully our reasons for a position taken. It is our policy to do this. Always there will be some impetuous persons not inclined to consider our viewpoint at all; but this is not true in my experience with the public as a whole. But the people are, as a rule, pretty well engrossed in their own affairs; most of us are busy in that direction and have too little time to study public questions. Therein we feel lies the greatest danger: a possibly incomplete knowledge of the subject under discussion and a tendency to hasty judgment. Notwithstanding the occasional publication of some confiscatory doctrine, this community, I am sure, has no desire to give less than a square deal to the electric railways; has no desire to frighten away any dollars rolling in this direction for investment."

Detroit Rental Suit Argued

The argument in the case of the city of Detroit against the Detroit United Railway to determine the right of the city to collect \$200 additional rental for the use of the streets occupied by the Fort Street line consumed the first four days of the week commencing on June 4, 1911. The full court, consisting of Judges Manning, Hosmer and Murphy, sat during the hearing. Fred A. Baker, attorney for the company, contended that a local court should not try a case of the kind in question and that the court should delay its decision until the United States Court has rendered a decision on the case involving what is known as the Hally ordinance, inasmuch as similar questions are involved. Mr. Baker called attention to the predicament of the city if the court should order the company to cease operation. Corporation Counsel Hally said that the Council asked the court to do exactly what was stated in the bill and that the people must expect to be inconvenienced if they are to gain their contention.

On June 5 the attorneys for the company questioned Mr. Hally's authority under the resolution adopted by the Council to go so far as to ask that the company be compelled to cease operation on the route in case it does not pay the rental asked. On the evening of June 5 a resolution was introduced in the Council to authorize Mr. Hally to conduct the case as he saw fit. This was referred to the committees on franchises and public utilities jointly.

Attorney Hinton E. Spalding argued that the only jurisdiction the court has is to determine whether the \$200 asked is just and reasonable, and, if not, then to order the company to pay a sum which it deems proper. He said that the City Council did not contemplate that the company should be ordered to remove its tracks from the streets. Mr. Hally replied that the money spent to put the system

in good repair and keep it up to date had no bearing on the case and that the company was an outlaw in the streets. He repeated that the Council intended that the company should pay the rental demanded or abandon the line.

On the closing day Mr. Hally said that the city was not in possession of the streets, as the Detroit United Railway has its tracks in the streets and is operating cars over them. The court asked the attorneys to present briefs on June 15, 1911.

Attorney Baker closed the argument by insisting that the grants under which the Fort Street lines were built and operated were made under the Constitution of 1850 and the Railway Act of 1855 and that the State franchise to maintain and operate street railways upon the streets named became a part of the physical property and that whoever owns the physical property is entitled to exercise the State franchise regardless of whether there is any further local consent or agreement, such owner being obligated, in the absence of an agreement fixing rates of fare, to charge a reasonable rate of fare. The action of the Council in imposing an unreasonable and confiscatory rental was in violation of Section 10, Article 1 of the Constitution of the United States and in conflict with the due-process-of-law clause of the Fourteenth Amendment of the Constitution of the United States.

Transit Affairs in New York

The Public Service Commission has approved the abandonment by the Second Avenue Railroad of unused franchises and tracks for street railways in the Borough of Manhattan, which aggregate 4.126 miles in length. The amended declaration of abandonment filed by the company has been approved by the commission, and wherever tracks are laid on the routes abandoned they will be torn up and forthwith removed from the streets. This action is the result of a promise made to the commission by the receiver for the company, George W. Linch, in July, 1910, in connection with the application then pending for the commission's approval of a change of motive power on the Worth Street line from horses to underground electricity.

The Manhattan Bridge Three-Cent Line has applied to the Public Service Commission for authority to issue capital stock to the amount of \$50,000, which will be paid up, and the commission has ordered a hearing to be held June 22, 1911. The company received a certificate of public convenience and necessity from the commission and a franchise from the Board of Estimate some time ago for an electric railway between the Long Island Railroad Station at Flatbush Avenue, Brooklyn, and West Street, Manhattan, via the Manhattan Bridge and Canal Street. The Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad, however, have secured from the Supreme Court a writ of certiorari to review the action of the commission in granting the certificate. The company has not heretofore issued any stock.

J. Sergeant Cram has reiterated his opinion on the urgent need for prompt subway action by the commission and the city authorities. He said: "I have very pronounced ideas on subway matters, but the present reports, which I understand are now ready to be laid before the Board of Estimate, will receive my sanction, if that be necessary. I will not do anything to delay for one day the granting of the contracts and commencement of construction work on the proposed new subway. I have perfect confidence in the judgment of my colleagues on this matter, and the conclusions which they have already arrived at in regard to routes, etc., will receive my approval."

The Board of Estimate has refused to grant the City Island Railroad, which operates a monorail line to City Island, a further extension of time to complete its line. It has had two extensions, the last expiring on June 16, 1911.

Edward M. Bassett, who has been succeeded as a member of the Public Service Commission of the First District of New York by J. Sergeant Cram, chairman of the general committee of Tammany Hall, in a brief farewell statement, said to his colleagues: "I am glad to return to my regular vocation, although the four years spent as a commissioner has been a time of keen interest to me. It has been a formative period of public regulation in this State, and it

is a great privilege to have had a hand in the shaping of new things in which one believes. I leave my colleagues with regret, and consider that I have been most fortunate in being in close contact with these men for four years. We have sometimes differed in our opinions, but wrong motives have never been ascribed to any one."

Recommendation of Commission to Syracuse Rapid Transit Company

As a result of the inquiry which it conducted recently in regard to the condition of the physical property of the Syracuse (N. Y.) Rapid Transit Company, the Public Service Commission of the Second District of New York has made public its recommendations to the company. The important improvements in extensions, equipment and service will require the expenditure of upward of \$1,000,000. The financial condition of the company is such that the commission states it will not expect all of these improvements to be made in one or two years. It is, however, of the opinion that all should be completed within five years. A full proportionate part of the amount of these expenditures should be made each year.

The requirements of the commission are for two additional transfer stations to cost \$158,090; thirty-four new double-truck cars to cost \$6,000 each, \$204,000; change in location of present East Syracuse line, including double tracking from James Street and Hawley Avenue to James Street and city line, \$188,964; East Syracuse extension, Burnett Avenue, double tracks, \$260,371; double tracking Seneca Turnpike from Salina Street to the Valley, \$60,300; double tracking in the village of Solvay, \$37,100; double tracks through Willow Street from Townsend Street to Lodi Street, \$29,984.

The company is directed and required to purchase and put in operation by Nov. 1, 1911, twelve large modern type double-truck cars suitable for winter service; to replace all the single-truck cars now in use on the East Syracuse line by double-truck cars on or before Nov. 1, 1911, and after that date to use no single-truck cars on that line except in cases of emergency; to equip with straps for the use of standing passengers all closed cars on the East Syracuse line which are not so equipped; to change the route of the East Syracuse cars in Syracuse so that they will run direct through and to the common center by use of a curve to be installed connecting the south-bound track in Warren Street with the west-bound track in East Fayette Street. The present side-aisle cars on the Park Summit line must be discontinued on or before Nov. 1, 1911, and after that date only such single-truck cars are to be used as shall have been reconstructed to afford the maximum seating capacity and standing space, or larger cars if the service on that line shall so require.

The company is also required to provide additional cars on the Valley end of the Oak Valley line between 5:30 p. m. and 6:30 p. m.; to construct at least one of the two additional transformer stations in the commission's plan on or before Nov. 1, 1911, and to put in service a wrecking or repair truck convenient to the common center on or before Jan. 1, 1912.

The Syracuse Rapid Transit Railway has already signified its willingness to accept the recommendations and conditions which have been made, and work has already been commenced to carry out the requirements of the commission.

The Question of Fare in Suburban Cleveland

Thomas P. Schmidt, a director of the Cleveland Railway who represents stockholders who became interested in the company during the Johnson management, has stated that he will ask for a referendum vote and that he will oppose the adoption of the proposed amendments to the Tayler grant if they are drawn to embody a clause to empower the City Council to extend 3-cent fare to the suburban towns when they are annexed to the city. He says he will also vote against the acceptance of the amendments by the company. Mr. Schmidt claims that the clause will endanger the success of 3-cent fare. He says that the late Mayor Johnson felt that the zone system of fares was the ideal method, but that Mr. Johnson realized that this was not practical at the time and supported the idea of having

a 3-cent fare within the city limits, with an increased fare for the suburbs.

Mr. Schmidt's idea is opposed to that of G. M. Dahl, street railway commissioner, who says that he is following Judge Tayler's plan of securing service at cost, whether the fare is 3 cents or more. He believes that the fare should be the same all over the city and wants the fare which is now charged in the city extended to the suburban towns as they become part of the city.

The South Cleveland Improvement Association has proposed to Director of Public Service Lea that the Cleveland Railway establish a belt line about the city, as suggested some months ago. Mr. Lea referred the committee which represents the association to Mr. Dahl.

By agreement of attorneys, the libel suit to recover \$500,000 which was brought by the late Mayor Tom L. Johnson against the Cleveland Electric Railway in November, 1906, has been dismissed by Judge Estep. The petition related to matter published in bulletins issued by the company.

Court Reverses Finding of New York Commission in Third Avenue Railroad Reorganization Case.

The Appellate Division of the Supreme Court of New York has reversed the decision of the Public Service Commission of the First District of New York in rejecting the reorganization plan of the Third Avenue Railroad. This will make the bondholders' plan effective. The plan was submitted to the commission by the bondholders' committee on Dec. 3, 1909. Justice Ingraham in his opinion says:

"Upon the facts as they appeared before the commission it would seem that it was bound to approve the issue of the stocks and bonds by the new corporation in accordance with the plan of reorganization, and the power of the commission was confined to a determination of the question as to whether the proposed issue was authorized by Sections 8 and 9 of the stock corporation law and the agreement for the purchase and sale and adjustment of foreclosure."

The Public Service Commission has announced that it will appeal to the Court of Appeals from the decision of the Appellate Division overruling its decision against the reorganization plan of the Third Avenue Railroad. The decision of the Appellate Division is considered by the commission as raising fundamental questions concerning the Public Service Commission's act, and if the Appellate Court is upheld the powers of the commission regarding securities issues in reorganizations will be so reduced as to make them purely nominal.

No Perpetual Easements in Los Angeles.—On recommendation of the Board of Public Utilities of Los Angeles, Cal., the Council has denied the application of the Los Angeles Railway for a franchise for the proposed Hoover Street extension. In return for certain rights of way which might be condemned the company asked for a perpetual easement in the street. The board recommended that no perpetual easements should be given by the city.

Progress of Toledo Negotiations.—Albion E. Lang, president of the Toledo Railways & Light Company, Toledo, Ohio, returned to Toledo from New York on June 10, 1911, after consulting with some of the bondholders, and it is expected that the directors will meet within a short time to consider the selection of Judge J. M. Killits of the United States Court as arbitrator to act with the experts who have been selected by the city and the company to appraise the property.

Strike at Newburg, N. Y.—The motormen and conductors in the employ of the Orange County Traction Company, Newburg, N. Y., went on strike on June 9, 1911, to force the company to modify terms of service governing them which they deemed too severe. The question of wages was not involved. On the afternoon of June 10, 1911, the men returned to work on the assurance of the officials of the company that the alleged grievance would be adjusted satisfactorily.

Earthquake Damage at Mexico City.—The property of the public service corporations operating in Mexico City, Mex., was damaged considerably by the violent earthquake which shook nearly all Mexico early on the morning of June 7, 1911. Several persons are reported to have been

killed and a score injured at the power station and repair shops of the Mexico Tramways Company at Indianalla. While considerable damage was done to the tracks of the company, operation had to be suspended on only one line.

State Assessment of Indiana Interurban Railways.—The Indiana State Tax Commission has fixed the total assessments of interurban railways in Indiana at \$23,566,823, as compared with \$22,376,628 for 1910, an increase in valuation of \$1,190,585. The total value of the rolling stock on all the roads is fixed at \$1,812,806. There was very little change in rate per mile, the increases including additional mileage and improvements. The largest increase was in the tax of the Indiana Traction & Terminal Company, which was raised \$166,920.

Terms Submitted for Investigation in San Francisco.—Bion J. Arnold has outlined the terms under which he would be willing to undertake to report to the Supervisors of San Francisco, Cal., in regard to street railway conditions in that city in accordance with the resolution to retain him as expert introduced before the board by Supervisor Murdock of San Francisco, as noted in the *ELECTRIC RAILWAY JOURNAL* of May 27, 1911, page 933. It was expected that the letter from Mr. Arnold in which his terms were embodied would come before the board at its next meeting.

Public Utility Commission Proposed for District of Columbia.—A public utilities commission for the District of Columbia, consisting of the District Commissioners, is provided for in a bill introduced in the United States Senate by Senator Gallinger, chairman of the committee of the Senate on the District of Columbia, and has been referred to that committee. The bill as drawn would give the commission full power to supervise and regulate all public utilities in the District of Columbia, including the street railways, telephone companies and electric light and power companies.

Hearing in Chicago on Subway Plans.—City Engineer Ericson of Chicago discussed the plans proposed by him for the construction of subways in Chicago before the transportation committee of the City Council of Chicago, Ill., on June 5, 1911. Mr. Ericson has proposed north and south lines and east and west lines. His estimates of cost for the north and south subway follows: Four tracks from Chicago Avenue to Twenty-second Street, complete, \$13,125,000; four tracks from Chicago Avenue to Twelfth Street, \$9,375,000. No estimates were made of the cost of constructing the east and west subways.

Strike in Dallas.—A strike of the employees of the Dallas Electric Corporation resulted recently on account of a misunderstanding in regard to orders issued by the company. The differences were settled at a conference held a few hours after the employees went on strike and the men returned to work at once. The men issued a statement to the public following the settlement in which they said: "We, the undersigned conductors and motormen in the employ of the Dallas Street Railways—many of us having been in the service many years and having families and homes—wish to say that our relations with our employers are entirely satisfactory and we hope the present disturbance will soon pass away in order that we may continue our service without fear of violence and outside interference."

National Civic Federation to Consider Uniform Utility Legislation.—Seth Low, president of the National Civic Federation, New York, N. Y., has called a meeting of the national committee on the regulation of railroads and public utilities of the federation to be held in New York on June 23, 1911, to consider the question of uniform public utility legislation. Mr. Low said: "The federation takes it for granted that there should be such regulation on the part of the public, the vital question being to what extent such regulation can go and be effective without interfering unduly with management. With so many different States legislating upon the subject, there is evidently great danger that each State will legislate in practical disregard of what is done by the other States. It is hoped that the committee to be appointed may consider the question so fully and so fairly as to be able to agree to prepare the draft of something like a model law, which would be useful in bringing about reasonable uniformity by the different States."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

On June 6, 1911, the Senate voted to adopt the minority report of the judiciary committee on the public utility bills. In a separate act the overissuance of capital and securities, which must be paid for in cash or its equivalent, is made a criminal offense with a penalty of \$10,000 fine and five years' imprisonment. The public utility bill as passed by the Senate creates one committee of three members, with annual salaries of \$5,000, to supervise all public service corporations and abolishes the present Railroad Commission.

MASSACHUSETTS

In the House on June 5, 1911, the committees on railroads and metropolitan affairs, acting jointly, reported a bill to provide for the electrification of all standard gage railroads in greater Boston. The bill would require the railroads to submit plans for electrification to the Railroad Commissioners within a year and would give the commission authority to compel electrification within a 10-mile radius of the city at its discretion. The special committee on public utilities voted recently to report no legislation necessary upon the recommendation of Governor Foss for a public utility commission to succeed the Railroad Commission, the Gas & Electric Light Commission, the Boston Transit Commission and the Massachusetts Highway Commission. A bill reported in the House would give the Railroad Commission the right to fix rates of fare and determine the quality of service and facilities afforded by railroads. The measure provides for a fifty-year extension of the Boston Elevated Railway-West End Street Railway lease, for a Boylston Street subway, the repeal of the Riverbank subway act, a subway from Park Street to the South Station and Dorchester, an extension of the East Boston tunnel to Bowdoin Square and extensions of the leases of the existing subways and tunnels.

The committee on street railways has reported a bill favoring the extension of the lease of the West End Street Railway, the construction of a tunnel to Dorchester and a subway under Boylston Street, and uniform extensions of the present tunnel and subway leases by the Boston Elevated Railway. The proposed act will fail unless accepted by the railway company, unless the Mayor and City Council of Boston agree to the section providing for new construction and new contracts for the use of the various subways and tunnels, so that the Boston Elevated Railway shall have exclusive use of them for an indeterminate period, ranging from forty-two years to fifty years, and unless a majority of the stockholders of the West End Street Railway agrees to a fifty-year extension of the present lease with 7½ per cent dividends.

NEW YORK

The Senate has confirmed the appointment of J. Sergeant Cram by Governor Dix as a member of the Public Service Commission of the First District of New York. The appointment was carried by a vote of 26 to 20. On June 6, 1911, the Assembly passed the McClelland-Walker bill, which gives the city authorities of New York power to enter into an agreement with the New York Central & Hudson River Railroad to remove its tracks from Eleventh Avenue, New York, by placing them on an elevated structure, in a subway, or both. This measure is favored by Mayor Gaynor and Dock Commissioner Tompkins of New York. On June 6, 1911, Senator O'Brien, Brooklyn, reintroduced, slightly modified, the bill to require the Long Island Railroad to extend the 5-cent zone on its electrified line between Flatbush Avenue, Brooklyn, and Jamaica, from Warwick Street to Railroad Avenue, Brooklyn. The Governor vetoed the original bill, contending that the measure tended to usurp the power of the Public Service Commission.

A bill to provide for the creation of a State Department of Electricity was reported favorably by the Senate finance committee on June 8, 1911. The measure would provide a single-headed commission, the commissioner to be appointed by the Governor and removable at his pleasure, at a salary of \$5,000, and for the appointment of a chief electrical engineer and chief inspector at salaries not exceeding \$3,000 and \$2,500 respectively.

Financial and Corporate

New York Stock and Money Markets

June 13, 1911.

Transactions in Wall Street continue to be largely professional in character. Trading to-day was somewhat irregular, the market closing firm, with a general advance throughout the list. The increase in bank clearings in the past week, the excellent crop reports and the activity of the bond market are regarded as signs of improvement. In the money market while rates have not changed appreciably there is less eagerness than heretofore to loan at existing rates. Quotations to-day were: Call, 2@2½ per cent; ninety days, 2½@2¾ per cent.

Other Markets

Traction issues were in fair demand in Philadelphia in the early part of the week and prices rose to a somewhat higher level. To-day's market was firm and showed signs of manipulative strength.

Chicago prices show mild improvement. Trading in the elevated shares was slightly better in to-day's market, with gains in Metropolitan West Side and Northwestern common.

The Boston market has been strong and its activity general throughout the week.

The feature of the Baltimore market to-day was the advance of 6 points in Fairmont & Clarksburg Traction preferred.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 6	June 13.
American Light & Traction Company (common).....	a295	a295
American Light & Traction Company (preferred).....	a107	a107
American Railways Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a41½	a43
Aurora, Elgin & Chicago Railroad (preferred).....	a86	a86
Boston Elevated Railway.....	128	129½
Boston Suburban Electric Companies (common).....	a14½	a15½
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a8½	9
Boston & Worcester Electric Companies (preferred).....	a51	a51
Brooklyn Rapid Transit Company.....	81¾	81½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	86	86
Capital Traction Company, Washington.....	130	a129
Chicago City Railway.....	a190	a195
Chicago & Oak Park Elevated Railroad (common).....	2	2
Chicago & Oak Park Elevated Railroad (preferred).....	5	6
Chicago Railways, ptcpgt., ctf. 1.....	a82	a84
Chicago Railways, ptcpgt., ctf. 2.....	a23	a22
Chicago Railways, ptcpgt., ctf. 3.....	a10	a10
Chicago Railways, ptcpgt., ctf. 4.....	a6	a6
Cincinnati Street Railway.....	a131	a133
Cleveland Railway.....	a97½	a97½
Columbus Railway (common).....	a96	a96
Columbus Railway (preferred).....	a101	a101
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105½	a105½
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a100	a100
Detroit United Railway.....	a74	74
General Electric Company.....	163¾	164
Georgia Railway & Electric Company (common).....	141	150
Georgia Railway & Electric Company (preferred).....	92	92
Interborough Metropolitan Company (common).....	19¾	19¾
Interborough Metropolitan Company (preferred).....	54	52
Interborough Metropolitan Company (4½s).....	79¾	79½
Kansas City Railway & Light Company (common).....	a19	a19
Kansas City Railway & Light Company (preferred).....	a49	a44
Manhattan Railway.....	a140	a139¾
Massachusetts Electric Companies (common).....	a23¾	a23½
Massachusetts Electric Companies (preferred).....	a91	a90¾
Metropolitan West Side, Chicago (common).....	a26	a26
Metropolitan West Side, Chicago (preferred).....	a72½	a72½
Metropolitan Street Railway, New York.....	*15	15
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	76¾	75½
Northern Ohio Light & Traction Company.....	46	48
Northwestern Elevated Railroad (common).....	a28½	a27½
Northwestern Elevated Railroad (preferred).....	a69	a69
Philadelphia Company, Pittsburgh (common).....	58¾	56½
Philadelphia Company, Pittsburgh (preferred).....	44	43¾
Philadelphia Rapid Transit Company.....	19¾	19¾
Philadelphia Traction Company.....	84	86¾
Public Service Corporation, 5% col. notes (1913).....	101	101
Public Service Corporation, ctf. s.....	a107	a107
Seattle Electric Company (common).....	a111	a111
Seattle Electric Company (preferred).....	a103¾	a103
South Side Elevated Railroad (Chicago).....	a77½	a77
Third Avenue Railroad, New York.....	11¾	107¾
Toledo Railways & Light Company.....	a8	8
Twin City Rapid Transit, Minneapolis (common).....	110	a109½
Union Traction Company, Philadelphia.....	49¾	49¼
United Rys. & Electric Company, Baltimore.....	18¼	*18¼
United Rys. Inv. Co. (common).....	42	41
United Rys. Inv. Co. (preferred).....	71½	71
Washington Ry. & Electric Company (common).....	34	35
Washington Ry. & Electric Company (preferred).....	89¾	88¾
West End Street Railway, Boston (common).....	a90¾	a91½
West End Street Railway, Boston (preferred).....	a103½	a104½
Westinghouse Elec. & Mfg. Co.....	77	76½
Westinghouse Elec. & Mfg. Co. (1st pref).....	118¾	118¾

a. Asked. *Last sale.

Report of the Westinghouse Company

The report of the Westinghouse Electric & Manufacturing Company for the year ended March 31, 1911, was made public on June 12, 1911. It showed that while the manufacturing business of the company was in a very prosperous condition some of the investments, particularly in foreign branches, had been unprofitable.

The income account for the year, which includes the operations of all the subsidiary companies—sales between companies, however, being eliminated—is as follows:

Gross earnings:	
Shipments billed.....	\$38,119,312
Cost of shipments:	
Factory costs, including all expenditures for patterns, dies, new small tools and other betterments and extensions; also inventory adjustments and all selling, administration, general and development expenses.....	32,510,546
Net manufacturing profits.....	\$5,608,765
Other income:	
Interest and discount.....	\$272,055
Dividends and interest on sundry stocks and bonds owned.....	615,299
Miscellaneous—royalties, etc.....	628,177
	1,515,531
Total income.....	\$7,124,296
Deductions from income:	
Interest on bonds and debentures.....	\$1,076,553
Interest on collateral notes.....	416,000
Miscellaneous interest.....	92,933
Property and plant depreciations charged against income.....	371,668
Proportion of expenses incidental to bond and note issues.....	76,666
Miscellaneous.....	209,369
	2,243,190
Net income—surplus for the year.....	\$4,881,105

Robert Mather, chairman of the board, says in part: "The year's business, both in gross earnings and net income, was the largest in the history of the company. The gross earnings exceeded those of the preceding fiscal year by \$8,870,630 and were greater by \$5,093,072 than the earnings of the best previous year in the company's existence.

"Your directors feel that the satisfactory results of the past year, reached as they were during a period of somewhat less than normal activity in other lines of industry, afford sound basis for continued hope in the future of the electrical manufacturing industry and in the maintenance by your company of its position in that field. It is, on the other hand, a fact that the volume of business now offering is on a diminishing scale, and the results of the last year, therefore, are no certain indication of a continuance for the future of gross earnings and net profits such as the past twelve months have produced. The business taken by the company during February and March, 1911—the last two months of the fiscal year covered by this report—was somewhat less than that taken during the same months of 1910, and the value of the orders booked since the close of the fiscal year does not compare favorably with that of the corresponding period of a year ago.

"The value of unfilled orders as of March 31, 1910, was \$11,256,196; as of March 31, 1911, this value stood at \$7,616,058.

"Certain other conditions affect the estimate for the immediate future of the earning power of your company. On March 31, 1896, your company entered into an agreement with the General Electric Company whereby for a period of fifteen years thereafter each company licensed the other under the patents controlled by it during the term of the agreement, with provision for the payment of royalties by each on the basis of its use of the patents of the other. For the past few years under the operation of this agreement your company has received substantial sums by way of royalties. This agreement expired by limitation of time on April 30, 1911. No renewal of it is contemplated. This source of revenue, therefore, cannot now be counted upon.

"Other patent license agreements with manufacturers of mining locomotives, small motors, fuses, switches and sockets, under which your company has been working for some years, have recently been canceled on the suggestion that they might be questioned as being in violation of the federal anti-trust laws, notwithstanding they were originally made and have been maintained under advice of counsel that assured your company of their validity.

"Your directors have had steadily in mind the purpose of strengthening your company's position in every possible direction. To that end they have authorized considerable increase in the expenditures of the selling organization, for

increasing the number of salesmen in the field, for remuneration to its representatives adequate to secure the best effort on their part, for the extension of advertising, and to provide for proper warehouse facilities for carrying stocks at distributing points. This has added considerably to the aggregate selling expense; but the results, we believe, have been justified in the increased volume of business obtained. It is a matter of simple computation, on the basis of the operations of the past two years, to ascertain the point at which the volume of gross business fails to provide a surplus over operating expenses and fixed charges. It is vital that your business should not drop to that point.

"With the same purpose in view fairly large expenditures have been authorized for the work of new development and for improvement in current types of apparatus. This work has been particularly marked with respect to the redesigning of direct-current motors, alternating-current and direct-current mill and crane motors, small power motors, high speed turbo-generators, circuit breakers, railway equipment and heating and cooking apparatus. Your directors feel that this is an item of expenditure which, owing to the position of your company, it would be unwise at any time to curtail. It must be borne in mind that your company must keep pace in technical skill and inventive ingenuity with its competitors even though their combined capital and manufacturing facilities are greatly in excess of yours. The cost of all new development and redesigning is charged monthly as a part of the current costs.

"The surplus as of March 31, 1910, was \$5,668,948. This has been increased during the year by various items of profit detailed in the statement of profit and loss to \$6,349,255. Adding the net income for the year, \$4,881,105, there resulted a surplus with which your directors had to deal as of the end of the fiscal year, of \$11,230,361.

"Against this surplus have been charged dividends on the preferred stock for the year at the rate of 7 per cent per annum and a balance of 8¾ per cent accumulated but unpaid in previous years, together aggregating \$629,795.25. In the adjustment of the account property and plant (hereinafter referred to) and in establishing a direct liability for bonds of the Walker company guaranteed by your company (hereinafter explained), there resulted charges against surplus aggregating \$1,193,207, the items comprising which are shown separately in the statement of profit and loss. Charges against surplus in connection with reserve for notes and accounts receivable were made during the year aggregating \$589,774. Miscellaneous charges against profit and loss amounted to \$355. The total of the charge enumerated is \$2,413,222. There were also written off as depreciations of investments, the following:

Stocks:	
Westinghouse Electric Company, Ltd., London.....	\$500,000
Société Anonyme Westinghouse (French company).....	218,974
The Westinghouse Machine Company.....	93,538
Bonds:	
Lackawanna & Wyoming Valley Rapid Transit Company.....	2,000,000
Miscellaneous stocks and bonds.....	40,402
Total	\$2,852,914

"As a result of these depreciations the surplus as of March 31, 1911, shown in the balance sheet, is \$5,964,224."

Among the foreign companies those which have been unprofitable have been the British, French, Italian and Russian companies. On the other hand the Austrian and Canadian companies have been successful.

After a full statement and analysis of the several items in the balance sheet Mr. Mather says that after a careful consideration of all the circumstances and the need for cash in extending the manufacturing facilities of the company the directors do not consider it wise to pay dividends upon the company's assenting stock.

Portland (Ore.) Railway, Light & Power Company

The results of operations of the Portland (Ore.) Railway, Light & Power Company in 1909 and 1910 follow:

	1909.	1910.
Gross receipts.....	\$4,818,022	\$5,638,895
Operating expenses.....	2,196,496	2,444,178
Net earnings.....	\$2,621,526	\$3,194,717
Fixed charges.....	1,493,039	1,678,228
Surplus	\$1,128,487	\$1,516,489
Per cent. of operating expenses.....	45.6	43.3

B. S. Josselyn, the president, says in his statement, in part:

"The increase in gross earnings in 1910 over 1909 was \$820,873, or 17 per cent. The increase in net earnings was \$573,191, or 21.9 per cent.

"Thirteen and one-half miles of single track were constructed and 22½ miles reconstructed, the reconstruction being caused mainly by the paving of streets occupied by tracks. The total cost of track construction and reconstruction was \$1,006,710, of which \$785,069 was charged to capital account. There are 250.93 miles of single track in the system.

"Eighty-two new passenger cars, thirty-four freight and work cars were purchased, and six passenger cars, one mail and express car and three locomotives were built in the company's shops, at a total cost of \$642,663. The present equipment consists of 568 passenger cars, 352 freight and work cars and eight electric locomotives. Three car barns with storage capacity for 115 cars were completed.

"The nine-story office building in Portland was completed.

"According to the census of 1910 the population of Portland was 207,214, compared with 90,426 in 1900, an increase of 116,788, or 129.2 per cent. This is the population within the city limits. A conservative estimate of the population served by your company is 300,000."

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—The Aurora, Elgin & Chicago Railroad has sold \$500,000 of first and refunding mortgage 5 per cent bonds to Hayden, Miller & Company, Cleveland, Ohio, the proceeds to be used to purchase additional equipment. This makes the total amount of bonds outstanding \$2,879,000.

Chicago (Ill.) Elevated Railways.—An advance offering of the new issue of \$30,000,000 of three-year 5 per cent notes of the Chicago Elevated Railways, which were taken by the National City Bank, New York, N. Y., to provide funds to carry through the merger of the elevated railways of Chicago, is being made at 98½ to yield more than 5½ per cent. The notes will be secured by \$25,000,000 of what are now first-mortgage thirty-year 5 per cent bonds of the Northwestern Elevated Railroad and by the stocks of the various properties to be merged under the plan at a total cost of \$21,000,000.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—It is stated unofficially that a tentative agreement has been reached which provides for carrying out the long-deferred reorganization of the Chicago & Milwaukee Electric Railroad. A new corporation will be formed to take over both the Illinois and the Wisconsin properties of the company. It is said that the holders of the second-mortgage bonds of the Illinois division have been successful in their contention to receive bonds of the new corporation instead of stock, although the bonds which they are to receive will be only income obligations, bearing 4 per cent interest if earned. The new bonds are to be exchanged for the old ones at par. The holders of the bonds of the Wisconsin division are to receive second income 4 per cent bonds for one-half of their claims and the balance in stock of the new company. The income bonds will be subject to an issue of first-mortgage bonds amounting to \$3,000,000 or more, which will be used to refund the \$1,080,000 first-mortgage 5 per cent bonds of the Chicago & Milwaukee Electric Railway at par, take up \$1,000,000 of receivers' obligations, pay reorganization expenses and furnish new capital. Interest has been paid on the first-mortgage 5 per cent bonds during the receivership, and the principal is due July 1, 1919. The receivers' certificates mature this year. According to the tentative plan, the holders of the \$4,000,000 of outstanding bonds of the Illinois division will receive \$4,000,000 first-income bonds and the holders of the \$10,000,000 bonds of the Wisconsin division will receive \$5,000,000 in second-income bonds and \$5,000,000 in stock. The stock of the new corporation will be all one class.

Citizens' Railway Company, Waco, Tex.—H. H. Shear has confirmed the statement that he has exercised the option obtained by him on the property of the Citizens' Railway Company. It is understood that Mr. Shear represents the J. F. Strickland Company, Dallas, Tex., which operates the

Texas Traction Company and is extending the lines of that company through Waxahachie and Hillsboro to Waco.

Columbia Power, Light & Railways Company, Bloomsburg, Pa.—The Columbia & Montour Electric Railway and the Danville & Bloomsburg Electric Railway, both of which are controlled by the Columbia Power, Light & Railways Company, have been merged as the Columbia & Montour Electric Railway with a capital stock of \$520,000.

Janesville (Wis.) Traction Company.—The Wisconsin Railroad Commission has authorized the Janesville Traction Company, which succeeded the Janesville Street Railway at foreclosure, to issue \$125,000 of stock of a par value of \$100 a share and \$50,000 of 5 per cent thirty-year first mortgage bonds of the denomination of \$100,000.

Joliet & Southern Traction Company, Joliet, Ill.—The following committee of bondholders of the Joliet & Southern Traction Company has been appointed by George M. Reynolds, of the Continental National Bank, Chicago, Ill., to consider the question of reorganizing the company: Joy Morton, E. L. Stuart and J. R. Chapman, Chicago, Ill.; C. E. Wilson, R. T. Kelly, Frank Kohlhausen and T. B. Stewart. The appointment of this committee was made in accordance with conclusions reached at a recent meeting of the stockholders and creditors of the company, referred to in the *ELECTRIC RAILWAY JOURNAL* of June 10, 1911, page 1036. The newly appointed committee of bondholders was to meet in Chicago on June 12, 1911.

Lynchburg Traction & Light Company, Lynchburg, Va.—The Lynchburg Traction & Light Company has filed a mortgage to the Real Estate, Title, Insurance & Trust Company, Philadelphia, Pa., as trustee, to secure an issue of \$1,750,000 of twenty-year 5 per cent bonds to retire outstanding bonds and for extensions and improvements. As noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 853, the company called for redemption on June 1, 1911, its \$250,000 of 6 per cent general mortgage convertible ten-year gold bonds of 1907.

Manhattan Bridge Three-Cent Line.—The Manhattan Bridge Three-Cent Line has applied to the Public Service Commission of the First District of New York for permission to issue \$50,000 of capital stock, which has already been authorized. The company stated that the entire amount has been fully subscribed and that the money has been paid in.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has approved the plan of Adrian H. Joline and Douglas Robinson, receivers for the Metropolitan Street Railway; Frederick W. Whitridge, receiver for the Third Avenue Railroad, and William W. Ladd, receiver for the New York City Railway, whereby the payment of \$200,000 by the Metropolitan Street Railway to the receiver of the Third Avenue Railroad will settle claims aggregating \$73,000,000. The plan provides that on the payment of \$200,000 the Third Avenue Railroad will cancel a claim of \$36,915,867 held against the Metropolitan Street Railway for rental and use of track, and a claim of \$36,475,097 against the New York City Railway for breach of contract. The agreement is not binding as to the validity of notes for almost \$6,000,000 in possession of the New York City Railway.

Ocean Shore Railway, San Francisco, Cal.—F. S. Stratton, receiver of the Ocean Shore Railway, which was sold under foreclosure recently to representatives of the bondholders of the company, has filed his final report with the court. During his administration Mr. Stratton collected \$440,791 and expended \$397,865, and has a cash balance on hand of \$42,925, against which there are claims by various creditors. There are also claims against the receiver to the amount of \$12,956. The receipts from the sale of the road were \$1,935,000, against which is the bonded indebtedness of \$4,995,500. He suggests that the balance on hand should be turned over to the Mercantile Trust Company. The receiver asks that he be allowed additional compensation at the rate of \$500 per month from March 6, 1911, the date first set for the close of the receivership. He asks also for an appropriation of \$2,500 for Walter W. Kaufman as attorney and additional compensation of \$1,000 per month from March 6, 1911. The court set June 26, 1911, as the date for a hearing.

Orange County Traction Company, Newburg, N. Y.—The Orange County Traction Company has applied to the Public Service Commission of the Second District of New York for permission to issue \$83,500 of 5 per cent fifty-year first and refunding mortgage bonds.

Parkersburg & Ohio Valley Electric Railroad, Parkersburg, W. Va.—Judge Dayton in the Federal Court at Sistersville, W. Va., has authorized C. L. Williams, the receiver of the Parkersburg & Ohio Valley Electric Railroad, to issue \$30,000 of receivers' certificates to complete the road between Sistersville and Friendly and to pay the accrued interest on the first-mortgage bonds.

Philadelphia (Pa.) Rapid Transit Company.—The Philadelphia Rapid Transit Company has arranged with Drexel & Company, Philadelphia, Pa., to purchase at 102½ on and after June 15, 1911, the issue of \$285,000 of second mortgage 5 per cent bonds which mature on July 15, 1911, with July coupons attached.

Texas Traction Company, Dallas, Tex.—An initial dividend of 1½ per cent has been declared on the \$1,000,000 of 6 per cent cumulative preferred stock of the Texas Traction Company, payable July 1, 1911, to holders of record on July 1, 1911.

United Railways, St. Louis, Mo.—On Aug. 1, 1911, \$1,500,000 of the 5 per cent bonds of the Lindell Railway mature, and the United Railways proposes to care for the maturing issue by an issue of 4½ per cent ten-year bonds. This refunding will reduce the indebtedness of the underlying companies from \$18,811,000 to \$17,211,000. The United Railways has outstanding \$30,769,000 of first general mortgage 4 per cent bonds and \$10,000,000 of 5 per cent bonds of the St. Louis Transit Company.

Dividends Declared.

Chattanooga Railway & Light Company, Chattanooga, Tenn., quarterly, 1¼ per cent, preferred.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1¼ per cent, common.

Indianapolis (Ind.) Street Railway, 3 per cent.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Manila Electric Railroad & Light Corporation, Manila, P. I., quarterly, 1¼ per cent.

St. Joseph Railway, Light, Heat & Power Company, quarterly, 1¼ per cent, preferred.

Texas Traction Company, Dallas, Tex., quarterly, 1½ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 1¾ per cent.

Union Passenger Railway, Philadelphia, Pa., \$4.75.

Union Traction Company, Philadelphia, Pa., \$1.50.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

West Philadelphia Passenger Railway, Philadelphia, Pa., \$5.

MONTHLY ELECTRIC RAILWAY EARNINGS

		BANGOR RAILWAY & ELECTRIC COMPANY.				
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., April	'11	\$43,097	*\$20,633	\$22,464	\$12,479	\$9,985
1 "	"	41,705	*20,780	20,925	11,713	9,212
10 "	"	483,650	*224,081	259,569	121,563	138,006
10 "	"	467,355	*214,622	252,733	117,328	135,405
		COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY.				
1m., April	'11	\$421,924	*\$246,197	\$175,727	\$105,081	\$70,646
1 "	"	389,314	*222,721	166,593	100,349	66,244
4 "	"	1,773,761	*1,000,572	773,189	408,214	364,975
4 "	"	1,610,472	*915,106	695,366	406,305	289,061
		DETROIT UNITED RAILWAYS.				
1m., April	'11	\$815,056	\$518,596	\$296,454	\$176,380	\$120,074
1 "	"	737,609	486,898	250,712	161,490	89,222
4 "	"	3,040,641	1,922,029	1,118,612	703,951	414,662
4 "	"	2,766,650	1,781,488	985,163	641,159	344,004
		EAST ST. LOUIS & SUBURBAN RAILWAY.				
1m., April	'11	\$178,507	\$99,784	\$78,723	.....	.....
1 "	"	171,640	95,823	75,818	.....	.....
4 "	"	712,803	387,936	324,867	.....	.....
4 "	"	785,321	390,451	344,871	.....	.....
		NORFOLK & PORTSMOUTH TRACTION COMPANY.				
10m., April	'11	\$1,734,461	\$986,409	\$748,052	\$624,631	\$123,422
10 "	"	1,593,526	908,036	685,490	643,842	41,648
		UNION RAILWAY, GAS & ELECTRIC COMPANY.				
1m., April	'11	\$242,968	*\$145,742	\$97,226	\$60,686	\$36,540
1 "	"	230,323	*139,218	91,105	57,959	33,146
4 "	"	1,024,475	*604,183	420,292	239,286	181,006
4 "	"	982,928	*591,370	391,558	232,181	159,377

*Including taxes.

Traffic and Transportation

Transportation and the San Francisco Exposition

Thornwell Mullally, assistant to the president of the United Railroads, San Francisco, Cal., has prepared for submission to the executive committee which has in charge the selection of a site for the San Francisco exposition a report in which he has summarized the problem before the company to meet the requirements for transportation to Golden Gate Park and to Harbor View, both of which are being considered as a site for the exposition. He says that the cost of construction to Harbor View is absolutely prohibitive for temporary purposes and that the company would have to be assured a twenty-five-year franchise if this site should be selected. He says in part:

"The men who are charged with the responsibility for the success of the exposition, which depends among other things upon transportation facilities, are not justified in selecting a site where new franchises and tunnels are an absolute requisite, when they do not know whether these franchises will be granted nor whether the people will vote the money necessary for the tunnels. Since the site must be selected immediately, it seems to be conclusive that Harbor View ought not to be selected when there is another site available with good transportation facilities and not dependent upon the people voting for and building tunnels.

"The new track that would have to be constructed at Harbor View by the street railroad company amounts to 12½ miles. In this connection it should be remembered that there are certain charter amendments which make it prohibitive for any street railway company to construct and operate new tracks under their provisions. No one can say with authority that these charter amendments will be revoked. These facts are stated to show that the Harbor View site would be impossible under present conditions, and that the necessary improvements in transportation facilities at that site are contingent upon things being done that may never be done.

"At Golden Gate Park none of these complications is present. There are there twelve lines spreading out in fan shape, which are capable of carrying 101,250 persons an hour; or, with the addition of only four blocks of new track, 116,250 passengers in an hour, and 500,000 in 4.2 hours. In this estimate I have not included the Geary Street line. If it were to be equipped for electric service it might carry 15,000 persons an hour to the Park, thus making a total of 131,250 passengers per hour, or 500,000 in 3.8 hours.

"Another difficulty in connection with Harbor View is that the crowds going to and coming from the grounds would move in the same direction and at the same hours as the regular city rush crowds. If the Golden Gate Park site is selected for this exposition the people of the city, instead of finding themselves forced to travel on the same cars with the exposition crowds, will get a better service than they could possibly have under ordinary conditions.

"In the morning the people coming to their work and business will travel on the large numbers of empty cars coming downtown to take the crowds out to the exposition; and in the afternoon they will return to their homes on the cars which are going out to the Park to bring the exposition crowds home."

"With the exposition at Golden Gate Park the exposition crowds not only will not impede the ordinary city travel, but will result in a better and more frequent service than could possibly be given under ordinary conditions."

Attention of School Teachers Called to Portland Accident Prevention Campaign

The Portland Railway, Light & Power Company, Portland, Ore., is sending the following letter, signed by B. F. Boynton, claim adjuster, to all of the large cities throughout the United States to interest school directors, principals and teachers in the subject of protecting the lives and limbs of school children:

"We started in Portland some two years ago a campaign against accidents, and we find that while all school children are receiving education on all lines of learning, one thing

sadly overlooked which causes more deaths and permanent injury than any other condition is the lack of education of the children in regard to the preservation of their lives and limbs.

"The statistics of this country show that there are hundreds and thousands of little ones each year whose lives are wiped out or whose limbs are severed and they are made permanent cripples simply because they have not been taught to avoid accidents in connection with street cars and other vehicles. Isn't it about time that our rising generation were taught what to do to avoid these accidents, and wouldn't it be time well spent if all the teachers throughout our land were to devote a few moments each day in instructing the children along this line?

"We have had a special lecturer go from school to school in Portland and talk to our children, and the results that we have obtained have been wonderful—in fact, accidents pertaining to children of a school age have been practically eliminated.

"As I know that every man has at heart the welfare of the children of our land, kindly give this a little consideration and see if you do not think that it would be time well spent to allow your teachers to instruct the little ones in the prevention of accidents, say, for at least five minutes each day.

"In doing this we are not only educating the children in the prevention of accidents, but through them practically all of the citizens of our various cities, for we all know that the school children do carry into their homes anything of a special nature that is brought up in their school work.

"We thank you in advance for any consideration that you may give this, and will further state that we shall be glad to render any assistance to you so far as ideas go on what we have done in Portland.

"P. S.—If you will kindly communicate with Frank Rigger, superintendent of schools of Portland, I know he will gladly vouch for the results which we have obtained in Portland."

Increase in Wages in Hazleton.—The Lehigh Traction Company, Hazleton, Pa., has granted an increase in wages to its employees which averages 8 cents a day. The minimum rate per hour is 22 cents and the maximum 24 cents. The agreement dates back to June 1, 1911, and is to be effective until Jan. 1, 1914.

Cleveland-Detroit Through Service.—The Lake Shore Electric Railway and the Detroit United Railway are planning to place through cars in service between Cleveland and Detroit on June 22, 1911. Through tickets have been sold for some time. The length of the run is 179 miles. The limited trains are scheduled to make the trip in 6 hours and 25 minutes.

Bulletins of Interest to Employees.—The Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has adopted a plan of issuing bulletins regularly on subjects of interest to the employees. The first bulletin included instructions to motormen and conductors. Motormen were warned in particular about speeding around curves and over bridges.

From Louisville to St. Joseph.—R. J. Thompson, manager of the traffic department of the Indianapolis & Louisville Traction Company, Louisville, Ky., has announced that delegates from Louisville to the meeting of the Central Electric Railway Association in St. Joseph, Mich., on June 22 will be carried to and from the convention in a special car to be furnished by the Indianapolis & Louisville Traction Company.

Increase in Wages in Easton.—The Easton (Pa.) Transit Company has granted an increase in wages to all its motormen and conductors, effective June 1, 1911. They will receive 1 cent an hour more than previously, making the rate 21 to 24 cents, according to length of service. First-year men will receive 21 cents an hour; second-year men 22 cents; third-year men 23 cents, and those in the company's employ four years or more 24 cents.

Park Attractions at Worcester.—The Worcester (Mass.) Consolidated Street Railway has arranged to have J. J. Gorman, Boston, Mass., present at the Lincoln Park Theater, Worcester, between June 19 and Labor Day the at-

tractions offered by him to the public at Worumbea Park, operated by the Massachusetts Electric Companies. W. C. Fleming, Chicago, Ill., has been retained as advertising manager of Lincoln Park by the company.

Complaint Made in Regard to Accident in Indiana.—The Indiana Railroad Commission has entered a complaint against the officials of the Indiana Union Traction Company, Indianapolis, Ind., for not having sent a report by telegraph of the accident on the company's line near Bluffton on May 27, 1911, as required by the law. The report was received by the commission on May 29, 1911. The commission is investigating the accident.

Fare Complaint in New Jersey.—The city of Gloucester, N. J., has filed a complaint with the Board of Public Utility Commissioners regarding the rates charged by the Public Service Railway between Gloucester and Woodbury. The complaint states that the distance from Camden through Gloucester to Woodbury is 8 miles; that the fare between Camden and Woodbury is 10 cents. The fare limit in either direction is King Street and Jersey Avenue, in Gloucester, so that a person boarding a car in the northern section of Gloucester and wishing to ride to the southern section of Woodbury is required to pay 10 cents. The board is asked to issue an order directing the Public Service Railway to charge one 5-cent fare from any part of Gloucester to Woodbury and vice versa.

Prepayment Cars in Brooklyn.—The two pay-as-you-enter cars and the two pay-within cars which have been operated for some time by the Brooklyn (N. Y.) Rapid Transit Company on lines in Brooklyn which do not operate over either of the two bridges into Manhattan have been placed in service on the Ralph Avenue line of the company, which is routed through the eastern district of Brooklyn into Manhattan via the Williamsburg Bridge. Instructions have been issued to the inspectors stationed on the loops at the terminal in Manhattan to allow passengers to board the pay-as-you-enter and pay-within cars at both ends. Fares of passengers crossing the bridge in these cars are collected by the conductors in the old way. The cars become prepayment cars, however, as soon as they leave the bridge at the Plaza in Brooklyn.

Terms of Service in Trenton.—In the *ELECTRIC RAILWAY JOURNAL* of June 3, 1911, page 994, mention was made of the first conference between the officers of the Trenton (N. J.) Street Railway and the employees of the company in regard to terms of service. At that conference the subject of wages was considered only in a cursory way. At a meeting in Trenton on June 8, 1911, however, a proposal was made by the company which is said to embrace an increase of 1 cent an hour in wages, making a wage of 24 cents an hour; also for the payment of wages weekly, instead of bi-monthly; for a "closed shop" rule; payment for time lost by the men through unjust suspension; a nine-hour working day, and the settlement of grievances by an arbitration board. The company offers these conditions on a two-year agreement, and a further conference between the company and the men will be held at which it is expected the agreement will be formally signed. The increase in wages is to become effective on July 1, 1911.

Protecting Grade Crossings in Los Angeles.—The Los Angeles County Grand Jury has addressed to Hiram W. Johnson, Governor of California, an appeal for his co-operation in the work which is being done to minimize the danger of collisions at grade crossings between steam trains and electric cars. The subject of grade crossings has recently been considered by the Board of Public Utilities of Los Angeles and the Pacific Electric Railway, and the company proposes to issue a general order to its employees instructing them under no circumstances to exceed a speed of 20 m.p.h. at any street crossing in Los Angeles, and at the board's request the bells on the automatic flagmen will be discontinued. In regard to the discontinuance of the bells the board says: "This will make conditions along the line of the Pacific Electric Railway in the city the same as exist on every railway, local or interurban, in this city outside of the congested district, except that the crossings over streets on the private right-of-way on the Pacific Electric Railway will have the additional protection of the automatic flagmen without the ringing of the bell."

Detroit United Railway Handling Construction Material.—The traffic department of the Detroit (Mich.) United Railway is handling construction materials for the large new waterworks plant in Gladwin Park, Detroit, at a considerable saving to the city. The company has installed curves which connect with the Detroit Terminal Railroad where the steam road intersects the Jefferson Avenue track of the Detroit United Railway. Delivery tracks have also been laid at the water-works location on Jefferson Avenue. The heavy freight-car deliveries are made between midnight and 4 a. m. and are handled over three-fourths of a mile of the Jefferson Avenue tracks. A minimum rate of \$5 per car, or 35 cents per ton, is obtained for this traffic. The extent of the shipments is indicated by the following figures: Structural steel, 900 tons; cement, 1000 tons; stone, 60,000 cu. ft.; bricks, 2,000,000; miscellaneous, 2000 tons, and machinery for reconstruction of old plant, 35 cars. The estimate for the amount of machinery that will be hauled into the new plant is not yet available because, on account of the extent of the work, it is expected that three years will be required for its completion. All of this heavy traffic is being handled by electric work locomotives as originally loaded.

The Omaha-Council Bluffs Fare Case.—Adjournment until the fall term was taken by the Commerce Court after the arguments in the case of the Omaha & Council Bluffs Street Railway, Omaha, Neb., had been finished. In this case the commission and the government ask for the dissolution of an injunction granted by the Circuit Court because, in the opinion of the court, Congress did not intend to include within the scope of the regulating power of the commission street railways whose lines happen to cross State boundaries. C. W. Needham, on behalf of the Interstate Commerce Commission, claimed that because Congress granted a charter for the bridge used by the company to cross the Missouri River and said it might be used by any railroad, and because the electric railway serves several villages and not merely a city and its suburbs, the road is not a street railway within the meaning of the decisions by the court on that point. Therefore, the reduction of the rate from any point in Council Bluffs to any point in Omaha from 15 cents to 10 cents is within the power of the commission. John L. Webster, for the complainants, referred to the many court decisions that seem to lie against the contention of the commission and which were adopted, when arguments were begun, by the United States, the intervener in the case.

School Fares in New Jersey.—The question of the interpretation of the section of the New Jersey public utility law which prohibits discrimination in fares came before the Supreme Court of New Jersey on June 8, 1911, on a writ of certiorari secured by the Public Service Corporation of New Jersey, Newark, to test the authority of the Board of Public Utility Commissioners to suspend the order issued by the company on May 1, 1911, which requires school children and school teachers to pay full fare on the lines of the Public Service Railway. The commission was represented before the court by Frank H. Sommer, general counsel, and the company was represented by Frank Bergen. Mr. Sommer said that the law prohibited "undue or unreasonable" discrimination. He declared that the Legislature intended to give the board full authority to say what discrimination was "reasonable" and what "unreasonable." Mr. Bergen filed a brief which contained five clauses to support the contention of the company. In short, he contended for the company that the discrimination clause of the new public utilities act had been copied almost word for word from the Interstate Commerce Act of 1887; that that act has been construed by the Interstate Commerce Commission as prohibiting the granting of reduced school fare privileges, unless all children of the same ages are included, and that this fact required an interpretation of the New Jersey law which would also preclude the granting of reduced school fares. On June 10, 1911, Justice Minturn, of the Supreme Court at Newark, before whom the case was heard, affirmed the order of the board directing the company to maintain 3-cent fares for school children and teachers. The court held that the contention of the company that the law prohibited the 3-cent fares "does not accord with the spirit and intent of the act."

Personal Mention

Mr. F. I. Hardy has resigned as superintendent of transportation of the Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.

Mr. John A. Buggy has been appointed chief engineer of the various power stations of the Wilmington & Philadelphia Traction Company, Wilmington, Del.

Mr. E. Dystero has severed his connection as local manager with the Monterey Railway, Light & Power Company, Limited, Monterey, Nueva Leon, Mexico.

Mr. C. C. Moyer, night dispatcher of the Columbus, Delaware & Marion Railroad, has been appointed chief dispatcher of the company to succeed Mr. J. H. Lahrmer, who has been appointed superintendent of the company.

Mr. E. S. Hughes has been appointed traffic manager of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., to succeed Mr. P. H. Scott, resigned. Mr. Hughes was connected with the Michigan Central Railway for twenty years in various capacities.

Mr. J. H. Lahrmer, chief train dispatcher of the Columbus, Delaware & Marion Railroad, Marion, Ohio, has been appointed superintendent of the company. Mr. Lahrmer has been acting superintendent of the company since the resignation of Mr. James R. Harrigan.

Mr. H. F. Dunwoody, attorney for the Mutual Light & Water Company and the City & Suburban Railway, Brunswick, Ga., has been appointed general manager of both companies to succeed Mr. F. D. Aiken, who has been vice-president, general manager and purchasing agent of the company.

Mr. C. P. Cooper has been appointed chief dispatcher of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., to succeed Mr. J. L. Mauder, resigned. Mr. Cooper has been connected with the Windsor, Essex & Lake Shore Rapid Railway in various capacities since the road was built, in 1907.

Mr. Frank G. Kelley, who resigned as secretary-treasurer of the Topeka (Kan.) Railway, in May, 1910, after serving with the company for eight years, has been elected secretary of the Kansas-Colorado Railroad, Pueblo, Col., which has awarded contracts for the construction of an electric railway from Canon City to Dodge City, Kan.

Mr. J. Doyle, who has been general superintendent of the Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., has been made acting general manager of the company to succeed Mr. J. N. Shannahan, whose appointment as railway manager of the operating department of J. G. White & Company, Inc., New York, N. Y., was noted in the *ELECTRIC RAILWAY JOURNAL* of May 27, 1911, page 935.

Mr. M. J. Kehoe has resigned as superintendent of the light and power department of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., to become connected with the Ft. Wayne Oil & Supply Company, Ft. Wayne, Ind. Mr. Kehoe has been superintendent of the light and power department of the company since July, 1910. Before that he was superintendent of power of the company.

Mr. A. W. Westman has been appointed superintendent of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., in charge of operation, in addition to track, overhead and equipment. Mr. Westman was employed by the London Street Railway, London, Ont., until 1908, when he accepted a position with the Windsor, Essex & Lake Shore Rapid Railway in the shops. Later he was placed in charge of the equipment, track and overhead departments.

Mr. J. J. Campbell has been appointed superintendent of the St. Paul lines of the Twin City Rapid Transit Company, Minneapolis, Minn., to succeed Mr. J. S. Pevear, who has been appointed general superintendent of the Buffalo & Lake Erie Traction Company, Jamestown, Chautauqua & Lake Erie Railway and the Chautauqua Steamboat Company, Buffalo, N. Y. Mr. Campbell has been assistant to Mr. W. J. Hield, vice-president and general manager of the Twin City Rapid Transit Company, for several years.

Mr. J. S. Pevear has resigned as superintendent of the St. Paul lines of the Twin City Rapid Transit Com-

pany, Minneapolis, Minn., to become general superintendent of the Buffalo & Lake Erie Traction Company, Jamestown, Chautauqua & Lake Erie Railway and the Chautauqua Steamboat Company, Buffalo, N. Y., to succeed Mr. R. R. Smith, resigned. Mr. Pevear was connected with the Twin City Rapid Transit Company for more than three years, and prior to entering the employ of that company he was connected with the office of the General Electric Company in Chicago, Ill.

Mr. D. F. Sherman, president of the Providence & Danielson Railway, Providence, R. I., and the Sea View Railway, Wickford, R. I., which have been leased by the Rhode Island Company, Providence, R. I., has been elected a vice-president of the Rhode Island Company. Mr. Sherman was born near Indianapolis, Ind., but lived in Illinois until he was about thirty years old. During his early career he was employed for ten years as a teller in a national bank in Illinois. In 1882 he was made cashier of a national bank in what was then the territory of Montana. A few years later he was made cashier of a national bank in Portland, Ore. Mr. Sherman lived in Portland for about sixteen years. His total period of service with national banks covered about twenty-three years, and through his business connections in the West he assisted in financing and developing railroad and other enterprises. Mr. Sherman was an officer and a director of one of the subsidiary companies of the Southern Pacific Railroad for a long time and in 1888 was one of the officers of a company organized to build an electric railway in Portland. While on the Pacific Coast, in 1900, Mr. Sherman financed the Providence & Danielson Railway and later took up his residence in Providence. He was made president of the Sea View Railroad in February, 1911, when that company was taken over by the interests which controlled the Providence & Danielson Railway. The Narragansett Pier Railroad has also been leased to the Rhode Island Company, and the Providence & Danielson Railway, Sea View Railroad and Narragansett Pier Railroad will all be taken over by the Rhode Island Company under lease on July 1, 1911. On that date Mr. Sherman's appointment as vice-president of the company in full charge of all of the company's operations becomes effective. He will report direct to Mr. C. S. Mellen, president of the Rhode Island Company, New York, New Haven & Hartford Railroad and the Connecticut Company, New Haven, Conn.

Mr. Henry N. Staats, vice-president and general manager American Railway Insurance Company, Cleveland, Ohio, has been appointed insurance expert of the American Electric



H. N. Staats

Railway Association. Mr. Staats was born in Danube, Herkimer County, N. Y., and received his education at Wilbraham University, Wilbraham, Mass. After leaving college he engaged in fire insurance and for ten years was employed by the old-line stock fire insurance companies. He then became identified with the factory mutual fire insurance companies of New England and was in their employ for twenty-one years, serving as manager in the Ohio department. In 1904 Mr. Staats originated plans and specifications for fire protection of car-storage houses with a system of automatic sprinklers. These plans were approved by the National Fire Protection Association. In 1906 he organized the American Railway Insurance Company and established a bureau of inspection and survey for the protection of railway and lighting properties. In 1906 he was appointed chairman of the committee on insurance and protection of the Central Electric Railway Association and has continued to serve in this capacity. In 1910 he was appointed insurance expert of the Street Railway Association of the State of New York, during which year he perfected plans and specifications for the fire protection of cars stored in yards.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***East Calgary Corporation Company, Calgary, Alta.**—Application for a charter will be made in Canada by this company to build an 8-mile electric railway to the south-east of Calgary, and connect with the municipal service at the eastern terminus of the city service. Among those interested are P. Burns and Col. Walker.

Citrus Southern Electric Railway, Orlando, Fla.—Application for a charter has been made by this company in Florida to build a 45-mile electric railway to connect Sanford, Orlando, Kissimmee and St. Cloud. Capital stock, \$500,000. Officers: T. K. Miller, president; J. J. Brophy, vice-president, and Moore Kelly, secretary and treasurer. [E. R. J., Jun. 10, '11.]

***Wapakoneta & Kenton Traction Company, Kenton, Ohio.**—Application for a charter has been made in Ohio by this company to build an electric railway from Wapakoneta to Kenton. The route has been decided upon and right-of-way has been secured. Capital stock, \$50,000. Incorporators: Alenzo S. Roberts, Charles K. Knowlton, George W. Welding, Thomas J. Cornell and Burr Fennell.

***Burbank Reinforced Concrete Railway, Enid, Okla.**—Chartered to build a 1-mile street railway in Enid. Capital stock, \$10,000. Directors: Charles Burbank, Roy W. Thomas, James W. Steen, William R. Russell and Joseph J. Klein, all of Enid, Okla.

Imperial Traction Company, Ottawa, Ont.—Chartered in Ontario to build an electric railway from Hamilton to Stratford and London, with extensions to Sarnia and Niagara Falls. L. B. Howland, Toronto, is interested. [E. R. J., Apr. 8, '11.]

New Castle & Beaver Valley Street Railway, Beaver Falls, Pa.—Application will be made in Pennsylvania on June 23 by this company for a charter to build a 22-mile electric railway to connect Beaver Falls and New Castle. Incorporators: J. S. Herron, J. S. Hayes, I. J. Lobert, E. A. Morton and Charles Pederson. [E. R. J., June 3, '11.]

***Conewago & Southern Railroad, Biglertown, Pa.**—Chartered in Pennsylvania to build an electric or steam railway between Biglerville, Arendtsville and Cashtown. Capital stock, \$150,000. Directors: H. W. Hamblin, Harrisburg, president; M. A. Garvin and J. J. Garvin, Gettysburg; Mark E. Johnson, Fillersburg; Paul Voorhees and J. H. Freeland, Harrisburg; D. M. Sheeley and J. A. Deardorf, Cashtown, and J. A. Kane, Arendtsville.

Kittitas Railway & Power Company, Cle Elum, Wash.—Incorporated in Washington to build an electric railway between Roslyn and Cle Elum, via Ronald and Janesville. Paul L. Richards, Tacoma, president; Andrew Norris, Roslyn, vice-president, and H. N. DeWolf, Tacoma, secretary. [E. R. J., June 3, '11.]

FRANCHISES

Fresno, Cal.—The Fresno, Coalinga & Tidewater Company, Fresno, will ask the Council for a franchise in Fresno. This line will connect Fresno, Coalinga, Hollister, Salinas and Monterey. T. C. White, Fresno, president. [E. R. J., Feb. 18, '11.]

Sacramento, Cal.—The Sacramento-Folsom Electric Railway has asked the City Council for a franchise in Sacramento. This line will connect Sacramento, Folsom and Fair Oaks. [E. R. J., May 20, '11.]

Galesburg, Ill.—The Galesburg & Rock Island Traction has asked the City Council for a fifty-year extension of time on its franchise in which to build its 41-mile electric railway between Galesburg and Rock Island.

East Lee, Mass.—The Berkshire Street Railway, Pittsfield, has received a franchise from the Board of Selectmen for an extension to East Lee.

Swansea, Mass.—The Providence & Fall River Street Railway has received a franchise from the Selectmen of Swansea to extend its tracks from North Swansea to the

Warren-Swansea State line. This will be part of the proposed railway line from Providence to Newport.

Hanover, N. J.—The Public Service Railway, Newark, has asked the Council for a fifty-year franchise in Hanover.

Brooklyn, N. Y.—The Jay Street Connecting Railroad has received a franchise from the Board of Estimate to extend its tracks on Jay, John, Pearl and Plymouth Streets in Brooklyn.

Cairo, N. Y.—The Catskill Traction Company has received a franchise from the Town Board to extend its tracks to Cairo.

New York, N. Y.—The Richmond Light & Railroad Company, New Brighton, has received a franchise from the Board of Estimate to extend its line from New York Avenue near Wadsworth Avenue to Ocean Avenue, and there connect with existing tracks of the company on Staten Island.

New York, N. Y.—The New York City & Interborough Railway has asked the Board of Estimate for a franchise for four extensions of its tracks in the boroughs of Manhattan and the Bronx.

Niagara-on-the-Lake, Ont.—The Frontier Electric Railway has got a twenty-five-year franchise from the Council on condition that it will operate four cars each way daily between Niagara-on-the-Lake and Queenstown or Niagara Falls. T. S. Ramsdell, president. [E. R. J., May 20, '11.]

***Klamath Falls, Ore.**—A representative of an Eastern syndicate has asked the City Council for a franchise in Klamath Falls.

Marshfield, Ore.—The Union Traction & Terminal Company, Marshfield, has received a franchise from the Council over certain streets in Marshfield.

Salem, Ore.—The Oregon Electric Railway, Portland, has received a franchise from the Council to build on certain streets within the city limits of Salem.

Irwin, Pa.—The Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, has asked the Borough Council for a franchise on Main Street to Oak Street. It agrees to build a \$20,000 viaduct over the Pennsylvania Railroad to North Irwin if granted the franchise.

Prospect Park, Pa.—The Philadelphia Rapid Transit Company, Philadelphia, has received a franchise from the Borough Council to build its tracks on Lincoln Avenue in Prospect Park.

***Saskatoon, Sask.**—H. M. E. Evans, of Edmonton, Alta., representing British capitalists, has bid for power rights on the Saskatchewan River, and also for a twenty-year franchise for an electric railway in Saskatoon.

Columbia, S. C.—The Columbia Electric Street Railway, Light & Power Company, Columbia, has asked the City Council for a franchise for three new lines in Columbia.

Salt Lake City, Utah.—The Salt Lake & Los Angeles Railway has asked the City Council for a franchise to build a double track electric line over various streets in the western part of Salt Lake City. This is part of a plan to electrify the entire line.

Bremerton, Wash.—L. H. Gray, representing the Puget Sound Southern Railway, has asked the Council for a franchise in Bremerton. He has received a fifty-year franchise to build this line in Seattle. This interurban line will be extended to Aberdeen.

Wausau, Wis.—The Wausau Street Railway has received a franchise from the City Council to double-track its Forest Street line in Wausau.

TRACK AND ROADWAY

***Nanaimo, B. C.**—Messrs. Stewart and Rogers, Victoria, have offered to install a tramway system in Nanaimo without a bonus from the Council. A similar proposition has also been submitted by another syndicate.

Pacific Electric Railway, Los Angeles, Cal.—Work is being rushed by this company on its double-track 4½-mile extension from Glendale to Burbank.

Northern Electric Railway, San Francisco, Cal.—Grading has been begun by this company for the extension from Factoryville to Nicholson. It will ultimately be extended to Binghamton, N. Y., via Montrose or New Milford.

Chicago, Waukegan & Woodstock Traction Company, Chicago, Ill.—This company advises that it will begin construction as soon as it has secured right-of-way for its 38-mile interurban railway to connect Waukegan, Fox Lake, McHenry and Woodstock. The motive power will be gasoline. Capital stock, authorized, \$50,000. Capital stock, issued, \$10,000. Officers: W. P. McCracken, Chicago; president; Peter B. Olesen, Chicago, vice-president; Charles A. Spenny, 312 Tacoma Building, Chicago, secretary and general manager; J. D. Stevens, treasurer, and J. E. Hicks, 312 Tacoma Building, Chicago, chief engineer. [E. R. J., May 20, '11.]

Southern Traction Company of Illinois, East St. Louis, Ill.—This company is reported to have purchased the Wabash, Chester & Western Railroad, which extends from Chester to Mount Vernon, Ill., a distance of 64.4 miles, and is said to contemplate converting the line into an electric railway. The company proposed to build from the east end of the East Side free bridge approach to Pinckneyville to connect with the Wabash, Chester & Western Railway.

***Hampshire, Ill.**—T. E. Getzelman, Hiram Gilkerson, J. F. Reid, A. A. Baker and others are considering plans to build an electric railway in Hampshire.

Woodstock & Sycamore Traction Company, Sycamore, Ill.—This company has completed its extension to Marengo and has begun surveys on a route from Marengo to Woodstock.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—Work will be begun at once by this company on improvements to its entire line.

Indianapolis, Nashville & Southern Traction Company, Indianapolis, Ind.—Bids for the construction of this railway between Indianapolis, Tralfalgar, Nashville, Bloomington, Bedford, Mitchell, Orleans and French Lick will soon be asked for by this company. Thomas F. Wakeland, secretary. [E. R. J., June 3, '11.]

Vincennes North & South Traction Company, Vincennes, Ind.—This company will build an electric railway from Decker to Sullivan. B. M. Willoughby, Vincennes, president. [E. R. J., April 29, '11.]

Davenport-Muscatine Railway, Davenport, Ia.—Contracts will be awarded shortly for the construction of this line from Blue Grass to Muscatine. The contract from Blue Grass to Muscatine will be awarded later. Preliminary work has been completed. J. F. Porter, president, and K. C. Weedon, chief engineer. [E. R. J., Feb. 19, '10.]

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company is considering the construction of interurban lines to LaPorte and other towns in the vicinity.

***Hutchinson, Kan.**—F. Corp. Hutchinson, and associates have organized a company to build a 40-mile electric railway from Meade south through Miles, Kan., and Hatten, Okla., to Beaver, Okla.

***Bowling Green, Ky.**—A conference is to be held shortly at Bowling Green, Ky., between business men of that city and Franklin, Ky., and H. H. Mayberry, of Nashville, Tenn., with reference to the construction of a line between Bowling Green and Franklin. Commercial interests of the cities named have indicated that there will be no difficulty in securing sufficient financial support to make the venture.

Cumberland & Westernport Electric Railway, Cumberland, Md.—Preliminary arrangements are being made by this company to build an extension from Westernport to Piedmont and Keyser, W. Va., a distance of about 6 miles.

Athol & Orange Street Railway, Athol, Mass.—Preliminary surveys are being made by this company to build an extension from Athol to Winchendon, via Baldwinville. Improvements are being made by the company along the line and over 8000 new ties will be laid between Orange and Athol Center.

Michigan United Railways, Lansing, Mich.—The Lansing-Owosso extension of this company has been completed and will be placed in operation by July 1. It is proposed to build another extension to Durand and Flint.

Minneapolis Northern Suburban Railway, Minneapolis, Minn.—The contract for the construction of this line has been awarded and work will begin at once to connect Minneapolis, Amoka, Onaway and Little. W. J. Whitcomb,

Minneapolis, is the road's president. [E. R. J., May 27, '11.]

North Missouri Central Railway, Mexico, Mo.—It is reported that plans are being prepared by this company to build its 63-mile electric railway between Jefferson City and Mexico, via Columbia, and a branch will be built from Columbia to Moberly, a distance of 39 miles. M. M. Stephens, East St. Louis, president. [E. R. J., Aug. 27, '11.]

Council Bluffs, Tabor & Southern Electric Railway, Omaha, Neb.—This company, whose project has been dormant for the past four years, is being revived. W. J. Dobbs, Omaha, Neb., is president.

Atlantic & Suburban Railway, Pleasantville, N. J.—This company has begun paving the Shore Boulevard from Absecon to Somers Point, a distance of 9½ miles.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—This company has ordered 1300 tons of rails to be used in parking Coney Island Avenue between Prospect Park and Coney Island.

Buffalo (N. Y.) Southern Railway.—Plans are being considered by this company for building an extension to East Aurora.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—It is reported that this company has decided to electrify the Jamestown, Chautauqua & Lake Erie Railroad. The line extends from Westfield to Jamestown.

Liberty & Jeffersonville Electric Railway, Liberty, N. Y.—During the next few weeks this company will award contracts to construct 12 miles of new track. William Craig, East Orange, N. J., president.

Syracuse (N. Y.) Rapid Transit Company.—This company will soon build a mile extension of its Court Street line in Syracuse.

North Carolina-Virginia Railway, Ridgeway, N. C.—This company has secured supplemental articles of incorporation from the State Corporation Commission to build a line between the North Carolina border and Ridgeway, a distance of 6 miles. It has been authorized to increase its capital stock from \$5,000 to \$100,000 as the minimum and \$500,000 as the maximum. The principal office was moved from Ridgeway to Roanoke, Va. [E. R. J., Dec. 31, '10.]

Lancaster & Buckeye Lake Traction Company, Lancaster, Ohio.—Dodge, May & Zimmerman, Philadelphia, Pa., engineers, are completing their report on the proposed 30-mile railway to connect Lancaster and Newark. [E. R. J., Mar. 11, '11.]

Brantford & Port Dover Railway, Brantford, Ont.—Bids are being asked by this company for the construction and equipment of its 30¼-mile railway; steel towers, 6600-volt, single-phase; and five large bridges. Surveys have been made. W. P. Kellett.

Lane County Asset Company, Eugene, Ore.—This company has been authorized to begin work at once on its proposed 12-mile electric railway between Eugene and Elmira. S. P. Ness, F. A. Anderson and John Baird are in charge of the work. [E. R. J., Mar. 4, '11.]

Oregon Electric Railway, Portland, Ore.—Terminal facilities for this line have been secured in McMinnville, to which place a branch line from the main road, running south from Portland, will be built.

***Allentown, Pa.**—Preliminaries are being considered for the organization of a company to build an electric railway from Schnecksville, where connection will be made with the Slatington line of the Lehigh Valley Transit Company, in a northerly course through North Whitehall, Heidelberg and Lynn, to the valley of the Ontalaunee, and thence to Reading.

Hattiesburg (Pa.) Traction Company.—Plans are being considered by this company to construct several extensions in Hattiesburg.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa.—This company proposes to extend its line in Wyoming Valley, and in Carbon County.

Irwin-Herminie Traction Company, Irwin, Pa.—This company will soon build a 15-mile extension from Herminie to Madison and Arona, ending with a connection in North Irwin. It will make a complete loop with Irwin as the center.

Johnstown (Pa.) Traction Company.—Right-of-way has been secured and construction will soon be begun by this company on its extension from Walnut Grove to Giestown.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—The directors of this company have voted to begin the construction of this line at once. The necessary stock has been subscribed. It will be a gasoline motor line and will extend from Ephrata to Lebanon via Lincoln, Clay, Hopeland and Schafferstown. M. H. Shirk, Lincoln, secretary. [E. R. J., May 13, '11.]

Northwestern Pennsylvania Railway, Meadville, Pa.—During the next two weeks this company will place contracts for the reconstruction of about 16 miles of track.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—This company and city officials are considering plans to build an extension out Washington Street to Cascade Park in New Castle.

Phoenixville, Valley Forge & Stratford Street Railway, Phoenixville, Pa.—Work has been resumed by this company and grading has been completed between Phoenixville and Valley Forge. Contracts will be awarded at once for the iron bridge work. Two bridges are to be built, one over Pickering Creek, which will have a span of 170 ft., and the other will be over Valley Creek.

Pittsburgh (Pa.) Railways.—Work has been begun by this company to construct the connecting link between Donora and Monongahela. Grading has been completed.

Titusville Electric Traction Company, Titusville, Pa.—This company has purchased from the Erie & Central Pennsylvania Railroad its right-of-way, grade, trackage and other property between Erie and Punxsutawney.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—This company is advertising for bids for the construction of its 15-mile electric railway between Waynesburg and Blacksville. The contract calls for grading, masonry and bridge work, and also the boring of a tunnel 500 ft. long. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., Apr. 29, '11.]

West Chester (Pa.) Street Railway.—It is reported that construction will be begun soon by this company on a line from Pequea to Mt. Nebo, which will connect with the old line to Rawlinsville. Surveys have been completed and most of the right-of-way secured.

Tennessee Traction Company, Memphis, Tenn.—This company is preparing to begin the construction of a line from Memphis to Brownsville, and later extending to Jackson, Tenn. The proposed line will parallel the route of the Louisville & Nashville Railroad. W. K. Burton, president. [E. R. J., Jan. 7, '11.]

***Austin, Tex.**—W. D. Shelly and associates plan to construct a 2-mile electric railway from the western part of Austin to the business section.

Dallas (Tex.) Street Railway.—This company advises that it has completed and placed in operation its 1½-mile electric railway in Dallas. Capital stock, \$20,000. Officers: R. Vickey, Ft. Worth, president; A. C. Maser, Dallas, vice-president, and George W. Works, Dallas, secretary, general manager and purchasing agent. Headquarters, 506 Guaranty Bank Building, Dallas. [E. R. J., April 22, '11.]

Dallas-Waxahachie Interurban Railway, Dallas, Tex.—Satisfactory progress is being made on the preliminary work for this railway which Stone & Webster are to build between Dallas and Waxahachie. Surveys are now being made and right-of-way will soon be secured. [E. R. J., April 1, '11.]

***Saltair Beach Railroad, Salt Lake City, Utah.**—It is reported that this company is considering plans to double track and electrify its entire line. Joseph Nelson, Salt Lake City, president.

***Staunton, Va.**—Plans are under consideration to build an electric railway from Staunton to Waynesboro, 10 miles. J. M. Spotts, president of the Blue Ridge Light & Power Company, Staunton, is quoted as saying that J. F. Cassell, engineer of his company, is preparing estimates of the cost of construction.

Clarksburg & Weston Electric Railway, Clarksburg, W. Va.—Work has been begun by this company on its line between Clarksburg and Byron.

***Fairmont, W. Va.**—John T. McGraw, George L. Potter, L. G. Race and associates are considering plans for an electric railway to connect Grafton, and Pittsburgh via Morgantown, Blacksville, Waynesburg and Fairmont. From Grafton the line will be extended to Bridgeport and Clarksburg.

SHOPS AND BUILDINGS

Illinois Traction System, Champaign, Ill.—The Illinois Construction Company, Joliet, has been awarded the contract by this company to remodel a building in Peoria to be used as a freight house. The building will be one-story, 63 ft. x 130 ft., and of brick construction. The cost is estimated to be about \$10,000.

Indiana Union Traction Company, Anderson, Ind.—This company has bought a plot 85 ft. x 140 ft. upon which to build a union station for traction companies running into Bluffton. The building when completed will be used jointly by the Indiana Union Traction Company and the Ft. Wayne & Northern Indiana Traction Company.

Boston (Mass.) Elevated Railway.—This company has purchased a location at Main, Center and Middlesex Streets in Malden to be used for its new terminal station.

Hull (Que.) Electric Railway.—This company will place contracts during the next three weeks for building a new carhouse in Hull. The structure will be 40 ft. x 288 ft. and will be located near the Hull Junction. The cost is estimated to be about \$25,000.

Moose Jaw Electric Railway, Moose Jaw, Sask.—The Navi Brothers has been awarded the contract by this company to erect a brick and concrete carhouse in Moose Jaw. The cost is estimated to be about \$60,000.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—This company has purchased a site for its freight and passenger terminal station on North Main Street in Anderson. It has awarded the contract to John W. Warehime, Waynesboro, for building its new passenger station at the terminal at Pen-Mar.

Aberdeen (S. D.) Street Railway.—This company will reconstruct and materially enlarge its carhouse and terminals.

Everett Railway, Light & Water Company, Everett, Wash.—This company has awarded the contract to Kelley & Son, Everett, to build its new interurban passenger station on the corner of Colby Avenue and Pacific Avenue in Everett.

POWER HOUSES AND SUBSTATIONS

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—Plans have been completed for building the power station to be erected by this company at the Mattei winery, in Fresno.

Bristol & Plainville Tramway Company, Bristol, Conn.—This company has purchased and will install within the next four months two 750-kw Curtis turbines, condensers, three 300-kw rotary, converters, pumps, etc., for its power house in Bristol. G. E. Cockings, general manager.

Portland Railway, Light & Power Company, Portland, Ore.—This company's local emergency power plant located on Eighth Street in Vancouver was destroyed by fire on June 4. The loss is estimated to be about \$65,000, with insurance of \$35,000. The company contemplates replacing the wooden building with a brick structure and plans for this improvement are being drawn. The new plant will cost from \$25,000 to \$35,000.

Lehigh Valley Transit Company, Allentown, Pa.—This company is installing a new 6000-hp turbine at its power house in Allentown. With this turbine the power house will have a total capacity of 23,000-kw.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company will install 1600-kw in generators and 2500-hp in engines by November. The present generators are 600-kw, driven by 1000-hp engines.

Northwestern Pennsylvania Railway, Meadville, Pa.—This company will purchase during the next two weeks one 300-kw rotary for its substation and one 300-kw motor generator set for its main station. C. L. Murray, Meadville, general manager.

Manufactures & Supplies

ROLLING STOCK

Texarkana Gas & Electric Company, Texarkana, Ark., has ordered three Brill 21-E trucks from the American Car Company.

Sheridan Railway & Light Company, Sheridan, Wyo., has ordered four Brill 27-MCB-1 trucks from the American Car Company.

Hutchinson (Kan.) Interurban Railway has ordered one 21-ft. closed pay-as-you-enter carbody from the Danville Car Company.

Parkersburg & Ohio Valley Electric Railway, Parkersburg, Va., is considering the purchase of several gasoline motor or storage battery cars.

Reading (Pa.) Transit Company has ordered six 30-ft. 8-in. semi-convertible pay-as-you-enter cars mounted on Brill 39-E trucks from The J. G. Brill Company.

Boise (Idaho) Railway has ordered two double equipments of No. 101-B motors with K-36 control from the Westinghouse Electric & Manufacturing Company.

Morris County Traction Company, Morristown, N. J., has ordered ten 30-ft. 8-in. semi-convertible cars mounted on Brill 27-G-1 trucks from The J. G. Brill Company.

New York & North Shore Traction Co., Roslyn, N. Y., has ordered one 30-ft. 8-in. semi-convertible car mounted on Brill 27 F-1 trucks from the G. C. Kuhlman Car Company.

Erie & Suburban Railway, Erie, Pa., has ordered twenty double-truck city cars from the Cincinnati Car Company. The cars will be equipped with Brill 39-E trucks and GE-80 motors.

Union Street Railway, New Bedford, Mass., has purchased two double equipments of No. 101-B motors with K-35 control from the Westinghouse Electric & Manufacturing Company.

Louisville (Ky.) Railway has ordered thirty double-truck city cars from the Cincinnati Car Company. These cars are duplicates of the thirty-three built for the same company during 1910.

Boston (Mass.) Elevated Railway has ordered twenty equipments of No. 301 interpole railway motors with multiple-unit control from the Westinghouse Electric & Manufacturing Company.

Cincinnati (Ohio) Traction Company has ordered a quadruple equipment of No. 303 railway motors with type HL non-automatic, unit-switch control from the Westinghouse Electric & Manufacturing Company.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, has purchased eight No. 304 motors from the Westinghouse Electric & Manufacturing Company and eight trucks from the Curtis Motor Truck Company.

North Jersey Rapid Transit Company, Paterson, N. J., has ordered two quadruple equipments of No. 306 interpole railway motors with type HL non-automatic, unit-switch control from the Westinghouse Electric & Manufacturing Company.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., has ordered two quadruple equipments of No. 306 split-frame interpole motors with type K-35 control and a Westinghouse line switch from the Westinghouse Electric & Manufacturing Company.

Lehigh Valley Traction Company, Allentown, Pa., has purchased four quadruple equipments of No. 304 interpole railway motors with type HL non-automatic, unit-switch control from the Westinghouse Electric & Manufacturing Company.

Alton, Jacksonville & Peoria Railroad, Alton, Ill., has purchased five quadruple equipments of No. 304 interpole railway motors with type HL non-automatic, unit-switch control from the Westinghouse Electric & Manufacturing Company.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C., has specified that the six semi-convertible cars ordered from The J. G. Brill Company as

noted in the *ELECTRIC RAILWAY JOURNAL* of June 10, 1911, shall be of the pay-as-you-enter type, 30 ft. 8. in long and mounted on Brill 27-G-1 trucks.

TRADE NOTES

A. T. Herr Supply Company, Denver, Col., has removed its office from the Ideal Building to 412 First National Bank Building, Denver.

Ralston Steel Car Company, Columbus, Ohio, has recently opened an office in the Henry W. Oliver Building, Pittsburgh, Pa., in charge of C. S. Rea.

McIntosh, Seymour & Company, New York, N. Y., have opened a branch office at 1218 Chestnut Street, Philadelphia, Pa., which will be in charge of J. R. O'Neill.

Eynon-Evans Manufacturing Company, Philadelphia, Pa., engineer, brass founder and machinist, has purchased the entire plant of the H. P. White Company, Philadelphia.

Page & Hill Company, Minneapolis, Minn., has installed an electric lighting system at its Minnesota transfer yard and put on a night shift so as to operate the plant day and night.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., announce that the Denver offices have been removed to 1052 Gas & Electric Building, Fifteenth and Champa Streets.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for ventilators for ten cars now being built for the Wilmington & Philadelphia Traction Company by The J. G. Brill Company.

W. J. Jeandron, New York, N. Y., exclusive agent for Le Carbone brushes in the United States, has returned from a trip to Paris, where he spent several weeks at the factory of Le Carbone Brush Company.

Mid-Western Car Supply Company, Chicago, Ill., has been incorporated to manufacture and deal in railway material, supplies, etc. The incorporators are George A. Chritton, J. G. Anderson and R. A. Raymond. Capital, \$25,000.

McKeen Motor Car Company, Omaha, Neb., has shipped a second 70-ft. gasoline motor car to the Sand Springs Interurban Railway, Tulsa, Okla., also a 70-ft. motor car to the Oregon-Washington Railroad & Navigation Company, Attalia, Wash.

Fairbanks, Morse & Company, Chicago, have delivered a passenger motor car to the Alaska Northern, Seward, Alaska, and have received an order from that company for another car. The car has a capacity of thirty-five passengers, with separate compartments for express and baggage. The motive power is a four-cycle gasoline engine mounted on the truck.

W. H. Stevenson, formerly with the McGuire-Cummings Manufacturing Company, and lately with the Indian Refining Company, has been appointed sales manager of the American Oil Company, which has headquarters at Jackson, Mich. This company is prepared to supply all kinds of lubricating oil and will specialize on rolling-stock and power-plant lubrication in the electric railway field.

Consolidated Car Heating Company, Albany, N. Y., at a meeting of the stockholders on June 12 elected Cornell S. Hawley president and treasurer. Mr. Hawley was formerly vice-president, general manager and treasurer of the company. C. C. Nuckols, formerly superintendent and purchasing agent, was made general manager. The sales for the year ended May 31, 1910, were the largest in the history of the company.

Terry Steam Turbine Company, Hartford, Conn., will build a large addition to its shop at Hartford in order to meet the increasing demand for the Terry turbine. The extension will more than double the capacity of the present plant and will be added to the eastern end of the shop, which was completed two and a half years ago. The plans are completed and bids have been called for, so that the construction may be begun as soon as possible.

American Ship Windlass Company, Providence, R. I., reports the purchase of an aggregate of 22,700 hp Taylor stokers by the following companies: Havana Electric Railway, Havana, Cuba, 2000 hp; Dayton Citizens' Electric Light Company, Dayton, Ohio, two stokers, 2400 hp;

New York, New Haven & Hartford Railroad, Cos Cob power station, 7500 hp; Northern Ohio Traction & Light Company, Akron, Ohio, 6000 hp; Philadelphia Electric Company, Christian Street Station, 4800 hp.

Wiener Machinery Company, New York, N. Y., has elected E. G. Schmeisser second vice-president of the company. Mr. Schmeisser is a graduate of the Massachusetts Institute of Technology in electrical engineering and was formerly assistant engineer in the electric traction department of the Pennsylvania Railroad. The Wiener Machinery Company, which is selling agent for the United States and Canada for German manufacturers of various types of machinery, has recently increased its capital to \$25,000 and has opened branch offices in Pittsburgh and Boston.

H. W. Johns-Manville Company, New York, N. Y., has recently placed on the market a new solder called "Solder-all." It is in the form of a paste in a collapsible tube. All that is necessary for its effective use is to scrape with a knife the surface of the part to be soldered, squeeze some of the soldering paste on and apply a match, candle or torch. When the paste becomes hot it fuses and solders in the same manner as the old style soldering stick. It is stated that while this article has been in use only a short time it has met with approval because of its convenience, cleanliness, economy and other advantages.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports the receipt of orders for power plant equipment from the following companies: Cosmopolitan Construction Company, Chicago, Ill., for two 1500-kw synchronous motor-generator sets; San Francisco Gas & Electric Company, San Francisco, Cal., for two 1000-kw synchronous motor-generator sets; Edison Electric Illuminating Company, Boston, Mass., for one 1000-kw motor-generator set; Doherty Operating Company, New York, N. Y., for one 300-kw synchronous motor-generator set and switchboard for Montgomery Light & Water Power Company; Alleghany County Light Company, Pittsburgh, Pa., for ten 250-kva and two 200-kva transformers of the oil-insulated, self-cooling type; Desert Power & Water Company, Kingman, Ariz., for four 600-kva oil-insulated, water-cooled transformers; New York Edison Company, New York, N. Y., for a 1000-kva oil-insulated, self-cooling transformer of the tubular type; Great Western Power Company, San Francisco, Cal., for six 300-kva oil insulated, self-cooling transformers.

Western Electric Company, New York, N. Y., will have a large exhibit at the convention of railway superintendents of telegraph to be held in Boston, Mass., June 26-30, 1911. The exhibit will be made in the Hotel Brunswick and will include several types of selector equipment as well as practically every kind of railway telephone apparatus. A new semaphore which has recently been developed by the Western Electric Company will be in operation. This device combines a signal and telephone system and should prove of interest to all electric-railway men. The new Western Electric group selector will be shown for the first time. The Western Electric Company announces that to expedite the handling of trains in and about its Jersey City yards the Lehigh Valley Railroad has applied to terminal operation the telephone methods already employed in dispatching scheduled trains. A telephone system under the supervision of the general yardmaster, with telephone lines extending to every point with which he is required to keep in touch, has been installed. Western Electric selectors and telephones, with which the rest of the Lehigh Valley Railroad's dispatching system has been equipped, are being used throughout. The company has also received an order from the Columbia & Puget Sound Railroad for selectors and associated telephone apparatus for a circuit about 30 miles in length.

ADVERTISING LITERATURE

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Circular 1194, which describes and illustrates type Q Westinghouse engine-driven direct-current interpole generators.

Pittsburgh Reinforcing Pole Company, Pittsburgh, Pa., has issued a 16-page booklet in which the method of reinforcing decayed wood pole with Orr reinforcement is described and illustrated.

Lindsley Brothers Company, Spokane, Wash., has issued a booklet describing its cedar poles and its facilities for delivery. The publication also contains specifications and other useful data on poles.

Chain Belt Company, Milwaukee, Wis., has issued general catalog No. 40, covering its complete line of elevating and conveying machinery. The catalog is profusely illustrated and contains 280 pages.

Crocker-Wheeler Company, Ampere, N. J., is mailing to all master mechanics a calendar card which contains a handy reference map of Atlantic City, for use in connection with American Railway Master Mechanics' convention being held in Atlantic City.

National Tube Company, Pittsburgh, Pa., has printed a booklet containing a general description and plan of its National works, located at McKeesport, in honor of the visit to its plant of delegates attending the spring meeting of the American Society of Mechanical Engineers, which was held in Pittsburgh on May 30 and June 1.

The J. G. Brill Company, Philadelphia, Pa., in *Brill Magazine* for May, 1911, presents an illustrated biography of Charles N. Black, vice-president and general manager United Railroads of San Francisco, and an article on rolling stock conditions in San Francisco in addition to descriptions of new rolling stock for several other cities.

Babcock & Wilcox Company, New York, has prepared an illustrated cloth-bound book describing the Rust water-tube boiler, including the record of elaborate test made by William Kent, professor of mechanical engineering, Syracuse University. The book also contains many views of manufacturing processes and of Rust boiler installations.

Matthews-Davis Tool Company, St. Louis, Mo., is sending out circulars in connection with the forthcoming convention of the railroad master mechanics and master car builders, from which it appears that Davis expansion boring tools are now used in about 1200 shops. Among the electric railway users are the Third Avenue Railroad, New York; Toronto Railway, and the York Railways.

United States Electric Company, New York, N. Y., has issued Bulletin 702, "Absolute Safety by Selective Signaling." This is a description of its dispatcher-controlled semaphores or train-order signals. This system was described and illustrated in the *ELECTRIC RAILWAY JOURNAL* of May 20, in which also the inspection by the Indiana Railroad Commission of these signals in operation on an interurban electric railway was noted.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1523, entitled, "Portable and Stationary Air Compressors for Industrial Purposes." The bulletin gives a general description and photographs of this type of apparatus, together with tables containing data relative to sizes, capacities, weights, etc. The company has also issued Bulletin No. 1081, which describes and illustrates both of its types AN and ANY polyphase induction motors. A list of ratings is also included.

NEW PUBLICATION

The Supply Department. By H. C. Pearce, general storekeeper Southern Pacific Company. New York: *Railway Age Gazette*. 112 pages, illustrated. Price, \$2.

Mr. Pearce analyzes in this book the organization and operation of the supply department of a steam railroad. It is true that the supply department practices of steam and electric railways differ in many particulars, but they have enough in common to make many parts of Mr. Pearce's book of value to the electric railway executive, purchasing agent, accountant and storekeeper. The author's first premise is that the financial importance of the supply department demands that its head should be more than a transmitting medium for orders from the several departments. He should report to and be supported by the chief executive officer. Among the subjects discussed by Mr. Pearce are the building up of the supply department; the duties of subordinates, such as the purchasing agent, engineer of tests, and the several classes of storekeepers; stores and facilities, subjects which relate more particularly to steam railroad conditions; forms of requisitions and orders; receipt and inspection of material; filling requisitions and pricing; assembling, marking and loading; home manufacturing, repair work and delivery; accounting.

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CONTENTS.

The Near-Side Car.....	1095
The Need for a Modern Car Cleaner.....	1095
The Test of Materials.....	1096
Illinois Traction Automatic Block Signals.....	1096
Concrete in Railway Service.....	1096
Car Maintenance by the Hudson Companies.....	1097
Operating Practices of the Hudson Companies.....	1098
A New Automatic Train Stop.....	1104
Automatic Block Signals on the Illinois Traction System.....	1105
Overhead Construction.....	1110
Wood Preservation.....	1110
Meeting of the Committee of Shop Accounting.....	1111
Master Mechanics' and Master Car Builders' Convention.....	1111
The Buffalo Near-Side Single Platform Car.....	1112
Improvements Planned in Albany.....	1114
Meeting of the Joint Committee on Block Signals.....	1114
Exhibits at the Railway Convention.....	1115
Robinson Plan for Chicago Subway.....	1117
Meeting of Committee on Engineering Apprentices.....	1117
Manufacturers' Exhibit Space at 1911 Convention.....	1118
New System of Signs Adopted by Boston Elevated Railway.....	1119
Meeting of the Executive Committee of Manufacturers' Association.....	1119
Hearing on West Newbury Fare Petition.....	1120
Metal Car Parts.....	1120
Commutating Pole Rotary Converters.....	1122
Flexible Asbestos Insulating Tape.....	1122
News of Electric Railways.....	1123
Financial and Corporate.....	1126
Traffic and Transportation.....	1129
Personal Mention.....	1131
Construction News.....	1132
Manufactures and Supplies.....	1135

The Near-Side Car

Radical innovations are uncommon in an industry so standardized as the electric railway business, but no milder term than radical can properly be applied to the near-side car recently developed for city service in Buffalo. From the very earliest days, when the street car was nothing but a modified bus body, mounted upon flanged wheels, it has been the universal rule to place the employee who collected the fares at one point in the car and the employee in charge of operation at another. Sometimes the main entrance and exit have been at the rear of the car and sometimes they have been at the side, but never before, we believe, except in the case of one-man prepayment cars, have all passengers been required to board and leave at the front end of the car. Nevertheless, an instant's thought will disclose a number of advantages in such an arrangement. Of these, most important in our opinion is the concentration on the motorman of the responsibility for seeing that the car is not started until all those who wish to ride are safely on board and those who are leaving the car are off the steps. There are other advantages of the car, however, and also possibly some disadvantages which time will disclose. There may be, for instance, a question whether standing passengers will pass to the rear of the car, as they are expected to do, and will not remain near the entrance where exit is easy. No final conclusions can be reached in any changes of this kind until an experiment has been tried on a considerable scale for some time and under both summer and winter conditions. But this is now assured at Buffalo, and the results attained there will be watched elsewhere with interest.

The Need for a Modern Car Cleaner

It is somewhat remarkable that while vacuum and compressed-air machinery is revolutionizing the cleaning of assembly rooms, offices and residences many electric railways cling to the car-cleaning methods which were in force during the era of the horse car. This condition seems all the more odd in view of the fact that some supply of energy for power-driven machinery is almost always available at a carhouse. It is true that a few companies have adapted certain old railway air compressors either for compressed-air cleaning alone or for a combination of pressure and vacuum cleaning. But such outfits cannot be expected to give the best possible results, partly because they are too small for the work and partly because they were designed for intermittent operation. What is wanted is a continuous-service machine which is capable of exerting such powerful suction that objects as heavy as peanut shells will be drawn out quickly from every nook and cranny of the car, even at a distance of several inches. The cost of cleaning constitutes so large a proportion of the car maintenance expenses that the application of specialized machinery to it is worthy of careful consideration.

The Test of Materials

We believe that on many roads greater use could be made than is now the case of the experience of the engineering department in the experimental testing of materials. The subject is a pertinent one at the present time, because a great many companies have not had much construction work recently to occupy the time of the engineering departments and on other lines the needs for the summer season in the way of new construction will soon be completed. The idea that the purchasing department should maintain the closest relations with the engineering department and should obtain the benefit of its assistance in the selection of supplies is not new, but is worth repeating. In nearly every engineering department there are a number of young men, recent graduates of technical schools, who are well fitted to carry out these tests of equipment and supplies. Almost all of the supplies used by an electric railway company are susceptible to this kind of engineering analysis, and these young men have had just the kind of training to conduct these tests satisfactorily, especially when they do so under the general supervision of the head of the engineering department. The number of articles which could be so tested for durability or efficiency is legion, but we might mention in particular insulation of all kinds, overhead appliances, lamps, bell cords, fare registers, trolley wheels, brakeshoes and wheels. Work of this character should pay for itself in a short time because it would determine quickly the relation between first cost and real cost of the articles tested, and where a company has no other or better facilities for determining the value of articles purchased it would usually prove more economical than laying these same men off in slack seasons.

Automatic Block Signals

Several notable installations of automatic block signals have been made on interurban electric railways during the past year, but the new signal equipment of the Illinois Traction System, which is described elsewhere in this issue, is the largest installation of its kind which has yet been made. Except for the use of alternating current in the track circuits the signal apparatus is very similar to the standard apparatus used on steam railroads. The density of traffic on the sections of the Illinois Traction System where the signals have been installed is greater than on most of the single-track steam railroads which have been equipped with block signals, and the average speed of trains is higher. The same considerations of safety, convenience and reliability which require the use of the track circuit system on steam roads influenced the management of the Illinois Traction System in its selection of signal equipment in spite of the comparatively high cost. Only part of the Illinois Traction System is being equipped with continuous signaling at the present time, but where continuous signaling has not been put in the most dangerous curves have been protected by warning signals which, while they are not block signals in the true sense of the word, afford ample protection against head-on or rear-end collisions at the points where the view of the track ahead is obscured. It is worthy of note that the block signals on the Illinois Traction System are not supplemented with any form of automatic stop. The block signals are not intended to displace the control of the train dispatcher over the movements of trains on the road, but they do assist materially in preventing cumulative delays when one or more trains are running late.

CONCRETE IN RAILWAY SERVICE

One sometimes thinks of our own as the age of steel and concrete, since these are the structural materials which occupy public attention. A vast amount of use has been found for both, and concrete is at present a very popular form of construction for buildings of ordinary type as well as for bridges, culverts and other such structures. Of late, railway companies have gone considerably into the use of concrete not only for these more commonplace purposes but for platforms in freight and passenger service, for ties and foundations for ties, and even for poles on their transmission and distribution systems. A recent discussion before the New York Railway Club brought out a large amount of interesting facts and comment regarding the applicability of reinforced and other concrete for the wide variety of structures which are used by railway companies.

Now, in the present stage of experience it quite goes without saying that for structural use, as in bridges and the abutments of bridges, arches, culverts, piers, viaducts and a great number of minor structures, reinforced concrete is a cheap and reliable substitute for masonry. When well mixed and reinforced there is every reason to believe that it is as permanent a building material as one could desire. It gets harder and harder with time, and after the passage of years the structure becomes practically a monolith in which the reinforcement is so sealed up that there is little reason to fear the effect of corrosion. Now and then one hears of a concrete structure giving way, which naturally causes some alarm among those who desire to use the material, but such accidents are, it is only fair to say, almost always the result of bad mixing with insufficient or poor cement.

This very fact, however, is of serious import. Building stone is a material about which there can be very little deception, and there are certain well-defined and standard ways of laying it. If the structure is properly designed these inevitably lead to sound results. But in using reinforced concrete one is dealing neither with a well-defined material of thoroughly ascertained qualities nor with methods which have been standardized through generations of practice. If a suitable mixture is carefully and honestly made and is set around suitable reinforcement, the result is of the highest excellence, but there is no material which can be more successfully scamped than concrete, as many a user of it has learned to his sorrow. So to speak, it varies in quality from adamant to mud. An adobe house in Arizona is granite compared with some of the concrete we have seen slapped together in buildings in the metropolis of our country. A closely drawn specification, an honest contractor and a minute inspection are the three things necessary to be in combination in order to get thoroughly first-class results out of concrete. When this trio is on duty concrete as a building material leaves very little to be desired; but good things come high in this world, and buildings of the grade of excellence we have described, while less expensive than if of masonry, can by no means be classified as cheap. When we pass to ordinary cases of building, like stations, freight houses, platforms, office buildings, carhouses and power stations, one meets a somewhat different set of conditions. All these things have been at times successfully built of reinforced concrete, which here is in competition, however, not with masonry, but with brick, terra cotta and steel, concrete blocks and even with wood

and galvanized iron. For instance, in building a freight house or a passenger station all these materials come into active competition, and when it comes to figuring the cost concrete has to take its chances with the rest.

Prices of material vary greatly from place to place, but true monolithic reinforced concrete will probably head the list in cost in a very large number of instances. It is solid, enduring and fireproof as regards the structure itself, but on the other hand it is somewhat expensive, runs such risk of interior fires that the underwriters make little difference between it and ordinary brick construction, and it is open to the objection that if alterations have to be made one is almost driven to diamond drills and dynamite. Concrete blocks have given great promise of usefulness, but at present many constructors look on them somewhat askant owing to the great care and close inspection required to secure a uniform and sound product. In the discussion to which we have referred there seems to be a rather well-settled opinion among practical railway men that cost of construction with concrete of really good quality runs much higher than is commonly stated, an experience which is not uncommon among those who have figured on such structures. There was, too, some complaint of dampness, so that even the reinforced concrete had to have a special waterproof coating, and of lack of durability in concrete used for floors and platforms, owing to gradual chipping which could not be easily repaired. Of course, the better the concrete the more waterproof it is and the less likelihood there is of chipping, all, however, at increased cost. The sum and substance of the experience in this matter seems to be that reinforced concrete, properly put up, is a fine and reliable substitute for masonry, but of somewhat uncertain economy when put into keen competition with other materials for structures which ordinarily would not be made of masonry.

The use of concrete for ties and poles has not yet progressed far enough to enable one to form a final opinion on it. Abroad concrete ties are coming into use, particularly in Italy. It must be borne in mind, however, that steel ties have been largely and successfully used abroad, while in American construction, in which the roadbed is differently designed, both concrete and steel are still looked upon with some disfavor. The objection to concrete seems to be chiefly one of cost, on the ground that if the tie is of section heavy enough and the concrete is rich enough to stand up well against disintegration it is too expensive, and if smaller, so much steel is required for reinforcement as again to bring up the cost. The reinforced-concrete tie, however, seems promising enough to warrant further experiments even though some of the results reached have been unsatisfactory.

The same is true of concrete poles. There is a fine stability to a well-built reinforced-concrete pole that appeals at once to the contractor. The endurance of such a pole is still a matter of some doubt since few have been in use for any considerable length of time. The concrete poles look well for supporting trolley wires and if on firm foundations should give a good account of themselves in such service. For transmission work they are perhaps less well adapted. The rigidity of the material is perhaps somewhat of a disadvantage for this service, inasmuch as it compels the use of rather massive poles, while equal security can be secured at lower cost by the intelligent use of steel alone.

To sum up the situation it appears that at present concrete offers a splendid substitute for masonry, serves admirably and under some circumstances economically for general structures in which it has to compete with other building materials, and that it is promising, though comparatively untried, for ties and certain classes of pole lines. With respect to these latter uses it would take much time and experience to find out the facts in the case. The general opinion seems to be that first-class concrete construction, while leaving little to be desired in its properties, is far from being as inexpensive as its warm advocates are disposed to assert.

CAR MAINTENANCE BY THE HUDSON COMPANIES

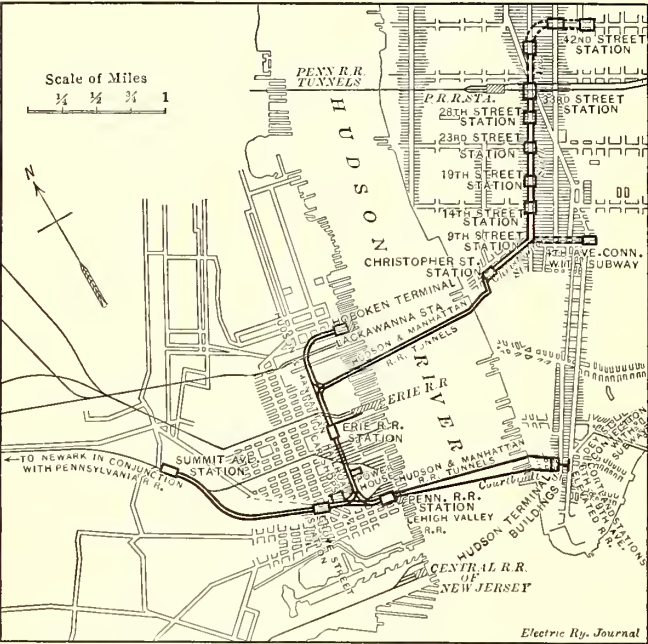
The car maintenance experiences of the Hudson Companies, whose practices are described elsewhere in this issue, prove that delays due to the failure of car equipment can be made practically negligible when modern electrical apparatus is operated within reasonable loading limits and maintained as closely as possible to the original standard of efficiency. To operate on such a basis as one minute car equipment detention for every 167,161 miles operated, as was actually accomplished last April by the Hudson Companies, is to set a mark of excellence which is high indeed. Such a record means that the action of the electrical apparatus must have been well-nigh perfect. In fact, this has been the case. At one time the armature shop was free from traction motor repair work for more than six months, although fifty of the 190 two-motor equipments had then been in service for longer than two and a half years. This railway's experience with steel cars is of particular interest. It has found that with oil burners it is possible to repair steel panels almost as easily as wooden panels are repaired by the usual methods, and that sand-blasting provides a quick and comparatively cheap means for preparing the steel for repainting. The behavior of the composition cement flooring in the Hudson cars is worth noting. These floors, it will be remembered, have a special hard rough surface so as to provide a good foothold for the passenger. In this respect they have proved very satisfactory, but as they have required redressing within two years some increase in longevity would appear to be desirable.

A very important feature of the Hudson Companies' operating practice has been the standardization of every car. This policy has given to the patrons the benefit of all the improvements which have been devised as the result of operating the first cars. At the same time the adoption of uniform car equipment to the smallest detail has simplified the maintenance work and made a complex record system unnecessary. The monthly comparisons of detentions and the analysis of equipment defects do not require much clerical work, but they do furnish plenty of data to keep the several departments and the manufacturers of the principal apparatus alert for possible betterments.

In conclusion, something should be said about the success this company has had in practically enlarging its facilities through the adoption of a piece-work system. When a car cleaner's average output can be raised from 8 2/7 to 12 1/3 cars a day, it becomes apparent that an equitable piece-work rate can do more for the company than merely to decrease the actual cost per car. The maximum use of the space available for inspection and cleaning is as important in a carhouse as is the intensive use of machine tools in a factory.

OPERATING PRACTICES OF THE HUDSON COMPANIES

The Hudson & Manhattan Railroad, commonly known as the Hudson Companies, operates 17.525 miles of single track, which consist of a belt line connecting all of the New Jersey steam railroad terminals in Jersey City and Hoboken, except that of the Central Railroad of New Jersey, a line under Sixth Avenue, New York, from Christopher Street to Thirty-third Street



Hudson Shops—Map Showing Routes of and Territory Served by the Hudson Companies

and Broadway, and two pairs of single-track tunnels which enter New York at Cortlandt Street and Christopher Street respectively. Franchises have also been granted for extensions from Sixth Avenue to Fourth Avenue along Ninth Street, and from Thirty-third Street and Sixth Avenue to the Grand Cen-

boken on Feb. 26, 1908, and on the downtown system from Hoboken to the Hudson Terminal Buildings at Cortlandt Street on July 19, 1909.

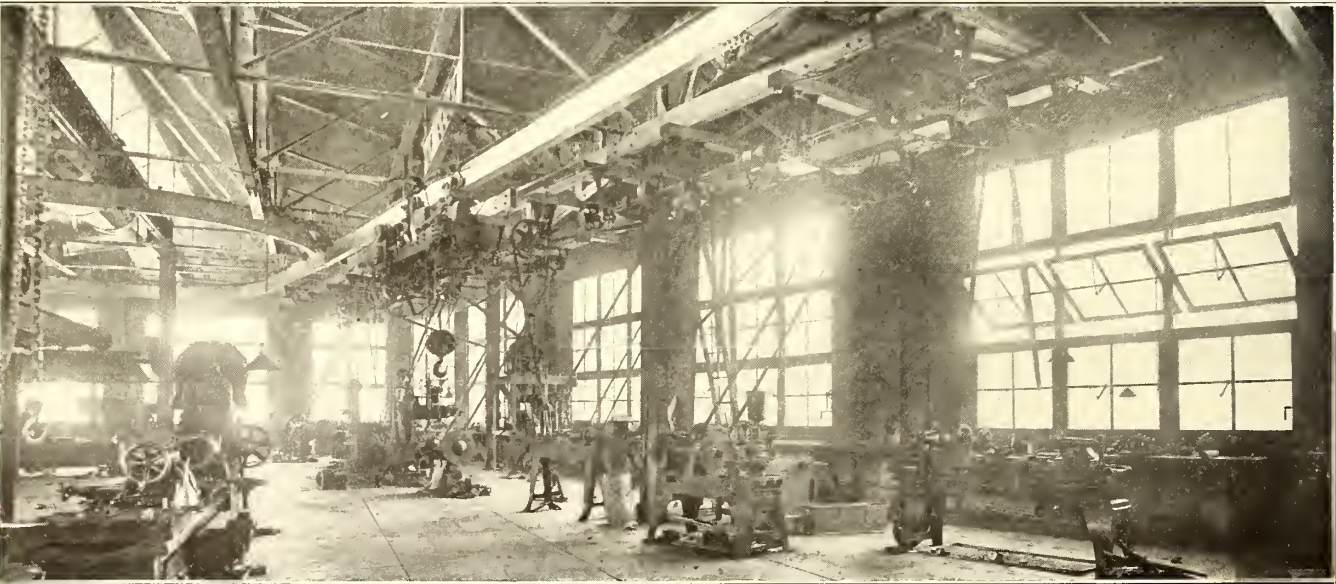
The growth of the system is well indicated by the increase in rolling stock. The original equipment consisted of fifty cars. The second lot consisted of ninety cars and was placed in service in July, 1909, and the third lot, consisting of fifty cars, was placed in service late in 1910, making a total of 190 cars. Orders have also been placed for thirty-six cars more for use in the service to Newark, which will be over the tracks of the Pennsylvania Railroad. All of the present rolling stock is of the steel center-door type, seating forty-four passengers, as described by Hugh Hazelton, electrical engineer of the Hudson & Manhattan Railroad, in the STREET RAILWAY JOURNAL for June 8, 1907. Many minor improvements were embodied in the later cars, and it was therefore decided early in 1911 to incorporate these changes in the first cars, thereby standardizing the rolling stock and bringing it up to the same

TABLE 1.—HUDSON COMPANIES' LABOR COSTS OF INSPECTION AND REPAIRS FOR MARCH, 1911.

Description.	Cost.	Cost Per Car Mile.
Painting and varnishing of cars.....	\$579.91	\$0.0009279
Repairs and renewals to car bodies.....	1130.18	0.0018083
Repairs and renewals to air brakes.....	603.95	0.0009663
Repairs and renewals to trucks.....	966.39	0.0015462
Repairs and renewals to wheels and axles.....	472.67	0.0007563
Renewals of brakeshoes.....	93.73	0.0001499
Repairs and renewals to motor bearings.....	14.36	0.0000229
Repairs and renewals to gears and pinions.....		
Other motor repairs.....	72.60	0.0001162
Repairs and renewals of control equipment.....	475.75	0.0007612
Repairs and renewals of pumps and governor.....	217.74	0.0003484
Train supplies and expenses.....	222.00	0.0003552
Total	\$4849.28	\$0.0077588
Car cleaning.....	\$847.04	
Cleaning cost per car for one month.....	\$4.46	
Cars in service.....		190
Total mileage.....		625,006.30

degree of safety and convenience. These alterations will be described hereinafter.

The rolling stock was maintained originally in temporary shops at Hoboken, but in January of this year this work was transferred to a permanent shop plant at Jersey City. The construction and general arrangement of these shops have also been described by Mr. Hazelton in the ELECTRIC RAILWAY JOURNAL for May 6, 1911. The general operation of the Hudson



Hudson Shops—Machine Shop, Illustrating the Layout of Tools, the Telfer System, Natural Lighting Facilities, Etc.

tral Terminal at Forty-second Street and Madison Avenue. The system now in operation comprises 7.25 route miles. The territory served in New York and Jersey City is shown in the accompanying map. The first regular trains were operated on the uptown system from Nineteenth Street and Sixth Avenue, New York, to Ho-

& Manhattan Railroad is in charge of E. T. Munger, general superintendent, with P. V. See as superintendent of car equipment.

DETENTION RECORDS AND MAINTENANCE COSTS

No consideration of the car maintenance practice of any railway would be complete without showing its relation to the

actual service reliability of the equipment. On this system a keen rivalry exists among all departments to keep the delays down to the irreducible minimum. This is reflected by the monthly comparative reports which are issued by the general superintendent with comments on the conditions which have produced the records of each department. From these records it appears that during the calendar year 1910 the cars ran 17,000 miles, per minute of detention, due to causes for which the car equipment department could be held responsible. A most extraordinary record was achieved by this department in April of this year, when 585,065 passenger car miles were operated with a detention of only $3\frac{1}{2}$ minutes, giving practically 167,161 miles per minute of detention. It is a curious fact that the detention record for the year 1910 was about three times better than for the preceding year, when the rolling stock was almost new. The first car was sent to the overhauling shop on Feb. 27, 1911, at which time it had run 175,000 miles without any other attention than regular inspection. The examination of this car proved that it could have run for a much longer period without trouble.

In spite of the remarkable freedom from mechanical and

ing up of car maintenance work is especially important. The classes of labor to which the piecework system has been applied are window cleaning, painting, wheelwork and for special jobs, such as the installation of electric heaters and coasting registers, replacement of broken motor studs, etc. The sand-blasting of cars is also to be worked out on this basis. The accompanying tables present the differences between day and piecework rates for certain classes of work.

Table II, for example, shows the estimates of savings which were made when the piecework system was decided upon for window cleaning. These estimates have proved correct in practice, as the application of piecework has reduced the cost of window cleaning from $19\frac{1}{2}$ cents to 15 cents per car. The

	Day Work. (Present.)	Piece Work. (Proposed.)	Saving. (Expected.)
Number of men.....	7	6	1
Cars per man.....	$8\frac{1}{2}$	Max. $9\frac{1}{2}$	$1\frac{1}{2}$ (increase)
Wages per diem.....	\$1.75	\$1.95	\$0.20
Cost per car.....	$0.19\frac{1}{2}$	0.15	$0.04\frac{1}{2}$
Cars cleaned per diem.....	58	74	16 (increase)
Minutes per car.....	70	46	24
Cost of cleaning per diem....	\$11.73	\$11.12	\$0.61
Cost per car per month.....	2.27	2.06	0.21
Total monthly saving.....			\$15.86
Extra cars cleaned per month.....			416

Scraping and painting roof.....	\$1.00
Scraping one side and one end.....	1.50
Painting one side and one end.....	1.50
Scrubbing seats.....	0.75
Varnishing.....	0.75
Rubbing outline, cleaning ventilators, painting poles and green parts.....	2.40
Coat white.....	1.75
Coat enamel.....	1.75
Painting under seats.....	0.25
Cleaning, retouching and varnishing.....	3.30

PAINTING CARS.

Last cars painted on day work.....	\$25.29
Cars painted on piece work.....	19.70

COMPARISON OF EARNING OF MEN.

	Day Work.	Piece Work.
Head painter.....	\$2.75	\$3.28
Inside painter.....	2.25	3.28
Painter's helper.....	1.75	2.49
Painter's helper.....	1.75	2.40

TABLE IV.—HUDSON COMPANIES' PIECEWORK RATES, WHEEL TURNING.

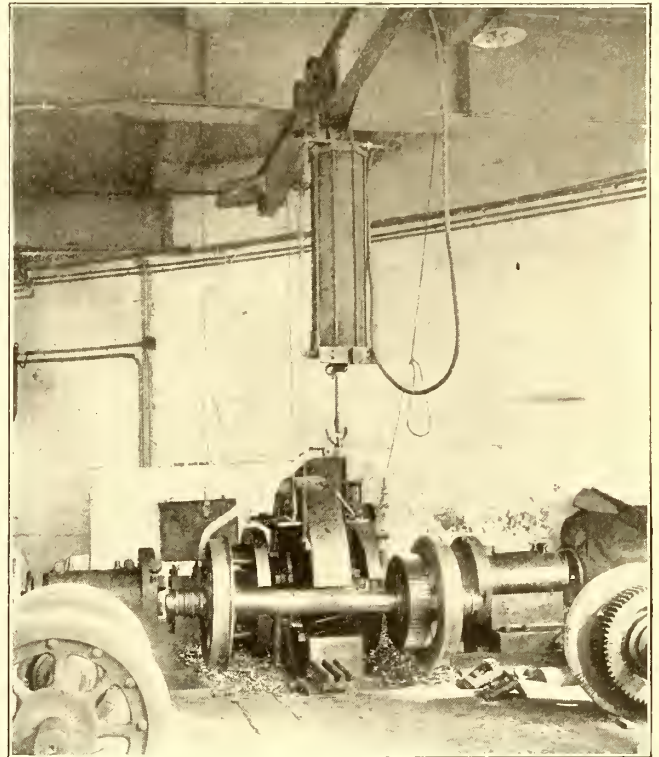
MOTOR WHEELS.	
Minimum diameter $30\frac{1}{4}$ in.....	\$0.16 $\frac{1}{2}$
Maximum diameter $34\frac{1}{4}$ in.....	0.48 $\frac{1}{2}$
TRAILER WHEELS.	
Minimum diameter $26\frac{1}{4}$ in.....	0.12 $\frac{1}{2}$
Maximum diameter $30\frac{1}{4}$ in.....	0.44 $\frac{1}{2}$
$\frac{1}{2}$ cent will be allowed for each $\frac{1}{16}$ in. diameter over minimum size.	

electrical troubles the car equipment department's expenditures for the calendar year 1910 did not exceed \$75,000, or only \$13.34 per 1000 car miles. The cost of labor alone was about \$50,000. The total cost previously given included \$1,876.17, which was spent for such extra equipment as rubber door cushions, and \$1,750, which was applied to the tire and wheel reserve fund.

Table I, on page 1098, shows the labor costs for car inspection and repairs for March, 1911. In this table there are listed the costs per car mile of all items relating to inspection and repairs, except that of car cleaning, which is given separately. This table also shows that the total distance run by 190 cars in March was 625,006 miles, or 3289 miles per car.

PIECEWORK SYSTEM

The piecework system has been applied in these shops on an extended scale. This practice has resulted in far larger pay for the men than under the day rate system. So far as the company is concerned, the change in labor payment has had at least two excellent results, namely, a great increase in the number of cars which can be passed through the shops in a given time and an improvement in the grade of work turned out by the men. The space facilities at Jersey City are so limited that the speed-



Hudson Shops—Air Hoist for Bringing Wheel Sets Direct to the Lathe

piecework system disposes of the cars much faster than the day system. It was correctly estimated that seventy-four cars could be cleaned by six men in the time formerly required by seven men to clean fifty-eight cars. Table III shows a similar comparison for painting. The saving in one case has amounted to \$5.59 per car and in another case to \$3 per car.

The piecework rates on wheel turning are not based on the usual cent per inch principle. As shown in the accompanying Table IV, the method is to pay the men $16\frac{1}{2}$ cents for a wheel of the minimum diameter of $30\frac{1}{4}$ in., allowing $\frac{1}{2}$ cent more for each $\frac{1}{16}$ in. diameter over the minimum size, consequently $48\frac{1}{2}$ cents is paid for a wheel of the maximum diameter of $34\frac{1}{4}$ in. On the inch basis the respective prices for minimum and maximum diameters would be $30\frac{1}{4}$ cents and $34\frac{1}{4}$ cents. It will be seen that the Hudson Companies' method is to give a high premium to the man who saves the most metal. In the long run this does not cost as much as the cent-per-inch practice. The company feels that it can well afford to pay for extra skill because a saving of $\frac{1}{16}$ in. metal means that the wheel may give \$1 to \$2 value in extra life. The introduction of the piecework system for wheels also has doubled the capacity of the lathe.

STANDARDIZATION AND IMPROVEMENTS IN CAR EQUIPMENT

As previously mentioned, it has been found desirable to standardize the rolling stock purchased at different times so that all cars would be brought up to the same degree of safety and efficiency. All work of this character is summarized in a monthly

progress report by the superintendent of car equipment, entitled "Special Work Done." The changes noted in the following paragraphs are of more or less general interest.

The leather hand straps in the first fifty cars have been replaced by horizontal enameled stanchions which form a convenient grab rail as in the later cars.

All cars have been equipped with door signal devices whereby a lamp in the motorman's cab is illuminated when all the doors of the train are closed. Soft rubber buffers have been added to the edges of all car doors to prevent passengers' clothing from being caught when the doors are closed. The original fifty cars are being furnished with electric door control valves to displace manual control valves. Feed valves have been installed to regulate the door pressure, which varies from 40 lb. to 50 lb., whereas the supply is delivered at 90 lb.

All electric switches have been lined with fiber on account of the short-circuits which were caused by the rough treatment they received from the trainmen.

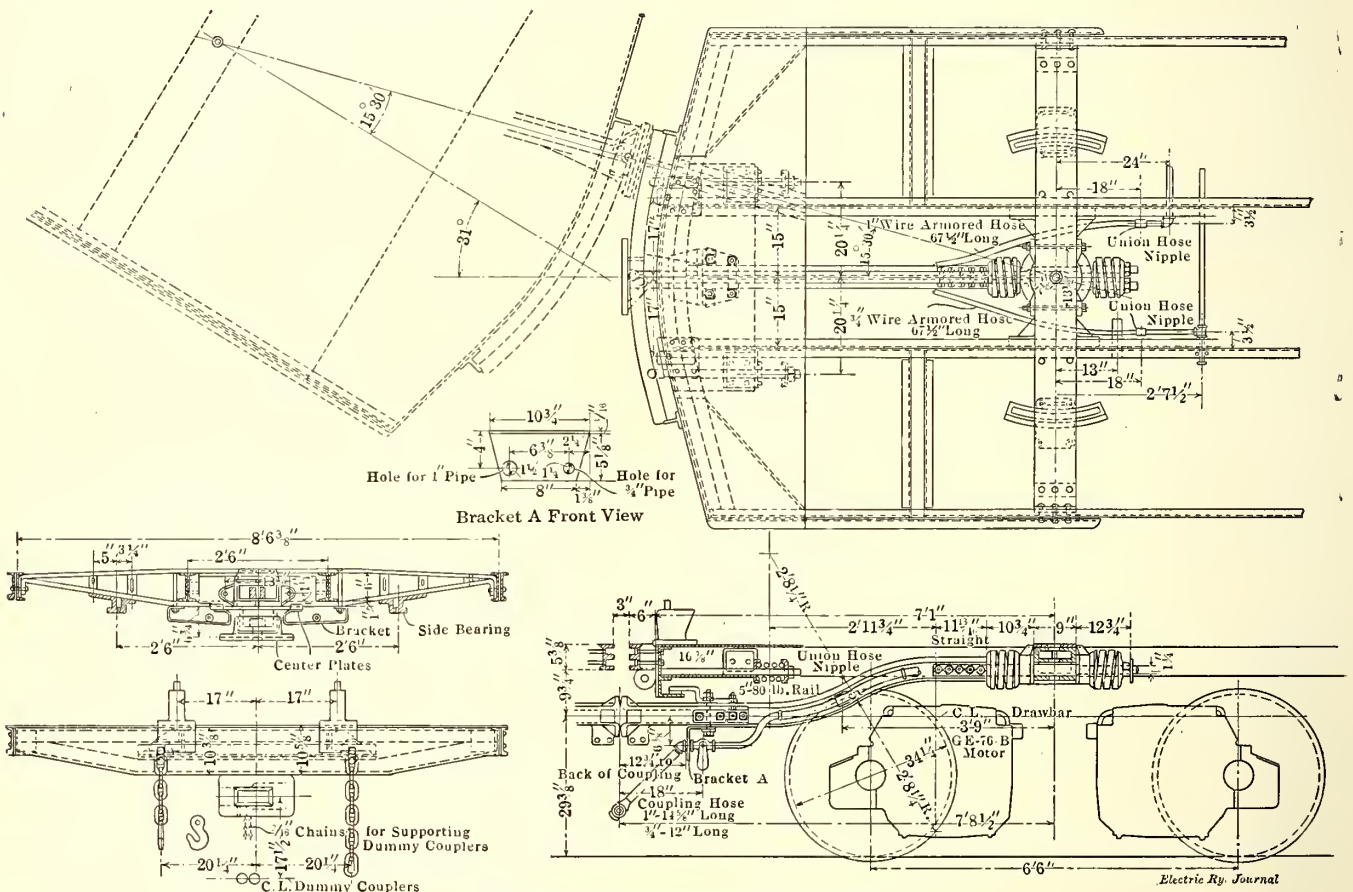
The aluminum corner plates of the cars are being replaced by brass, owing to the strong corroding influence of the salty atmosphere of the tunnels.

The removal of the kingpins from the trucks made it possible to use for lubricating passages the holes which existed in the car floors. The oil falls on a wooden block and then spreads out over the center plate.

To prevent breaks at bends, a change has been made in the undercar pipe fittings from the truck to the tripper. The new fittings are of the bored-out, high-pressure type.

Westinghouse automatic resetting devices have been installed for emergency trippers. This device resets when the train line pressure drops to zero.

Consolidated electric heaters have been placed under the seats in all the cars despite the fact that the tunnel temperature ranges from 60 deg. to 70 deg. Fahr. even in the coldest weather. The heaters were installed because air-brake apparatus was found frozen in cars which had been standing in the yards.



Hudson Shops—Details of Draft Rigging

All cars have been furnished with Hedley anti-climbers.

It has been found necessary to renew the top surface of the composition cement car flooring, which had worn out at the doors and opposite the seat risers after two years' service. In placing the new flooring two important changes are applied as follows: The flooring is laid perfectly flat instead of being crowned, so that there is no thinning out at the very place at which the wear is greatest, namely, opposite the risers, where there is a great deal of shuffling by passengers; the top dressing is $\frac{1}{2}$ in. instead of $\frac{3}{8}$ in. thick. The underlying layer of these floors, which has not been touched, is about $\frac{7}{8}$ in. thick at the deepest point of the keystone section floor. The cement-covered area of the floor section and vestibules of a car is 265 sq. ft. The net cost of removing the top dressing is \$2 and the cost of laying the new dressing \$4 per car. The cement, after requiring some five hours' preparation, will set sufficiently well over night to permit the car to go into service. At this time the company is experimenting with five different types of fire-proof flooring.

The air hose on all cars formerly was fastened to a sector bar. This bar proved troublesome because the hose would uncouple on short curves. The hose is now fastened to the drawbar, as shown in the accompanying drawing, so that it remains rigid and parallel to the drawbars at all times.

All cars have been equipped with train line receptacle cover springs. The train line jumper used to work loose, so that it would fail to make contact and would drop to the rail. This trouble is now prevented by the cover springs, which will last indefinitely because they are not subjected to tension under normal conditions.

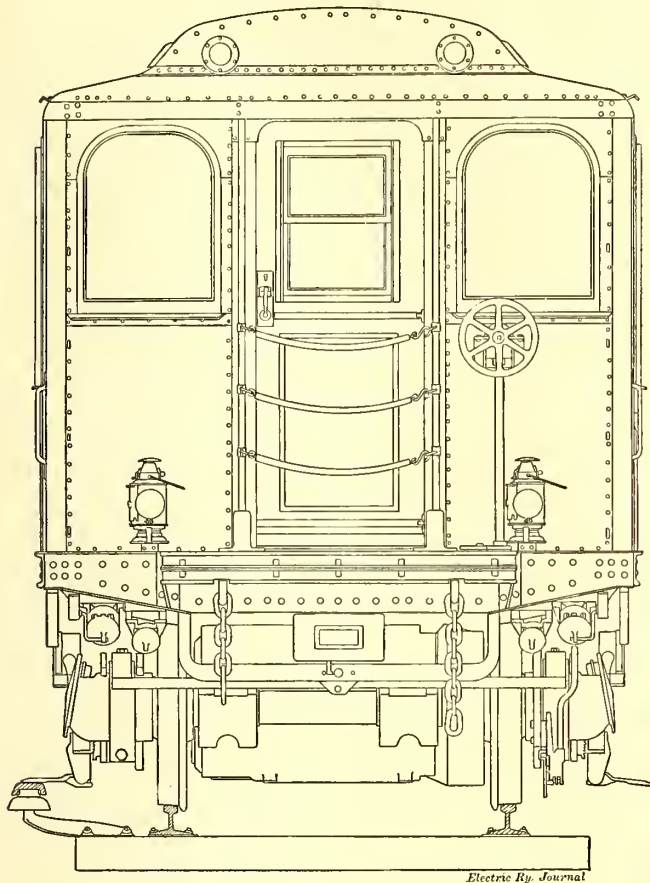
The original motor studs broke frequently, owing to the very short and sharp curves and the steep grades on this system. They have been replaced by heat-treated steel studs.

Round ribbon contactor shunts have replaced the old-style laminated flat ribbon shunts, the breakage of which caused trouble with the contactors.

INSPECTION FACILITIES AND RECORDS

The inspection quarters at the Jersey City shops were de-

scribed in detail in Mr. Hazelton's article in the issue of May 6, but it will be of interest to refer to some features which have been installed in connection with this work. As stated by Mr.

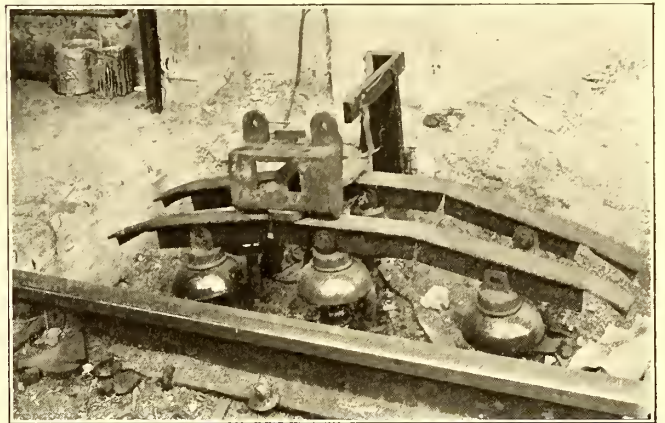


Hudson Shops—End Elevation of Hudson Companies' Standard Car

Hazelton, the inspection tracks are carried on concrete piers of such height that all work under the cars can be done while the men are standing up. The inspection shop has room for six-

An electric tell-tale alongside one of the inspection tracks is installed to catch any third-rail shoes of improper height. This tell-tale is in circuit with a warning bell in the office of the superintendent of equipment. As shown in one of the accompanying illustrations, it consists of a pair of conductors, mounted on six insulators, and a small scaffold from which is suspended a set of copper strips similar to a gold-leaf electroscope. If a shoe is too high, the warning circuit will be closed when contact is made with the copper strips; if the shoe is too low, the warning circuit is closed by the depression of the springs under one of the conductors. The roofs of all cars are furnished with mechanical tell-tales which indicate by the amount of their bending how much a car tips from the vertical when passing through the tunnels.

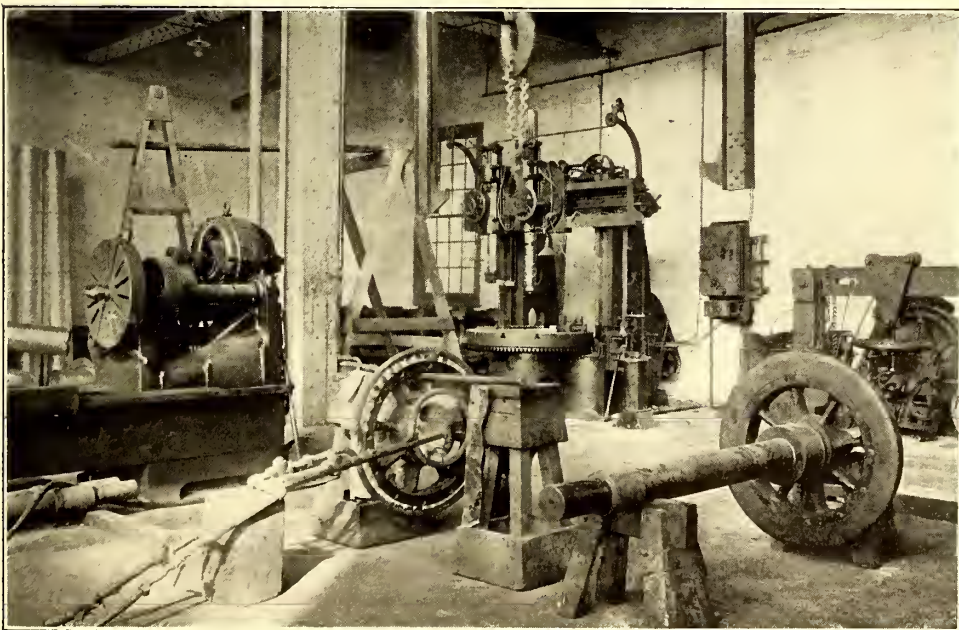
Contrary to the practice of most large companies, this railway does not keep individual mileage records of equipment parts. The principal cause for this is that the equipments are practically uniform throughout, so that no good reason exists for keeping track of many thousands of items.



Hudson Shops—Third-Rail Shoe Tell-tale Outside of the Inspection Shop

One of the principal records of the company is based on the daily reports on all cars in the shop. These reports are made out by the shop foremen and assembled by the superintendent of car equipment for a monthly report to the general superintendent. A noteworthy feature of these reports is that various manufacturers are furnished with reports of the troubles relating to their equipment. In this way they have an opportunity of determining what their apparatus is doing in service even when the railway company does not ask directly for assistance in solving maintenance problems. Thus all door trouble reports are sent regularly to the Burdette-Rowntree Company; the motor and control report, which goes to the General Electric Company, shows the number of cars in service, the mileage made and the delay in minutes caused by this apparatus; the brake trouble report, Table V, which goes to the Westinghouse Traction Brake Company, also gives the amounts of oil used in the compressors in addition to statistics like the electrical report.

One of the improvements made as the result of sending these reports to the manufacturers was in the motors. The original armatures were subject to open circuits at the back end. These



Hudson Shops—Gas-Heating Outfit for Applying Steel-Tired Wheels

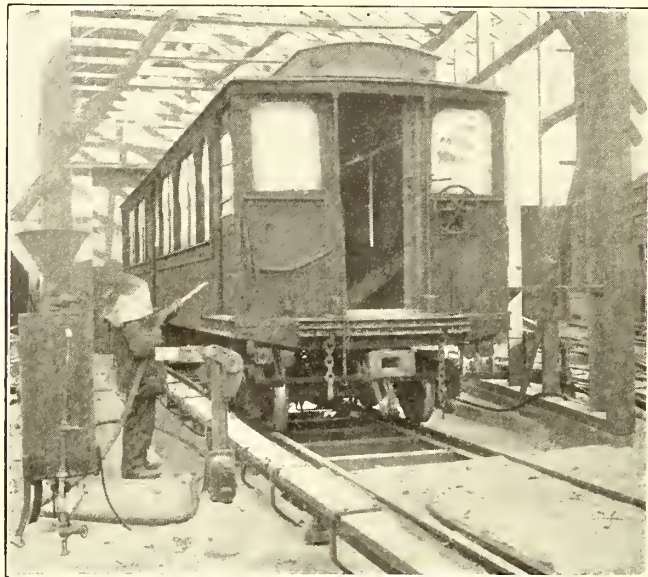
teen cars, but on an average fifty cars can be disposed of in a ten-hour day.

Clearance plates are bolted to the inspection tracks to prevent cars from going back to service with the automatic trip too low.

troubles have been overcome by inserting wooden pegs to prevent the vibration of coils where connected at the back end.

WHEEL PRACTICE

The standard motor wheels of this company are $34\frac{1}{4}$ in. diameter and the standard trailer wheels are $30\frac{1}{4}$ in. diameter. All motor wheels are of the extended hub, steel tire type. The original design of riveted section tires has been replaced by



Hudson Shops—Sand-Blasting Outfit in Service

bolted sections. The bolt passes through the tire and rim, whereas in the old wheels the rivets passed through the rim only and so did not always prevent the slipping of hot tires. The wheels are shrunk on hot by means of the gas-heating outfit shown in one of the accompanying illustrations. Special valves are installed in the gas pipes to permit variable amounts of heat to be applied to the rim and tire in accordance with their difference in thickness. At present this work is done in the open, but an inclosed type of heater is now being devised in order to economize in gas. Wheels which are to be shrunk on axles are set on horses by means of a crane.

The wheels are bored according to the standard M. C. B. shrinkage allowance of 0.001 in. per inch of diameter. They are installed on the axle in about twenty minutes. Wheels are put in the hydraulic press only for removal, and must be heated before they can be taken off, despite the fact that the press has a capacity of 300 tons.

As shown on page 1099, wheel sets are brought directly to the lathe by means of an air hoist instead of by the slower method of rolling them over a track into the lathe.

ELECTRICAL PRACTICES

It is impossible to describe the motor maintenance practice of this company for the simple reason that there has been no necessity to date for any appreciable amount of maintenance work. The armature room is empty almost all the time, as appears from the fact that not more than eight railway armatures have required any attention since the opening of the system. During the last six months there have been no electric repairs whatsoever. The repairs to compressor armatures have also been very light.

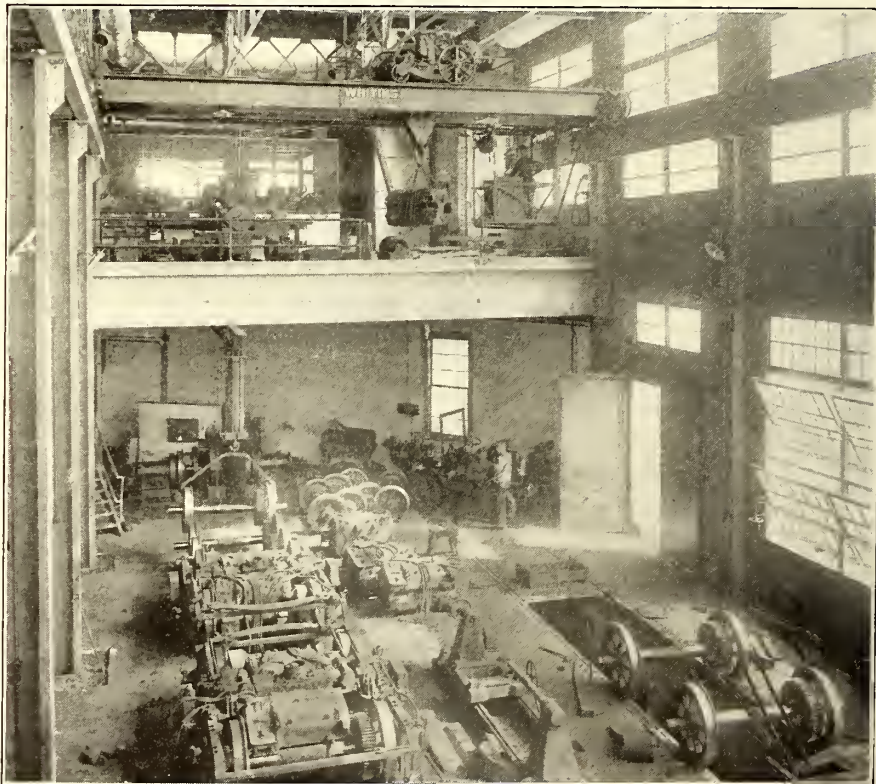
All of the cars are equipped with two GE-76 160-hp motors. This motor has slotted commutators but no commutating poles.

TABLE V.—HUDSON COMPANIES' BRAKE TROUBLES DURING THE MONTH OF FEBRUARY, 1911.

Fuse blown (electric brake).....	6
Pump slow.....	1
Stuck pump governor.....	2
Open circuited pump armature.....	1
Bad order valve (electric brake).....	1
Stiff brake valve.....	5
Bad order pump governor.....	5
Frozen magnet (electric brake).....	1
Feed valve frozen.....	2
Pump governor out of adjustment.....	1
Pump fuse missing.....	1
Short brushes in pump.....	3
Pilot valve cut out.....	2
Dirty slide valve (feed valve).....	1
Bad order finger (electric brake).....	1
Bad order bleed cock.....	1
Electric brake cut out.....	3
Dirty valve (electric brake).....	4
Nipple broken on pipe leading to governor.....	1
Pump fuse blown.....	2
Grounded pump armature.....	1
Total	46
Delay in minutes.....	0
No. cars in service.....	190
Mileage	565,815.89
Compressor oil used (gal.).....	104

The excellent results which it has given may be ascribed to four causes: First, the satisfactory design of the motor; second, the motors are not overloaded; third, the trains are operated through comparatively cool sub-aqueous tunnels for a large portion of the route; fourth, a thorough system of inspection. The gears and pinions, which are the General Electric Company's manufacture, type F, have shown no perceptible wear to date.

Lubrication is supplied on a Galena mileage contract. The lubricating cost for March, 1911, was \$0.1098 per 1000 car miles. All oil which is removed from the journal and motor bearings is re-used for lubricating levers, rods, etc. No oil-reclaiming



Hudson Shops—Truck Overhauling Section with Wheel Shop in the Background and the Compressor Shop in the Gallery

devices have therefore been required at this installation.

MAINTENANCE SHOPS

The general layout of the different shops has already been described in Mr. Hazelton's article, but the accompanying illus-

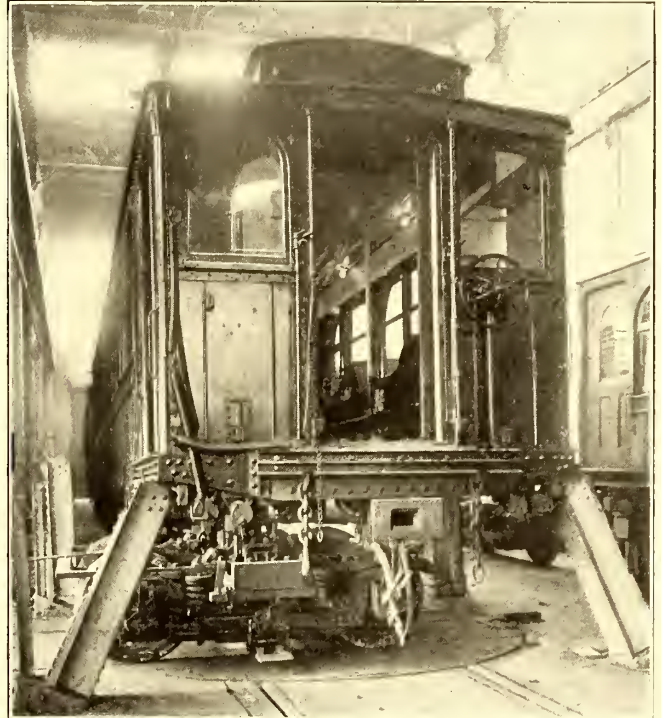
trations are added to show various operating features. One of these illustrations shows the machine shop with its comprehensive telfer system. This shop is practically a gallery overlooking the heavy repair shop; the latter is spanned by a crane

cial repair department is that devoted to taking care of storage batteries which are used for emergency car lighting. The batteries are tested about every fifty days, or when cars are in for general inspection. These batteries are filled to the proper



Hudson Shops—Preparing to Remove a Truck

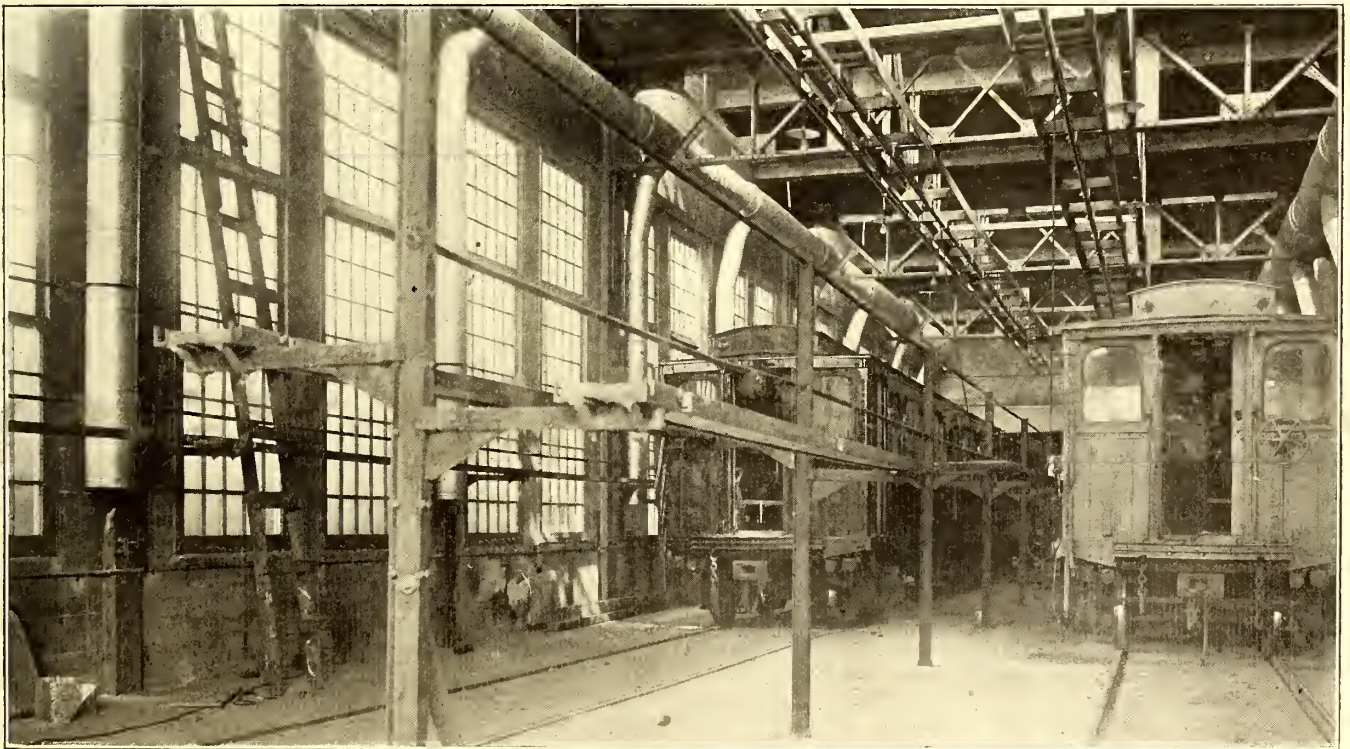
which connects with the telfer system whereby articles brought to the rear of the machine shop can be transferred to the telfer for conveyance to individual machines.



Hudson Shops—Shifting the Truck with a Turntable

level and then charged until their specific gravity is constant.

Two views on this page show the method of removing trucks from cars to the adjacent truck shop by means of a turntable.



Hudson Shops—Interior of Painting Section, Showing Trolley System for Shifting, Heating Pipes and Outlets, Aisle Scaffolds, Etc.

One view shows the rear of the truck shop and the gallery for compressor and general air-brake work. This gallery contains a home-made air-brake testing bench which is furnished with a special pump to give various operating pressures. Another spe-

The car is suspended in a steel yoke while the truck is taken out, and is afterward carried on steel supports, as shown, until the truck has been replaced.

The paint shop is large enough for six cars and handles an

average of one car a day. One of its features is the use of steel posts with brackets to permit the workmen's planks to be adjusted at any height desired. The view of this construction also shows the indirect heating system outlets and the Coburn trolley track for moving cars.

The interesting outfit shown on page 1102 was devised for the rapid sand-blasting of cars. In fact, this work is done at the rate of 1 sq. ft. per minute. The equipment includes an old car reservoir, which is filled with sand and supplied with air at 85 lb. pressure. Two inlets are used, one to force the sand down and the other to force it out of the tank at the bottom. The average life of a continuously used steel nozzle is about one day. With this equipment two men can sand-blast a 48-ft. car in eight to nine hours. The men who do this work under the present system receive respectively \$2 and \$1.75 a day each. The blasting is carried on outside the shop on the car-washing track, which is set in cement to permit easy cleaning.

The blacksmith shop has not been kept very busy to date owing to the fact that the steel cars require very little attention except on rare occasions. At present the shop contains two forges and a steam-type hammer, which, however, is operated pneumatically. When the first damaged car was repaired it was thought necessary to dismantle all of the bent plates and work them over in the blacksmith shop, but experience has shown that with McCloud oil burners repairs can be made on a steel car almost as easily as on a wooden car.

The carpenter shop, naturally, has even less car repairing than the blacksmith shop. The two carpenters employed spend much of their time in making patterns, benches, boxes, and other odds and ends required by the other departments of this railroad. In addition to the storeroom at the entrance to the shop, two auxiliary stockrooms are provided in order to save time in getting supplies. The main stockroom contains two Bowser pumps, one of which controls a 250-gal. compressor oil tank and the other a 500-gal. car oil tank. Both tanks are buried.

A NEW AUTOMATIC TRAIN STOP

At a meeting of the Railway Signal Association held in New York, June 14, 1911, J. M. Waldron, signal engineer Interborough Rapid Transit Company, described a new type of automatic train stop employing no mechanical trips or electrical contact-making devices, which has been in experimental use in the New York subway for several months.

The apparatus uses a closed magnetic circuit between the right of way and the moving vehicle. The closed circuit on the track is maintained by locating between the ties and below the rails and insulated therefrom at the beginning of each block an electromagnet and a permanent magnet which are superimposed, the electromagnet receiving its energy from a local battery through a contact on the relay of the track circuit in the block which it protects. This energy amounts to about $2\frac{1}{2}$ watts. When the block ahead is occupied or the track is obstructed the track circuit is interrupted and no energy will pass through the electromagnet between the rails. The stationary apparatus would then be in position for stopping a train. If a train at that time should attempt to pass by the de-energized magnet the brake would be applied automatically. The part of the apparatus placed on the locomotive or motor car consists of one small loop of wire passing around each of the front pair of wheels of the train. These coils are parallel to the rails and can be 4 in. or more above the rails, but they must be below the car axle. The coils are fastened to the car truck and clear the wheels a sufficient distance to permit free movement of the wheels as well as the easy change of brake shoes. In the cab of the locomotive or motor car are a small transformer, an impedance coil, a solenoid coil which is attached to the valve in the train line pipe and a small battery with an emf not exceeding 10 volts. The battery, transformer, impedance coils, solenoid coil and wheel coils are connected in series on a closed circuit. There are no moving contacts in any portion of this apparatus.

In normal operation current from the battery flows through the transformer, impedance coils, solenoid coil and the wheel coils in series, and then back to the battery. As long as the solenoid coil is energized its armature is attracted and the valve in the train line pipe remains closed. When a locomotive or motor-car passes over one of the magnets between the rails and the block ahead is clear the electric energy passing through the track coil, which is immediately under the permanent magnet between rails, counteracts the effective force which the permanent magnet would exert on the apparatus on the vehicle passing over it to such an extent that the energy in the solenoid coil on the moving vehicle is not opposed but rather is assisted. The armature of the solenoid coil is therefore held in the attracted position and the brakes are not applied.

When the track ahead is occupied and the track circuit is shunted the danger position is then indicated and no energy passes through the magnetic coil on the track; therefore there is nothing to oppose the force exerted by the permanent magnet on the track. If an engine or motor car should then attempt to pass over the permanent magnet on the track and enter the next block which that magnet protects, the permanent magnet would induce in the wheel coil circuit a flux, which would tend to change the potential in that circuit. This energy induced by the permanent magnet upon the apparatus on the vehicle which is moving over it is in opposition to the current flow in the apparatus on the vehicle. This opposition is strong enough to counteract the holding effect which the battery on the moving vehicle exerts on the armature of the solenoid coil, with the result that the coil is de-energized, its armature falls and the brakes are applied automatically.

This counter emf is alternating, and its frequency is determined by the speed at which the train or car is moving. After the apparatus is once regulated to permit all movements being made over the track magnets when the speed of such movements does not exceed, say, 5 m.p.h., the apparatus remains permanently at that adjustment. There is an efficient margin of 50 per cent provided on both sides of that which is considered the best working condition of the apparatus. At any speed exceeding 5 m.p.h. the operation is positive. The higher the speed at which the train is moving the more pronounced is the effect on the solenoid coil which controls the air brake valve. The current consumption of the apparatus on the locomotive does not exceed 1 watt.

The batteries for supplying current on the train or car are small. In fact, a few cells of dry batteries would be sufficient to make a round trip from New York to Chicago and have considerable energy left. The parts of the apparatus on the train also are quite small. That which has been constructed and used in making experiments is placed in a box 12 in. long by 12 in. wide by 5 in. deep. These dimensions can be materially reduced by careful designing. As the apparatus is designed, steel bridges, steel viaducts or grade crossings will have no effect whatever upon its correct working. Tests covering a period of several months have been made with a motor car equipped with this device, with the desire to locate any defects, but so far the results have been entirely satisfactory.

REPORT OF COMMITTEE ON INTERURBAN RULES

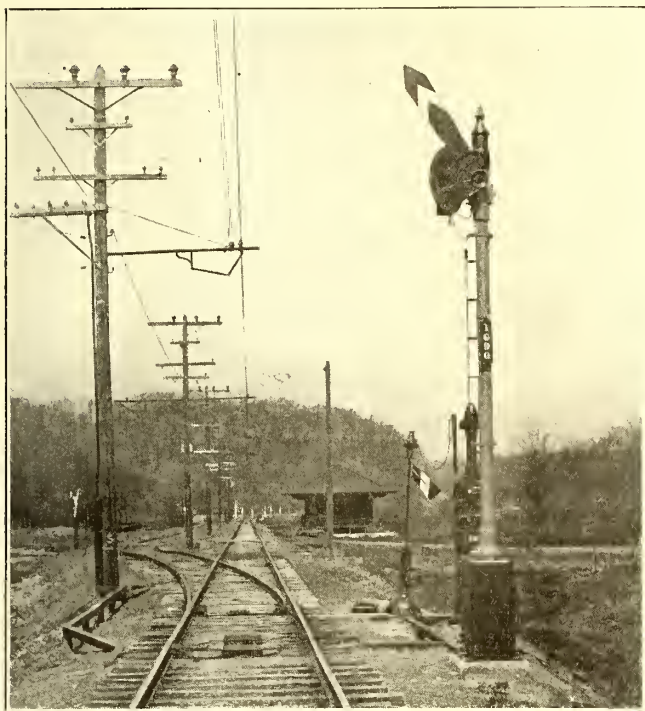
Secretary H. C. Donecker, of the American Electric Railway Transportation & Traffic Association, has sent to member companies part of the report of the committee on interurban rules, showing the changes made from the code adopted at the Denver convention in 1909. The report shows the old rule and the proposed substitute rule in parallel columns and also gives the reasons for the changes recommended in each instance.

It is urgently requested by the committee that operating officials give the subject and the report careful attention and submit written criticisms promptly. A digest of such criticisms will be prepared in advance of the meeting and, the committee believes, will be an aid toward decisive action at the October convention.

AUTOMATIC BLOCK SIGNALS ON THE ILLINOIS TRACTION SYSTEM

BY JOHN LEISENRING, SIGNAL ENGINEER ILLINOIS TRACTION SYSTEM

On Jan. 18, 1911, the signal department of the Illinois Traction System began the installation of 131 automatic block signals which will protect trains and facilitate their movement.



Illinois Traction Signals—Home Signal, Showing Location with Respect to Siding

Operation under signal protection was first begun on April 20 between Peoria and Mackinaw Junction and on the approaches to Mackinaw Junction, a total of 20.5 miles of track having been signaled. One-half of this signal equipment has been in service since April 1. Under the supervision of the writer the work of installing the signal apparatus is being carried on actively and about 65 miles of track will be operated under signal control by July 1.

These signals will protect practically all of the track outside of towns which is not on tangents. The first announcement of plans for this installation was made in the *ELECTRIC RAILWAY JOURNAL* for Nov. 26, 1910, page 1070, and subsequent articles have reported the progress of the erection work. Train operation on the Illinois Traction System is typical of interurban roads with heavy traffic. On each division the daily service includes hourly passenger trains of one and two cars in each direction running alternately as locals and limiteds, two scheduled freight trains and an average of four express or merchandise trains in each direction.

Since the signals were put in use on the Peoria-Mackinaw division train operation has proceeded smoothly and the public has so well recognized the purpose of the signal installation that Vice-president Executive H. E. Chubbuck has placed an order for thirty-seven additional signals of similar design. A portion of the equipment represented by the latest signal order will be installed between Princeton and Ottawa on the Chicago, Ottawa & Peoria Railway in the north central part of Illinois, which is under the same management as the Illinois Traction System.

GENERAL PLAN OF PROTECTION

On the Illinois Traction System proper, which has 460 miles of single track on private right-of-way, six sections of the road are being protected with continuous signaling as follows:

Peoria through Mackinaw to Porter and Summit, 20.5 miles, thirty-nine signals; Selbytown to Ridgeley Junction, 7 miles, seventeen signals; Carlinville to Staunton, 20.0 miles, thirty-six signals; Edwardsville to Granite City, 14.0 miles, thirty signals; Danville City limits to Gray's Siding, 5.7 miles, thirteen signals. This is a total of 67 miles of track provided with continuous block-signal protection, and in addition automatic signals are being installed to protect eleven separate sections of curved track, ranging from 1 mile to 1.7 miles in length each.

SIGNALING SCHEME

The scheme of signaling which has been followed in this installation was adopted only after a most careful study had been made of its effect on train operation. On continuously protected track one train following another is spaced one siding in the rear, and opposing trains at meeting points are given notification of the presence of other opposing trains when within not less than 1500 ft. of the siding at which they are to meet. The average distance between sidings on the Illinois Traction System is about 3 miles. Just previous to the installation of the automatic signal equipment, the sidings falling within the protected territory were double-ended and made about 1000 ft. long. These are not used as "through" sidings, but trains are required to head in and back out. The first train arriving takes the siding. The extra long side track with the double-end main-line connections is utilized for setting out freight cars and frequently is necessary for passing fifteen-car freight trains which are operated daily.

The following description of the standard location arrangement of signals for curve protection and for siding protection appears in the recently issued signal supplement to the standard book of rules of the Illinois Traction System.

CURVE PROTECTION

"Fig. 1 shows a typical arrangement of curve protection



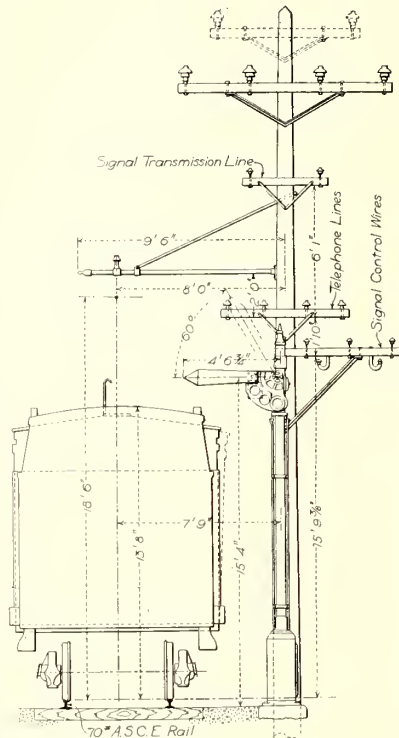
Illinois Traction Signals—Standard Distant Signal

signals, the dangerous curve being between signals Nos. 1 and 2. Whenever it is possible these signals are placed about 2000 ft. from the beginning of the curve. The dotted lines show the limits of control of the signals, or the point to which the signal is controlled. Point 3 is called the preliminary and is usually about 1500 ft. from signal No. 1. The operation of the signals is as follows:

"A train approaching from the right passes point 3; as soon as the first truck is past this point signal No. 2 goes to the 'stop' position, and any train approaching from the left will be stopped by signal No. 2. The first train continues past signal No. 1, which is in the clear position, and runs on around the curve, knowing that if signal No. 1 is clear there is no train between the two signals. The fact that signal No. 1 is clear, however, does not mean that the track is clear to the next siding, and in going around a protected curve a motor-man must always expect to find another train standing at the opposing signal, and be under such control that he can stop before reaching it.

"When a train is running from left to right and passes signal No. 2 while it is clear, which shows that the other train has not passed point 3, because signal No. 2 is controlled to point 3, signal No. 1 will go to danger and stop any train running from right to left.

"Should two following trains approach a dangerous curve close together, the second train would be stopped by the signal until the first section had passed beyond the limits of control of that signal."



Illinois Traction Signals—Clearance Diagram

SIDING PROTECTION

"Referring to Fig. 2, A, B and C are three sidings with the usual arrangement of signals at each. North is on the right-hand side of the page as distinguished by the signal numbers.

"Signals Nos. 2, 6, 10 and 3, 7 and 11 are distant signals, as shown by the slotted blade, and signals Nos. 4, 8 and 12 and 1, 5, and 9 are home signals. The limits of control of the different signals are shown in the same manner as in Fig. 5.

"One pair of siding-protection signals is almost exactly similar to a set of curve signals. Take, for instance, the two signals Nos. 4 and 5. These are two opposing home signals placed just like the curve signals in Fig. 1, the preliminary being on the south end at point 2. Other home and distant signals on the plan tend to confuse, but if the theory of the curve protection is mastered the siding protection will be readily understood.

"A train approaching siding C from the north passes signal 11; this has no effect on signals Nos. 6 and 8, as they are controlled only to signal No. 9. A train passing signal No. 9, however, will block the opposing train at signal No. 8 because this signal goes to the 'stop' position as soon as signal No. 9 is passed.

"In the other direction, a train passing signal No. 6, which is the preliminary for signal No. 9, will cause signal No. 9 to go to the 'stop' position as in the curve protection described above.

"Now, considering that siding B is a meeting point and the southbound train is late, should the northbound train pass signal No. 6 while it is clear, which shows that there is no train between that signal and signal No. 9, it might stop the southbound train at signal No. 9 until the northbound train reaches the siding. In this case the train in the siding would have to wait for the southbound train to run from signal No. 9 to siding B before it could proceed north. If the northbound

train waited at signal No. 6 until it went to 'caution,' which indicates that the southbound train had passed signal No. 9 the northbound train could then proceed to the siding and get into clear without blocking the southbound train and neither train would be greatly delayed.

"In the case of a southbound train approaching the meeting point at B before signal No. 7 goes to 'caution' it can pro-

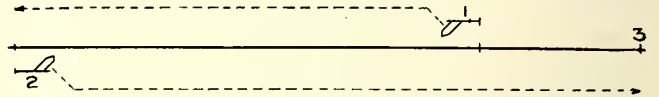


Fig. 1—Illinois Traction Signals—Diagram of Curve Protection

ceed at once to the siding and get into clear, for the reason that signal No. 4 is controlled only to signal No. 5, and not beyond it to signal No. 7.

"For ordinary meets when both trains are on time and arrive at the meeting point together, the first train, when pos-

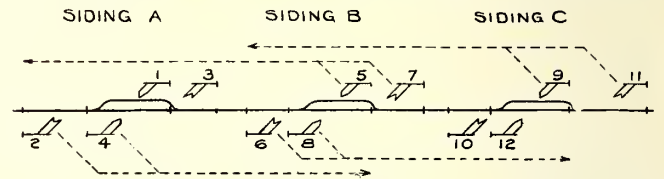
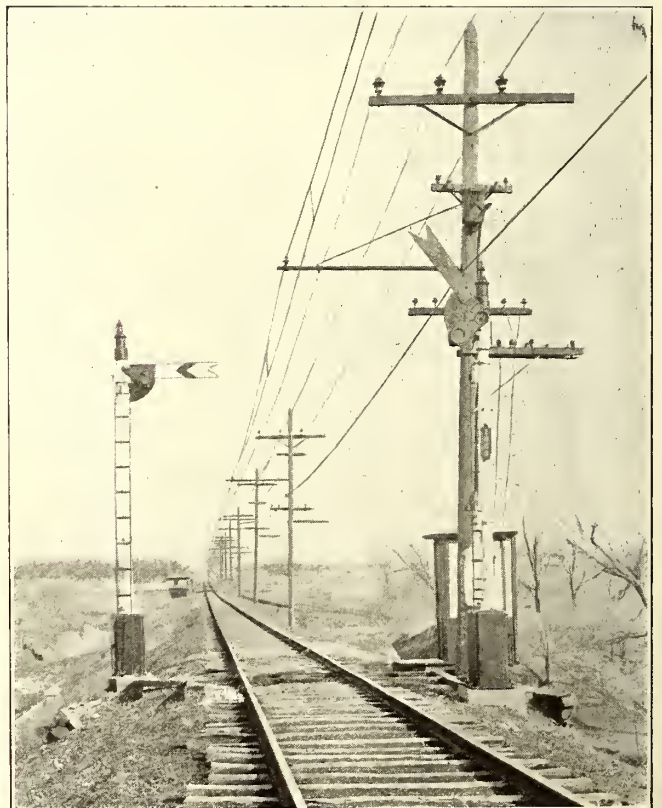


Fig. 2—Illinois Traction Signals—Diagram of Signals at Sidings

sible, takes the siding, the other train stopping at the home signal at the far end of the siding until this signal clears."

TYPE OF APPARATUS

The Union Switch & Signal Company's style B signals, alternating-current relays, track reactance bonds and specialties

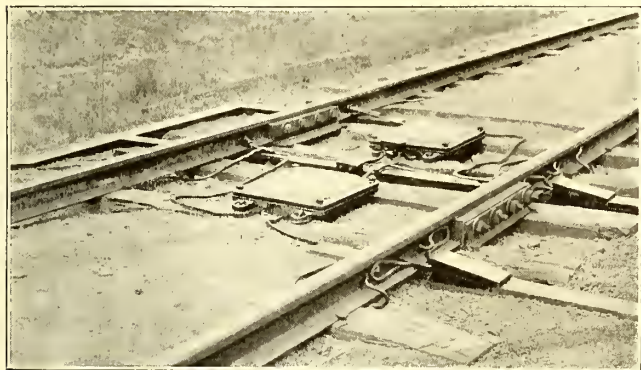


Illinois Traction Signals—Home and Distant Signals Midway Between Two Sidings 4500 ft. Apart

have been used. The signals have bottom post mechanisms and give a 60-deg. clear indication in the upper left-hand quadrant. They are mounted on steel masts set vertically with centers 7 ft. 9 in. from the center line of the track. The signal spectacle shafts are 15 ft. 4 in. above the top of the track rails. An accompanying engraving shows the location of a signal

mast in relation to equipment clearance lines and to a trolley bracket and a transmission pole.

All signal poles, blades and mechanisms are uniform in design, except that the blades of the home signals are pointed and those of the distant signals are notched. Standard American Railway Association colors were followed in painting the blades, using red for home signals on the governing side and



Illinois Traction Signals—Reactance Bonds and Insulated Joints

white on the rear side; the distant signals similarly are painted yellow and white. The signal masts have been painted the standard colors—olive green and buff—which are used on all roadway structures along the Illinois Traction System.

Each signal mast has a number plate showing the number of the signal in raised cast-iron letters painted white with a black background. The scheme of numbering is as follows: The signals are given numbers according to their distance from St. Louis. That is to say, all the signal numbers in mile 170 have the prefix "170," with which is coupled a unit number indicating the location of the signal in relation to the milepost. Odd-numbered signals govern trains which have odd train numbers, and similarly the even-numbered signals govern trains with even train numbers. Thus signal 1704 would indicate that it was the fourth signal north of milepost 170 north of St. Louis and that it governed a northbound movement.

The signal equipment, all of which was supplied by the Union Switch & Signal Company, included: Track relays and transformers, impedance bonds, switch circuit controllers and miscellaneous smaller fittings, including reactance coils, lightning arresters, etc. The insulated joints were supplied by

line relays having been used. Standard vane and galvanometer type relays were employed, each having four front contacts. The galvanometer relay has two windings, the track and the line, the track side being fed from the transformer at one end of the track section through the rails to the armature of the relay. The line side is fed from the same transformer as the track but directly over the line and through a small relay transformer located in the relay case. An inside view of a relay case is shown on page 1109. It is necessary to have the proper phase relation between the currents in the two windings of the relay before it will pick up.

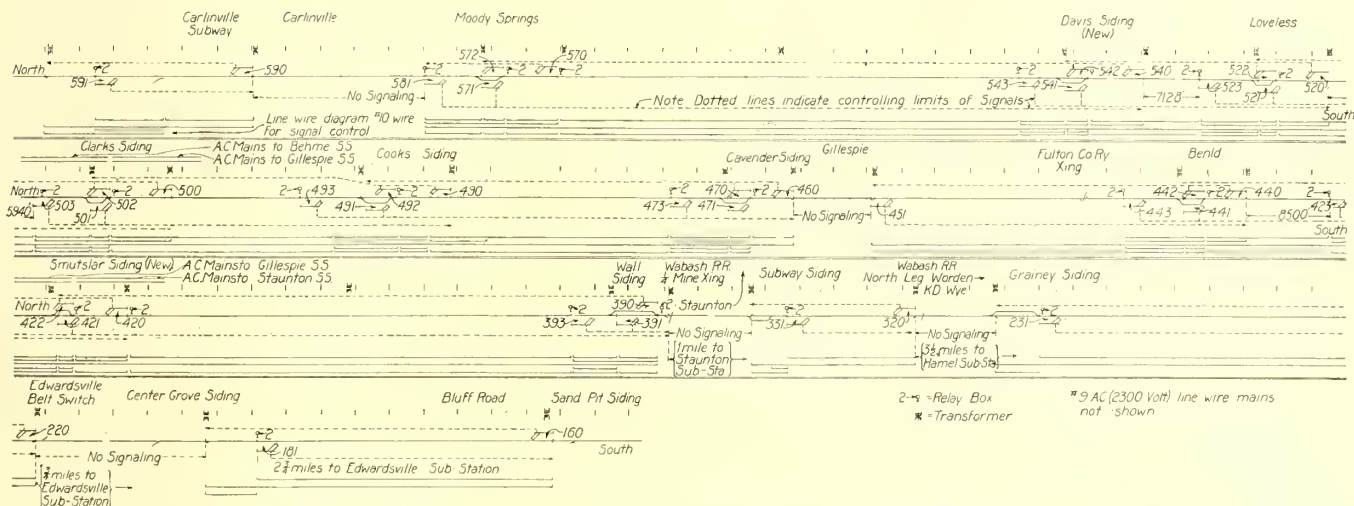
A view on this page shows a complete impedance bond in place at an insulated track section. This bond consists of two reactance coils of heavy copper, the terminals of each of which connect with the two running rails. The intermediate points of each of the two coils are connected by an equalizer for continuing the propulsion return circuit. Each coil is contained in a cast-iron case filled with oil. These cases are designed to be installed between the ties as shown. All exterior connections are made with flexible copper cable.

The impedance, which is used to protect the track transformer at the bond location when a car stands on the track directly at the bonds, is mounted in a wooden box hung on a pole near the reactance bond. These boxes also contain the low-tension lightning arresters which protect the signal apparatus. The switch lamps in the signaled territory have all been lighted by current from the signal transformers.

No switch indicators are used because distant signals 1500 ft. away from the switchstands give the best possible indication of whether or not the block is occupied. Each switch is provided with a switch circuit controller, as shown in a view on page 1108. This small drum controller, inclosed in a cast-iron case, is so connected with the switchpoint by a rod that the movement of the switchpoint from the closed to the open position will make or break circuits which cause the signals to assume the "stop" position. With the closing of the switch for main-line travel the reverse procedure follows, provided, of course, that the signal is not held in the "stop" position because of a train on the track section.

CONTROL CIRCUITS

All connections at the track level are made with rubber-covered signal wire of American Steel & Wire Company manufacture inclosed in treated wooden trunking. The connections between the line transformers on the transmission poles and the apparatus at the ground level are made with similar wire inclosed in iron conduit. The line transformers are pro-



Illinois Traction Signals—Diagram of Signaling Between Carlinville and Edwardsville

the Rail Joint Company and are of the Weber type. The relays are mounted in cast-iron cases erected on short steel masts bolted to concrete foundations. The cases are provided with rubber gaskets to exclude moisture, and the relays have glass sides to allow inspection of contents, etc.

All circuits are broken directly over the track relays, no

tected by means of Westinghouse 2300-volt fuse plug cut-outs.

As indicated on the accompanying signaling plan, line control wires varying from three to five in number are required through all territory having continuous protection. These signal control wires have been installed on three-pin side-arms supported by pressed-steel braces. The first, second and third

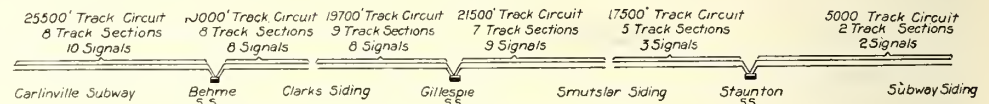
wires are carried above the cross-arms and wherever the fourth and fifth wires are installed they are supported from insulators on J-hooks. This arrangement of wires permitted standardizing on one size of cross-arm for all locations. The signal control wires are No. 10 hard-drawn bare copper of American Steel & Wire Company manufacture, drawn to a special specification as to elastic limit and ultimate strength.

CURRENT SUPPLY

Energy for operating the system of automatic block signals is received from the power transmission system at the rotary-converter substations, which are approximately 10 to 12 miles apart. A 10-kw oil-cooled transformer in each substation is fed from one phase of the low-tension side of a large substation transformer. Thus it receives current at 370

volts, which is stepped up to 2300 volts, 25 cycles, for feeding a single-phase transmission line extending through the signal territory. Substation signal transformers were not necessary at all substations because at some the company already had 2300-volt, single-phase current available from 33,000-2300-volt step-down transformers feeding local lighting or power circuits.

The 2300-volt signal transmission power line has two No. 9 hard-drawn bare copper wires carried on a two-pin cross-arm located 4 ft. 4 in. below the 33,000-volt circuit and about 8 ft. above the signal control wires, as shown in one of the engravings. The step-up transformer at each substation feeds the signal line for about 5 miles in each direction. The line is opened at a line oil switch located at an intermediate point. Should there be any derangement of the feeding apparatus at one substation it can be cut off the transmission line and the line switches 5 miles away in each direction may be closed, thus



Illinois Traction Signals—Diagram of Signal Transmission Circuits

ported inoperative. The ammeters show that the energy consumption is about 475 watts per mile of track, or roughly, one-half horsepower. The substation equipment for the signal system is protected by an installation of Type C multigap lightning arresters.

The circuit breakers of the substation equipments have been fitted with contact points so that when the breakers open an alarm bell is rung to attract the attention of the substation operator. Inclosed fuses are inserted between the substation and the signal transformers. The 2300-volt mains are led out

of the substation building through lead-covered cables. All of the substation equipment is of Westinghouse manufacture.

SIGNAL INSTRUCTIONS

Previous to the time when the different sections of the signal work are made effective for train operation, schools are held for the purpose of instructing trainmen regarding the operation of the signals. Signal diagrams having movable dummy blades are arranged so that the actual movements of the signals as trains assume different positions can be shown.

In connection with its new automatic block signal equipment the operating department of the Illinois Traction System has issued a signal supplement to its standard book of rules for the government of operating officers and trainmen. This book contains the following sections: Automatic block signals; definitions; block signal rules; principles of location; rules, and maintainers. A portion of the contents of this rule book follows:

AUTOMATIC BLOCK SIGNALS

"122. Automatic block signals, controlled by a track circuit in the rails, will be installed on different sections of the system, and as the various sections are ready for operation, bulletins to that effect will be issued and posted for the information of the employees concerned.

"There will be two kinds of protection afforded by these automatic signals: First, the continuous protection or blocking between sidings; second, the local or curve protection for dangerous curves and other points where the view is obstructed.

"It shall be the duty of all trainmen to familiarize themselves with the following rules as well as the location of the different signals, the meaning of the different indications shown, and the extent of the protection afforded.

DEFINITIONS

"123. Block: A length of track of defined limits, the use of which by trains is controlled by block signals.

"124. Block Signal: A fixed signal controlling the use of a block.

"125. Home Block Signal: A fixed signal at the entrance of a block to control trains in entering and using the block.

"126. Distant Block Signal: A fixed signal used in connection with the home block signal to regulate the approach to said home block signal.

"127. Block System: A series of consecutive blocks.

"128. Automatic Block System: A block system in which the signals are operated by electric current actuated by a train or by certain other conditions affecting the use of a block.

"129. The apparatus is so constructed that the failure of any part controlling the home block signal will cause it to indicate 'Stop' and the distant block signal to indicate 'Caution.'

"130. The normal indication of the home and distant signals is clear.

"131. The distant signal being so controlled that if the home signal indicates 'Stop' the distant signal will indicate 'Caution.'

BLOCK SIGNAL RULES

"132. All automatic block signals are distinguished by numbers, the even-numbered signals controlling north and



Illinois Traction Signals—Switch Circuit Controller and Lighting Connection for Switch Lamp

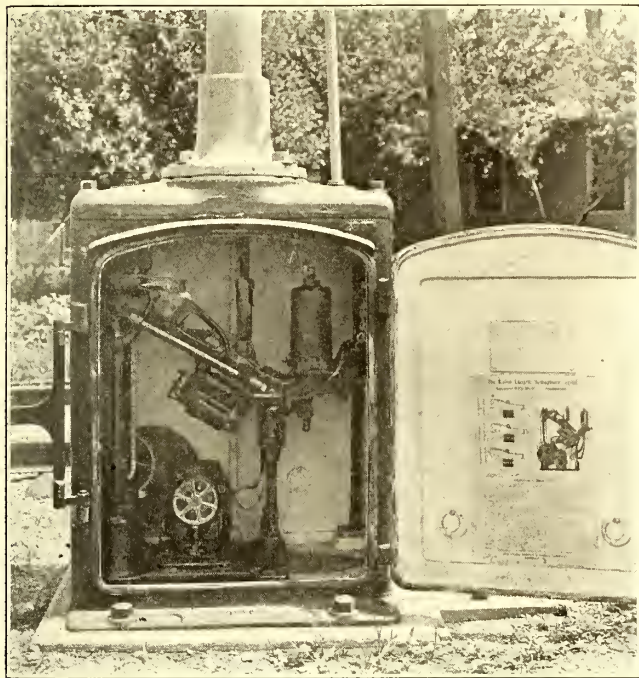
permitting the 2300-volt signal transmission system to be fed continuously, even though one substation is inoperative.

SUBSTATION EQUIPMENT

Each substation signal transformer has a gray marble control panel. On this panel are a 2300-volt circuit breaker and oil switch, an ammeter reading up to 10 amp, and a recording voltmeter. These voltmeters furnish the signal engineering department with valuable evidence in case signals may be re-

east-bound trains and the odd-numbered signals the south and west-bound trains.

"133. Block signals control the use of the blocks, but unless otherwise provided, do not affect the movement of trains under the time card or train rules, nor dispense with the use or observance of other signals whenever and wherever they may be required. This system does not affect flagging rules



Illinois Traction Signals—Bottom Post Signal Mechanism

and none of the usual precautions are to be omitted, and rules must be carried out at all times and places in the same manner as if the block signals did not exist.

"134. Block signals apply only to trains running in the established direction, and are displayed on the right-hand side of the track movement over which they govern.

"135. Automatic signals are of the semaphore type and, unless otherwise designated, are positive signals.

"136. Indications are given by not more than two positions of the arm operating in the upper left-hand quadrant, and in addition, by lights of prescribed color.

"137. On automatic block signals the arms that govern are displayed to the left of the post as seen from an approaching train.

"138. The arm of the home automatic block signal has a pointed end and is painted red with a white band near the end.

"139. On automatic block signals the arm of the home signal in the horizontal position by day and a red light by night indicate 'Stop.'

"140. The arm of the home automatic block signal at an angle of 60 deg. above the horizontal by day and a green light by night indicate 'Proceed.'

"141. The arm of the distant automatic block signal in the horizontal position by day and a yellow light by night indicate 'Caution—be prepared to stop at the home signal.'

"142. The arm of the distant automatic block signal at an angle of 60 deg. above the horizontal by day and a green light by night indicate 'Proceed,' except as noted in Rule 151.

"143. A signal improperly displayed, a white light by night displayed on a signal, or the absence of a signal at a place where a signal is usually shown, must be regarded as a 'stop' signal and the fact reported to the dispatcher.

"144. When a train is stopped by a block signal that is evidently out of order, after waiting two minutes the motorman must call up the dispatcher and proceed only after the dispatcher has given the authority for so doing on the form used for a regular order.

"145. Reports of detentions to trains by signals must be made by the motorman to the dispatcher by telephone, at once, and a written report sent to the dispatcher and signal engineer on the form provided, upon reaching the end of the run.

"146. In reporting a signal the number of the signal as indicated on the signal itself must be used.

"147. Motormen before reporting the cause of the stop 'Unknown' must, if possible, ascertain if such stop was caused by a train in the block, an open switch, a broken rail, or some other obstruction.

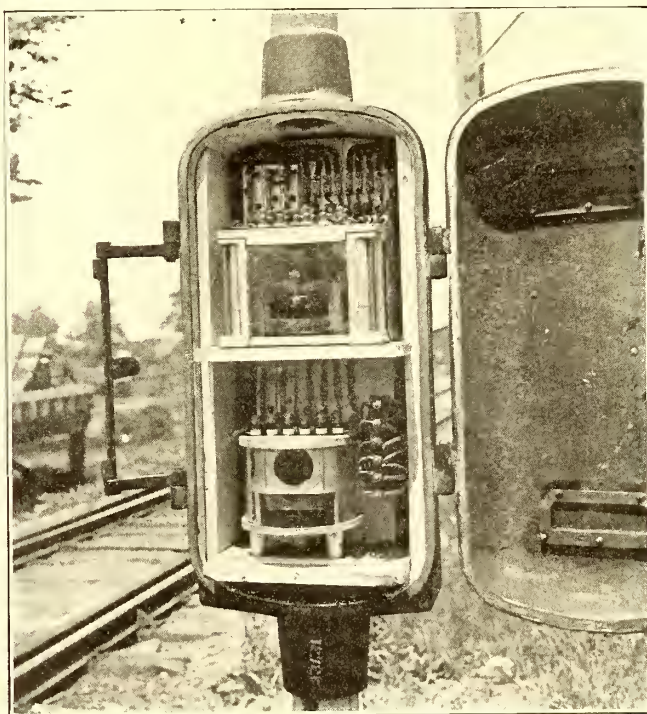
"148. Switches in or leading to the main track are provided with switch boxes so connected to the switch points that opening the switch in any block will cause the home signals governing that block to indicate 'Stop' and the distant signals to indicate 'Caution,' until the switch is again closed.

"149. Cars taking the siding must be stopped clear of the fouling point and insulated track joints, as otherwise the signal for the block in which the siding is located will indicate 'Stop.'

"150. Block signals are absolute except as per Rule No. 144, and that northbound trains may run past a 'Stop' signal at a meeting point in order to take the siding.

"151. Northbound trains approaching a meeting point and finding the distant signal at the meeting point clear must stop, and, after waiting one minute, call the dispatcher. In case the orders are not changed the train must wait until the distant signal goes to 'Caution' before proceeding to the siding. This rule applies only to northbound trains at the time-card or train-order meeting points.

"152. A train having entered the siding and cleared the main line at a meeting point, the conductor must leave the switch set for the siding and remain at the switch until he sees the other train approaching, and knows that it has passed the distant signal. He may then close the switch and give the other train the signal to proceed.



Illinois Traction Signals—Case with Two Relays

"153. Trains taking a siding must in every case back out of said siding.

"154. Any train entering the main line from a siding, except in the case of a regular time-card or train-order meet, must protect his rear end by flag, the flagman going back a sufficient distance to insure full protection.

"155. Trackmen and other employees will report promptly to the dispatcher and signal engineer by telephone all defects noticed in the block signal system."

OVERHEAD CONSTRUCTION*

BY EDWARD HEYDON, SUPERINTENDENT OVERHEAD CONSTRUCTION
TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

At present too little attention appears to be given to the construction and maintenance of the overhead line and material used. In the early days of electric lines the greater part of this construction was experimental. Every builder used what looked best and cheapest to him. The results are that now we have practically no part of the lines that we can class as standard. I believe that the elimination of these conditions would be of great benefit in many ways to all properties and would also establish a standard grade of material for overhead construction.

POLES

In purchasing wooden poles the first thing the seller will offer is the Northwestern Cedarmen's Association specifications, and he expects you to be governed by them. If you make this concession, you will get about 25 per cent poles suitable for trolley construction. Greater care should be used in the selection of poles. In the past, when Michigan cedar was plentiful, we did not have as much trouble getting good stock. Therefore, some of the older lines have much better poles than those more recently constructed. The time is now at hand when we have to look to the Southern States for poles, with the result that the chestnut pole will come into more general use. There have been some objections heretofore to the chestnut pole, mainly on account of its rough appearance. However, plenty of reasonably straight poles can be procured, and if they are shaved and properly set they are practically as neat as cedar in appearance and far more substantial. There are many defects in chestnut poles that do not appear in cedar. Poles should therefore be carefully inspected in the yards before shipment. Nothing but winter-cut timber should be accepted, and consideration should be given to the general appearance of the pole.

FEED WIRE

In purchasing insulated feed wire thought should be given to the question of insulation. There is more profit for the manufacturers in insulation than in copper, and hence the insulation is often heavier than required. The writer has in mind a comparison of two insulated feeders, in which the one with double braid only was of larger external diameter than one of the same capacity with triple braid. Rigid specifications will make it possible to obtain efficient insulation at minimum cost per mile.

TROLLEY WIRE

In the last report of the committee on standards of the American Electric Railway Engineering Association it was recommended that No. 0000 grooved trolley wire be adopted as a standard. While a No. 0000 trolley offers greater capacity than the smaller sizes, it is not without its drawbacks, such as excessive weight, which makes it very difficult and expensive to maintain. At present there is not a satisfactory No. 0000 splice that will properly withstand the strain of having a trolley wheel pass over it without causing a hammering which will cause the crystallization of the wire in a very short time. Furthermore, the No. 0000 wire is not practicable for use especially in city streets and special work, whereas No. 00 and No. 000 size have many advantages. The No. 00 round wire is particularly suitable in city streets, as it is lighter and, consequently, easier to support. It causes less strain on poles and is more flexible in special work and easier to splice.

SPAN WIRE

In the past few years it has been rather difficult to obtain the proper grade of span wire. The manufacturers now tell us that the span wire of five years ago will not fully meet the requirements of to-day, and that the strands we are now getting are not what they should be. The galvanizing is not perfect, and it appears that a lower grade of steel is used.

*Abstract of paper read at quarterly meeting of Central Electric Railway Association, St. Joseph, Mich., June 22, 1911.

HANGERS

The question of insulation within the hanger is of utmost importance. There are numerous hangers on the market, all of which have some merit. The round top and three-piece hanger are generally used, each having but little advantage over the other. Three new-type hangers are now being developed by manufacturers, who expect to have them on the market within the next year.

EARS

The type of ear and the material therein govern to some extent the maintenance and cost of overhead lines. Ears should be designed to give flexibility and long life. The boss should be heavy enough to stand the strain on curves and high enough to prevent the trolley wheels from hitting the hangers on pull-overs. All ears should be clinched on the wire and solder used only on curves to prevent the ears from slipping, and then only for about 2 in. on each end.

SPLICES

There are a great number of mechanical and soldered splices on the market. The disadvantage of the soldered splice is that in order to obtain the proper amalgamation of the metals it is necessary to create an intense heat, which anneals the copper and greatly weakens it where it enters the splice. The drawback of a few of the mechanical type splices is that they are too long and rigid. This absence of flexibility causes crystallization of the wire at the end of the splice; consequently, the shorter the splice the longer the life and the better the results.

INSULATORS

Wood strain insulators have recently come into more general use for all classes of work. The question arises, Are we overdoing it? That is, are we forgetting the fact that we are placing a great deal of confidence in sticks of wood when we depend on them to withstand all kinds of weather conditions and mechanical strains? Although the composition insulator may break down electrically, yet it will very seldom let a wire fall. It is a problem whether it is not better to have a leaky insulator than to have a wire fall on the street.

TROLLEY WHEELS AND STANDS

Much line trouble is caused by the use of a bad trolley wheel or because the trolley base is not receiving the proper care. It is very natural for this part of the equipment to be neglected by the car equipment department, as it is necessary for the inspector to climb to the top of the car. If this equipment received as much attention as the rest of the apparatus, little if any trouble would be due to defective wheels and stands.

WOOD PRESERVATION

At the June meeting of the Central Electric Railway Association, held at St. Joseph, Mo., on June 22, 1911, C. P. Winslow, engineer in wood preservation, United States Department of Agriculture, Forest Service, Madison, Wis., presented a paper entitled "Advantages to Electric Traction Companies of the Use of Treated Timber." Mr. Winslow first referred to the constantly increasing price of lumber. The average price of ties at the point of purchase had risen from 47 cents in 1906 to 49 cents in 1909. The increase in lumber values had been closely followed by an increase in the use of treated material, namely, from over 68,000,000 cu. ft. in 1907 to 99,000,000 cu. ft. in 1910. With a total consumption of slightly over 22,000,000 treated ties in 1909, only 835,000 were used by electric railways. During the same year only 24 per cent of the poles bought by electric railway light and power companies were treated.

Mr. Winslow described an experiment undertaken in the spring of 1902 by the Forest Service on a section of track in Texas. The results up to February, 1911, showed that whereas the untreated ties had a life varying from one and one-half years to slightly over four years, many treated ties were still in service at the end of nine years. The early and rapid removal of some of the treated ties was due to an im-

proper selection of material, to an improper application of the preservative, or to a combination of both causes. This only tended to prove the necessity of care in successful wood preservation. In 1907 the Forest Service co-operated in placing about about 3000 hemlock and tamarack ties for a Wisconsin railway. The treated ties, all of which were protected with tie plates, showed no decay after three and one-half years' service. On the other hand, of the untreated ties, over 14 per cent of the hemlock and 12 per cent of the tamarack were so badly decayed that they had to be removed; over 8 per cent and 29 per cent, respectively, were partly decayed, and 43 per cent and 60 per cent, respectively, were rail-cut from $\frac{1}{4}$ in. to $\frac{1}{2}$ in.

The life of poles could be similarly increased. In one case, in a period of eight years, untreated chestnut poles had decreased in circumference at the ground line from 1.86 in. to 2.27 in., while creosoted pine poles had shown no loss at all.

In discussing the utilization of the so-called inferior species, Mr. Winslow said that some of them were not so resistant to rail wear as white oak, long-leaf pine, etc., but in such cases recourse may be had to tie plates.

The following conditions were assumed by the speaker in showing the ultimate financial saving from wood preservation:

Initial cost of an untreated 6-in. x 8-in. x 8-ft. red oak tie.....	\$0.50
Cost of placement in new track.....	.10
Cost of replacement in old track.....	.15
Cost of zinc chloride treatment (Burnett).....	.11
Cost of creosote treatment.....	.32
Life of untreated tie.....	5 years
Life of Burnettized tie.....	11 years
Life of creosoted tie.....	16 years

The cost per tie in place in the track would then be as follows:

	New Work.	Replacement in Old Track.
Untreated	\$0.60	\$0.65
Burnettized .....	.71	.76
Creosoted .....	.92	.97

Applying these figures to a mile of new track to contain 2800 ties, the actual expenditure at the end of the first year would amount to \$1,680, plus 5 per cent interest on this investment. Theoretically, with the exception of the yearly interest charge, there would then be no further expenditure until the end of the fifth year. During the sixth year a replacement charge amounting to $\$2,800 \times .65 = \$1,820$ would be undergone, together with 5 per cent interest on both the placement charge during the first year and the replacement charge during the sixth year. Thus, there would always be a slight annual expenditure due to the interest charges, and, at intervals of five years, a comparatively heavy charge for replacements. Assuming that creosoted ties were used, the expenditure at the end of the first year would amount to $\$2,800 \times .92 = \$2,576$, plus 5 per cent interest on this amount. With the exception of this yearly interest charge, there would be no further expenditures until the end of the sixteenth year, when it would be necessary to renew the ties.

The diagram presented by Mr. Winslow in this connection showed the saving resulting from the use of creosoted ties. At the end of twenty years, the actual expenditure per mile of track, using untreated ties, would be over \$12,000, while with creosoted ties it would be only slightly over \$8,000. In other words, a saving of approximately \$4,000, or 25 per cent of the total cost using untreated ties, would result.

The actual expenditure for the first year would be considerably greater with creosoted than with untreated ties, and the total actual expenditure would continue to exceed that for the untreated until the middle of the sixth year. In other words, actual financial saving would not accrue for a period slightly greater than the life of the untreated material. It was mainly due to this fact that treated material was not more widely used. Other figures presented by Mr. Winslow compared the fixed charges for treated and untreated ties.

Continuing, Mr. Winslow said that there were now numerous commercial plants from which treated material may be purchased, but frequently a traction company would find advantageous the installation of a treating plant adapted to

its needs. Plants, with an annual capacity of from 40,000 to 50,000, 6-in. x 8-in. x 8-ft. ties could be completely installed for from \$4,000 to \$5,000; larger plants, with an annual capacity of about 140,000 ties, would cost about \$15,000.

He said that some of the work now under way at the Forest Products Laboratory, at Madison, Wis., included investigations regarding the relative efficiency of various wood preservatives, the relative cost of impregnation of various woods, the relative durability of various woods and the relative efficiency of various processes. As secured, the results of such work would be published and disseminated, the ultimate aim being to assist both the producer and consumer to a more economic utilization of forest products.

MEETING OF THE COMMITTEE ON SHOP ACCOUNTING

A meeting of the joint committee on shop accounting of the American Electric Railway Engineering and Accountants' Associations was held at the Engineering Societies Building, New York, on June 20. The following were present: P. S. Young, Public Service Railway, Newark, N. J., chairman; H. H. Adams, Metropolitan Street Railway, New York; E. O. Ackerman, Columbus (Ohio) Railway & Light Company; Charles Hewitt, Philadelphia Rapid Transit Company; C. E. Thompson, Chicago & Milwaukee Electric Railroad.

Mr. Adams, as chairman of a sub-committee appointed at the last meeting to review the 1910 report of the joint committee on shop accounting, submitted a report containing recommendations for changes in some of the accounts and also further subdivisions of certain accounts. The sub-committee was composed of Mr. Adams, N. E. Stubbs, United Railway & Electric Company of Baltimore, and John W. Corning, Boston Elevated Railway. The report was accepted and will be incorporated in the report of the committee.

Mr. Hewitt, together with Mr. Ackerman and F. B. Lasher, New York State Railways, constituted a sub-committee appointed to consider what constitutes maintenance. Mr. Hewitt read a preliminary report on this subject, which will be given further consideration by the sub-committee.

The subject of inter-department charges was discussed in papers sent by A. D. McWhorter, Memphis Street Railway, and A. F. Elkins, Columbus, Delaware & Marion Railway. Mr. Thompson, who was present, also discussed the subject. After discussion by several members of the committee, it was decided to ask the sub-committee to hold a meeting and to prepare a report for inclusion in the report of the committee.

There was also a general discussion on the subject of efficiency. Part of the report of the committee will be devoted to discussion on this topic.

THE MASTER MECHANICS' AND MASTER CAR BUILDERS' CONVENTIONS

The annual conventions of the American Railway Master Mechanics' Association and the Master Car Builders' Association, which were held in Atlantic City June 14-16 and 19-21, were largely attended by railway officers and supplymen. The exhibits of railway appliances on Young's Million-Dollar Pier exceeded those of any previous year in numbers and space occupied and the decorations of growing flowers and plants were especially attractive.

Neither of the two associations had any committee reports or individual papers relating to electric railway practice, but a large number of devices used on electric railway cars were included among the exhibits, so that the conventions were interesting in that respect to electric railway officials, a number of whom were present. The social side of the conventions included two large balls on the Pier, a baseball game between teams representing the East and the West, which was won by the Western team, and an all-star vaudeville performance on Saturday evening.

THE BUFFALO NEAR-SIDE SINGLE-PLATFORM CAR

Some time during next September the International Railway, Buffalo, N. Y., is to place in service thirty-five single-platform prepayment cars, to be known as "near-side" cars. This type of car has been developed to meet the requirements of the New York State Public Service Commission, Second District. Following a careful inspection of the sample car, hereinafter described, the commission authorized the purchase of additional cars as noted. The near-side car was developed under the personal direction of T. E. Mitten, president Chicago City Railway, and R. T. Senter, master mechanic International Railway. Valuable assistance in the development of the combined heating and ventilating system was given by Dr. W. A. Evans, health commissioner of Chicago. The builders of the car also received many helpful suggestions from Charles R. Barnes, electrical inspector of the Public Service Commission, Second District. The car was built by The J. G. Brill Company.

To prepare the public for this radical change in car design and operation the International Railway has issued an elaborately illustrated bulletin from which the following information and accompanying illustrations are taken. The first part of the bulletin sets forth the conditions which should be met by a car to give the maximum convenience and comfort to passengers and employees and to insure the minimum liability to accidents. It is pointed out that the usual form of prepayment car, having no entrance at the front, is at a disadvantage during bad weather in such cities as Chicago, Philadelphia and Buffalo, where ordinances require the cars to be stopped at the near crossing. Furthermore, the conductor cannot see all approaching passengers from his position on the rear platform, while alighting passengers who get off at the rear and turn toward the far side of the street are in danger of being run down. Although the rear-entrance prepayment car has greatly reduced platform accidents, it still leaves the

GENERAL DESCRIPTION OF NEAR-SIDE CAR

As shown in the accompanying illustrations, the entrance and normal exit are by way of the front platform, thus enabling the passengers to enter and leave the car directly at the cross-walk on the near side of the street. The plan shows a step entrance of 29 $\frac{3}{4}$ in. and a step exit of 26 $\frac{1}{4}$ in. The corresponding divisions at the front end of the car body proper are 28 in. and 28 $\frac{3}{4}$ in. The motorman is provided with a seat and in the operation of his apparatus is protected from interference by a dividing rail. His vision is guarded against



Near-Side Car—View Showing Closed Doors and Folded Steps on Front Platform, Front and Side Destination Signs, "Car Full" Sign, Etc.

reflected light by installing an adjustable curtain. By means of a lever the motorman controls the entrance and exit folding



Near-Side Car—Interior View Showing Longitudinal Seats in Front, Circular Seating at Rear and Cross Seats



Near-Side Car—Entrance and Exit in Simultaneous Use at the Front Platform

conductor's control imperfect, because he must divide his attention between collecting fares at the entrance and watching the step. The near-side prepayment car is intended not only to remove these disabilities, but also to incorporate certain other advantages, such as effective automatic ventilation and improved destination signs.

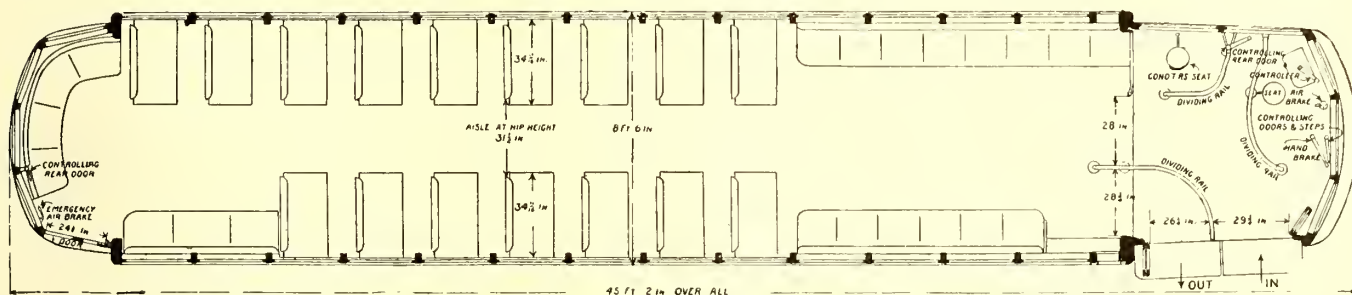
doors and steps either separately or together. While the car is at a standstill the motorman can plainly see the passenger enter and leave, and is thus able to act promptly in operating the doors and steps and in getting the car under way without waiting for the bell signal. Passengers are not permitted to remain upon the platform when the car is in motion. This rule

prevents the motorman's attention from being diverted and consequently enables him to give all of his attention toward watching for passengers and avoiding collisions.

The conductor is provided with a seat within the rail space directly opposite the entrance to the front platform. In this position he is able to control the entrance passage in the body of the car. As the conductor is amply protected from the weather, he can be clothed always in the way most convenient

Should they desire to pass behind the car from which they alight, they must necessarily await its forward movement. These conditions serve to forestall the accidents which occur when passengers alight from the rear end of the car and pass directly behind it.

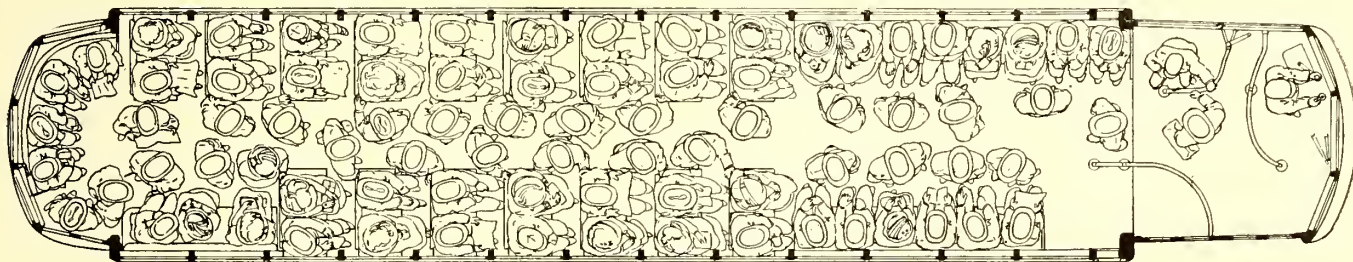
It will be noted from the plan that, strictly speaking, there is no rear platform. However, a door and step are installed for emergency exit or for use at points where the car is



Near-Side Car—General Plan Showing Seating and Clearances

for his work. When the car is taking on passengers the conductor collects fares and issues transfers. He is able to do this work more rapidly and accurately than heretofore because the motorman relieves him of the necessity of watching the step and of giving the starting signal. The entrance

entirely unloaded, as at parks, baseball grounds, etc. This rear exit may be operated either from the rear end of the car or by the conductor from his position on the front platform. The space heretofore required for a rear platform is utilized for a circular seat, thereby giving a largely increased seating capac-



Near-Side Car—View Downward, Showing Distribution of Passengers, Position of Motorman and Conductor, Etc.

portion of the front platform will accommodate ten to fifteen oncoming passengers. When the car is in motion the conductor, whether seated or standing, directly faces the passengers, thus placing him where he can most readily observe the signals of those passengers who cannot conveniently reach the signal push-buttons. Having no other duty to perform while

ity. In fact, the total seating capacity of the car is 53, as compared with 40 for a prepayment car of the same length. Of these 53 passengers 35 face forward; there is also room for 30 standing passengers, on the basis of each standing passenger occupying an oval 12 in. by 18 in.

This car, as described, operates ordinarily from one end



Near-Side Car—Side View, Showing Regular Front Entrance and Exit Doors and the Emergency Rear Exit Door

the car is moving, the conductor is able to call the streets, as required, and as he faces the passengers the street names are much more easily heard and understood.

Passengers alighting from the car by way of the front platform and passing across in front of it have a direct view of cars or automobiles approaching from the opposite direction.

only, necessitating loops or wyes at the ends of the line. It can, however, be run in the reverse direction in case of emergency. This single-end design permits the use of a non-reversible cross seat, which with the semi-convertible window construction gives a considerable increase in the width of the aisle and the width of the cross seats without increasing the

over-all width of the car. The adoption of maximum traction center bearing trucks allows the use of two-motor instead of four-motor equipments, greatly reducing the weight per passenger and also reducing the height of the car floor to such a degree that the lower step is carried 2 in. nearer the ground.

Another interesting feature of the construction of this car is the use of a flat-arch roof in connection with the automatic ventilating system. Fresh air is brought in over the electric heaters, which are controlled by a thermostat, and the foul air is discharged through nine registers placed in the ceiling directly over the seats. These registers are connected with ventilators placed at intervals on the roof of the car. The vacuum created by the motion of the car draws out the foul air so rapidly that the air in the car is renewed every three and one-half minutes, which is slightly in excess of the Buffalo health commission's requirements.

To provide against the inadequacy of the usual destination signs, there is used to designate the route a large illuminated white letter on a black background located in the upper half of the right-hand front vestibule window. This letter is large enough to be visible by day or night for a distance of several blocks. Supplementary thereto, a side destination sign occupies the full length of the opening immediately over the entrance and exit doors. An application of European practice is found in the "Car Full" sign, which is dropped into place below the initial destination sign whenever a maximum car-load of passengers has been taken on.

The inherent accident prevention features of this car are supplemented by the use of the H.-B. life guard and by a safety grab-handle around the front vestibule. The handle is so designed and placed that it can be easily seized by a person about to be struck by the car and who might otherwise be thrown under the platform.

The seating capacity, dimensions, weights, etc., of the near-side car as compared with the standard pay-as-you-enter cars used in Buffalo and Chicago are as follows:

	Near-side Car.	Pay-as-you-enter Car.
Seating capacity	53	40
Length of cross-seat cushion.....	34 11/16 in.	34 in.
Width of aisle, at hip height.....	31 1/2 in.	27 in.
Width of car	8 ft. 6 in.	8 ft. 6 in.
Length of car, over all.....	45 ft. 2 in.	45 ft.
Height of car	12 ft.	12 ft. 5 in.
Height of lower step from ground....	14 in.	16 in.
Weight of car fully equipped.....	39,000 lb.	52,000 lb.
Weight per seated passenger.....	736 lb.	1,300 lb.

IMPROVEMENTS PLANNED IN ALBANY

Improvements in street railway service on the Pine Hills and West Albany lines of the United Traction Company, Albany, are called for in the order made by the New York Public Service Commission, Second District, after investigation for the past two years. Objections of the company to the installation of double-truck cars on these lines have been eliminated one by one by the commission, excepting that of expense. The commission says that the United Traction Company is in excellent condition financially. It pays 4 per cent on \$12,500,000 capital annually.

The commission points out that, in its opinion, the company is well able financially to furnish reasonable service.

During the evening rush hours' season when all closed cars are used the company has been providing a seating capacity running from 900 to about 1000 on the Pine Hills line and from 900 to 975 on the West Albany line. The commission has ordered the company on or before Nov. 1, 1911, to provide for not less than 1300 seats on the Pine Hills line and not less than 1400 on the West Albany line on both east and westbound trips.

The running of any closed cars less than 21 ft. in length on these two lines of the United Traction Company is prohibited after Nov. 1, 1911.

The company is required to provide for and permit the discharge of passengers from both the front and rear ends of its closed cars on these lines unless the type of car adopted shall be a double-truck car arranged for exit by front door only.

The commission recommends that in making necessary additions to service on the Pine Hills and West Albany lines modern double-truck cars be provided. In this connection it was announced on June 21, 1911, that the United Traction Company had placed an order with the Pressed Steel Car Company for twelve double-truck cars.

MEETING OF THE JOINT COMMITTEE ON BLOCK SIGNALS

The joint committee of the Engineering and the Transportation & Traffic Associations held a meeting in Pittsburgh, Pa., June 19 and 20. The members of the committee present were J. M. Waldron, Interborough Rapid Transit Company, chairman; J. N. Shannahan, Washington, Baltimore & Annapolis Electric Railway, and G. H. Kelsay, Indiana Union Traction Company. John Leisenring, Illinois Traction System, and L. E. Gould, ELECTRIC RAILWAY JOURNAL, representing the block signal committee of the Illinois Electric Railways Association, were also present, as were M. H. Hovey, consulting engineer of the Indiana Railroad Commission, and A. B. Cloud, managing editor *Signal Engineer*.

The meeting was called to discuss the general arrangement and details of the forthcoming report of the committee and to go over the information obtained from manufacturers and other sources regarding existing installations of block signals and other data. It was decided to include in the committee report the roll call of each committee meeting and an abstract of the minutes of the several meetings which the committee has held.

Mr. Waldron presented for discussion a draft of the first part of the committee's report, which will cover the following subjects:

1. Instructions from associations.
2. Personnel of committee.
3. Minutes of committee meetings.
4. Introductory paragraphs on signal systems.
5. Historical data on signaling.

Mr. Waldron will also prepare a summary of answers to the data sheet which was sent out and to which replies were received from ninety-six companies.

A general discussion followed on existing signal installations. Mr. Shannahan presented a summary on state and interstate laws and regulations relating to signals for electric railways. He called particular attention to the report of the Interstate Commerce Commission for 1903 and also read the text of House Bill No. 1668, which was introduced in the House of Representatives in 1903 and has been introduced at each succeeding session of Congress, including the special session called in April, 1911, when the bill was presented by Representative Esch of Wisconsin. This bill has been killed in committee each year. It was thought desirable to include the text of this bill in the report of the block signal committee to show its drastic provisions. Mr. Shannahan also read Bill No. 479-S, which has been made a law in Wisconsin. This law gives the Railroad Commission authority to compel the installation of adequate signals where reasonably demanded for safe operation.

The data sheets were next discussed in detail, and the answers arranged for presentation in the report.

Mr. Leisenring described the use of Blake dispatchers' signals to supplement train orders on the Illinois Traction System.

The committee then entered into a general discussion regarding the method of arranging for publication the descriptions of signal systems and apparatus which had been supplied by manufacturers at the request of the committee.

The committee met on Tuesday morning for its second session and concluded its consideration of the technical data received from the manufacturers. After adjournment the committee visited the plant of the Union Switch & Signal Company at Swissvale, Pa., where the members were entertained at luncheon.

EXHIBITS AT THE RAILWAY CONVENTIONS

The exhibits at the convention of the Master Mechanics' and Master Car Builders' Associations this year occupied more than 75,000 sq. ft. of space on Young's Million-Dollar Pier. In spite of an increase of 5000 sq. ft. over last year it was found impossible to furnish space to nearly seventy companies which had applied, and several of those which were disappointed rented space on the Boardwalk near the Pier. Among the exhibitors who showed devices and products used in the electric railway field were the following:

Acme Supply Company, Chicago, Ill., had an exhibit of pressed steel shapes used in car construction, steel doors, deck sash and "Tuc" curtain fixtures.

Adams & Westlake Company, Chicago, Ill., showed samples of pressed-steel window frames, car-lighting fixtures, interior fittings for cars and a full line of marker and signal lamps and lanterns.

American Brake Company, St. Louis, Mo., exhibited the American automatic brake slack adjuster in the space of the Westinghouse Air Brake Company.

American Brake Shoe & Foundry Company, Mahwah, N. J., had a large reception booth in which were displayed numerous samples of flanged and unflanged steel-back brake shoes for use on solid-steel wheels, steel-tired wheels and cast-iron wheels.

American Car & Foundry Company, New York, N. Y., showed in its booth photographs of typical passenger and freight car equipment built at its works.

American Mason Safety Tread Company, Boston, Mass., showed samples of Karbolith flooring and safety step treads.

American Rolled Gold Leaf Company, Providence, R. I., had sample of gold leaf for car striping.

Automatic Ventilator Company, New York, N. Y., had a full-size sectional model of a car roof equipped with its ventilators and by means of an electric fan, which created a current of air past the ventilators, their positive action was demonstrated.

Baldwin Locomotive Works, Philadelphia, Pa., occupied a large reception booth in the main building with the Standard Steel Works Company, which had an elaborate exhibit of wheels, axles and forgings.

Berry Brothers, Limited, Detroit, Mich., displayed a number of panels illustrating different methods of painting and finishing cars. Specimens of the crude materials used in paint and varnish making were also shown.

Blake, John S., Charlotte, N. C., showed a folding car step suitable for steam or interurban cars. The step was operated by a lever from the platform, and when not in use folded up underneath the platform or lowest permanent step of the car.

Bowser & Company, Inc., S. F., Ft. Wayne, Ind., exhibited a line of typical oil-storage and pumping systems for use in shops, power stations, etc.

Buffalo Brake Beam Company, New York, N. Y., showed sample brake beams of all kinds for steam and electric railway cars and locomotives.

Carborundum Company, The, Niagara Falls, N. Y., demonstrated the cutting qualities of its carborundum wheels on grinding machines in operation. It also displayed samples of carborundum grinding wheels, aloxite wheels and cloth and other forms of abrasives.

Carnegie Steel Company, Pittsburgh, Pa., had a large space in which it showed Schoen steel wheels for all classes of service, also samples of structural shapes and plates, gear blanks, steel sheet piling, concrete reinforcing bars, rail sections and steel ties and track accessories.

Chicago Varnish Company, Chicago, Ill., exhibited sections of car sides finished with the "Ce Ve" process of quick painting for cars.

Chisholm & Moore Manufacturing Company, Cleveland, Ohio, displayed a line of chain hoists and trolleys of different sizes and had a working model of a section of the gearing used in these hoists.

Cleveland Twist Drill Company, The, Cleveland, Ohio, had in operation a drill press on which were given demonstrations of the cutting qualities of Cleveland high-speed drills and reamers. It also showed a complete line of small tools.

Coe Brass Manufacturing Company, Ansonia, Conn., placed in its booth several boards, on which were mounted sections of intricate designs of extruded metal, such as are used in car trimmings and art-metal work.

Coe Manufacturing Company, W. H., Providence, R. I., exhibited samples of gold leaf, aluminum leaf, and gilding wheels and brushes.

Commonwealth Steel Company, St. Louis, Mo., displayed photographs of some of its latest types of cast-steel car and truck specialties, including body and truck bolsters, truck frames and its weed burner.

Consolidated Car Heating Company, Albany, N. Y., showed a full line of steam-heating apparatus and electric heaters.

Crane Company, Chicago, Ill., exhibited a large assortment of steam specialties, valves, fittings and traps.

Curtain Supply Company, Chicago, Ill., had several models showing the application of its ring curtain fixtures and various designs of car curtain materials.

Dahlstrom Metallic Door Company, Jamestown, N. Y., had a full-sized section of a sleeping car, in which all of the parts were made of steel finished in imitation of Circassian walnut. It also displayed metal doors and samples of pressed-steel interior trimming for cars.

Davis-Bournonville Company, New York, N. Y., had a working exhibit on the end of the Pier, where is shown the process of welding and cutting with oxy-acetylene forge.

Dearborn Drug & Chemical Works, Chicago, Ill., had an attractive reception booth in the main building.

Dixon Crucible Company, Joseph, Jersey City, N. J., exhibited samples of a large number of graphite lubricants and paints for different purposes.

Dressel Railway Lamp Works, The, New York, N. Y., had an exhibit of headlights, marker lamps, tail lamps and railway lanterns.

Duff Manufacturing Company, Pittsburgh, Pa., showed several types of Barrett ratchet track jacks, Duff ball-bearing screw jacks, and Bethlehem forged-steel hydraulic jacks.

Edison Storage Battery Company, Orange, N. J., displayed sample batteries for car lighting, signaling, etc., and specimen plates, showing the details of manufacture of Edison storage batteries.

Edwards Company, The O. M., Syracuse, N. Y., had a large exhibit of full-sized models of its window fixtures, shade rollers, steel platform trap doors and pressed-steel office furniture.

Electric Storage Battery Company, Philadelphia, Pa., exhibited car lighting batteries, Exide vehicle batteries and chloride accumulators.

Emery Pneumatic Lubricator Company, St. Louis, Mo., showed its automatic lubricator for air brake, triple valves and cylinders.

Fairbanks, Morse & Company, Chicago, Ill., exhibited a full line of ratchet and hydraulic jacks and also two types of gasoline motor section cars.

Federal Storage Battery Company, New York, N. Y., had on exhibition its double-truck closed car built for the Erie Railroad. This car has been making regular runs on the Greenwood Lake division of the Erie Railroad, but with its permission was taken to Atlantic City. The car made the run of 135 miles, from Elizabethport, N. J., to Atlantic City, N. J., on one charge and reached Atlantic City over the tracks of the Central Railroad and the Reading Railroad. It was on exhibition at the yards of the Pennsylvania Railroad, and exhibition runs were made over the tracks of the local system on Atlantic Avenue.

Ford & Johnson Company, The, Michigan City, Ind., exhibited a line of Perfection car seats, parlor car furniture and seating material.

Forsyth Brothers Company, Chicago, Ill., had a large exhibit, which included the Forsyth high-capacity buffing device, deck sash ratchets, metal sash and weather strips, Forsyth one-piece metal doors and pressed-steel unit car side construction.

Galena Signal Oil Company, Franklin, Pa., as has been its custom at past conventions, had an attractively decorated reception booth, where tea was served to guests.

General Electric Company, Schenectady, N. Y., exhibited on the Pier a steam turbine set for train lighting and 5-kw gasoline-electric generating set, portable air compressors, shop motors, incandescent lamps, electric heating and cooking devices, a large railway motor and a number of other electric specialties. It also had at the convention one of its latest types of gasoline-electric motors, which is to be put in trial service on the Philadelphia & Reading Railroad immediately and later is to be put in service on the Central Railroad of New Jersey.

General Railway Supply Company, Chicago, Ill., exhibited samples of metallic steel sheathing, National steel vestibule trap doors, Flexolith composition flooring, car window screens and sash fixtures.

Gold Car Heating & Lighting Company, New York, N. Y., had samples of its ventilator porcelain core heater of different types, 2-deg., 3-deg., truss plank, longitudinal seat, etc., as well as heaters for steam railroad cars.

Goldschmidt Thermit Company, New York, N. Y., gave frequent demonstrations of welding by the Thermit process, and its booth was decorated with a large number of photographs showing repairs made by this process. A feature of this exhibit was a moving-picture machine, which showed the complete process of making Thermit welds.

Grip Nut Company, Chicago, Ill., exhibited a full line of large and small grip nuts.

Hale & Kilburn Manufacturing Company, Philadelphia, Pa., had as a feature of its exhibit a room such as would be installed on a steamship or steamboat, fitted throughout with steel furniture. There was a stationary bed, folding bed, couch, washstand, chiffonier, stool and other articles of furniture constructed entirely of steel, but the finish was so perfect that it looked exactly like enameled wood. The exhibit also contained many other specimens of steel work finished to represent various kinds of wood. One of the single-piece-door vestibules for the motorman of interurban cars was also shown. These vestibules are used on the electric motor-cars of the New Haven Railroad.

Johns-Manville Company, H. W., New York, N. Y., displayed sample sheets of asbestos roofing, asbestos packings, pipe covering, waterproof materials, electrical materials, asbestos wood, underground electrical conduits and other specialties.

Kerite Insulated Wire & Cable Company, New York, N. Y., showed samples of wires and cables insulated with Kerite.

Knight Pneumatic Sander Company, Huntington, Ind., had an exhibit of pneumatic sanders for steam and electric locomotives and motor cars.

Linde Air Products Company, The, Buffalo, N. Y., exhibited its oxy-acetylene welding and cutting apparatus and its acetylene generators, also numerous samples of work done by the oxy-acetylene process in building and repairing steel cars and locomotives.

Lupton's Sons Company, David, Philadelphia, Pa., displayed specimens of Lupton's steel sash for side walls and Pond's continuous sash for monitor roofs.

McConway & Torley Company, The, Pittsburgh, Pa., exhibited McConway steel-tired wheels, the Pittsburgh car coupler and samples of steel castings.

McCord & Company, Chicago, Ill., showed samples of metal dust guards, journal boxes made of malleable iron and cast steel, and a full line of metal sash and sash fixtures.

McGraw Publishing Company, New York, N. Y., had a booth at the entrance to the Pier, where it showed photographs of its offices and printing plant, sample copies of the *ELECTRIC RAILWAY JOURNAL*, *Electrical World* and *Engineering Record*, and copies of the *Electric Railway Dictionary*.

Midvale Steel Company, The, Philadelphia, Pa., exhibited rolled-steel and steel-tired wheels for passenger and freight service, and small test pieces showing the fine quality of the metal in its heat-treated axles and steel forgings.

Milburn Company, Alexander, Baltimore, Md., displayed several types of Milburn acetylene lights for construction work and wrecking trains.

Mudge & Company, Burton W., Chicago, Ill., had full-sized sectional model of cars showing the application of Garland ventilators to monitor decks and arch roofs.

National Lock Washer Company, The, Newark, N. J., displayed several models showing various types of car window and curtain fixtures, also National lock washers.

National Tube Company, Pittsburgh, Pa., displayed a full line of Kewanee unions, valves and fittings for air, steam and hydraulic pressure.

Niles-Bement-Pond Company, New York, N. Y., exhibited a new type of car-wheel lathe, which was too large to place on the Pier. It was shown in a special booth on the Boardwalk opposite the entrance to the Pier.

Pantasote Company, The, New York, N. Y., had on display a full line of Pantasote curtains and upholstery materials and samples of Agosote of different thicknesses for different uses of interior finish of cars.

Pneumatic Jack Company, Louisville, Ky., showed samples of pneumatic journal jacks of different sizes and capacities. These jacks can be used wherever compressed air is available.

Pressed Steel Car Company, Pittsburgh, Pa., decorated its booth with photographs of steel passenger and freight cars of all types which it has recently built.

Pyrene Manufacturing Company, New York, N. Y., exhibited a line of its chemical fire extinguishers.

Railway Materials Company, The, Chicago, Ill., showed samples of steel-back brake shoes for steam and electric railway service, also drawings and photographs of the Ferguson shop furnaces.

Scarritt-Comstock Furniture Company, St. Louis, Mo., had on exhibition car seats and reclining chairs.

Sherwin-Williams Company, Cleveland, Ohio, had a reception booth in the main building.

Sprague Electric Works of General Electric Company, New York, N. Y., exhibited a full line of flexible steel armored hose, flexible steel conduit, outlet boxes and other electrical fittings.

Standard Steel Car Company, New York, N. Y., had a reception booth.

Standard Steel Works Company, Philadelphia, Pa., had a large space in the main building, where it showed specimens of steel-tired wheels, rolled-steel wheels, axles, forgings, springs and wheel centers.

Strong, Carlisle, Hammond Company, The, Cleveland, Ohio exhibited Randall graphite sheet lubricator bearings.

Symington Company, The T. H., Baltimore, Md., had an exhibit of Symington journal boxes, flexible dust guards and Farlow draft gear.

Underwood & Company, H. B., Philadelphia, Pa., exhibited a number of types of special portable machine tools.

Union Spring & Manufacturing Company, Pittsburgh, Pa., had an exhibit of coil and elliptic springs, Kensington all-steel journal boxes, pressed-steel journal box lids and steel castings.

United States Lighting & Heating Company, New York, N. Y., had complete equipments of its axle lighting system and samples of storage batteries for car lighting, signals, telephones and central stations.

U. S. Metal & Manufacturing Company, New York, N. Y., showed pressed-steel journal boxes, Diamond tapered steel poles, "Galco" artificial lumber, Anglo-American varnish and car cleaner.

Universal Safety Tread Company, Boston, Mass., exhibited samples of safety treads for car steps and station platforms.

Westinghouse Companies, Pittsburgh, Pa., had a combined exhibit, which included an air-brake demonstration rack with complete equipment, and air-brake test truck, alternating-cur-

rent and direct-current motors for shop machinery, tungsten and carbon lamps for all voltages and a 25-kw turbo-generator outfit.

Wheel Truing Brake Shoe Company, Detroit, Mich., exhibited abrasive brake shoes for truing locomotive driver and car wheels.

Yale & Towne Manufacturing Company, The, New York, N. Y., had an exhibit of chain blocks, trolleys, electric hoists and car hardware.

PLAN BY A. S. ROBINSON FOR CHICAGO SUBWAYS

Before the local transportation committee of the Chicago City Council, June 14, A. S. Robinson, now chief engineer of the Mountain, Valley & Plains Railroad Company, Dalhart, Tex., presented suggestions for a plan of Chicago subways involving a number of through routes between the North, South and West sides of the city, besides several loops entering the downtown district from the West Side. Intersecting all of these subways, along the lines of Monroe Street and Jackson Boulevard, Mr. Robinson has provided a low-level transfer-belt subway, by changing to which passengers may cross over to any other main line and continue their journeys, with universal transfers if desired. The system suggested is an amplification of that first proposed by the author in a paper read before the Western Society of Engineers at Chicago in February, 1911. Mr. Robinson's routes, which provide for both the surface and elevated lines in the downtown district, were prepared to employ the minimum number of curves, making possible future high-speed operation in connection with outlying subways or elevated roadways. By employing four-track construction, it was also sought to work each downtown street to its fullest sub-surface capacity, thus securing the greatest proportion of high-level subway, and in this way cheapening excavation and locating all stations near the surface.

The plans indicate four-track construction of the several routes under the downtown streets, providing in each bore two outside "local" tracks and two inside "express" tracks. Island platforms would be installed between each adjoining local and express track, while a partition wall between the center express tracks would divide the subway into two sections, in each of which the piston-like action of similarly moving trains is expected to accomplish adequate ventilation. The subway tracks for the surface cars would be carried at a level of 16 ft. below the street surface and the elevated cars 14 ft. below the surface, requiring excavation averaging 20 ft. deep, or about 6 ft. below the Lake Michigan datum line. Electric pumps would provide for removing any seepage occurring through the waterproofed concrete walls. At the side of the tracks Mr. Robinson allowed space for gas, water, electric service and telephone wires, while in the 5-ft. earthen back-fill above the roof of the tunnel would be space for various small service laterals. This earth back-fill is designed to deaden the noise of traffic overhead, as well as to silence the roar of the trains beneath the surface. Mr. Robinson suggested that street cars entering the tunnel portals be collected into trains of several cars each, and thus handled as multiple units through the underground section. Outside the downtown congested district, the speaker proposed extension subways or high-speed elevated structures of concrete, providing rapid transportation to outlying sections of the city. The minimum of curves and the absence of all grade crossings in the tunnels will permit this traffic to be handled with the maximum of dispatch. While the transfer belt, Mr. Robinson said, is a valuable feature of his plan, it need not be installed until most of the subway system has been completed, since arcades or foot passages could be temporarily provided for the short transverse distances in going from line to line.

The cost of this four-track construction is estimated at \$3,141,000 a mile, and the entire 18-mile installation as planned by Mr. Robinson would involve an expenditure of about \$57,000,000. The smallest loop and its adjoining through-route

should be built first, as this construction would provide most relief at a low cost and give valuable engineering experience. The preliminary subways indicated, those of the La Salle Street through route and a loop on Washington, Van Buren and Clark Streets, totaling 2.75 miles, would cost \$8,638,000, not including the existing river tunnels. Following this construction, Mr. Robinson suggested the building of the State Street through route and a West Side loop on Randolph, Dearborn and Harrison Streets. Coincident with the building of the subway system, he urged the construction of an adequate sewerage system for Chicago. As each element of the proposed subway system was constructed, it would begin to contribute its share of relief to the traffic problem, without depending on the completion of the entire installation.

For the elevated lines entering the downtown district over his proposed system of through-route subways, Mr. Robinson exhibited a diagram of a reversing-yard arrangement which can be employed to send cars back through the city to the express or local tracks of their own lines if desired. These reversing yards permit a "local" train to come in and unload on the "local" tracks in the downtown section, running on to the reversing yard and there being shunted to come back through the business district as an "express" train over the express tracks, carrying the evening rush homeward. In the morning the conditions would be reversed, of course, the center track of each line being employed for "express" service in the predominating direction of traffic.

MEETING OF COMMITTEE ON ENGINEERING APPRENTICES

A meeting of the committee on engineering apprentices, American Electric Railway Engineering Association, was held at the New York office of the association on Saturday, June 17, 1911. The committee members present were Chairman W. H. Evans, superintendent of motive power Indiana Union Traction Company, and H. A. Benedict, mechanical engineer Public Service Railway Company. There were also present H. H. Adams, superintendent rolling stock and shops Metropolitan Street Railway Company, and J. L. Ingoldsby, mechanical department Brooklyn Rapid Transit Company. Mr. Evans suggested the formulation of specific courses for shop apprentices to consist of separate specialties, as pit work, electrical equipment, car body repairs, machine shop, armature room, painting, etc. In addition, such an apprentice should have enough general knowledge to be able to take care of general inspection and minor repairs at outside carhouses. He submitted for discussion copies of the steam railroad apprenticeship course laid out by the Master Mechanics' Association in 1898. He suggested a four-year course, beginning with boys, say, seventeen years old. It is the plan of the committee to draft a number of courses. The courses applicable for a large company will be specialized, while those for small companies will be fewer in number but correspondingly broader in scope. Thus a large company would train separate men for controllers and for motors, whereas a small company would train one man for both classes and possibly for all classes of electrical work on cars. It was also suggested that such students be given some information about records and storekeeping. The head of the mechanical department should furnish a certificate of completion of apprenticeship course, properly signed by different instructing foremen.

A report presented in London, England, on May 2, to the directors of the La Plata (South America) Electric Tramways Company stated that the total receipts of the La Plata system, most of which is now under construction, had amounted to £34,483, of which amount £21,691 had been derived from electric traction. The average earnings were one shilling per car mile and the operating expenses averaged about 67.5 per cent of the receipts, thus making the cost of operation about eightpence per car mile.

MANUFACTURERS' EXHIBIT SPACE AT 1911 CONVENTION

George Keegan, secretary-treasurer of the American Electric Railway Manufacturers' Association, 165 Broadway, New York, has just issued a circular concerning the exhibit arrangements of the convention of the American Electric Railway Association and allied associations, which is to be held on Young's Pier, Atlantic City, N. J., from Oct. 9 to Oct. 13, inclusive, 1911. The circular is accompanied by an application blank for space. All applications received on or before June 30 will be considered as of that date and will have equal preference as to location; applications received after June 30 will be considered chronologically. The diagram, as reproduced on this page, shows the layout of exhibit spaces, for which applicants may state their preference, giving first, second and third choice. The charge for space on the Pier will be 30 cents per square foot, it being understood that this payment includes erection of booth ready for occupancy, electricity, steam, air and gas for power with terminal in booth, Crex floor matting, burlap erected on sides and back, enameled 3-in. name sign erected, telephone, checking, removing and returning all boxes and crates, and swinging-board sign without lettering. The booths in Buildings Nos. 1, 2 and 3, Aquarium Court and Machinery Hall, will be ready for exhibits Oct. 1.

All freight charges should be prepaid and the receipt for the prepaid charges sent to the Eldredge Express Company, Atlantic City, N. J. The boxes addressed to the exhibitor, care of the Eldredge Express Company, should give the space number on the Million-Dollar Pier. Heavy shipments should be routed via the Pennsylvania Railroad. Express packages should be sent care of the association, charges prepaid and marked with the exhibitor's space number. The exhibitors will install their own exhibits and must have same completed and in order by 8 a. m. Monday, Oct. 9. Arrangements for the unpacking and installations may be made with any responsible contractor. Workmen's badges must be procured. Reservations for machinists' labor may be made through the exhibits committee. Badges for the workmen will be issued at the office of the exhibits committee in the tower on the pier. The weights allowed by the pier management are as follows: Building No. 1 and Machinery Hall, 200-250 lb. per square foot; Aquarium Court, 200 lb. per square foot; Building No. 2, 150 lb. per square foot; Building No. 3, 150-200 lb. per square foot, and Booths 960-969, 80 lb. per square foot. Concentrated loads of 10 tons or less are permissible if placed directly over piles.

The Pier Company will provide adequate general lighting until 10 o'clock each night. Special arrangements have been made with the Ingalls Electric Construction Company, 22 South Tennessee Avenue, Atlantic City, for all special lighting and electric signs to be erected at the exhibitor's expense. No electric signs, however, will be permitted in Building No. 1. The uniform display signboard which added greatly to the appearance of the exhibits last year will be continued this year. No cardboard, oilcloth or other sign will be permitted. A signboard will be supplied by the association and the printing thereon will be paid for by the exhibitors.

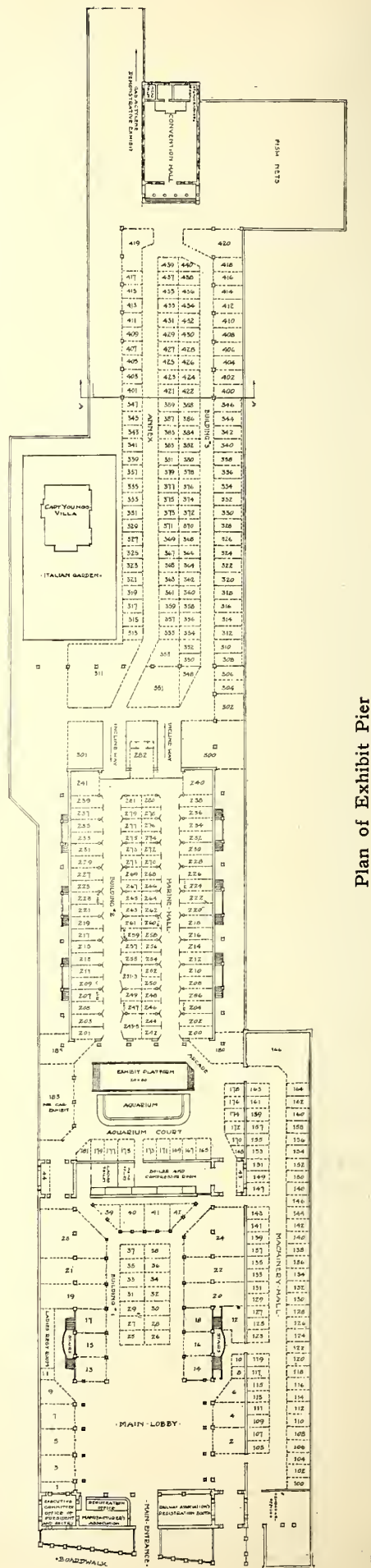
The operation of pneumatic hammers will not be allowed. No noisy or otherwise objectionable exhibits will be permitted. No watchman, workman or other attendant will be allowed on the pier between 12 o'clock midnight and 6 a. m., unless by permission countersigned by the director of exhibits and management of the Pier.

The Pier will be guarded at all hours of the day and night by special watchmen and the Atlantic City police department. It will also be under the protection at all times of the Atlantic City fire department, which will have firemen on the Pier constantly. To facilitate the service it is absolutely necessary to keep the aisles clear of all boxes, crates or other obstructions.

Arrangements have been made so that only the regular prevailing rates for skilled or unskilled labor will be charged the exhibitors. If an exhibitor requires any labor he should make early application to the association, stating what class is required, the number of men required, and on what days they will be required.

Arrangements have been made for the storage of packing boxes, crates, etc. Each exhibitor will make application for the space required for this material. These spaces are open, subject to weather conditions, unless special arrangements are made. The storage areas will be in care of watchmen and boxes will be issued only to persons holding the proper receipts.

Local telephone service will be furnished free of charge from Oct. 9 to Oct. 13, inclusive. Telegrams can be telephoned to the information office at the main entrance of the Pier. The Edwards Floral Hall Company, 1700 Pacific Avenue, Atlantic City, N. J., will rent palms, ferns, flowers, etc., for the convention period. Joseph L. Shoemaker & Company, 926 Arch Street, Philadelphia, will rent furniture and rugs. Leonard Young, 2517 Atlantic Avenue, and Bell, Gorman & Higby, Atlantic and Tennessee Avenues, Atlantic City, are recommended for handling decorations. Detailed information covering hotel rates, railway facilities, etc., will be sent out by Mr. Keegan later.



Plan of Exhibit Pier

NEW SYSTEM OF SIGNS ADOPTED BY BOSTON ELEVATED RAILWAY

As a result of a long study of the problem of car signs the Boston Elevated Railway Company has decided to equip all of its surface cars with a new type of Hunter sign arranged to indicate routes on the dual basis of numbering and lettering. The street layout in Boston and the interrelation of about forty suburban municipalities with the city proper have complicated the question of signs and the natural tendency has been to multiply the legends carried by the cars, but this plan had obvious limitations. For many years the company attempted to use cars of different colors on different lines, but the advantages of a single color standard were recognized and two years ago a standard color was adopted and the rolling stock is gradually being changed to a uniform dark green color.

Some months ago the company installed disks bearing the division number on the front and rear hoods of the surface cars. The disks were visible for considerable distances by day and were also legible at night for distances of two or more blocks through the use of incandescent lamps with reflectors arranged to throw the light upward upon the disk face, the



New Car Signs in Boston

lamps being practically concealed from persons on the street or car. The use of these division numbers proved helpful in enabling passengers quickly to identify cars destined for a given general direction, but the company felt that a still more accurate and flexible designation was desirable. Thorough discussion of the question and conferences with representatives of various civic organizations led to the adoption of the present sign, which is illustrated herewith.

The new signs, which the Boston Elevated Railway Company is to install upon about 3150 cars are 5 ft. long by 11 in. high and are lighted from the interior of the car without the use of extra sign lamps. The hood signs are to show the number of the division and route, the first figure indicating the division and the others the route designation. Thus, No. 756 indicates route 56 of division 7, and applies to a line running to City Point, South Boston, via Broadway. In addition to the number, which thus forms a route and destination symbol, the hood signs also show the name of the destination of the car and, where space permits, the name of the trunk line of the route over which the car runs. Wherever possible the company plans to use a single word on the hood signs, the lettering being about 9 in. high, white on a dark background. The side signs indicate the route or destination of the car in words only. In all cases the proper abbreviation is to be used, as "No." for "North," "Ave." for "Avenue," etc. These signs will be standard for all cars so equipped and no other signs of any kind will be used on the roof of the car.

As is well known, the Hunter sign consists of a roll of canvas on which a maximum of twenty destinations may be painted. The destination displayed can be changed readily by turning a handle within the car. The rolls are interchangeable. Wiring, power consumption and lamp maintenance are eliminated in connection with the signs of this type and a good illumination of both hood and side signs is insured, there being no illumination whatever on the present type of painted wooden side signs.

Previous to exhibiting a car equipped with the new signs the company sent the following letter to a large number of persons associated with various improvement associations in Greater Boston, including the Boston Chamber of Commerce, United Improvement Association and the Retail Merchants' Association:

"April 21, 1911.

"Dear Sir:

"In an endeavor to simplify and improve the present method of signing cars on the surface lines of the Boston Elevated Railway a systematic and thorough study has been made of the subject, together with investigations of the practices elsewhere in this country and abroad, as well as conferences with representatives of various local associations. There has now been designed a general scheme, which, in the judgment of the officers of the company, will be much more intelligible, satisfactory and clear to the public, embodying as it does the best features of methods developed by the most able railway minds and tested by years of experience.

"A car has been equipped with these signs in manner identical with that which it is anticipated will become common, to the exclusion of all other signs or indications of routes, divisions, etc., of any nature whatsoever on the surface lines of the company, and arrangements have been made to place this car on Providence Street at the junction of Church Street, near Park Square, on the evening of Tuesday, April 25, at 8:30 p. m.

"The company cordially invites you to be present at the time to inspect the signing. There have been invited to observe this example of signing representatives from organizations such as the Chamber of Commerce, Retail Trade Board, Improvement Associations, etc., as well as individuals who from time to time have made suggestions to the officers of the company in connection with the signing of cars.

"Representatives of the company will be present and will be glad to explain any details or give any information possible.

"Yours very truly,

(Signed)

"C. S. SERGEANT,
"Vice-president."

The car was exhibited on April 25 as planned and many favorable comments were received upon the design of the signing equipment.

MEETING OF THE EXECUTIVE COMMITTEE OF THE MANUFACTURERS' ASSOCIATION

The meeting of the executive committee of the American Electric Railway Manufacturers' Association was held at Atlantic City, June 16, during the progress of the American Railway Master Mechanics' convention. At that meeting Edwin H. Baker, of the Galena Signal Oil Company, was elected a successor as vice-president of exhibits to K. D. Hequembourg, whose resignation was announced last week.

At the same meeting W. L. Conwell, vice-president in charge of entertainments, showed sketches of different designs of badges for the convention. These were considered by the committee and Mr. Conwell was authorized to order the type finally selected.

The Swiss government has just granted a concession for the construction of a narrow gage electric railway, about 19 miles long, from Meiringen to Engelberg over the Joch Pass.

HEARING ON WEST NEWBURY FARE PETITION

A hearing was given by the Massachusetts Railroad Commission recently at Boston upon the petition of the Selectmen of West Newbury for a reduction of fares between West Newbury and Haverhill on the Boston & Northern Street Railway. Charles W. Ordway, chairman of the board, represented West Newbury and Bentley W. Warren, Boston, appeared for the company. Commissioner White conducted the hearing. The petitioners asked that a 5-cent fare should be established from any part of West Newbury to Haverhill or Newburyport. The present fare is 10 cents. They also asked for a reduction in the price of workmen's tickets from the present charge of \$1.40 for a twenty-ride book to \$1 between Indian River and Haverhill. The claim was advanced that as the People's Street Railway, a predecessor of the Boston & Northern Street Railway, had agreed to carry passengers between any two points in West Newbury for 5 cents, the existing fares should be scaled as requested. Mr. Ordway said that the Boston & Northern Street Railway occupies a total length of about 5 miles of track in West Newbury, making a charge of 5 cents for the upper half of the town above the town hall and 5 cents for the lower half, although warrants are given out which entitle passengers to ride upon a single fare to a fare limit post located within the town about 100 ft. from the line. Beyond this limit an additional fare is collected.

Mr. Warren brought out the point in cross-examination that the Boston & Northern Street Railway is carrying passengers from point to point in West Newbury for 5 cents as agreed upon in the franchise granted its predecessors, with the exception that merely as a matter of operating convenience the fare zones east and west bound had been set at posts marked just inside the town line. Mr. Ordway admitted that he did not know of any cases where passengers had been obliged to pay two fares to ride in the town. Continuing, Mr. Warren said the commission's order of 1906 had been fully complied with by the company. At that time the board had recommended that the fare of 7 cents between Haverhill Center and the town house in West Newbury should be made to apply as far as Indian River in West Newbury. The board had also recommended that the ticket between any part of West Newbury and Haverhill Center, with fare of 10.5 cents, be extended throughout the day.

Mr. Warren further said that he doubted if any one knew exactly how far, with a normal amount of business in a reasonably thickly populated section, passengers could be carried for 5 cents at a profit. It was impossible to tell how much it costs to carry a passenger one, two or three miles. The company does know, however, the average cost per passenger. Of each nickel taken in the stockholders of the Boston & Northern Street Railway receive only a fraction of a cent. On a ride of a few miles, for which the company gets 5 cents, passengers pay for more than they receive in transportation. The average, however, shows a small profit. This indicates that on all long rides the company furnishes service at a loss.

No discrimination is practised against the people of West Newbury, and there is no house or point of interest between the fare limit and the town line. The company does not feel that it can afford to give more to the people of West Newbury than it is now giving, either in the direction of Newburyport or Haverhill. There has been no increase of business on the line such as would warrant a fare reduction at this time. The existing rates are very reasonable and should not be lowered. The United States Supreme Court has said that it would be an unsound proposition to establish rates which would be unreasonable on the present business in anticipation of increased business which may never come. The company cannot afford to carry the few people who want to ride for less than the present rates when they are already paying less than was formerly charged. Regarding the contention of the petitioners that workmen should be permitted to ride for 5 cents where they are now paying 7 cents, Mr. Warren called attention to

the fact that the employees of the railway company have been obliged to face the increased cost of living, receiving two increases in wages in the past five years.

The company filed with the board subsequent to the hearing an exhibit showing in detail the rates of fare charged for given distances on the Newburyport, Lawrence and Lowell, Andover and Byfield lines. These data showed that the rate per mile on the disputed line was less than 1 cent per mile in the local service of the town of West Newbury, rising to 2.1 cents per mile on part of the through trip from Haverhill to Newburyport. The total distance from Haverhill to Newburyport is 13.77 miles, the fare being 20 cents, or about 1.4 cents per mile. In general the fare did not exceed 1½ cents per mile, which, it was contended by the company, was reasonable for the sparsely settled district served. It was also shown that the rates of fare existing on workmen's tickets were extremely reasonable per mile, viz:

Route.	Distance Miles.	Reduced Fare.	Rate per Mile.
Haverhill-Newburyport	13.77	14 cts.	1.02 cts.
W. Newburyport-Groveland line to Newburyport	8.95	10½ cts.	1.17 cts.
Town Hall, W. Newbury to Newburyport	6.25	7 cts.	1.12 cts.
Artichoke River-Haverhill	9.92	10½ cts.	1.06 cts.
Indian River-Haverhill	8.57	7 cts.	.82 cts.

The board took the case under advisement.

METAL CAR PARTS

The increased popularity of steel cars has resulted in the design and manufacture by Forsyth Brothers Company, Chicago, of numerous metal unit parts, all adaptable for assembly in the construction of a car. The Southern Pacific cars, for example, described in the *ELECTRIC RAILWAY JOURNAL* for June 17 are furnished throughout with Forsyth doors and windows. In general, the use of metal parts for car framing and fittings is said to result in first economy as well as in reduced upkeep expense. This manufacturer has just completed a large plant with machinery designed for pressing car members from sheet steel and for manufacturing all of the products described in this article. These include pressed-unit car side sections, Doyle car posts, carlines, pressed-steel roof sections, one-piece metal doors, motormen's cabs, self-adjusting dust-proof window sash, metal interior car finish, draft appliances, buffing devices and weather stripping.

PRESSED UNIT CAR SIDE SECTION

The pressed unit side section represents the most advanced development of the built-up steel truss side construction. The latter, while utilizing the full height of the side of the car for a lattice girder or truss (having the diagonals so disposed as to permit windows to be formed in the structure) has resulted in producing a car body of great strength and rigidity with minimum weight. As the life of a steel car is dependent entirely on the security of the joints of its members, it is obvious that the fewer the joints the better will be the car. This latter consideration led to the invention of the pressed unit section, wherein the side posts, diagonal braces and side brace of the car are formed of one piece of metal.

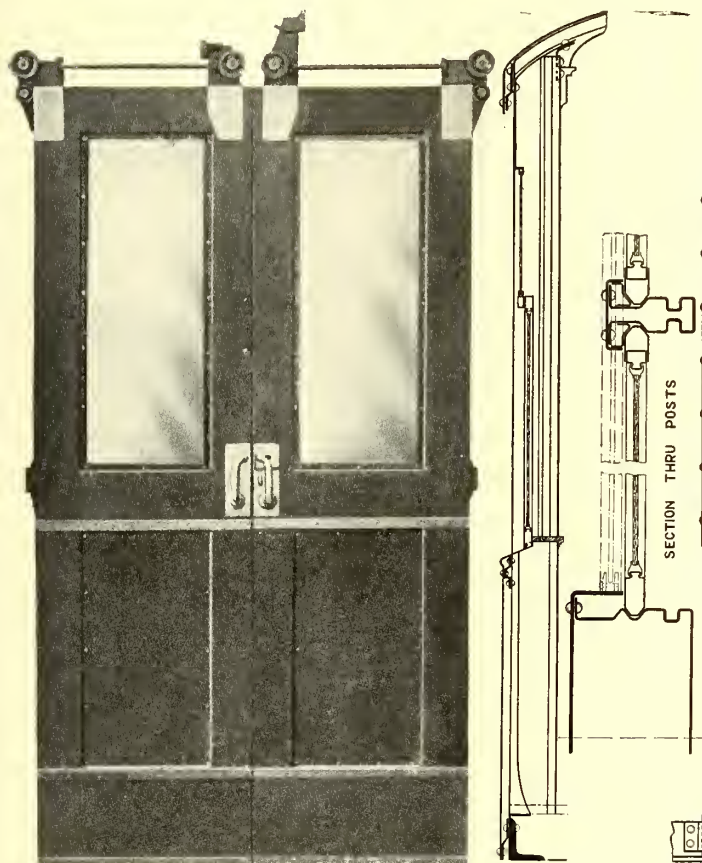
In a truss side-frame car the distribution of shock-resisting members in the truss frame results in practically surrounding the passenger space with a metal shield. The buffing shocks can be taken by a comparatively light center sill construction because this sill can be supported and secured from deflection at each side post by the rigid side frame. It is believed that weight for weight a car constructed with the pressed unit side truss will be more rigid and provide greater security to passengers than a car having all its shock-resisting members in the underframe or relying on a plate-girder side construction which has its top member below the sash rest. This construction may be adapted for any design of car or underframe.

ONE-PIECE METAL DOORS

In this company's one-piece metal door the framing and panels are formed out of one sheet of metal. Formerly metal doors were built up in sections, but under the constant rack-

ing action of the door when the cars were in motion the joints and seams would tend to open. In this way moisture entered the door and caused the formation of rust. Similar troubles occur where light metal sheets are overlapped and riveted together. The one-piece metal door is free from this defect since it contains no joints. It is composed of single sheets of metal in which the frame, panel and other finish are formed in the metal itself. These formations in the sheet of metal have in themselves the effect of stiffening the door and of imparting rigidity to it. There is no overlapping of sheets in making this door. Within the interior of the door and along its edge there is provided a one-piece reinforcing frame, which assists the door to withstand the most abusive treatment and prevents distortion of the door in service.

This door can be made in any pattern and dimensions desired with such glass or panel design as may be preferred. As it is formed from dies it is more readily interchanged than built-up doors.



One-Piece Metal Doors

The door is rendered thoroughly rust-proof by means of steel preservative which is baked on the interior as well as the outside of the door. The hardware is securely united to the interior reinforcements, which are in turn welded to the interior framework of the door itself. Consequently, any strains which may be imparted to the hardware are not transmitted to the shell of the doors, and, therefore, do not cause bulging or distortion of the finished door surface.

Large numbers of these one-piece metal doors are in service on both steam and electric lines, such as the Southern Pacific Company and the Interborough Rapid Transit Company of New York.

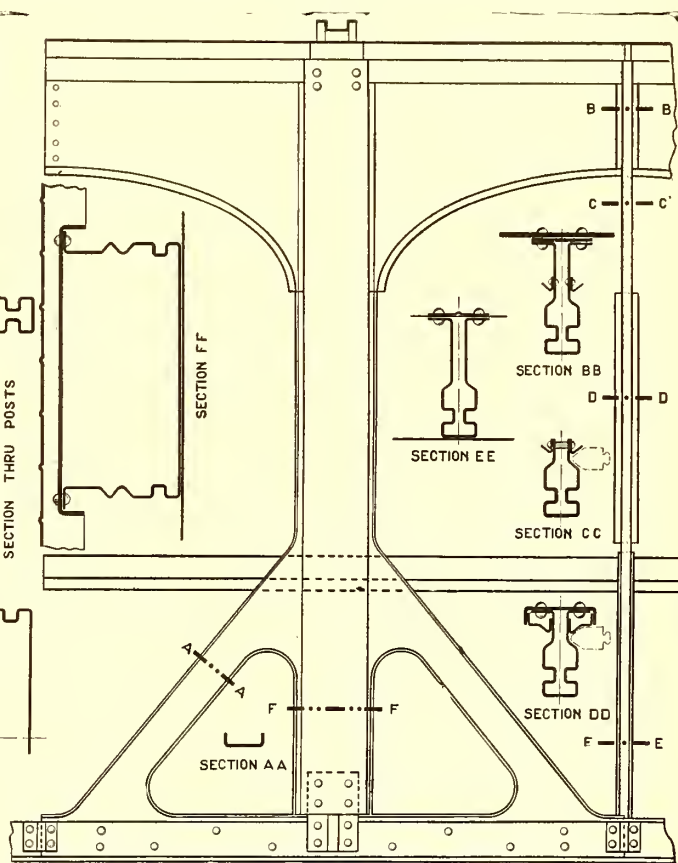
METAL SASH

Metal sash, adapted for various classes of service, is made both in steel and brass. This metal sash is readily adjustable for variations in the window openings, is absolutely dust-proof and can be made for any kind of glazing. Among other designs of metal sash there is one in which the rails are quite narrow, thus affording a maximum area of glass and increasing the light in the car.

Metal, and particularly brass, sash are coming into growing favor, not merely because of the finish which they impart to the car, but as a matter of economy in maintenance. There is imparted to the brass sash by the action of the atmosphere a permanent gun-metal finish which is not only pleasing to the eye, but eliminates the necessity of removing the sash at intervals for revarnishing. Along with other metal sash the company furnishes, if desired, various sash attachments, including weather stripping. Many thousands of these metal sash are in service.

DOYLE METAL POSTS

In the Doyle post the guides for the sash, as well as the curtain fixtures, are formed in the post itself. This avoids having extra strips and stops for this purpose. The formations and corrugations in the post also add to its rigidity. Between the sash and the post there is provided an outwardly springing thrust shoe, carried by the sash, and having a wedge or other suitable engagement with the corrugation or sash guide, formed



Pressed Steel Unit Car-Side Construction

in the post. These shoes automatically adjust the sash to any variations in the distance that the posts may be set from each other in the car and to any variation in their vertical alignment. They also permit the sash, along its lower edge, to adjust itself automatically to the camber of the car.

This shoe engagement also renders the sash dust-proof. The guides, or frames on the posts, upon which the sash shoes operate are preferably covered with a brass capping, which becomes oxidized from the action of the atmosphere and thus prevents the shoes from coming in contact with the paint or the finish of the rest of the post.

The sash shoes permit almost instantaneous withdrawal of the sash from the opening when desired without removing any of the customary sash guides. This is done by forcing the shoes inwardly to the sash, which thereupon permits the whole to be swung free of the opening.

The posts are formed out of one piece of metal and can be adapted to any construction of wooden or steel car. They are joined along the floor and at the top of the car construction in such a manner as to be readily removed at any time desired.

COMMUTATING POLE ROTARY CONVERTERS

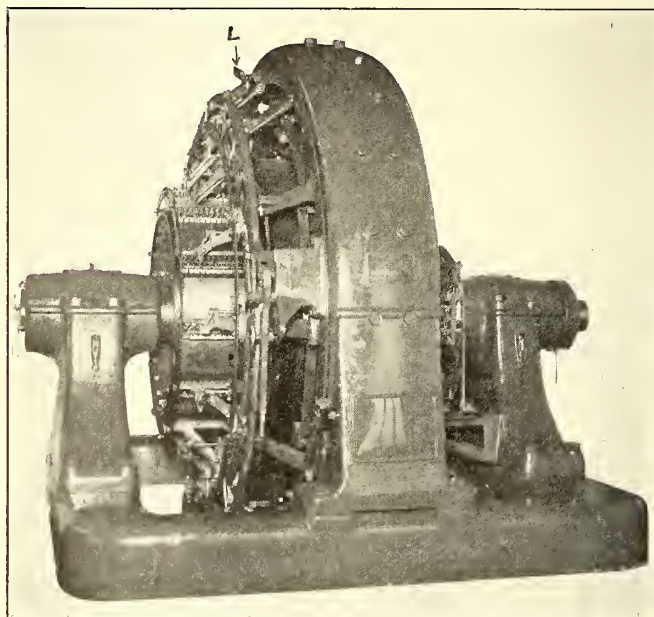
The General Electric Company has developed a line of commutating pole rotary converters for direct-current railways. As is well known, the limiting feature which governs the size of apparatus installed in most railway substations is the maximum momentary capacity and not the continuous capacity. Therefore, a considerable saving can be made in the initial cost of such a substation and a higher all-day efficiency can be obtained by using smaller machines having larger momentary overload capacities. This point is further emphasized when it is remembered that a fair average load factor for a substation of this nature is about 40 per cent, and it is in a great number of cases very much below this figure. These commutating pole rotary converters have the same normal heating and overload heating as the present standard railway apparatus, but have a momentary overload capacity of 200 per cent instead of 100 per cent. The commutating poles have such constants as give practically sparkless commutation from no load to 200 per cent overload, both when the machine is working at a nearly constant load or on a widely fluctuating load. The accompanying illustrations show the general appearance of such a machine, as well as some of the special features.

In general the construction of these machines is similar to standard rotary converters, with, of course, the addition of commutating poles. One novel detail is a device for raising the d.c. brushes when the machine is started from the a.c. end. This device will permit the use of both new and partially worn brushes on the same stud.

The details of the brush-raising device will be seen in one of the accompanying illustrations, where *A* is the operating lever. This is connected with the ring *B* in such a manner that when the handle is moved outward *B* shifts in the direction of the arrow, actuating the bell cranks *C* through the bars *D*. The bell

side by means of partial voltage taps on the secondary of the transformers, approximately full-load current is drawn from the line, but when the d.c. brushes are lifted from the commutator the amount of line current required to start the machine is very materially reduced. Consequently this brush-raising device has removed the objection that a.c. starting took too much current from the line.

The collector rings of the machine illustrated are provided with a new metal brush known by the trade name of "Metite." These brushes are said to be a marked improvement on the

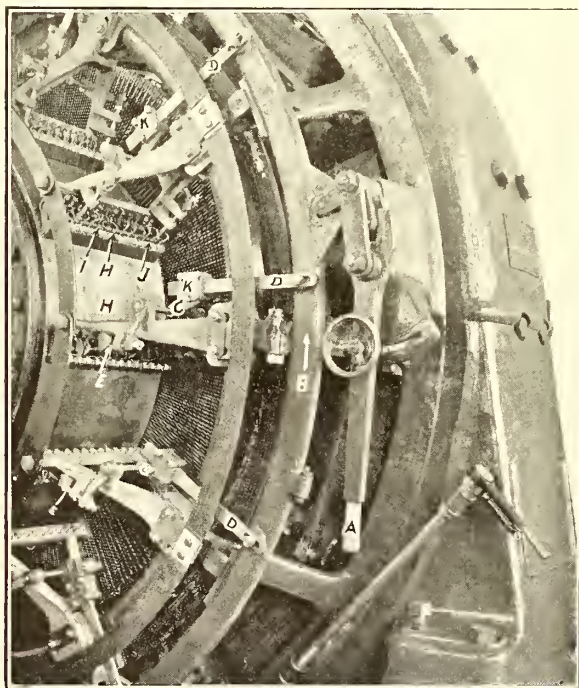


1200-Volt Commutating Pole Rotary Converter

old-type copper-leaf brush. They have heavy pigtails and are held in the brush holders in a similar manner to the brushes used on the d.c. end. Ample provision is made for brush adjustment and new brushes can be put in and old ones taken out and adjustments made while the machine is in operation. The method of operation is as follows: Before the machine is started the brushes are raised, leaving only two thin pilot brushes resting on the commutator to supply the field and for obtaining polarity. The machine is run up to speed and synchronized and then the brushes are lowered. The position of the brushes is always indicated by the semaphore *L*.

FLEXIBLE ASBESTOS INSULATING TAPE

The D & W Fuse Company, Providence, R. I., is making a new product called "Deltatape." This is a heat-resisting insulating material which has asbestos fiber as a base. Because of this fact and the special compound used for impregnation, the tape can be raised to a temperature of 500 deg. Fahr. before decomposition begins. It is said to be a good insulator electrically, although at the same time a good conductor of heat. Therefore, a coil wrapped with it, while thoroughly insulated, is not blanketed so as to make it retain heat, as is the case with most asbestos coverings. This material is made in any width and in thicknesses between 10 mils and 25 mils. The 10-mil tape requires 2500 volts to puncture it, and 5000 volts is required to break down the 20-mil tap. The flexibility of this tape makes it suitable for forming around the corners and the terminals of coils. These qualities make it particularly adapted for railway motor and controller work where high temperatures and severe conditions are to be met. The flexibility is practically permanent. "Delta" sheeting is also manufactured. This is a material 8½ in. wide, but identical with "Deltatape" in properties, texture and finish. It is made in rolls of any convenient length and is intended for use where large pieces of insulating material are required.



Brush Raising and Shifting Mechanism of Commutating Pole Rotary Converter

cranks actuate the vertical rods *E*, which are in turn connected to the horizontal rods *H*. The rods *H* pass under the brush holder springs *I* and the free end of these springs pass under the clips *J* attached to the brushes, so that when the rods *H* are raised the brushes are raised and when they are lowered the brushes are lowered. The operating handle, etc., is insulated by the joint *K*.

When an ordinary rotary converter is started from the a.c.

News of Electric Railways

Commission to Appeal from Finding in Regard to Third Avenue Reorganization

By a vote of 4 to 1 the Public Service Commission of the First District of New York on June 16, 1911, determined to appeal from the decision of the Appellate Division overruling the finding of the commission in the Third Avenue Railroad reorganization. The commission had unanimously refused to approve the plan for the reorganization of the Third Avenue Railroad on the ground that neither the earnings nor the property values of the system, as demonstrated by the long series of hearings on the plan itself, justified the issuance of the volume of securities which the reorganization committee proposed to issue, and that the commission was as clearly charged under the law with preventing the issuance of securities in excess of value in railway reorganizations as in original promotions. The reorganizers, on the other hand, cited a section of the Stock Corporation act and contended that the power of the commission was nominal in such cases and ran only to determining whether the reorganization committee legally held title to any property in question, whether the outstanding securities were legally issued, and whether the proposed new securities exceeded the volume previously outstanding.

The new member of the commission, J. Sergeant Cram, objected to the resolution of the majority directing counsel to appeal from the decision of the Appellate Division. Commissioner Cram said:

"I cannot, after having carefully read the opinions of Mr. Justice Clark and Mr. Justice Ingraham, vote to appeal, as I entertain no doubt of the result of the appeal. I think the Court of Appeals has already passed upon the difference between the original organization of a railroad and its reorganization. In the first instance there is no doubt of the jurisdiction of this board, but I think in the second the law relating to reorganizations of corporations controls.

"I am satisfied that it has not been superseded by the Public Service act, and consequently I think a great hardship would be inflicted upon the junior bondholders if they should be kept indefinitely out of what little is left to them of their property. I am therefore opposed to the appeal."

In reply to Mr. Cram, Chairman Willcox of the commission said:

"I think, in voting for the appeal, that the question at issue is so important that we should have the decision of the highest court. The evident intention of the Public Service Commissions law was to put the issuance of securities under the control of a State body, and it is anomalous to say that a new company would in its application for the issuance of securities be governed by the Public Service Commissions act while a company which has been reorganized would not be subject to such provisions. It is essentially desirable to have the opinion of the court of last resort in the questions at issue in this matter."

Commissioner McCarroll said:

"In voting for the appeal, I feel that the whole question of the limitation of the issuance of securities and supervision by the State is at stake. I feel that it is quite as important that the people of the State should have the protection that is given by the provisions of the statute in the case of a reorganization as in the case of a new company. I feel that in this particular case the issuance of the proposed securities would bring about practically a repetition of the history of the bankruptcy of this company, and I therefore feel that if the State's powers can be extended so as to bring such matters within the jurisdiction of the Public Service Commissions law that law should be sustained in that respect. I think it is exceedingly important that all resorts of the law should be exhausted to establish that position."

Commissioner Maltbie said:

"I think that it is essential and absolutely necessary that a decision be obtained from the highest court in the State of New York upon this subject. One of the opinions of the Appellate Division intimates that this point has never been decided by the Court of Appeals squarely upon the Public

Service Commissions law, as the point has not been raised in the court as to the Public Service Commission's power upon any such case before it. I think, therefore, that we should appeal this case and secure the decision of the highest court before definite action is taken in accordance with the opinion of the Appellate Division. If the decision of the Appellate Division should be affirmed, I think that the effects will be far-reaching, for they will go very much beyond the present case and their effect upon service, upon rates of fare and upon transfers will be tremendous, if the company is to start at the capitalization proposed in the plan of reorganization. Either the commission is entirely wrong upon its facts, as found in the evidence taken at the hearings, or the company cannot give adequate service at reasonable rates and still pay a fair return upon the securities that are to be issued."

In explaining his vote for the appeal, Commissioner Eustis said:

"In voting for the appeal, I do so because I feel that the State intended that the commission should have jurisdiction over the issue of stocks and securities by all companies, including reorganized companies. It appears from this decision that there is some question, at least, that reorganizations are exempt from the Public Service Commissions law. I think that the matter should be decided by the court of last resort, so that the Legislature will have final knowledge of what the law is, and then it will be up to it to revise these sections, so that in case there is any question about jurisdiction the law can be changed to meet the situation."

Ticket Counterfeiters Arrested

Through the efforts of J. J. Stanley, president of the Cleveland Railway, and C. E. Hauk, head of the secret service department of the company, the leaders of a gang of street railway ticket counterfeiters have been arrested. It has been known for some time that bogus tickets were in use on the Cleveland Railway, and while several conductors were punished for handling the tickets, the makers of the tickets could not be located. Not long ago, however, the fare box of a conductor who had been seen during the day to take tickets from an envelope was found to contain a large number of counterfeit tickets. He is said to have confessed that the tickets were purchased from a man in Akron and that other conductors were implicated. One of the Cleveland conductors was trailed to Akron, and Pinkerton detectives and Secret Service Agent Hauk finally located a house near Akron where they were satisfied the tickets were made.

On the evening of June 11, 1911, the detectives, accompanied by Attorney H. J. Crawford, acting for the company, and Charles Currie, general manager of the Northern Ohio Traction & Light Company, raided the house near Akron and arrested Leonard Reis, a printer, and his wife. A complete outfit for reproducing tickets and a large number of completed tickets ready for circulation were found. Reis gave information that resulted in the arrest of John F. Farris, William E. Farris and Joseph C. Hart, of Chicago. The Farris brothers are in the employ of the Illinois Central Railway. It is said that a complete plant for making tickets and also tickets aggregating \$150,000 in value were found at the Farris home. Of these tickets to the amount of \$70,000 are said to have been counterfeits of the tickets of the Cleveland Electric Railway and \$60,000 counterfeits of the tickets used by the Indianapolis Traction & Terminal Company. Others are said to have been counterfeits of tickets used by the Columbus Railway & Light Company, the Northern Ohio Traction & Light Company and the Toledo Railways & Light Company. The plates were made to the order of the Farris brothers. The Akron plant seems to have been a branch. Joseph C. Hart claims that he printed the tickets under contract with the Farris brothers, without suspecting that they were counterfeits.

The Farris brothers were bound over to the United

States grand jury on the charge of using the mails to defraud and were placed under bonds of \$10,000 each, while Hart was charged with conspiracy and placed under a bond of \$2,500. It is said that the Farris brothers confessed that plans had been made to counterfeit tickets of a number of the street railways in important cities. The principal difference between the real tickets and the counterfeits used in Cleveland was in the thickness of the paper. The counterfeits were thicker than the originals.

Ira F. Williamson, a conductor on the Superior Avenue line, was arrested on June 17, 1911, charged with being the Cleveland agent of the counterfeiters. He was committed in default of \$10,000 bail.

Rules to Govern Applications for Approval of Securities in New Jersey

The Board of Public Utility Commissioners of New Jersey has adopted a conference ruling for the guidance of public utilities applying for approval of proposed issues of stocks, bonds, notes or other evidences of indebtedness. The ruling gives in detail what will hereafter be the requirements of the board in such cases. It provides as follows:

"All applications for authority to issue any stocks, bonds, notes or other evidences of indebtedness must show by petition:

"One—The amount and terms of the proposed issue; the purpose for which the proceeds are to be used, and the nature of the security, if any.

"Two—Where the purpose is the acquisition of property, a general description of the property, from whom it is to be acquired, and the terms of the contract for such acquisition, if any has been made. Names of the owners of property to be acquired for rights-of-way need not be set out; a general description of the proposed route will be sufficient.

"Three—Where the purpose is the construction, completion, extension or improvement of facilities, existing facilities, as well as those proposed, must be described.

"Four—Where the purpose is the improvement or maintenance of service, the existing service, as well as the improvements or betterments proposed, must be described.

"Five—Where the purpose is the refunding of obligations, the obligations to be refunded must be described fully and the kind, amount, date of issue, date of maturity and all other material facts affecting the same must be set out.

"Six—The financial condition of the applicant must be set forth in appropriate schedules showing: (a), amount and classes of stock authorized; (b), amount and classes of stock issued and outstanding; (c), terms of preference of preferred stock; (d), brief description of each mortgage upon any property of the applicant, giving date of execution, name of trustee, amount of indebtedness actually secured and brief description of the mortgage property; (e), number and amount of bonds authorized to be issued under each mortgage, describing each class separately, giving date of issue, par value, rate of interest, date of maturity and how secured; (f), other indebtedness of all kinds, giving same by classes and describing security, if any; (g), amount of interest paid during previous fiscal year upon each kind of indebtedness and rate thereof, and, if different rates were paid, amount paid at each rate; (h), amount of dividends paid upon each class of stock during previous fiscal year and rate thereof; (i), detailed statement of earnings and expenditures for previous fiscal year, and balance sheet, showing conditions at the close of the year.

"Seven—Where the application is for the issue of bonds to be secured by an existing mortgage, the amount of bonds, if any, already issued under such mortgage and the amount and application made of the proceeds of the same.

"Eight—Where the proceeds are to be used for construction, completion, extension or improvement purposes the affidavit of a competent person must be annexed, showing the estimated cost in reasonable detail.

"Nine—That no franchise or right is capitalized directly or indirectly except as authorized by the statute, but in case it is proposed to capitalize any franchise as authorized by the statute, a verified copy of such franchise shall be at-

tached to the application, together with an affidavit of the proper officer of the state, county or municipality, showing the amount that has actually been paid for such franchise.

"Ten—Where any contract, agreement or arrangement, verbal or written, has been made to sell the securities proposed to be issued, such contract, agreement or arrangement must be described fully, and, if in writing, a copy of the same must be annexed to the application.

"Eleven—If no contract, agreement or arrangement has been made for the sale or other disposition of the securities proposed to be issued, there must be attached to the application an affidavit of a competent person, showing the amount which can probably be realized from the sale and disposition thereof and the reasons for the opinion of the affiant.

"Twelve—All such applications should be verified by the affidavits of the chief administrative and chief financial officer of the applicant, and such verifications must include a statement that it is the intention of the applicant in good faith to use the proceeds of the securities proposed to be used for the purpose set forth in the application."

Further Consideration Given Amendments to Cleveland Grant

At a meeting of the committee of the whole of the Council of Cleveland on the afternoon of June 16, 1911, to consider amendments to the Tayler franchise proposed in the Dahl ordinance introduced some time ago, City Solicitor Baker opposed the amendment to extend the low fare to the suburbs as they are annexed. He said that the amendment endangers the whole plan of low fare. G. M. Dahl, Councilman Morgan and others argued that the referendum vote on the admission of the suburbs would also mean a referendum on the extension of the fare. Mr. Baker said that if Council should decide before a vote on annexation was taken that the suburb could not have low fare and the suburb should be annexed that portion of the city would be prevented forever from securing a reduction in fare. He said that it would be much better to adopt an amendment putting the entire matter in the hands of Council and allow that body to fix the fare at all times within the city limits.

Another amendment objected to by Mr. Baker was the provision for arbitration in case the city and company did not agree on the propriety or necessity of making betterments and extensions. Mr. Baker argued that this matter should be in the hands of the City Council. Mr. Dahl replied that the whole Tayler ordinance was saturated with arbitration provisions and that this amendment provided nothing new. Mr. Baker said that the Tayler ordinance was not perfect and that he did not believe in arbitration.

Councilmen are at odds in regard to the period during which the city should have the right to dictate in the matter of betterments and extensions. Some of them feel that the period should continue to within five years of the expiration of the franchise, while others desire a shorter period. It is argued that possibly it would be better to fix the grant so that the city could not dictate during the last fifteen years of the franchise period in order to insure a renewal, as refusal to renew might give the company what would amount to a perpetual grant. The company has stated that it cannot accept an amendment that would give the Council the right to dictate extensions and betterments during the last fifteen years of the life of the franchise.

At its regular meeting on June 12, 1911, the City Council voted to refer to Mr. Dahl the question of permitting passengers to smoke on the three rear seats of the cars through the summer.

New York Subway Report Adopted

The Board of Estimate and Apportionment of New York on June 21, 1911, unanimously adopted the report of the joint committee of the Board of Estimate and the Public Service Commission relating to the pending proposals submitted by the Interborough Rapid Transit Company and

the Brooklyn Rapid Transit Company for the construction, equipment and operation of rapid transit lines in New York. In adopting the report the board authorized the committee to notify the companies that they must signify by June 28, 1911, whether they will accept the division of territory proposed in the report.

Mayor Gaynor made known on June 19, 1911, that he would favor the adoption of the McAneny report dividing contracts for new subways between the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company. Mr. Gaynor said:

"Mr. Seth Low, formerly Mayor, called on me to discuss the subway report. He has been of the utmost service to the officers and to the city in this matter. The committee appointed by the Chamber of Commerce and the Merchants' Association some time ago, of which Mr. Low is chairman, is to meet on June 20, 1911, and I hope that with Mr. Low's advice it will ratify the subway report and help us in passing it and carrying it out. Of course, there are still a number of things unsettled. I do not mind saying I have asked Mr. Low to have a sub-committee of his committee appointed to give us its assistance hereafter in settling disputed things and framing the contracts. Much yet remains to be done."

Brief Filed in Detroit Rental Suit.—Corporation Counsel Hally has filed a supplemental brief in the case of the City of Detroit against the Detroit (Mich.) United Railway in an effort to collect a rental of \$200 a day for the use of the streets occupied by the Fort Street line. He denies that the company is in possession of the streets in the sense of possession of real estate, because it uses the streets for traffic, and only a portion of the space at that. He says that under present laws the company could be dispossessed even if operating under a contract with the city.

Important Tax Decision at Columbus, Ohio.—Judge Dillon in Common Pleas Court at Columbus, Ohio, has decided against the Ohio Electric Railway in its suit against the State Tax Commission to enjoin the commission from requiring that revenue derived from the company's terminal building in Cincinnati should be included in the report of its gross earnings. The commission entered a demurrer to the petition and this was sustained by the court, which held that the company is prevented from seeking a remedy in a court of equity. The case will be carried to the Supreme Court.

Oak Park Elevation Ordinance Passed.—The Oak Park village board on June 15, 1911, passed an ordinance to require the Chicago & Oak Park Elevated Railroad to elevate its tracks in Oak Park. No provision was made in the ordinance for a 5-cent fare to Chicago, and the measure passed, with a few minor amendments, is the one submitted to the board by Clarence A. Knight, president of the company. The company is given until July 1, 1913, to complete the work of elevation. The ordinance calls for an earth embankment, with concrete retaining walls, from Austin Avenue, the eastern boundary of the village, to Wisconsin Avenue, the terminus of the road.

Decision in Car Tax Case.—Judge R. C. Stewart, of the Court of Common Pleas of Northampton County, has rendered a decision in the case of the City of Easton, Pa., against the Phillipsburg (N. J.) Horse Car Railroad to recover a tax on cars doing an interstate commerce business. The company operates between Phillipsburg, N. J., and Easton, Pa., and Judge Stewart held that the ordinance imposing a tax of \$25 on each car of the company was a burden imposed on the company contrary to the provision of the Constitution of the United States with reference to interstate commerce and that the defendant was not liable for the payment of license fees under the ordinance.

Want Proposed Cincinnati Subway Operated at Three-Cent Fare.—At a meeting of the Federated Improvement Association of Cincinnati on June 8, 1911, a resolution was adopted requesting the city to build a subway under the Miami & Erie Canal within the city limits and lease it to an operating company on a three-cent fare basis. The plan suggested would provide branches along Queen City Ave-

nue for the development of Price Hill and Westwood and skirting Bond Hill on the south and Norwood on the north. One of the delegates asked to have the transportation committee instructed to investigate the franchise of the Cincinnati Traction Company. This franchise is subject to revision in 1916, at the end of the first twenty-year period.

Key Route Improvements at Oakland.—Plans for improvements that will double the capacity of the San Francisco, Oakland & San José Railroad through Oakland and Berkeley, Cal., are nearly completed. In addition to converting the pier of the company into a solid mole it is proposed to enlarge the ferry depot and slips at the end of the mole and to carry all trains through the depot on a series of loops instead of having them sent in and out on straight single tracks as at present. The loop is to be constructed on a solid foundation of earth and concrete, instead of upon piling, and the whole space within the loop and beneath the depot building will be filled in. The loop system, it is claimed, will greatly facilitate the handling of passengers and will shorten the running time of trains.

Electric Railway Development in Uruguay.—A long report has been received by the Bureau of Manufactures of the Department of Commerce and Labor at Washington, D. C., from Frederick W. Goding, United States Consul at Montevideo, on the development of Uruguay. Mr. Goding says that the net receipts of the electric tramways of Montevideo for the year ended Oct. 1, 1910, were \$513,701, an increase over the previous year of \$106,501. The number of passengers carried in 1910 was 60,124,305, against 48,017,142 in 1909, and on the horse tramways 2,632,354 in 1910 and 2,391,112 in 1910. The government, at present part owner of the lines, is studying a plan to nationalize and electrify the horse tramway system. Plans are being prepared for building an electric railway from Montevideo to Punta del Este, a favorite summer resort near Maldonado. Mr. Goding says that "the opportunities for the sale of American electrical goods and machinery in Uruguay are unlimited, but do not seem to arouse the interest of American manufacturers."

Improvements in St. Louis.—The United Railways, St. Louis, Mo., is reconstructing 25 miles of track at a cost of \$750,000. Of this mileage about 15 miles are practically completed. Twenty-five new semi-steel cars have been placed in operation and an equal number will be placed in service by Jan. 1, 1912. The roadway and car expenditure for 1911 will exceed \$1,000,000. When this year's improvements are completed, all the lines in the heart of St. Louis will have been rebuilt, except that on Locust Street, and this work will be done as soon as contracts are let by the city for the street paving. The McPherson line has been reconstructed from end to end, the Easton from end to end, and the Manchester from end to end. The Delmar line will be reconstructed from end to end when the city decides as to the kind of crossing which should be constructed at the Wabash station. The strip adjacent to the Wabash station is the only part of the line not rebuilt. The reconstruction on the Manchester line is in advance of street paving. The thoroughfare will be paved to the city limits.

Ladies' Day Outing of New England Street Railway Club.—The ladies' day outing of the New England Street Railway Club will be held at Uncanoonuc Mountain, Goffstown, N. H., on Thursday, June 29, 1911. The start from Boston will be made by special train at 9:15 a. m. Manchester, N. H., will be reached at 10:45 a. m., and at 11:45 a. m. the party is due to arrive the summit of the mountain. Returning, the special train will leave Lowell at 7:45 p. m. and arrive at the North Station, Boston, at 8:25 p. m. Dinner will be served at the Uncanoonuc Casino, on Uncanoonuc Mountain, N. H. Through the courtesy of the Manchester Street Railway, special cars will be furnished from Manchester to the base of the mountain and, returning, to Pine Island Park and Hudson Bridge; and also admission to all amusements at Pine Island Park. Through the courtesy of the Boston & Northern Street Railway, special cars will be furnished from Hudson Bridge to Lake View Park and Lowell, and also admission to Lake View Park. Tickets for the day's entertainment, including dinner, lunch and transportation are \$2.50 each.

LEGISLATION AFFECTING ELECTRIC RAILWAYS CONNECTICUT.

The deciding vote taken in the Connecticut House on June 15, 1911, on the proposed public utilities bill resulted in a tie, 118 to 118, which was broken by Speaker Scott in favor of the amended majority report. A vote to reconsider was made and defeated, which will prevent the House from taking the matter up again this session. The Senate, after passing the minority report last week, also became deadlocked, so there is little likelihood of a utility measure being passed at this session. The majority bill differed from the minority measure in that it provided for two commissions instead of one, with lesser penalties attached to violations of their orders. The present Railroad Commission would have been continued, with the same jurisdiction, while another commission would have been created by it to control all other public service corporations.

MASSACHUSETTS

Several bills have been filed in the Senate in connection with the proposed extension of the lease of the West End Street Railway to the Boston Elevated Railway. As announced last week, the Boston Elevated Railway interests favor a bill which would provide for a fifty-year extension of the lease of the West End Street Railway, with the provision that leases of existing and prospective subways expire in 1936 with the probability of further extension for twenty-five years. Another section of the bill would provide for the construction of subways to Dorchester, the South Station, under Boylston Street, and an extension of the East Boston tunnel to the Charles River district of the West End Street Railway. The company takes the position that it cannot afford to bind its stockholders to meet the annual charges upon additional subways unless assured of a more permanent foothold in the community than is now the case. A protracted debate is anticipated when the measure comes up for consideration in the Senate. Senator Tinkham has filed substitute bills which would separate the question of West End Street Railway and Boston Elevated Railway relations from the subway acts and provide for the consolidation of the two companies with leases limited to twenty-five years.

The bill to give the Boston & Eastern Electric Railroad a certificate of exigency has been passed to a third reading in the Senate without dissent. Senator Schoonmaker has announced that the appearance of the bill at the engrossment stage will result in an attempt to amend it by a provision that the act shall become null unless within four months after its passage the company shall have subscribed in good faith to its capital stock not less than \$4,000,000, of which at least \$1,000,000 shall have been paid into the State treasury. From the latter amount, upon orders of the company certified by the railroad commission, the treasurer is to pay out such sums as may be demanded for the purchase of land and cost of construction, but not exceeding 50 per cent of such cost. At a recent committee session C. S. Mellen, president of the New York, New Haven & Hartford Railroad, announced that if the bill giving the company the right to purchase the Boston, Revere Beach & Lynn Railroad and to build a tunnel under Boston Harbor should pass the Boston, Revere Beach & Lynn Railroad would be electrified at the earliest possible date.

OHIO.

The Winters public utilities bill became a law on June 14 without the approval of Governor Harmon. Under the new law the Railroad Commission of Ohio will become the Public Service Commission of Ohio and electric railways and interurban railways will be subject to all the laws and rules governing steam railroads. The law becomes operative June 30, 1911. The bill places interurban railways in the same class as steam railroads. Upon the order of the commission a company may issue stocks, bonds, notes or other evidences of indebtedness, payable at periods of more than twelve months after date. The manner of hearing in cases of this kind is set out in full and the order issued by the commission must state clearly the kind of securities that may be issued, the term they are to run and the rate of interest.

Financial and Corporate

New York Stock and Money Markets

June 20, 1911.

On the New York Stock Exchange during the week the volume of sales decreased slightly, but price changes were few and unimportant. Heavy subscriptions to the \$30,000,000 Chinese government loan and the \$50,000,000 Panama Canal bond issue were important incidents of the week. The market to-day was dull, with a downward tendency. No marked change has occurred in the money market, and rates are still at the level of recent weeks. Quotations to-day were: Call $2@2\frac{1}{2}$ per cent; ninety days, $2\frac{1}{2}@2\frac{3}{4}$ per cent.

Other Markets

In Philadelphia announcement of the first plans to rehabilitate the Philadelphia Rapid Transit properties caused interest in traction shares.

Prices declined slightly in Chicago to-day. Trading has been light throughout the week, accompanied by minor price changes.

The Boston market has been interested chiefly in the copper shares, with mild activity and varied prices the record of the week.

United Railways income bonds were in good demand on the Baltimore market to-day, with general trading quiet and prices but slightly changed.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 13.	June 20.
American Light & Traction Company (common).....	a295	a295
American Light & Traction Company (preferred).....	a107	a108
American Railways Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a43	a43
Aurora, Elgin & Chicago Railroad (preferred).....	a86	a88
Boston Elevated Railway.....	129½	129½
Boston Suburban Electric Companies (common).....	a15½	a16
Boston Suburban Electric Companies (preferred).....	a75	75
Boston & Worcester Electric Companies (common)...	9	10
Boston & Worcester Electric Companies (preferred)...	a51	a51
Brooklyn Rapid Transit Company.....	81½	80¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s....	86	85
Capital Traction Company, Washington.....	a129	127½
Chicago City Railway.....	a195	a195
Chicago & Oak Park Elevated Railroad (common)....	2	2
Chicago & Oak Park Elevated Railroad (preferred)...	6	6
Chicago Railways, pteptg., ctf. 1.....	a84	a84
Chicago Railways, pteptg., ctf. 2.....	a22	a22
Chicago Railways, pteptg., ctf. 3.....	a10	a9½
Chicago Railways, pteptg.....	a6	a5½
Cincinnati Street Railway.....	a133	*133
Cleveland Railway.....	a97½	a96
Columbus Railway (common).....	a96	96
Columbus Railway (preferred).....	a101	101
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105½	a105½
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a100	a100
Detroit United Railway.....	74	a74
General Electric Company.....	164	163¼
Georgia Railway & Electric Company (common).....	150	151
Georgia Railway & Electric Company (preferred).....	92	93
Interborough Metropolitan Company (common).....	19½	18½
Interborough Metropolitan Company (preferred).....	52	51½
Interborough Metropolitan Company (4½s).....	79½	77½
Kansas City Railway & Light Company (common)...	a19	a19
Kansas City Railway & Light Company (preferred)...	a44	a44
Manhattan Railway.....	a139½	137½
Massachusetts Electric Companies (common).....	a23½	a23
Massachusetts Electric Companies (preferred).....	a90¾	a92¾
Metropolitan West Side, Chicago (common).....	a26	a26¼
Metropolitan West Side, Chicago (preferred).....	a72½	a72
Metropolitan Street Railway, New York.....	15	15
Milwaukee Electric Railway & Light (preferred)...	*110	*110
North American Company.....	75½	74½
Northern Ohio Light & Traction Company.....	48	*48
Northwestern Elevated Railroad (common).....	27½	a27¾
Northwestern Elevated Railroad (preferred).....	a69	a67
Philadelphia Company, Pittsburgh (common).....	56½	a56½
Philadelphia Company, Pittsburgh (preferred).....	43¾	a44½
Philadelphia Rapid Transit Company.....	19½	19½
Philadelphia Traction Company.....	86½	a87¼
Public Service Corporation, 5% col. notes (1913)...	101	101
Public Service Corporation, ctf.	a107	a107
Seattle Electric Company (common).....	a111	a111
Seattle Electric Company (preferred).....	a103	a103
South Side Elevated Railroad (Chicago).....	a77	77
Third Avenue Railroad, New York.....	10½	11
Toledo Railways & Light Company.....	8	8
Twin City Rapid Transit, Minneapolis (common)....	a109½	a108¼
Union Traction Company, Philadelphia.....	49¼	a49¼
United Rys. & Electric Company, Baltimore.....	*18¼	18¾
United Rys. Inv. Co. (common).....	41	37½
United Rys. Inv. Co. (preferred).....	71	68½
Washington Ry. & Electric Company (common).....	35	35½
Washington Ry. & Electric Company (preferred).....	88¾	89¼
West End Street Railway, Boston (common).....	a91½	a90½
West End Street Railway, Boston (preferred).....	a104½	104
Westinghouse Elec. & Mfg. Co.....	76½	76
Westinghouse Elec. & Mfg. Co. (1st pref.).....	118¾	a118¾

a Asked. * Last sale.

ANNUAL REPORTS •

Northern Ohio Traction & Light Company

The income account for the last two years compares as follows:

Year Ended Dec. 31.	1909.	1910.
Gross earnings.....	\$2,177,641	\$2,437,426
Operating expenses and taxes.....	1,190,057	1,348,963
Net earnings.....	\$987,584	\$1,088,463
Interest on bonds and collateral trust notes.....	524,065	521,069
Available for company's uses.....	\$463,519	\$567,394
Dividends.....	157,500	225,000
Balance surplus for years ended Dec. 31.....	\$306,019	\$342,394
Surplus on Dec. 31, 1908 and 1909.....	782,941	947,166
Total surplus Dec. 31.....	\$1,088,960	\$1,289,560
Charged for depreciation, reconstruction, discount on bonds, etc.....	141,794	214,748
Balance surplus, Dec. 31.....	\$947,166	\$1,074,812
Average mileage in operation.....	214.88	215.20

Earnings and expenses in detail for the two years were as follows:

Earnings.	1909.	1910.
Passengers.....	\$1,875,334	\$2,080,136
Light and power.....	156,614	204,434
Car mileage.....	4,245	4,421
Freight, etc.....	58,596	67,422
Parks.....	69,746	70,309
Interest and discount.....	5,469	5,496
Miscellaneous.....	7,637	5,208
Total.....	\$2,177,641	\$2,437,426
Expenses.	1909.	1910.
Maintenance way and structures.....	\$140,180	\$174,326
Maintenance equipment.....	173,221	212,238
Operating power plants.....	267,342	291,590
Conducting transportation.....	365,718	399,231
General.....	243,596	271,578
Total.....	\$1,190,057	\$1,348,963

H. A. Everett, the president, says in his report, in part:

"The total expenditure for additions and improvements for the year was \$309,779. During the year extensive repairs and renewals have been made on the various divisions of the company by way of reballasting, placing new ties and the laying of new rails. Twenty-eight thousand one hundred and thirty-three ties have been renewed. The tracks of the company are now in first-class condition in every particular.

"The rolling stock and electrical equipment of the company have been maintained in good, first-class operating condition. Twenty additional cars, including equipment, were placed in service during the fiscal year.

"The Canton car barns and shops were equipped with an automatic sprinkling system, and for the location of the new proposed carhouses and repair shops the company has purchased, in the city of Akron, eight acres of real estate favorably situated for this purpose.

"On April 1, 1910, your board of directors authorized the creation of a pension fund from the earnings, on a basis of $\frac{1}{4}$ of 1 per cent, for the benefit of employees who have grown old in the service or become totally disabled in the performance of their duties, such employees to be retired on 40 per cent of their wages, based upon ten hours per day.

"The policy adopted by your company in charging from income account a substantial amount for depreciation has been continued, making a total to the credit of this fund Dec. 31, 1910, of \$400,000."

Washington Water Power Company

Results of operation in the year ended Dec. 31, 1910, were as follows:

Gross receipts.....	\$3,155,223
Expenses, including taxes.....	1,678,540
	\$1,476,683
Interest on bonds, less interest on work during construction.....	\$223,424
Premium on bonds exchanged and redeemed.....	4,947
Interest on loans.....	12,772
Profit and loss.....	2,367
Written off for depreciation of plant.....	314,400
	\$918,773
Dividends paid at the rate of 7 per cent, and an extra dividend of 1 per cent.....	708,231
	\$210,542
Surplus from 1909.....	860,499
Surplus Dec. 31, 1910.....	\$1,071,041

D. L. Huntington, the president, said in part:

"During 1910 the outstanding capital stock of the com-

pany was increased April 1, by the issue of 30 per cent at par, from \$7,223,200 to \$9,390,100, and a further issue of 25 per cent was taken Jan. 3, 1911, making the total amount now outstanding \$11,737,600. In anticipation of the stock issue of Jan. 3, 1911, the company borrowed in all \$775,000 toward the end of the year, which was paid off on Jan. 3.

"During 1910 \$42,000 of collateral trust bonds have been exchanged for first refunding mortgage bonds, leaving only \$245,000 of the former now outstanding. Also \$109,000 of first refunding mortgage bonds have been retired by operation of the sinking fund provision of the first refunding mortgage, leaving \$5,593,000 outstanding, of which \$400,000 are still in the treasury.

"The estimates of expenditures for 1911 have now been completed and the board of trustees has decided to make the next issue of stock on Jan. 2, 1912, to the extent of 20 per cent, and to allow prepayment thereof on Nov. 1 and Dec. 1 at a rate of interest to be determined later in the year.

"During the year we have relaid with 70-lb. steel rails, and paved between our rails, 11.09 miles of track. We have double-tracked 1.56 miles of road and extended our lines 7.9 miles. We have added ten passenger cars and one motor car to our equipment. We have equipped our interurban railway lines with an automatic block signal system of the most modern and efficient type."

The following comparative statement regarding the railway system is published:

Years.	Miles of Track.	Passengers Carried.	Car Miles Run.	Car Hours Run.
1903	42	8,209,740	1,409,458	194,132
1904	50.39	9,208,058	1,745,790	239,190
1905	72.52	11,210,958	2,242,143	292,745
1906	82.94	13,915,570	2,914,502	378,263
1907	96.21	17,249,527	3,111,563	398,820
1908	97.55	19,520,942	3,393,479	420,836
1909	100.96	21,842,767	3,624,586	435,541
1910	108.92	24,730,145	3,990,653	465,516

These statistics cover the whole system excepting passengers carried, which are for city lines only.

The report says that the property of the company is carried on its books at actual cost, notwithstanding that there is a considerable increase in its market value.

In the balance sheet as of Dec. 31, 1910, the value of the street railway property, city and interurban, is stated as \$3,918,244.

Federal Utilities, Incorporated

Announcement has been made of the organization under the laws of Virginia of the Federal Utilities, Incorporated, with an authorized issue of \$3,000,000 of 6 per cent cumulative preferred stock and \$3,000,000 of common stock, of which \$1,000,000 of the former and \$2,000,000 of the latter have been issued. The company will acquire and sell the securities of public utilities and other corporations having established earnings.

The company will begin operations at once. There has already been paid into the treasury \$1,000,000. The capital stock will be invested in various dividend-paying securities of companies, chiefly public utilities.

The preferred stock has preference both as to principal and dividends. It is expected that the company's revenues will furnish funds sufficient to pay in full the 6 per cent dividend for 1911 on the \$1,000,000 preferred stock outstanding. In addition to the income and profits which will result from the ownership of securities, it is expected that the company will derive its largest profit from the sale of bonds, stocks, notes and other securities to bankers and other investors. Under its charter the company may issue its own bonds secured by the bonds of other companies as collateral.

The executive committee of the company follows: De Forest Condee, formerly of Lee, Higginson & Company; Anson W. Burchard, assistant to the president of the General Electric Company; Samuel McRoberts, vice-president of the National City Bank; Thomas A. Reynolds, of the National City Bank, and Harrison Williams, who is associated with the American Gas & Electric Company, the Federal Light & Traction Company and the Springfield Railway & Light Company. Mr. Condee is president of the new company.

Chicago (Ill.) Railways.—The local transportation committee of the City Council of Chicago has been empowered to appraise the lines of the Chicago Southern Traction Company within the city limits, preparatory to their purchase by the Chicago (Ill.) Railways. If the purchase is made the Chicago Railways will acquire all the properties of the Chicago Southern Traction Company within the city limits.

Danville Railway & Electric Company, Danville, Va.—Local capitalists at Danville are reported to have secured an option on the controlling interest in the Danville Railway & Electric Company, which is held by W. J. Payne, Richmond, Va., president, and J. F. Rison, Danville, vice-president.

Escanaba (Mich.) Traction Company.—Tweedy, Underwood & Edgar, Milwaukee, Wis., are offering for subscription \$150,000 of first and refunding mortgage 5 per cent gold bonds of the Escanaba Traction Company, dated Aug. 12, 1909, and due \$10,000 annually from 1914 to 1933, inclusive. The balance of the issue, of which the total authorized is \$600,000, is due in 1934, but the bonds which remain outstanding are callable at 103 and interest upon any interest date. The Michigan Trust Company, Grays Harbor, Mich., is the trustee of the mortgage.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has made a mortgage to the Guaranty Trust Company, New York, N. Y., as trustee, to secure an issue of \$1,250,000 of first mortgage 5 per cent fifty-year gold bonds dated Feb. 1, 1911, and due in 1961, but subject to call on any interest date at 105 and interest. Of the new bonds \$62,500 are reserved to retire bonds of the same amount due Jan. 1, 1961, issued under a mortgage of Oct. 1, 1910, and \$98,000 for other indebtedness. The remaining \$1,089,500 of bonds will be issued on account of the construction of 33 miles of railroad from Fresno, Cal., to Kingsburg and Sanger at \$33,000 per mile.

Interstate Railways, Philadelphia, Pa.—An initial semi-annual dividend of 3 per cent has been declared on the \$1,000,000 of new 6 per cent cumulative preferred stock of the Interstate Railways, payable on July 5, 1911, to holders of record on June 20, 1911.

Jacksonville (Fla.) Traction Company.—Stone & Webster, Boston, Mass., and Estabrook & Company, Boston, Mass., and Chicago, Ill., offer for subscription at 96½ and interest to yield more than 5¼ per cent, \$750,000 of first consolidated mortgage 5 per cent gold bonds of the Jacksonville Traction Company, dated March 1, 1911, and due March 1, 1931, but callable as a whole or in part for the sinking fund at 105 and interest. Interest is payable in May and September at the office of the State Street Trust Company, Boston, Mass., trustee of the issue.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe in the United States Circuit Court has adjourned the sale of the property of the Metropolitan Street Railway under foreclosure from June 22, 1911, to Sept. 21, 1911. W. L. Turner, special master in the suit of the Pennsylvania Steel Company and the Degnon Contracting Company against the New York City Railway, has filed his report in the United States Circuit Court in the matter of Charles Brenner and others as a committee of the tort creditors of the New York City Railway. After reviewing the testimony taken before him, Mr. Turner said that the lease made by the Metropolitan Street Railway on Feb. 14, 1902, to the Interurban Street Railway, now the New York City Railway, should be decided to have been no longer in effect after the appointment of receivers by the court on Sept. 24, 1907; that from the latter date to July 31, 1908, Adrian H. Joline and Douglas Robinson were acting in a dual capacity as receivers of the Metropolitan Street Railway and the New York City Railway. He further finds that without prejudice to the rights of any creditor of the New York City Railway to claim preference therein over the Metropolitan Street Railway or any of its creditors, secured or unsecured, the receipts of the receivers between these dates are to be credited to the Metropolitan Street Railway; that such moneys, materials, supplies or other property as belonged to the New York City Railway on Sept. 24, 1907, and were not subject to the lease

made by the Metropolitan Street Railway to the Interurban Street Railway, and all proceeds, earnings, rents and profits that were not subject to this lease should be credited to the receiver of the New York City Railway. The special master holds that Receivers Joline and Robinson at no time adopted this lease in respect to the property of the New York City Railway. The Farmers' Loan & Trust Company, successor of the Morton Trust Company, as trustee under the mortgage made by the Metropolitan Street Railway in March, 1902, to the New York City Railway, has filed in the United States Circuit Court exceptions to Special Master Turner's report.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—H. M. Byllesby & Company, Chicago, Ill., are reported to have secured control of the Pueblo & Suburban Traction & Lighting Company through the purchase of the holdings of M. D. Thatcher, T. H. Devine and J. F. Vail.

Schuylkill & Dauphin Traction Company, Pottsville, Pa.—A meeting of the stockholders of the Schuylkill & Dauphin Traction Company has been called for July 29, 1911, to authorize an increase in the bonded indebtedness of the company from \$62,880 to \$67,880.

Springfield Railway & Light Company, Springfield, Mo.—The Springfield Railway & Light Company has sold an issue of \$2,000,000 of first lien fifteen year 5 per cent sinking fund gold bonds to Lee, Higginson & Company, Boston, Mass. The bonds are part of an authorized issue of \$7,000,000, of which the balance of \$5,000,000 is reserved for additions and improvements. The bonds are substantially a first lien on the entire property of the system, being secured by a first mortgage on all capital stock, mortgage bonds and notes of the two subsidiary companies, with the exception of certain non-callable bonds. The bankers are offering the issue at 96 and interest to yield 5.40 per cent.

Susquehanna Railway, Light & Power Company, New York, N. Y.—An initial dividend of 1 per cent has been declared on the \$4,134,500 of common stock of the Susquehanna Railway, Light & Power Company, payable on July 1, 1911, to holders of record on June 15, 1911.

Titusville (Pa.) Electric Traction Company.—The stockholders and directors of the Titusville Electric Traction Company have authorized an increase in the bonded indebtedness of the company from \$300,000 to \$1,250,000, to provide for constructing and equipping 34 miles of line. The proceeds will be used specifically to extend the present line of the company northward to Cambridge Springs, Crawford County, Pa., about 17 miles from the present terminal, and for an extension southward to Oil City, Venango County, Pa., about 17 miles from Titusville.

Toronto (Ont.) Suburban Street Railway.—Announcement has been made that the Toronto Suburban Railway has been purchased by Sir William MacKenzie, president of the Toronto Railway.

Virginia Railway & Power Company, Richmond, Va.—A special meeting of the stockholders of the Virginia Railway & Power Company has been called for June 24, 1911, to vote on the agreement entered into between the directors of the company and the directors of the Norfolk & Portsmouth Traction Company to merge the companies in accordance with the terms which were given in the ELECTRIC RAILWAY JOURNAL of May 27, 1911, page 930.

Dividends Declared

American Cities Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred; 2½ per cent, common.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¼ per cent.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbus (Ga.) Electric Company, 3 per cent, preferred.

Frankford & Southwalk Passenger Railway, Philadelphia, Pa., quarterly, \$4.50.

Traffic and Transportation

New Jersey Employers' Liability Act

A formal notice has been sent to each employee of Public Service Railway, Public Service Gas Company, Public Service Electric Company and Public Service Corporation of New Jersey, Newark, N. J., directing attention to the provisions of the Employers' Liability and Workmen's Compensation act, which becomes effective in New Jersey on July 4, 1911. Duplicates of this notice, which is appended, printed on cardboard and enlarged, have been posted in all the carhouses, shops, terminals and other places so as to be conspicuous and attract the attention of employees. The welfare committee, of which John J. Burleigh, second vice-president of the Public Service Corporation, is chairman, is arranging for a series of meetings of employees at which the purpose and probable effects of the act will be clearly set forth so that all may understand its provisions. The notice to the employees follows:

"The Legislature of the State of New Jersey during its latest session passed an act entitled 'an act prescribing the liability of an employer to make compensation for injuries received by an employee in the course of employment, establishing an elective schedule of compensation, and regulating procedure for the determination of liability and compensation thereunder' (Chapter 95, New Jersey Laws, 1911), which act goes into effect on July 4, 1911.

"The law provides for an elective system of compensation to be paid by the employer to an employee injured in the course of his employment, irrespective of the negligence of the employer.

"Public Service Corporation of New Jersey, Public Service Railway, Public Service Gas Company and Public Service Electric Company, being desirous of co-operating with public sentiment to which the Legislature has given expression, and believing that their employees will be benefited thereby, are willing, notwithstanding the increased expense of so doing, to enter into agreements with their respective employees for the acceptance of the provisions of Section 2 of said act. The companies, therefore, desire an expression of opinion from their respective employees as to their acceptance or rejection of the act, and to facilitate the same will shortly give to each employee an opportunity for such acceptance or rejection in writing.

"As it is desirable that employees should be familiar with the provisions of the act before signing an acceptance of Section 2 thereof, copies of the law may be had on application to the foreman or superintendent of the various carhouses, shops or stations.

"Any employee receiving compensation under this act on account of injuries arising from accidents will not be entitled, on account of such injuries, to compensation under the welfare plan now in force."

Accident Prevention Campaign in Kansas City

The Metropolitan Street Railway, Kansas City, Mo., has prepared a general plan for conducting its campaign to make street car ethics a feature of instruction in the public schools of that city. When the subject was first taken up by the company the idea was to confine the presentation to such information as would help to prevent accidents, but it was decided by H. P. Crouse, special agent to the president, that other things might properly and profitably be added. The plan is to discuss on slips printed for distribution to the pupils as often as once a week, or perhaps twice a month, the special subjects selected with the hope that after the children have read them they will take the slips home to their parents. The distribution of the printed slips will be supplemented by chapel talks once a month on the same subjects treated more liberally.

Among the subjects selected for the printed slips are the following: Getting off and on cars safely; perils to avoid; in the case of an accident, the disposal of the crowd; the conductor's duty; the passenger's duty; the right to a seat; delays in the service—what they mean; private conduct on the car; good rules for children; the dog, the suitcase and the bundle; the public interest in a low cost of

ELECTRIC RAILWAY MONTHLY EARNINGS

BROCKTON & PLYMOUTH STREET RAILWAY.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., April, '11	\$8,277	\$6,660	\$1,617	\$1,561	\$55
1 " " '10	8,744	6,581	2,163	1,807	356
12 " " '11	119,600	85,449	36,152	19,243	16,909
12 " " '10	129,792	93,677	36,115	20,872	15,243

CAPE BRETON ELECTRIC COMPANY.

1m., April, '11	\$23,332	\$12,328	\$11,003	\$6,137	\$4,876
1 " " '10	24,897	13,493	11,404	6,161	5,244
12 " " '11	327,303	169,856	157,447	73,729	83,719
12 " " '10	302,472	169,902	132,570	74,083	58,487

DALLAS ELECTRIC CORPORATION.

1m., April, '11	\$125,387	\$83,119	\$42,269	\$27,797	\$14,472
1 " " '10	113,406	74,510	38,896	26,599	12,297
12 " " '11	1,527,202	968,529	558,674	313,158	245,517
12 " " '10	1,371,826	877,527	494,299	328,226	166,074

GALVESTON ELECTRIC COMPANY.

1m., April, '11	\$34,622	\$17,349	\$17,274	\$8,543	\$8,730
1 " " '10	26,145	18,273	7,872	6,446	1,427
12 " " '11	385,904	216,932	168,972	95,560	73,413
12 " " '10	367,600	228,510	139,091	76,765	62,325

HOUGHTON COUNTY TRACTION COMPANY.

1m., April, '11	\$25,509	\$12,810	\$12,699	\$6,491	\$6,208
1 " " '10	24,248	13,479	10,769	6,317	4,453
12 " " '11	306,123	166,126	139,997	78,372	61,626
12 " " '10	322,125	167,617	154,508	76,008	78,450

NORTHERN TEXAS ELECTRIC COMPANY & SUBSIDIARY CO.

1m., April, '11	\$126,681	\$67,123	\$59,558	\$25,354	\$34,204
1 " " '10	111,280	61,001	50,278	19,081	31,198
12 " " '11	1,506,633	795,449	711,184	261,193	449,992
12 " " '10	1,319,993	714,952	605,040	209,711	395,329

PADUCAH TRACTION & LIGHT COMPANY & SUBSIDIARY CO.'S.

1m., April, '11	\$21,452	\$12,395	\$9,057	\$7,723	\$1,334
1 " " '10	20,389	12,342	8,047	7,047	1,000
12 " " '11	253,931	140,005	113,927	89,280	24,647
12 " " '10	234,796	140,899	93,897	81,694	12,203

SAVANNAH ELECTRIC COMPANY.

1m., April, '11	\$55,395	\$36,928	\$18,468	\$18,450	\$19
1 " " '10	50,651	32,740	17,910	17,901	9
12 " " '11	651,331	432,691	218,640	217,532	1,108
12 " " '10	608,256	395,066	213,190	211,134	2,056

SEATTLE ELECTRIC COMPANY & SUBSIDIARY COMPANIES.

1m., April, '11	\$452,178	\$257,695	\$194,483	\$115,501	\$78,982
1 " " '10	460,490	273,266	187,225	108,709	78,516
12 " " '11	5,585,558	3,139,671	2,445,887	1,319,891	1,125,996
12 " " '10	6,049,682	3,515,783	2,533,899	1,278,810	1,255,089

TAMPA ELECTRIC COMPANY.

1m., April, '11	\$55,309	\$28,765	\$26,544	\$6,996	\$19,648
1 " " '10	48,263	31,209	17,154	4,590	12,564
12 " " '11	603,567	325,130	278,437	71,866	206,571
12 " " '10	609,325	346,822	262,503	55,700	206,803

service; offensive habits in the car; individual rights on the car; how everybody can help to make the service good; integrity in the car; good nature in the car; patience and toleration in the car; the rules of the service; principle of the universal transfer; abuse of the universal transfer; humanity on the car; gentility on the car; the motorman's responsibility; important facts in creating good service; some frequent hindrances; maintenance of sanitary conditions; some interesting cost items; conditions governing frequency of service; what a big street car service means.

This list may be amplified from time to time, as subjects are suggested by experience.

Car Signs in New Haven.—The Connecticut Company has had new dasher signs prepared for use on its cars in New Haven so as to aid passengers to distinguish quickly the routes traversed by the cars.

Fewer Stops in Worcester.—The Worcester (Mass.) Consolidated Railway is endeavoring to improve the running time of its cars by eliminating all such special stopping places designated by poles painted white as are not likely seriously to inconvenience its patrons.

Toledo Trolley Trips.—The Toledo Railways & Light Company, Toledo, Ohio, has issued, with the title "Toledo Trolley Trips," an illustrated folder which gives all the information that the traveler by trolley could desire about places of interest on the lines of the Toledo Railways & Light Company and the Toledo & Western Railroad.

Service Between Los Angeles and Huntington Park.—The Pacific Electric Railway, Los Angeles, Cal., contemplates making important improvements in the near future in its service to Huntington Park. J. McMillan, general manager of the company, has stated that the fare between Huntington Park and Los Angeles will be reduced to 5 cents.

Prizes Awarded for Name for Los Angeles Trolley Trips.—The Pacific Electric Railway, Los Angeles, Cal., has awarded the first prize, \$20, in the contest for the name of its new trolley trip along the south coast for the name "Triangle Trolley Trip." The second prize, \$10, was awarded for the name "South Beach Trolley Trip." An additional prize of \$10 was awarded for a design for the trolley trip.

Articles No Longer to Be Carried by Utica & Mohawk Valley Railway.—On July 20, 1911, the Utica & Mohawk Valley Railway, Utica, N. Y., will add the following to the list of articles which will no longer be accepted by the company for transportation: Benzine, carbon oil, coal oil, cordage oil, gasoline, naphtha, neutral oil, petrolatum oil (illuminating or burning), and residuum; also empty barrels or carriers which have contained any of the above articles.

Report on Traffic in Jersey City.—The commission appointed some time ago by Mayor Wittpenn, of Jersey City, N. J., to consider plans for relieving traffic conditions in various parts of the city has submitted to the Mayor a plan by which it is hoped to relieve congestion in lower Jersey City and at the same time provide the facilities frequently urged by the merchants of the Newark Avenue shopping district. The Public Service Railway is willing to reroute its lines, but has stated that it cannot consider the construction of any extensions under the existing twenty-year franchise.

Conference with Employees in Philadelphia.—T. E. Mitten, acting chairman of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, conferred on June 16, 1911, with the representatives of the employees in regard to the wages of motormen and conductors. Mr. Mitten said that other meetings would be held, but that until the conferences were concluded no statements in regard to them would be made public. The relations of the company with its employees were summarized in the statement made by Mr. Mitten following his election to the company. This statement was published in full in the *ELECTRIC RAILWAY JOURNAL* of June 10, 1911, page 1033.

Service in Jacksonville.—The joint committee composed of members of the City Council and prominent citizens of Jacksonville, Fla., which was appointed some months ago to

take up with the Jacksonville Electric Company the question of extensions, improvements and service in Jacksonville, presented its report to the City Council on June 6, 1911. The report was read and then a motion was carried to have 300 copies of the report printed in pamphlet form and to insert the report in the daily papers. A statement by the Jacksonville Electric Company to the committee was published in part in the *ELECTRIC RAILWAY JOURNAL* of March 25, 1911, page 531. It contained a tabulation presented by the company to show that the new work of the company for 1911 would call for the expenditure of \$824,412.

Mayor of Kansas City Vetoes Ordinance to Permit Smoking.—Mayor Brown, of Kansas City, Mo., has vetoed the ordinance to permit smoking on the cars of the Metropolitan Street Railway in Kansas City. He said, in part, in vetoing the measure: "One of the fundamental principles underlying our popular form of government is that the functions of government should be exercised in such a manner as to bring about the greatest good to the greatest number. When a man, woman or child enters a street car the company contracts to transport the passenger to his or her destination with the greatest expedition and with due regard to the safety, health, comfort and convenience of the passenger. It would not, therefore, in my opinion, be doing the greatest good to the greatest number to enact a law which would compel the operators of public conveyances to permit a few to indulge in a habit or do a thing which would be a source of discomfort, annoyance and injury to health to the majority of those riding upon such public conveyance."

Through Service Between Sycamore and Marengo.—The Woodstock and Sycamore Traction Company, which has been operating between Sycamore and Genoa, Ill., a distance of 8 miles, began operating through cars on Saturday, June 10, between Sycamore and Marengo, a total distance of 23 miles. The company is running two McKeen motor cars on a three-hour schedule. The time between terminals, including all stops, is 65 minutes. On the opening day more than 200 passengers were carried at a time on several trips, the cars maintaining the schedule. The Sycamore station is near the terminal of the DeKalb-Sycamore & Interurban Traction Company. The terminal at Marengo is near the station of the Elgin-Belvidere Electric Company. The line of the Woodstock & Sycamore Traction Company touches five steam railroads and operates through a rich farming community. It will be extended to Woodstock and eventually will reach Waukegan and the lake region west of that city. The road is built on private right-of-way in the country, but the tracks occupy the streets in cities. The company will handle freight and express.

Fares on Albany Southern Railroad.—The Albany Southern Railroad, Hudson, N. Y., has filed with the Public Service Commission of the Second District of New York the following statement in regard to fares in Hudson: Local fares in Hudson (route: starting at New York Central & Hudson River Railroad over South Front, Warren, North Seventh and Columbia Streets to Cemetery, or to Boston & Albany bridge on Farmers' Turnpike). Round-trip fare: During May, June, July, August and September only (excepting Decoration Day, Independence Day and Labor Day) each year, from any starting point, one continuous trip over the entire Hudson City Railway trackage and back to original starting point, 5 cents; children under five years of age, when accompanied by parent or guardian, free, but not more than three children will be transported free with one person paying fare; children over five years of age, adult fare. Commutation tickets: Books containing 25 coupons, each good for transportation one way between any two points, \$1 per book. School commutation tickets: Books containing thirty-three coupons, each good for one single trip between any two points (for use of students regularly attending any public school), will be sold for \$1 per book. Chartered car rates: Single-truck open or closed cars for one way or round trip between any two points, between 6 a. m. and 11 p. m., \$5; between 11 p. m. and 6 a. m., \$3; new fares and rates. Effective July 12, 1911.

Personal Mention

Mr. Samuel J. Taylor has resigned as secretary of the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway.

Mr. De Forest Candee, formerly with Lee, Higginson & Company, Boston, Mass., has been elected president of the Federal Utilities, Incorporated, the organization of which is noted elsewhere in this issue.

Mr. S. D. Camden has been elected president of the Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., to succeed Mr. C. H. Shattuck, deceased. Mr. Camden was formerly treasurer of the company.

Mr. C. E. Lenhart, superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa., has tendered his resignation to take effect July 15, 1911. Mr. Lenhart has not at this time fully decided on his future plans.

Mr. H. E. Prior has resigned from the electrical department of the Illinois Traction System, Peoria, Ill., to become connected with the electrical department of the Cleveland, Painesville & Eastern Traction Company, Willoughby, Ohio.

Mr. Charles F. Fleming, secretary to Mr. C. H. Harvey, president of the Knoxville Railway & Light Company, Knoxville, Tenn., has been appointed manager of Chilhowee Park, near Knoxville, which is operated by the company. Mr. Fleming succeeds Eugene R. Roberts, who died recently. He will retain his present position in addition to managing the park.

Mr. W. F. Kelly, whose resignation as general manager of the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway was announced in the *ELECTRIC RAILWAY JOURNAL* of May 6, 1911, has been elected vice-president and general manager of the People's Water Company, San Francisco, Cal., of which Mr. Frank C. Havens is president.

Mr. David S. Bachman, superintendent of the Schuylkill & Dauphin Traction Company, Williamstown, Pa., has been appointed freight and traffic manager of the Midland Pennsylvania Railroad, but will retain the office of freight and traffic manager of the Schuylkill & Dauphin Traction Company. Mr. Edgar D. Rank will hereafter act as secretary, treasurer and superintendent of the Schuylkill & Dauphin Traction Company.

Mr. S. W. Greenland, who was appointed purchasing agent of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., recently, has also been appointed assistant general manager of the company in charge of the light and power department, to succeed Mr. M. J. Kehoe, whose resignation from the company to become connected with the Ft. Wayne Oil & Supply Company was noted in the *ELECTRIC RAILWAY JOURNAL* of June 17, 1911.

Mr. J. F. Harmer was elected president of the New England Security & Investment Company, Springfield, Mass., on June 19, 1911, to succeed Mr. L. S. Storrs, who it is reported will be elected a vice-president of the Connecticut Company and the Rhode Island Company, of which Mr. C. S. Mellen, president of the New York, New Haven & Hartford Railroad, is president. Mr. Harmer was also elected a trustee of the New England Security & Investment Company. He was formerly comptroller of the company.

Mr. J. J. Caulfield, who has been appointed superintendent of the lines of the Twin City Rapid Transit Company in St. Paul to succeed Mr. J. S. Pevear, has been connected with the Twin City Rapid Transit Company for more than three years. He was graduated from Cornell, and prior to entering the service of the Twin City Rapid Transit Company he was for some years with the commercial department of the General Electric Company. Mr. Caulfield was assistant to Mr. Willard J. Hield, vice-president and general manager of the Twin City Rapid Transit Company, before being appointed to succeed Mr. Pevear.

Mr. J. A. Trawick, whose appointment as manager of the Mississippi River Power Company, Keokuk, Ia., was an-

nounced in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, was tendered a banquet by the heads of the departments of the Tampa (Fla.) Electric Company, of which he was general manager, when he formally retired from the company. Mr. Trawick was presented with a loving cup by the employees as a token of esteem. The company with which Mr. Trawick has become connected is constructing a dam across the Mississippi River between Keokuk, Ia., and Hamilton, Ill., and will construct a large hydroelectric plant.

Mr. Charles F. Scott has been appointed professor of electrical engineering at Sheffield Scientific School by the Yale Corporation. Mr. Scott was president of the American Institute of Electrical Engineers in 1902-03 and has long been identified with the Westinghouse Electric & Manufacturing Company. His connection in recent years with that company has been of an advisory nature, and he has had the title of consulting engineer. Mr. Scott was graduated from Ohio State University in 1885 and afterward attended Johns Hopkins University. He has always shown a particular adaptability for educational work, and has been closely identified with the apprenticeship work at the Westinghouse Company, as well as that of the Casino School, which is run under the auspices of the company. He is therefore particularly well fitted for his new duties, upon which he will engage at the beginning of the fall term, Sept. 28, 1911.

Mr. D. F. Sherman, whose election as a vice-president of the Rhode Island Company, Providence, R. I., in charge of operation was noted in the *ELECTRIC RAILWAY JOURNAL* of June 17, 1911, succeeds Mr. H. A. Fabian, now manager of purchases and supplies for all of the lines operated or controlled by the New York, New Haven & Hartford Railroad, including the Boston & Maine Railroad, Maine Central Railroad and New England Navigation Company. Mr. E. G. Buckland's jurisdiction in regard to the Rhode Island Company, of which he is a vice-president, has not been changed. Mr. Buckland is a vice-president of the New York, New Haven & Hartford Railroad, a vice-president of the Connecticut Company and a vice-president of the New England Navigation Company, operating the Long Island Sound lines of the New York, New Haven & Hartford Railroad. Mr. Buckland, however, has not operated the property in Rhode Island since 1907. At that time the New York, New Haven & Hartford Railroad established an office at Washington in charge of Mr. Buckland and he relinquished the operation of the Rhode Island Company to Mr. H. A. Fabian.

OBITUARY

W. R. Brixey, of the Kerite Insulated Wire & Cable Company, New York, N. Y., died at his home in Norfolk, Conn., on June 9, 1911. Mr. Brixey was born in Southampton, Eng., in 1851.

Clarence A. Knight, president Chicago & Oak Park Elevated Railway, Chicago, Ill., died on June 21, 1911, following an operation for appendicitis. Mr. Knight was born at McHenry, Ill., on Oct. 28, 1850.

Mr. E. M. Kenly, vice-president, general manager and chief engineer of the Yakima Valley Transportation Company, North Yakima, Wash., died on June 10, 1911. Mr. Kenly was an associate member of the American Society of Civil Engineers.

Charles Allen Bodwell died on June 6, 1911, at Sanford, Maine, aged fifty-three years. He was one of the promoters of the Mousam River Electric Railroad, which became the nucleus for the present Atlantic Shore Electric Railroad, and was superintendent of the company from 1894 to 1903.

Capt. James W. Hinkley, Jr., president of the Poughkeepsie & Wappinger's Falls Electric Railway, Poughkeepsie, N. Y., died on June 19, 1911, at the home of his mother in Poughkeepsie. Capt. Hinkley was forty years old. He was graduated at West Point, and was for two years an instructor in mathematics at the United States Military Academy. He retired from the army in 1904. Capt. Hinkley was second vice-president of the Street Railway Association of the State of New York, and from 1908 to 1910 was a member of the executive committee of that organization.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Mt. Carmel Railroad, Hamden, Conn.**—Application for a charter has been made in Connecticut by this company to build an electric railway from Hamden to Mt. Carmel. Capital stock, \$50,000. Incorporators: Willis M. Cook and Charles F. Clarke.

***Boise-Council-Ladronne Railway, Lewiston, Idaho.**—Application for a charter has been made in Idaho by this company to construct an electric railway from Council, through Adams County and the Seven Devils section. Preliminary surveys have been completed. Capital stock, \$2,000,000. Incorporators: E. W. Rowman, C. M. Hail, D. S. Manville, Harry C. Wyman and George H. Bener.

St. Louis, Arcadia & Jefferson City Railway, St. Louis, Mo.—Chartered in Missouri to build a 15-mile interurban railway between Russell Place, St. Louis, and Fenton, Mo. Capital stock, \$250,000. Officers: E. F. Kinney, St. Louis, president; Charles F. Vogel, St. Louis, vice-president; T. G. Portis, St. Louis, secretary and treasurer. [E. R. J., April 15, 1911.]

Masontown-Morgantown Street Railway, Uniontown, Pa.—Application for a charter has been made by this company in Pennsylvania to build a 4-mile electric railway between Masontown and New Geneva. It will connect at Masontown with the West Penn Railway and will be operated as an extension of that line. Incorporators: Byron Trimble, C. W. Scheck, A. Dubois, Charles C. McBridge and W. F. Craig.

Wenatchee (Wash.) Traction Company.—Incorporated in Washington to build an electric railway in Wenatchee. Capital stock, \$250,000. Incorporators: Louis W. Pratt, president; J. R. Askew, W. M. Harvey, Henry Hewitt, Jr., and A. A. Hilton. [E. R. J., April 29, 1911.]

***Charleston-Dunbar Traction Company, Charleston, W. Va.**—Chartered in West Virginia to build an electric railway from Charleston to Dunbar. Capital stock, \$150,000. Incorporators: Fred Paul Grosscup, Paul B. Grosscup, W. C. Davisson, J. Gluck and H. D. Rummell, all of Charleston, W. Va.

***Mount Morris-Morgantown Traction Company, Morgantown, W. Va.**—Application for a charter will be made by this company in West Virginia to build an electric railway between Mount Morris, Maidsville, Jimtown and Morgantown. Work has been begun on the preliminary survey. It will connect with the Morgantown & Dunkard Valley Railway at Maidsville. Capital stock, \$12,000. Incorporators: W. K. Hatfield, Thomas Keena, John Long, Rufus Lazzelle and P. Bowley.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company has received a franchise from the City Commissioners to extend its lines along Montgomery Street as far as McDonough Street in Montgomery.

Fowler, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has asked the Council for a franchise to build its tracks through Fowler.

Haywards, Cal.—I. B. Parsons has received a thirty-year franchise for an electric railway over certain streets in Haywards. [E. R. J., Mar. 25, '11.]

Woodland, Cal.—The Vallejo & Northern Railway has asked the City Trustees for a franchise to build its tracks through the main street of Woodland. T. T. C. Gregory, Suisun, president. [E. R. J., Apr. 1, '11.]

La Junta, Col.—The Pueblo & Suburban Traction & Lighting Company has asked the County Commissioners for a franchise to extend its line down the valley to La Junta.

Daytona, Fla.—R. S. Parks, New York, and associates will ask the Council for a franchise for an electric railway between Daytona and DeLand.

Yorkville, Ill.—The Yorkville & Morris Electric Railway has received a franchise in Yorkville.

Athol, Mass.—The Athol & Orange Street Railway has asked the Board of Trustees for a franchise to make extensive alterations, extensions and changes in the location of its railway near the Peoquoig House in Athol.

Springfield, Mass.—The Springfield Street Railway will ask the City Council for a franchise to extend along the south side of Mill River and on Dickinson Street.

Oneida, N. Y.—The Oneida Railway has asked the Common Council for a franchise to extend its line in Oneida on Madison Street.

Schenectady, N. Y.—The Schenectady Railway has asked the Board of Aldermen for franchises to extend several of its lines in Schenectady.

Brantford, Ont.—The Lake Erie & Northern Railway has received a franchise through Brantford. This line will connect Port Dover, Brantford, Simcoe, Waterford and Paris. W. P. Kellett, Brantford, general manager. [E. R. J., Apr. 1, '11.]

Lebanon, Pa.—The Ephrata & Lebanon Street Railway has received a franchise from the Common Council to build its tracks on Walnut, Ninth and Cumberland Streets in Lebanon. [E. R. J., Jun. 17, '11.]

Millcreek, Pa.—The Erie & Suburban Railway, Erie, has received a franchise from the Board of Supervisors to build its tracks on the east side of Millcreek. This line will connect Millcreek and Harborscreek. W. F. Burgess is interested. [E. R. J., Mar. 18, '11.]

New Castle, Pa.—The Beaver Falls, Koppel & New Castle Street Railway has received a twenty-five-year franchise in New Castle.

Washington, Pa.—A. Baughman, representing the West Penn Railways, Pittsburgh, has asked the City Council for a franchise in Washington.

Ft. Worth, Tex.—The Texas Traction Company has been granted a franchise by the County Commissioners for an extension of the Summit Avenue line about a mile to the site of the Texas Christian University.

Waxahachie, Tex.—Stone & Webster, Dallas, representing the Dallas-Waxahachie Interurban Railway, have received a fifty-year franchise through Waxahachie. [E. R. J., Jun. 17, '11.]

Richmond, Va.—The Virginia Railway & Power Company has asked the Council for a franchise to extend its line into the annex west of the boulevard.

***Leavenworth, Wash.**—L. W. Pratt, J. B. Askew and W. M. Harvey have applied for a franchise for an electric railway in Leavenworth.

Wellsburg, W. Va.—The Steubenville, Wellsburg & Weirton Railway, Charleston, will ask the County Commissioners for a franchise from the east end of the Steubenville bridge to the Hancock County line. Albert G. Lee is interested. [E. R. J., 18, '11.]

TRACK AND ROADWAY

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—This company will spend \$200,000 on improvements of its lines. The Garrison Avenue line and the Little Rock line will be rebuilt with 80-lb. rails.

***Vancouver, B. C.**—Plans are being considered by the Board of Trade to build a 14-mile electric railway from Vancouver to Ladner. The carrying out of this project will include the building of a bridge across the north arm of the Fraser River.

Glendale & Eagle Rock Railway, Los Angeles, Cal.—Plans are being made by this company to build a line from its present western terminus, at Fourth Street and Brand Boulevard, through the Valley View tract, across the Los Angeles River into Griffith Park.

Los Angeles & San Fernando Electric Railway, Los Angeles, Cal.—This company advises that it has begun the construction of its 6-mile electric railway between San Fernando and Los Angeles. Capital stock authorized, \$25,000; capital stock issued, \$25,000. The company's power house will be located at San Fernando. L. C. Brand, Title, Guarantee & Trust Company, Los Angeles, president,

and J. W. Reagan, Central Building, Los Angeles, chief engineer. [E. R. J., June 3, '11.]

Petaluma & Santa Rosa Railway, Petaluma, Cal.—This company is arranging to finance an extension from Petaluma southward to the bay, with terminal at McNear's Point. The extension will be 25 miles long and the bay haul 13 miles.

Grand Junction & Grand River Valley Railway, Colorado Springs, Col.—Right-of-way has been secured by this company, and construction will be begun at once to build an extension from Grand Junction to Clifton. Later this line will be extended to Palisades.

Washington Railway & Light Company, Washington, D. C.—Plans are being considered by this company for a double-track line between Anacostia and Congress Heights.

***Lake Weir, Ocala & Silver Springs Suburban Railroad, Ocala, Fla.**—This company has just been organized to build an electric railway between Lake Weir, Ocala and Silver Springs. Capital stock \$500,000. Officers: D. S. Woodrow, president; E. W. Davis, secretary and treasurer, and H. A. Kramer, general manager.

Citrus Southern Electric Railway, Orlando, Fla.—This company advises that it has not awarded contracts to date and that it is finishing the preliminary work and will begin the construction of its 50-mile line in the fall. It will connect Sanford, Lake Mary, Longwood, Altamonte, Springs, Maitland, Winter Park, Orlando, Conway, Taft, Kissimmee, St. Cloud and East Lake. Gasoline-electric cars will be operated. Capital stock authorized, \$500,000. Officers: T. K. Miller, Orlando, president; J. J. Brophy, vice-president; J. M. McCue, secretary; M. Kelly, treasurer, and G. E. Ramsey, Orlando, engineer in charge. [E. R. J., Jun. 17, '11.]

Freeport Railway & Light Company, Freeport, Ill.—During this month this company will rebuild its track, with 80-lb. rails, between Taylor's Park, in East Freeport, and Whistler Street, in Freeport.

Kokomo Western Traction Company, Kokomo, Ind.—This company advises that it expects to begin to build its 18½-mile electric railway about July 1 to connect Kokomo, Burlington and Young America. Negotiations are now under way for the purchase of bonds by two concerns. The company's power house and repair shops will be located at Kokomo. Bonds authorized, \$325,000. Officers: C. C. McFann, Kokomo, president and general manager. [E. R. J., April 9, 1910.]

South Bend & Logansport Traction Company, South Bend, Ind.—S. S. Perley, of this company, denies a rumor that it has sold out to the Vandalia Railroad. This line will be finished shortly and will eventually extend to Logansport, where connections will be made with the Indiana Union Traction Company, thus making a short-line route between Indianapolis and South Bend.

Davenport-Muscatine Railway, Davenport, Ia.—Yale & Regan Company, Chicago, has been awarded the contract by this company for grading the right-of-way from Davenport to Muscatine. [E. R. J., June 17, 1911.]

Des Moines (Ia.) City Railway.—During the next few weeks this company will award contracts to build new track and special work.

Louisville (Ky.) Railway.—Practical agreement has been reached between the Louisville Railway, the Kentucky & Indiana Terminal Railroad and Louisville whereby a viaduct for the elimination of grade crossings along Thirty-first Street, Louisville, will be erected. The cost of the work will be about \$480,000, and the city will pay \$50,000, the remainder being shared by the companies concerned in the project.

***Perth Amboy, N. J.**—W. P. Deering, Perth Amboy, is promoting an electric railway project between Perth Amboy and Dunellen.

New York & North Shore Railway, Mineola, N. Y.—Surveys are being made by this company for building an extension up Broadway, Flushing, to Farrington Street, connecting with its line on Prince and Farrington Streets. It is understood that an agreement has been reached with the New York & Queens County Railroad for the use of

its tracks from Prince to Main Streets and work will be begun as soon as the rails, which have been ordered, arrive.

Niagara Gorge Railroad, Niagara Falls, N. Y.—George A. Ricker, Buffalo, has begun work double-tracking this company's Lewiston-Youngstown division.

East Side Traction Company, Syracuse, N. Y.—The Public Service Commission, Second District, has authorized this company to construct an addition track on Manlius Street in East Syracuse.

***Waterville, N. Y.**—Plans are being considered to build a 20-mile electric railway to connect Vernon, Waterville, Vernon Center, Augusta and Oriskany Falls.

Piedmont Traction Company, Gastonia, N. C.—The Durham Iron Works have been awarded the contract by this company to furnish 700 tons of 70-lb. steel rails for use on its proposed line from Burlington to Haw River. T. C. Lee, chief engineer. [E. R. J., May 20, 1911.]

North Carolina Public Service Company, Greensboro, N. C.—Plans are being made by this company to build several extensions of its lines in Greensboro and High Point.

Cleveland (Ohio) Railway.—During the summer this company will build 22 miles of new track.

Oklahoma (Okla.) Railway.—This company has completed and placed in operation its extension from Britton to Edmund. The line now extends from Oklahoma City to Edmund, a distance of 15 miles. The company intends to extend this line to Guthrie after the completion of the Oklahoma City-El Reno extension now in course of construction.

Guelph (Ont.) Radial Railway.—P. H. Secord & Sons, Brantford, have been awarded the contract by this company to build the St. Patrick's Ward extension.

Grants Pass & Rogue River Railroad, Grants Pass, Ore.—Work has been begun by this company on its 30-mile electric railway to connect Grants Pass, Medford and Ashland. The Pacific Western Company has the contract. Franchises have been obtained in most of the towns. John R. Allen is interested. [E. R. J., April 22, 1911.]

Conewago & Southern Railroad, Bigerville, Pa.—S. S. Johnson, Millersburg, has been awarded the contract by this company to build its line from Bigerville to Arendtsville and Cashtown. H. W. Hamblin, Harrisburg, president. [E. R. J., June 17, 1911.]

Butler, Pa.—It is reported that plans are being made for the construction of an electric railway from Butler, Pa., to Erie, Pa., by Charles Gibson, J. H. Barrett and B. S. Wilson. The statement is made that the road will operate into Pittsburgh, over either the Pittsburgh & Butler Street Railway or the Pittsburgh, Harmony, Butler & New Castle Railway, and that from Erie it will operate into Buffalo, N. Y., over the line of the Buffalo & Lake Erie Traction Company. According to plans now being made, the lines will be built on private right-of-way between Butler and Erie, extending through Slippery Rock, Grove City, Mercer, Polk, Franklin, French Creek, Meadville, Cambridge Springs, Edinboro and Middleboro.

Johnstown (Pa.) Traction Company.—Work has been begun by this company on its extension from the Eighth Ward, Johnstown, to Southmont.

Lewisburg, Milton & Watsonville Passenger Railway, Milton, Pa.—It is reported that this company contemplates the extension of its lines to Northumberland to connect with the line of the Sunbury & Northumberland Electric Street Railway or the Sunbury and Selinsgrove Electric Street Railway.

West Penn Railways, Pittsburgh, Pa.—The contract to build an extension from Vance's Mills to Philadelphia, a distance of 2 miles, has been awarded to Reagom & Lynch Company, Uniontown, by this company.

Titusville Electric Traction Company, Titusville, Pa.—The bonded indebtedness of this company has been increased from \$300,000 to \$1,250,000 to provide funds to construct and equip 34 miles of track. The proceeds of the issue will be used specifically to extend the present line of the company northward to Cambridge Springs, Craw-

for County, Pa., about 17 miles from the present terminal, and for an extension southward to Oil City, and Wenango, about 17 miles from Titusville.

Charleston Consolidated Railway & Light Company, Charleston, S. C.—This company plans to build an extension of its belt line through Columbus Street from Meeting Street to King Street in Charleston.

Franklin, Tenn.—It is reported that the proposed railway from Nashville to Franklin will be operated with steam and operated in connection with the Middle Tennessee Railroad. [E. R. J., Jan. 7, '11.]

Nashville-Gallatin Interurban Railways, Gallatin, Tenn.—This company advises that it has financed its railway and construction has been begun. The Fidelity Securities Corporation is building the line. It will connect Nashville and Gallatin, a distance of 27 miles. The company desires to purchase steel for bridges, 70-lb. rails, etc. Capital stock issued, \$750,000. Bonds issued, \$600,000. Officers: H. H. Mayberry, president and purchasing agent; M. A. Pitts, vice-president; R. A. Bailey, secretary, and M. A. Stainer, chief engineer. [E. R. J., May 13, '11.]

Lake View Traction Company, Memphis, Tenn.—During the summer this company will begin the construction of an extension from South Memphis to its city terminal at Third Street and Union Avenue.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—Contracts have been let and work has been begun by this company on its extension from Corpus Christi to Epworth.

El Paso (Tex.) Electric Railway.—It is reported that this company will build a concrete viaduct to carry its tracks over various steam railroads in El Paso.

Longview & Junction Street Railway, Longview, Tex.—During the next few months this company will award contracts to build one mile of new track and rebuild another mile of track.

San Benito (Tex.) Interurban Railway.—An extension from Santa Maria and Rio Grande City is being considered by this company.

Citizens' Street Railway, Waco, Tex.—An extension from Waco to East Waco will be among the improvements made by this company in the near future.

Myton, Utah.—It is reported that the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is preparing plans, specifications and estimates on contracts for the construction and equipment of an 85-mile electric railway to connect Theodore, Colton, Myton and Roosevelt, Utah. [E. R. J., May 27, 1911.]

***Tacoma, Wash.**—Frank E. Ross, Tacoma, is reported to have stated that preliminary plans have been completed for the construction of an electric railroad from Gig Harbor to the Straits of Juan de Fuca. Survey has been completed and part of right-of-way secured.

Mt. Adams Railway, White Salmon, Wash.—Representatives of this company are negotiating for right-of-way for the construction of a short route from North Bank to White Salmon. W. W. Swan, president. [E. R. J., Jan. 7, '11.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has completed and placed in operation its new crosstown extension in Milwaukee. It extends from Grand Avenue to Washington Street.

SHOPS AND BUILDINGS

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—This company will soon enlarge its repair shop near Electric Park in Fort Smith.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has purchased property at Fortieth Street and Shafter Avenue in Oakland, on which it will soon build a terminal and depot.

Rockford & Interurban Railway, Rockford, Ill.—This company will place contracts during the next three weeks to build a carhouse in Rockford.

Evansville (Ind.) Railway.—Plans are being made by this company for the immediate construction of a freight and

passenger station at Richland. It will be 60 ft. x 80 ft.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company has decided to build its new carhouse on Spy Run Avenue in Ft. Wayne. Plans will soon be completed.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company's new carhouse will occupy one complete block in Minneapolis and will be constructed of pressed brick. It is estimated that 600 cars can be stored in this building. [E. R. J., May 6, '11.]

Oakwood Street Railway, Dayton, Ohio.—This company will erect at once, on the east side of Brown Street in Dayton, a new carhouse to accommodate upwards of fifty cars. The structure will be of steel and concrete, with tile roof, and the front will be of ornamental brick and tile, and it will be mission in point of architecture. The cost is estimated to be about \$100,000.

Portland Railway, Light & Power Company, Portland, Ore.—Work has been begun by this company on its new building on East Thirteenth Street and East Twelfth Street in Sellwood. The structure will be 200 ft. x 100 ft., one story high, and of reinforced concrete. The cost is estimated to be about \$75,000.

United Railways, Portland, Ore.—This company has acquired terminal grounds and water frontage covering a strip of land about 1500 ft. long near Tallamook Bay, on which it will erect terminals and warehouses.

Galveston-Houston Electric Railway, Houston, Tex.—Harty & Ford have been awarded the contract by this company to grade a site on which to build a machine shop and carhouse in Houston. The structure will be of brick.

POWER HOUSES AND SUBSTATIONS

Los Angeles (Cal.) Railway.—This company is dismantling its power house at the corner of North Broadway and Workman Street in Los Angeles.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Work will be begun at once by this company on an addition to its Brandywine power plant, near Buena Vista Street. The building will be 100 ft. x 80 ft., of steel and brick construction. The plant will be equipped with 300 hp. in boilers, mechanical coal-handling machinery and a Curtis steam turbine, in connection with which a Worthington surface condenser will be installed.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—This company has awarded the contract to J. J. Wuellner & Sons to build its new power station about 9 miles beyond Alton. The cost is estimated to be about \$10,000.

Illinois Traction System, Champaign, Ill.—It is reported that this company has awarded the contract to build three new substations along its new line from Morris to Joliet.

Des Moines (Ia.) City Railway.—This company will purchase during the next few weeks a 2000-kw low-pressure turbine for its power house in Des Moines. It has just awarded a contract for a 300-kw rotary to the Westinghouse Electric & Manufacturing Company.

Berkshire Street Railway, Pittsfield, Mass.—Fred T. Ley & Company have been awarded the contract by this company to build an addition, 35 ft. x 80 ft. high, to its power house on East Street in Pittsfield. The company will also build on the opposite side of the street a transformer station, 40 ft. x 50 ft. Both structures will be of brick.

Cape Breton Electric Company, Ltd., Sydney, N. S.—This company has now under construction an addition to its power house in Sydney. It will install a 500-kw Allis-Chalmers turbo-generator and necessary auxiliaries. The cost is estimated to be about \$75,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company is reported to have awarded a contract for electrical equipment for its new power plant at Cuyahoga Falls and six substations to the Westinghouse Electric & Manufacturing Company.

Beaumont (Tex.) Traction Company.—This company has purchased and is now installing a 200-hp Heine boiler in its power house in Beaumont.

Manufactures & Supplies

ROLLING STOCK

Evansville (Ind.) Railways have purchased one electric locomotive from the Cincinnati Car Company.

United Traction Company, Albany, N. Y., has ordered twelve cars from the Pressed Steel Car Company.

Longview & Junction Street Railway, Longview, Tex., expects to purchase two small second-hand cars.

Oakland & Antioch Railway, Antioch, Cal., has ordered one 45-ft. express car from the W. L. Holman Company.

Stockton Terminal & Eastern Railway, Stockton, Cal., has ordered one trail car from the W. L. Holman Company.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., is in the market for two new or second-hand closed cars.

Central California Traction Company, San Francisco, Cal., has ordered two 34-ft. express cars from the W. L. Holman Company.

Piedmont Traction Company, Charlotte, N. C., has ordered six four-compartment, high-speed interurban cars 60 ft. long from the Jewett Car Company.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C., has ordered seventeen four-compartment, high-speed interurban cars 60 ft. long from the Jewett Car Company.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont., has purchased one 35-ton Baldwin-Westinghouse locomotive from the Westinghouse Electric & Manufacturing Company.

New Jersey & Pennsylvania Traction Company, Trenton, N. J., has ordered one 25-ft. 4-in. closed motor-car body mounted on Brill-27-G-1 trucks from The J. G. Brill Company.

People's Street Railway, Nanticoke, Pa., has ordered two quadruple equipments of No. 101-B-2 motors with type K-28-B control from the Westinghouse Electric & Manufacturing Company.

Peterborough (Ont.) Radial Railway has purchased three cars and one snow sweeper from the Ottawa Car Company. The motor equipments for these cars were ordered from the Canadian General Electric Company.

Illinois Traction System, Champaign, Ill., has ordered twelve 57-ft. interurban trailer coaches from the St. Louis Car Company. Subsequently the company ordered twelve M. C. B. trailer trucks from the St. Louis Car Company to be placed under the coaches.

Altoona & Logan Valley Electric Railway, Altoona, Pa., has specified that the five single-truck, pay-within motor cars ordered from the Cincinnati Car Company shall be 25 ft. long over all, 8 ft. 5 in. wide over all, and equipped with Hedley anti-climbers, Tomlinson couplers, Pantasote curtains, H-B life guards, Peacock hand brakes, Consolidated heaters, Universal step treads and Taylor single trucks.

New York, New Haven & Hartford Railroad, New Haven, Conn., reported in the ELECTRIC RAILWAY JOURNAL of May 27, 1911, as having ordered fifteen electric locomotives from the Westinghouse Electric & Manufacturing Company, has ordered fourteen articulated-truck switching locomotives from that company. Each locomotive is to be equipped with a quadruple equipment of No. 410 motors and type HB unit-switch control.

Northern Texas Traction Company, Ft. Worth, Tex., mentioned in the ELECTRIC RAILWAY JOURNAL of May 6, 1911, as having ordered four single-end, straight-sided vestibuled motor cars with smoking compartment at front end from the St. Louis Car Company, has included the following details in the specifications for these cars:

Seating capacity.....54	Air brakes.....West. Trac.
Length of body.....40 ft.	Bumpers...Hed. anti-climber
Over vestibule.....51 ft.	Control, type M non automat.
Width over sills...8 ft. 10 in.	Couplers.....Van Dorn
Over all.....9 ft.	Curtain material...Pantasote
Height, rail to sills.....43 in.	Heaters .....Consol.
Sill to trolley base.9 ft. 5 in.	Headlights .....Wagenhals
Body .....wood	Motors.....four G-E 73
Interior trim.....mahogany	Seats.....Heywood Bros.

Roof .....monitor	Trucks.....Baldwin 78-25-A
Underframe .....wood	Wheels....37-in. rolled steel

Iowa City (Ia.) Electric Railway, noted in the ELECTRIC RAILWAY JOURNAL of April 22, 1911, as having ordered four closed, single-truck motor cars from the McGuire-Cummings Manufacturing Company, has specified the following details for this equipment:

Weight, body.....13,000 lb.	Fenders .....McGuire-C.
Length of body...31 ft. 11 in.	Gears and pinions.....G-E
Over vestibule...31 ft. 3 in.	Gongs .....McGuire-C.
Width over sills...8 ft. 1½ in.	Hand brakes.....McGuire-C.
Over all.....8 ft. 6 in.	Heaters .....Consol.
Height, rail to sills.2 ft. 6 in.	Headlights .....McGuire-C.
Sill to trolley base.....9 ft.	Journal boxes....McGuire-C.
Body .....wood	Motors .....G-E-54
Headlining.....sheet steel	Paint .....green
Roof .....monitor	Sash fixtures....drop sash
Underframe .....composite	Seats.....F. & J.
Axles .....McGuire-C.	Seating material.....rattan
Bumpers .....McGuire-C.	Springs .....Union
Car trimmings...McGuire-C.	Step treads.....wood
Control .....G-E	Trolley base.....G-E
Couplers .....McGuire-C.	Trucks .....McGuire-C.
Destination signs....Hunter	Wheels.....33 in.

TRADE NOTES

Philadelphia Locomotive Works, Philadelphia, Pa., have increased their capital stock from \$50,000 to \$40,000,000.

Automatic Car Coupler Company, Los Angeles, Cal., has delivered 270 Bonney car couplers to the Terre Haute, Indianapolis & Eastern Traction Company which are now being operated successfully.

Scofield Engineering Company, Philadelphia, Pa., has completed plans and specifications for the power plant and equipment for the Helena Gas & Electric Company, Helena, Ark. Bids are now being received for this work.

Standard Steel Works Company, Philadelphia, Pa., announces that Arthur S. Goble, formerly with the testing department of the Chicago & Northwestern Railway, has become connected with the New York office of the company.

Railway Roller Bearing Company, Syracuse, N. Y., has just completed delivery for The J. G. Brill Company of "railway" journal boxes ordered for thirty-five new storage battery cars to be operated by the Third Avenue Railroad, New York, N. Y.

American Brake Shoe & Foundry Company, New York, N. Y., has purchased from the Chicago, Burlington & Quincy Railroad a tract of ten acres at the northeast corner of Twenty-sixth Street and Forty-sixth Avenue, Chicago, Ill., on which it is building an extensive plant.

McClintic-Marshall Construction Company, Pittsburgh, Pa., has moved its Pittsburgh offices from the Park Building to 1218-1224 Oliver Building. The contracting and treasury departments have also been removed from Rankin, Pa., to the new quarters in the Oliver Building.

Canadian Car & Foundry Company, Montreal, Que., has announced that \$200,000 will be spent in extensions to its Montreal works. The present capacity of the works is about seventy cars a day and this will be increased to one hundred cars. The Canadian Car & Foundry Company ordered 50,000 tons of structural steel from the United States Steel Corporation.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports the receipt of an order for export from the Elektrisk Bureau for Holmenkollenbanen, Norway, for three equipments of type HL unit switch control for a quadruple equipment of motors aggregating 89 hp. The Westinghouse Company has also recently shipped twenty-five double equipments of interpole railway motors to South America.

Brown Hoisting Machinery Company, Cleveland, Ohio, has elected Harvey H. Brown president to succeed his brother, the late Alexander E. Brown, founder of the company. Other officers were elected as follows: Alexander C. Brown, director and vice-president; George C. Wing, secretary; Charles T. Pratt, treasurer and Richard B. Sheridan, general manager.

Thomas W. Pangborn Company, Jersey City, N. J., announces the removal of its New York office, 90 West Street,

New York, to Hudson Street and Morris Street, Jersey City, where all business of the company will be transacted in the future. The New York office comprised the executive, sales, accounting and purchasing divisions of the company and has been consolidated with the Jersey City plant, which represented the manufacturing and engineering division and showrooms.

The J. G. Brill Company, Philadelphia, Pa., has received the following orders for export: Macartney, McElroy & Company, one 1800-gal. centrifugal sprinkler motor car body with Brill 21-E truck; Cie J. G. Brill, Paris, France, two radial axle motor trucks without wheels and axles; M. E. Curwen, London, forty Brill 21-E trucks without wheels, axles and journals. The company has also received an order from R. D. Campbell, Indianapolis, Ind., for seven 51-ft. omnibus motor bodies.

Sangamo Electric Company, Springfield, Ill., announces that it has completed arrangements with the Westinghouse Electric & Manufacturing Company which permits the use of inductive load compensating devices as covered by Shallenberger patents of June 1 and Oct. 22, 1895. As the result of this arrangement, the Sangamo type H induction meters are now fully compensated for use on inductive loads of all power factors and will be supplied in all capacities up to the largest commercial sizes.

General Railway Signal Company, Rochester, N. Y., has made a contract to install automatic block signals on the Chicago, Indianapolis & Louisville Railroad between Hammond and Indianapolis, 163 miles of single track. Upper quadrant signals, type 2A, will be used. The company will also furnish block signals to the Chicago, Burlington & Quincy Railroad for installation between Cameron Junction, Mo., and Harlem, 44.7 miles of single track and 7.3 miles of double track. Signals of type 2A, lower quadrant, will be used.

Wonham, Sanger & Bates, New York, N. Y., report the receipt of recent contracts for H-B life guards from the following companies: All cars of Union Traction Company, Coffeyville, Kan.; 300 guards for Wilkes-Barre (Pa.) Railway, repeat order for fifty guards for the Sao Paulo Tramway, Light & Power Company; repeat order for sixty guards for the Brooklyn (N. Y.) Rapid Transit Company and all cars of the Orange County Traction Company, Newburg, N. Y. In Rome, Italy, 750 cars are to be equipped with this device. Nearly every large system in Europe and Asia now includes the H-B life guard among its equipment.

C. G. Young, New York, N. Y., consulting engineer, recently has visited the city of Panama, on his way to Hayti, where he is consulting engineer on 350 miles of railroad construction. In an interview published in the *Panama Journal* of June 5 Mr. Young is quoted as saying that he was investigating the possibilities of building an electric railway system in Panama and the suburbs in the interests of a group of New York capitalists, who are negotiating for the purchase of the franchises held by Henry T. Cook. The details of the franchises held by Mr. Cook were published in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, p. 684.

General Electric Company, Schenectady, N. Y.—The sixth annual outing and games of the New York office of the General Electric Company were held at Lange's New Dorp Beach Hotel, Staten Island, on June 17. In addition to the regulation field events, there was the annual baseball game between the "Old Boys," headed by S. W. Trawick, of the railway department, and the "Young Men," under M. F. Reardon, of the P. & M. department. This was won for the third consecutive time by the "Old Boys," by a score of 11 to 9. In the regular baseball game between the New York office and the Harrison Lamp Works teams, the game was won by the former; score, 16 to 4. There were 122 present at the outing.

Western Electric Company, New York, N. Y., reports that the May gross earnings were 12 per cent in excess of the same month a year ago and for the five months to June 1 sales have exceeded the same period of 1910 by 8 per cent. This means a gross business for the full fiscal year, if maintained, of between \$70,000,000 and \$71,000,000. At the end of May the company was employing 26,000 men

compared with 25,000 two months ago and 23,464 at the beginning of the fiscal year. When business was at the top in 1907 the company had 29,000 employees, or 10 per cent more than at present, although the volume of production was between 4 per cent and 5 per cent less than this year. Increased efficiency of operation explains the difference.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued its June list of second-hand electrical machinery.

Indianapolis Brass Company, Indianapolis, Ind., is mailing a double post card which describes its Clark trolley splicer.

Precision Instrument Company, Detroit, Mich., is mailing a card which calls attention to the Precision dead-beat draft gage.

Duplex Metals Company, Chester, Pa., is mailing a circular calling attention to its four grades of copper-clad steel wire.

Western Electric Company, New York, N. Y., is mailing a circular entitled "Our Contribution" which contains illustrations of many recent types of Western Electric train-dispatching telephone equipment.

International Steam Pump Company, New York, N. Y., has issued two bulletins describing and illustrating type D centrifugal Worthington pumps for low-head service and Worthington centrifugal house and sump pumps.

Crocker-Wheeler Company, Ampere, N. J., has issued a booklet in which are discussed the merits of the Renek transformer. The pamphlet also contains a table showing the comparative efficiencies of the leading transformers on the market.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has published a thirty-two-page booklet which is devoted to H-B ball bearings in woodworking machinery. It contains illustrations of different types of woodworking machines equipped with these bearings.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder calling attention to some of the contracts it has received recently for registers. Among these were registers for the Chicago, South Bend & Northern Indiana Railway and the Puget Sound Electric Railway Company.

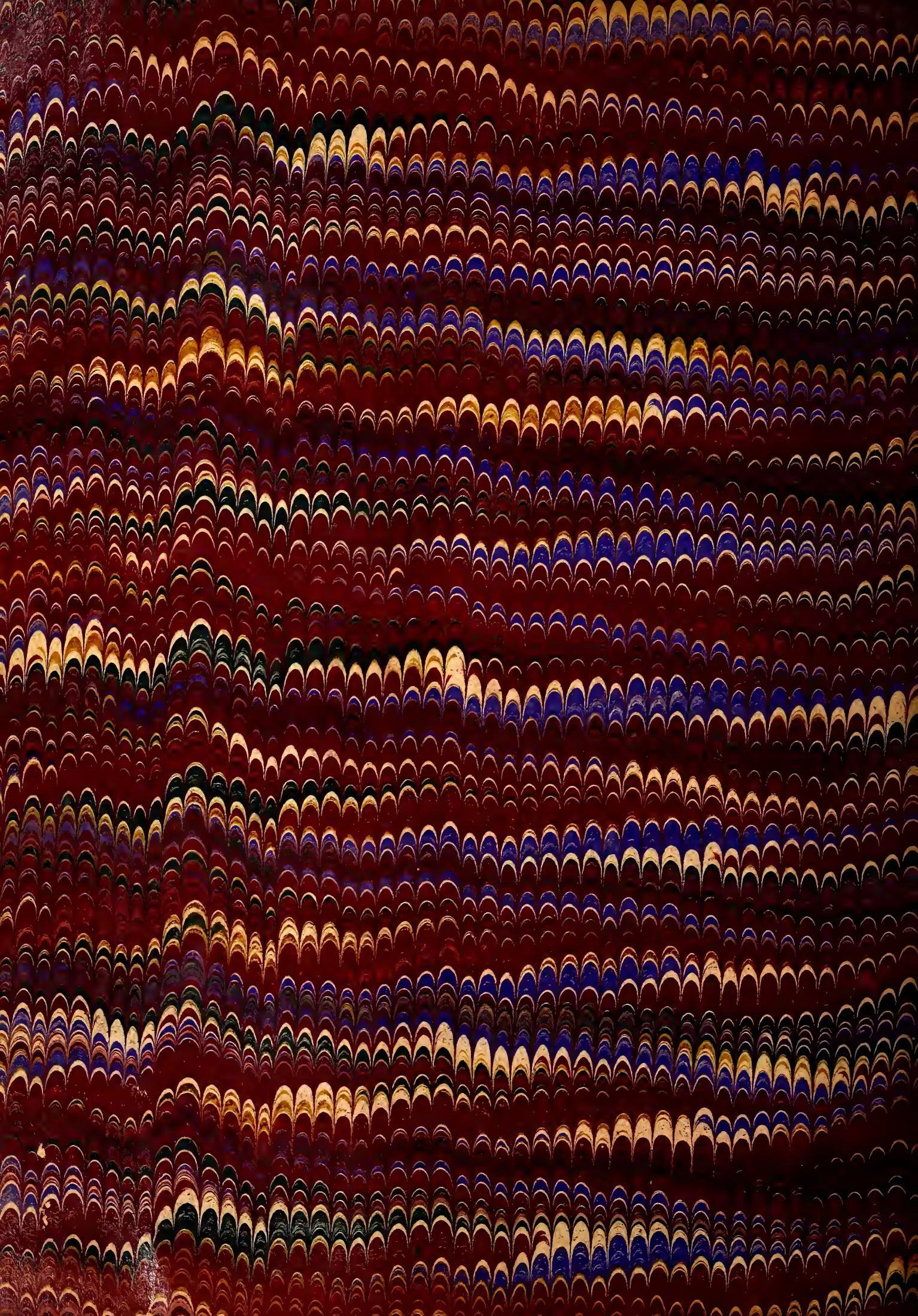
Ohio Brass Company, Mansfield, Ohio, has printed the "O-B Bulletin" for May-June, 1911, which contains among others the following articles: "O-B Thermo Bonding Process," "New O-B Trolley Wire Pick-Up," "Rock Island Southern Railway," and "O-B Type B Section Insulator."

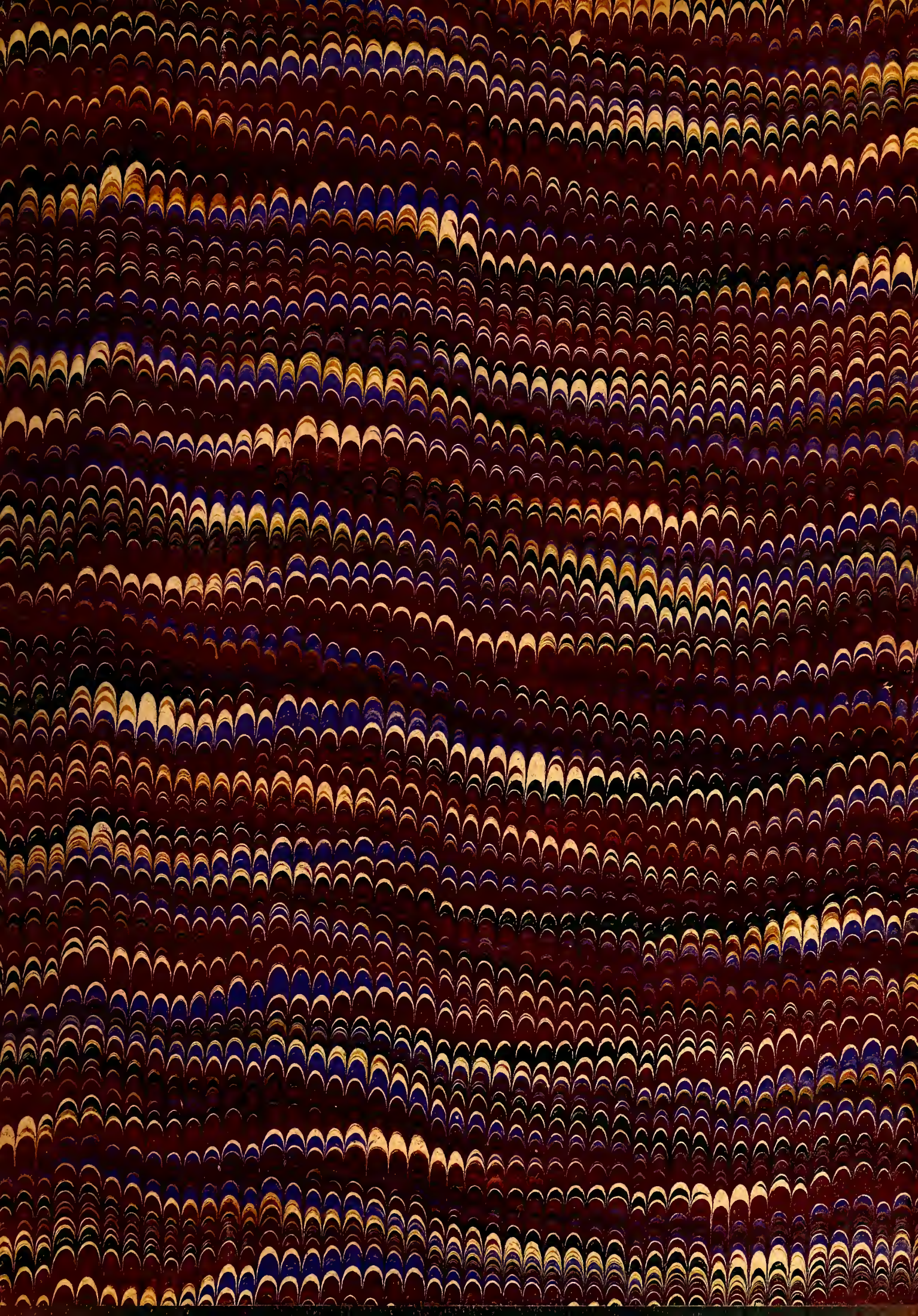
Linde Air Products Company, Buffalo, N. Y., has issued a fifty-page catalog which describes and illustrates its oxy-acetylene apparatus for welding and cutting metals. It also contains instructions for using the blow pipe and other valuable data and several illustrations showing repairs on castings of various kinds which have been made with the oxy-acetylene.

McGraw-Hill Book Company, New York, N. Y., announces an edition in cloth of Frederick W. Taylor's "Shop Management." This is a reprint of Mr. Taylor's paper delivered before the A. S. M. E. in 1903. It embodies the essentials and fundamentals of Mr. Taylor's principles of efficiency and has for several years been the standard work on the subject. It is now available in permanent binding for the first time.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4851, which contains data relative to the use of electricity in the service of steam roads. The publication comprises forty-eight pages, which illustrate and describe both station and road equipment of the New York Central & Hudson River Railroad; the Detroit Tunnel of the Michigan Central Railroad; the Cascade Tunnel of the Great Northern Railroad; the equipment of the Baltimore & Ohio Railroad; the West Jersey & Seashore Railroad; the West Shore Railroad, etc. The company has also issued Bulletin No. 4845, which contains illustrations and descriptive matter in considerable detail of its horizontal steam turbo-generators of from 100-kw to 1000-kw capacity at 3600 r.p.m.

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